

Open Research Online

The Open University's repository of research publications and other research outputs

Living with Elephants, Living with People: Understanding the Complexities of Human-Elephant Interactions in the Nilgiris, South India

Thesis

How to cite:

Thekaekara, Tarshish (2019). Living with Elephants, Living with People: Understanding the Complexities of Human-Elephant Interactions in the Nilgiris, South India. PhD thesis The Open University.

For guidance on citations see [FAQs](#).

© 2018 The Author

Version: Version of Record

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Living with Elephants, Living with People:

***Understanding the complexities of human-
elephant interactions in the Nilgiris, South India***

Tarshish Thekaekara

Thesis submitted for the degree of Doctor of Philosophy

Department of Geography, The Open University

November 2018

Abstract

This thesis aims to better understand how people and wild elephants interact in the Nilgiris, Tamilnadu, working towards a larger goal of humans and wild animals better sharing space, or conservation beyond protected areas. It first identifies various relevant literatures across the disciplines of biology (including conservation), anthropology and geography, examining the epistemological tensions between them in order to be able to constructively undertake interdisciplinary research focussed on informing the practice of nature conservation.

The main body of the thesis, first, identifies and examines a range of social, political and ecological factors that underpin the interactions between the species in the region; the history and contested claims to the land, the multi-layered conflict between groups of people relating to conservation, agricultural land use, extent and fragmentation of natural habitat and how all these are changing.

Second, it examines the diversity in the elephants in the region, in contrast to the normative biological descriptions of elephant behaviour from more intact forests, and also in terms of individual variability in behaviour among the elephants that live alongside people, focussing on the implications of this for sharing space with people.

Third, it does the same for people, highlighting the varied attitudes and practices among the people in their interactions with elephants, focussing on the elements of this diversity that are useful for a more peaceful sharing of space with elephants.

Fourth, it looks at how all this complexity can be better understood, including a reconceptualisation of the shared space in topological terms, in order to better inform the management of the human-elephant shared space to minimise the negative impact the two species have on each other.

Finally, in conclusion, using a personal and reflexive approach, it reflects on the process of undertaking interdisciplinary and inter-epistemological research, and the future prospects of sharing space with elephants as an inhabitant of the region.

Acknowledgements

My part time PhD has been an exceptionally long journey, made possible by more people than an acknowledgement page can possibly identify.

There is of course my immediate family whose support has been invaluable, but extending to all realms of my life much beyond the thesis. There are all the amazing friends who have inspired me at multiple levels; you all know who you are. I love you guys; a thank you here does not do justice to everything you have done for me.

Elephant Family, International Elephant Foundation, Rufford Foundation, The Pirojsha Godrej Foundation and The Critical Ecosystem Partnership Fund, who have funded our work over the years and allowed us to follow the elephants.

Prof. R. Sukumar and Dr. MD Madhusudhan, who were prevented from being formal supervisors by parochial policies, but who have extended informal support and kept me committed to the elephants.

Nachiketh Sharma and Nishant Srinivasaiah, the next generation of elephant men. Maan Barua, who thinks, and sometimes lives, in another dimension. All of whom kept me on my toes. So close yet so far.

Prof. Kathy Willis who was almost a supervisor, and gave me space to sit and work in Oxford. And all of the amazing OXLEL lab, who kept me sharp.

Nikki and Chris, where 60 James Street has always been home in Oxford.

The Shola Trust team; Arunkumar, Ramesh, Manikandan, Prakash and Vishnu. You were once my students, but you've taught me so much. None of our elephant work would have happened without you guys.

And most importantly my supervisors. Shonil, who moved seamlessly from being a friend to a great supervisor without me realising it. Parvati, for cracking the whip when I needed it and pushing me to get the funding to live in the UK for a while and actually write the thesis. Nick, the more-than-human geographer with his knowing smile who always seemed to know my thoughts as they came. And Tom, the anthropologist who really cares about indigenous worldviews, whose seemingly small inputs made all the difference to my writing.

Contents

Abstract	1
Acknowledgements	3
Contents	5
Glossary	9
Supporting video links	11
Map of the Region	15
Preface	17
1. AN INTRODUCTION TO THE PEOPLE AND ELEPHANTS	21
1.1 Bharathan – the friendly elephant	21
1.1.1 Bharathan plus friends and the seemingly schizophrenic guard	24
1.1.2 Varying local opinions, changing over time	27
1.2 The research questions - how do elephants and people share space?	31
1.2.1 Connecting with the literature	32
1.3 Positive interactions, varying elephant behaviour, and elephant agency	36
1.3.1 Jolly elephant chasers	36
1.3.2 Peaceful mappers, troublesome youth and inexplicable house breakers	38
1.3.3 Elephant caught up in garbage problems	41
1.4 Scientific vs. practical management of “problem” elephants	44
1.5 Significant “events” - the human and elephant reaction	47
1.6 Expert opinion and the policy space	51
1.7 This thesis	57
2. THE LITERATURE AND METHODS	61
2.1 Situating this thesis in the literature	61
2.1.1 Accessing the literature	62
2.1.2 Policy relevance	63
2.2 Biology	66
2.2.1 Conservation and “Human-Wildlife Conflict”	66
2.2.2 Elephant Biology	79
2.3 The critical social sciences	93
2.3.1 Anthropology	93
2.3.2 Human and “more-than-human” geography	97

2.4 Methodology	104
2.4.1 Biology	105
2.4.2 The critical social sciences	108
2.4.3 Interdisciplinary methodology in this thesis	111
2.5 Methods	114
2.5.1 A political and ecological baseline of human-elephant interactions	114
2.5.2 Methods for human-elephant ethnography	116
2.6 Positionality and limitations	126
2.7 Summary – the literature and methods used in this thesis	129
3. THE POLITICAL AND ECOLOGICAL CONTEXT OF HUMAN-ELEPHANT INTERACTIONS	133
3.1 An event - people killed and elephants captured	134
3.1.1 A person killed by an elephant in O’Valley	134
3.1.2 More people killed in Cherambadi, and elephant captured	138
3.2 The region’s “high conservation value” and people’s rights	145
3.3 History and contested land tenure	149
3.3.1 The Janmam land leases	150
3.3.2 Indigenous land rights	155
3.4 Corridors and conflict	158
3.4.1 Elephant corridors – from biology to policy	158
3.4.2 Elephant corridors in Gudalur	161
3.4.3 Corridors creating conflict	164
3.4.4. Ecological concerns	169
3.5 The ecological context of human-elephant interactions	172
3.5.1 Natural vegetation vs. legal forests	172
3.5.2 Agricultural land use	172
3.5.3 Human and elephant distribution	173
3.5.4 Patterns in elephant related human fatalities	177
3.6 Processes of change at play	184
3.6.1 Tea, coffee and global agricultural commodities	184
3.6.2 Elephant and human distribution	186
3.7 Conclusions	189
4. LIVING WITH PEOPLE	193
4.1 Describing the Gudalur elephants	195
4.2 Population-level comparisons	209
4.2.1 Demography	209
4.2.2 Home range	212

4.2.3 Physiology	215
4.2.4 Human Interaction	218
4.3 Individual variation	223
4.3.1 Quantitative classification of behavioural types	223
4.3.2 Qualitative Classification	229
4.4 Conclusions	246
5. LIVING WITH ELEPHANTS	251
5.1 Conflict and coexistence	252
5.2 A quantitative approach to human diversity	258
5.3 A qualitative approach to human diversity	260
5.3.1 Kattunayakans	262
5.3.2 Bettakurumbas	266
5.3.3 Paniyas	269
5.3.4 Mullukurumbas	273
5.3.5 Chettys	275
5.3.6 Early Planters	276
5.3.7 Malayalis	279
5.3.8 Sri Lankan Tamils	282
5.3.9 Wildlife People	284
5.4 Categorising the human diversity	287
5.4.1 Elephant ontologies	287
5.4.2 Modes of subsistence or agricultural crop types	290
5.4.3 Shared history	292
5.5 Conclusions	294
6. UNDERSTANDING AND MANAGING THE SHARED SPACE	297
6.1 Understanding the shared space beyond “conflict”	297
6.2 Indigenous worldviews, animism as a factual basis	300
6.3 Re-thinking “space” - relations and topologies	303
6.4 Mapping the topological human-elephant shared space	306
6.4.1 Elements of the shared space:	308
6.5 Managing a topological space	315
6.5.1 Decision-making framework	315
6.5.2 Planning conservation interventions	316
6.6 Tipping points and intense folding	318
6.7 Conclusions	321






7. CONCLUSIONS	323
7.1. A summary of conclusions	323
7.2 Undertaking interdisciplinary research	327
7.2.1 Disciplinary and epistemological boundaries	327
7.2.2 Accepting contradictory epistemologies	328
7.2.3 Inter-epistemological methods	333
7.3 Personally living with elephants	347
7.3.1 Perceptions and interactions with elephants over the years	347
7.3.2 The limits of sharing – elephants in our house	349
7.3.3 Our relationship with elephants and the implications beyond	352
8. REFERENCES	357
9. APPENDICES	375
9.1 Appendix 1 – Mapping methods	375
9.2 Appendix 2 – Working of the Crowd-sourced Elephant Monitoring and Early Warning System	377
9.3 Appendix 3 – Elephant database	381
9.4 Appendix 4 – Ethical research documentation	389
9.5 Appendix 5 – Selected relevant popular articles	391







Glossary







ACE	Abductive Causal Eventism, which emerged from Event Ecology (Walters 2012)
CEMEWS	Crowd-sourced Elephant Monitoring and Early Warning System
DFO	Divisional Forest Officer, in charge of the Forest Department's basic unit of management – the Division
GIS	Geographic Information System
GPS	Global Positioning System, usually referring to the device
HEC	Human-Elephant Conflict
HWC	Human-Wildlife Conflict
IISc	Indian Institute of Science
IUCN	The International Union for the Conservation of Nature
Kumki	A trained captive elephant used most often to capture or drive away other elephants
Mahout	A person who rides and cares for an elephant
Makhna	A tuskless male elephant
MTHG	More-than-human Geography
MTR	Mudumalai Tiger Reserve, the PA adjoining my study region
Musth	A periodic condition in male elephants, characterised by excitement and often aggressive behaviour, caused by elevated testosterone levels
PA	Protected Area
QR Code	Quick Response Code
RDO	Revenue Divisional Officer
RFO	Range Forest Officer, one rank below the DFO
TST	The Shola Trust







Supporting video links

Data and discussion in this thesis, particularly around elephant behaviour, is supported by videos of elephants in their varied interactions with people. These can be viewed by clicking on the links in the digital version of this thesis, or scanning the Quick Response (QR) Codes with a mobile phone in the printed version.

<i>QR Code Number</i>	<i>Link</i>	<i>Description</i>	<i>QR Code</i>
1	https://youtu.be/bWo0S7K9kxo	MGMK1/ Bharathan unaffected by people - 1	
2	https://youtu.be/JPj056iDAd8	MGMK1/ Bharathan unaffected by people - 2	
3	https://youtu.be/QOjB0M3RGdA	MGT2 agitated by people and charging - 1	
4	https://youtu.be/nJOYUpzTeK4	MGT2 agitated by people and charging - 2	
5	https://youtu.be/1qka_hrx0bjE	GDK Herd at the garbage dump	

6	https://youtu.be/zT6I0RuROgE	KK Herd moving through Cherambadi town	
7	https://youtu.be/AYu1znheiV4	KK Herd sleeping with people watching all around	
8	https://youtu.be/TjE1QmxXlh8	Madhi/ KK3 going in and out of an “Elephant Proof Trench	
9	https://youtu.be/32vHM9IHv1g	CMK1/ Ganesan in Kolapalli with lots of people around	
10	https://youtu.be/zIr0hsrJ9LE	CMK1/ Ganesan outside house near Aiyankolli	
11	https://youtu.be/RUF C5rGF1Io	OVT8/ Kuppaiswamy climbing over electric fence at the garbage dump	

12	https://youtu.be/mE2NgXbDPCo	OVT7/ Alibaba breaking the electric fence at the garbage dump	
13	https://youtu.be/UcM3uOHOMAQ	OV Herd reacting to fire crackers and scattering in all directions	
14	https://youtu.be/1buz02keXSk	Mudumalai Herd stuck on the wrong side of the trench in Chembakolli	
15	https://youtu.be/5WECCKR8SE	CMK1/ Ganesan breaking a bus windshield	
16	https://youtu.be/QiAATPI0_xw	CMK1/ Ganesan first seen in 2013. Video from local person's mobile phone camera	
17	https://youtu.be/ZXtvx8zyTCs	CMK1/ Ganesan lying down and sleeping in a tea estate	

18	https://youtu.be/B4J07wUBhvw	CMK1/ Ganesan not afraid or reacting of fire crackers in Cherambadi	
19	https://youtu.be/V7j_rf49Wfw	CMK1/ Ganesan injured and unable to move	
20	https://youtu.be/UasEbp5ZB4g	CMK1/ Ganesan medicated by the forest department	
21	https://youtu.be/Tf-ECITfzzI	CMK1/ Ganesan have intense fire crackers thrown at him in O'Valley	
22	https://youtu.be/PaQPfD7i3cc	CMK1/ Ganesan attacking the Rapid Response Team vehicle	
23	https://youtu.be/AWJ-HE4jIsA	CMK1/ Ganesan behaving aggressively towards people for the first time	

Preface

After an undergraduate degree in Physics and a six-month stint at a German software company, I moved back to my home town in the Nilgiri hills of South India to teach maths and science in a school for indigenous children in 2007. A year later I found myself more interested in indigenous knowledge of forests, and whether this could be incorporated into a formal curriculum to “conserve” that knowledge. I soon found this “knowledge” only existed in its context; it came flowing out in animated discussions while walking through a forest, but elders could not even name the three kinds of bees when sitting in a classroom. But the focus of the more traditional conservation laws meant that indigenous people did not have legal access to the forests. So I got involved in some work around indigenous rights and implementing the newly enacted “Forest Rights Act” (2006), which sought to reinstate indigenous peoples’ rights over their ancestral lands.

In 2008, a few of my friends and I started the The Shola Trust, in the Nilgiri Hills of South India. The hills are central to the UNESCO Nilgiri Biosphere Reserve, and a part of the Western Ghats-Sri Lanka biodiversity hotspot identified by Myers et al. (2000). It is home to one of the largest contiguous populations of Asian elephants and tigers in India, and consequently the world. The region is also home to about 2 million people: five different indigenous groups and various immigrant populations starting with the colonial tea planters in the 1800s. We, at The Shola Trust, believed in a more human inclusive approach to wildlife conservation. We had grown up with the “tiger vs. tribal” debate, had seen “voluntary relocations” being implemented, and knew it didn't work. India is home to 60% of the world's Asian elephants and more than half the world's tigers, alongside an exceptionally high human density of over 400 people/ km². Challenging as it was, there was no option for the residents of this landscape but to continue to share space with wildlife. Elephants are arguably one of the hardest animals to live with, and “peaceful coexistence” with elephants became one of our major objectives. In 2009 I did a Master's course on biodiversity conservation at Oxford, and was amazed at the disconnect between the “scientific” literature, policies and practice of nature conservation.

Nature conservation has traditionally relied on the creation of human-free “protected areas” (PAs), ostensibly to 'protect' nature from people. While biologists have argued that these traditional protected areas have played an important role in conserving the earth's biodiversity, there is a growing recognition that these regions alone will not be sufficient in the years to come, and there is a move to look outside of these formal conservation zones. The challenge that biologists perceive, is of “human-wildlife conflict” (HWC), where it is assumed that people and wild animals compete for space and resources, making “conflict” inevitable. The problem of “human-elephant conflict” (HEC) is particularly pronounced, as elephants consume large quantities of food and water, and have vast home ranges that extend well beyond protected area boundaries. Asian elephants share space with humans across 80% of their range (Rangarajan et al. 2010). The question of how people and large, “dangerous” wild animals share space is clearly complex and nuanced, but is dominated by the natural sciences, aiming to “fix” or “solve” the problem.

The problem of sharing space is not limited to India and elephants; there are now Hyenas in Harar, Lions in Nairobi, Alligators in Miami, Wolves around Madrid, Leopards in Mumbai, and Mountain Lions/Bears in LA/California. Are animals being forced out of their habitats and are they ending up living marginalised lives along the edges of human societies? Or are they adapting and choosing to live alongside people?

What might conservation look like in this human-dominated epoch – the Anthropocene? At a global scale, there broadly appear to be two visions for this, which I choose to heuristically classify along the lines of the land “sparing” and “sharing” debate.

The land sparing movement is epitomised by E. O Wilson’s “half-earth project” - “*the only solution to the Sixth Extinction is to increase the area of inviolable natural reserves to half the surface of the Earth or greater*”¹. This vision seems simple and clear with wide-spread mass appeal, with the thrust of all conservation interventions so far being largely on setting

¹ <http://www.half-earthproject.org/>

aside more land for nature². While there are numerous problems with this approach, this vision is simply not possible in a country like India – less than 5% of the landmass as protected areas (UNEP- WCMC 2005), and 80% of the elephants’ range is outside these areas, living alongside humans and a density of 400 people/km² (Rangarajan et al. 2010). Sharing space is an imperative, not an option.

But the land sharing alternative is a messy and complex mix of approaches to using land - community conservation, agro-forestry, sustainable use, indigenous management regimes, farmland conservation and many more. Various case studies across the world show that some sharing of space is possible – people and nature can live together. While there is growing acceptance of land sharing and “coexistence” being useful and inevitable to an extent, there remains scepticism about whether large and dangerous mammals can share space with people other than in a few stray cases, given the immutable problem of conflict over the space and resources or “Human-Wildlife Conflict”.

There is little effort to engage with the issue from different epistemological standpoints, questioning the paradigm within which biology operates, or to better understand the plurality in the human-wildlife interaction. The social sciences have seen significant engagement with animals in the last decade, how animals and humans shape each other's worlds, but these ideas do not transpose onto the natural sciences or “conservation literature” in ways that can influence the practice of nature conservation or the lives of the animal and people that share living space.

This thesis aims to better understand how people and elephants are sharing space in the Gudalur Forest Division of the Nilgiris, a district in Tamilnadu, South India -to understand the diversity in people, elephants and the interactions between them. Being based in a geography department gives me an opportunity to take an interdisciplinary approach, working in the gaps between the natural and social sciences. My research trajectory differs significantly from most PhDs; I have lived in the “field” for most of my life, with short

² The International Union for the Conservation of Nature’s (IUCN) “Aichi Targets” include increasing the terrestrial protected area network to 17% of the earth’s surface by 2020 - <https://www.cbd.int/sp/targets/>

sojourns into the academic world over the last eight years, first through my MSc, then as a part time student, and finally as a full-time student to actually finish writing the thesis. The “methods”, discussed in more detail, are very mixed and diverse, drawing mostly on ethnography. The language used all through this thesis is cognisant of the audience I am trying to reach, accessible to social and natural scientists as well as conservation practitioners. I hope that this body of work can make a contribution to the policy space, and a difference to the lives of people and elephants on the ground, while also being a significant academic endeavour that adds something meaningful to the body of “geographical” knowledge. The former is my forte, the latter is the challenge that this thesis takes on.

1. An introduction to the people and elephants

1.1 Bharathan – the friendly elephant

Bharathan was a large wild “Makhna” - a tusk-less male elephant - and a bit of a local celebrity around Thorapally, a small town along the Mysore-Ooty highway at the edge of the Mudumalai Tiger Reserve (MTR) in Tamilnadu. The last decade has seen the village turn semi-urban, with farm land giving way to hotels, resorts, restaurants and small shops catering to the growing number of tourists visiting the Nilgiri hills.



Image 1: Bharathan at Thorapally

Some colleagues and I were waiting in the area one night in early 2013, soon after we had heard about Bharathan, hoping to document his alleged unusual behaviour. The highway closed at 9 pm every night, and that was when Bharathan usually came out. We were sitting outside a brightly lit local restaurant when he suddenly emerged, coming out from behind the parking lot, towering over the neatly lined cars, calmly weaving his way through them. Our first instinct, from years of encountering wild elephants, was to run, but the locals all just continued to stand around, apparently unconcerned. He was a regular

feature there and seemingly on “friendly” terms with the people of Thorapally and possibly the only wild elephant in Mudumalai to be named by locals. He continued walking past all the people standing around, not more than 15 metres from them, across the highway, and 50 metres along the road to a garbage dump where he proceeded to eat a mound of used banana leaf plates (that had been especially piled up for him). His hind-quarters were on the road, blocking half of it, with a small crowd of tourists piling up on the other side, camera phones in hand. His rear end didn't make for good photographs, and the crowd soon started whistling and shouting, trying to get him to turn around. We were worried for the safety of the tourists and their ignorance of the danger of being in such close proximity to a large and dangerous wild elephant, and tried to warn them to move away, but with no results. The locals told us not to bother, Bharathan was used to all this and would not do anything in response. In keeping with their prediction, he completely ignored all the commotion building up. A young man from the crowd, tired of waiting for Bharathan to turn around, quickly ran across the road, and did the most incredible thing we had ever seen – tugged the huge elephant's tail and darted back. We were in shock; hundreds of people across India are killed every year in much less intimate encounters. Bharathan swung his hind leg out lazily (still only narrowly missing the foolhardy tourist), turned around briefly to look at the tourists, walked around to the other side of the pile of bananas and continued eating while keeping an eye on the troublesome crowd. Even the locals had not seen anything like it before. There were stories all around – of how he had outsmarted the jackfruit seller and stolen all the fruit, and how all his interactions with people were measured and thoughtful, not unpredictable and instinctive like other wild elephants. No one seemed to mind having him around.

Bharathan's case is at odds with the global narrative around nature conservation, which arguably aims to separate and protect “natural habitats” from people. Asian elephants are classified as an endangered species by the International Union for the Conservation of Nature (IUCN), on account of an inferred reduction in population by 50% over the last three generations or 60-75 years (Choudhary et al 2008). The IUCN red list species page for the Asian elephant states:

“The pre-eminent threats to the Asian elephant today are habitat loss, degradation, and fragmentation, which are driven by an expanding human population... Because elephants

require much larger areas of natural habitat than most other terrestrial mammals in Asia, they are one of the first species to suffer the consequences of habitat fragmentation and destruction and because of its great size and large food requirements; the elephant cannot co-exist with people in areas where agriculture is the dominant form of land-use.”

He was not being driven “out” of the forests on account of habitat destruction (the boundaries of the Mudumalai Tiger Reserve have been stable for at least half a century now). He is choosing to come out and interact with humans in a semi-urban environment, seemingly peacefully. This is not the case everywhere with all elephants, but research around the elephants living alongside people is severely under-represented in the global conservation narrative: we simply do not know how people and elephants are sharing space.

In this thesis, the overall research question I ask is *learning from the Nilgiris, how can human-elephant shared landscapes be better understood and managed?*

In this introductory Chapter, I chart out a range of ethnographic descriptions of human-elephant interactions that are unusual or counter to the mainstream “human-wildlife conflict” narrative, to set the context for the ethnographic approach I take in this thesis. Through these grounded descriptions I draw out some of the research questions that I answer in this thesis.

1.1.1 Bharathan plus friends and the seemingly schizophrenic guard

The story didn't end with Bharathan. About a year later a young tusker decided to follow him on his nightly forays into the town. The youngster was a lot less comfortable around people; he chased them, charged at (and damaged) a few cars, and broke down numerous fences and even walls of houses. There were rising protests in the area, with the highway finally blocked when the metal shutters of a vegetable shop were prised open and the contents emptied before anyone could react. In response, the forest department dug an “elephant proof trench” along the park boundary to keep the elephants in. But that didn't stop the elephants. The trench could not be dug across the highway. Every night they would come walking along the highway right up to the check post. The forest guard, not wanting to have the check post broken down, would open it up and allow the elephants through!

We sat with the forest guard at the check post one night, to get a better feel for the problem of Bharathan and his friends on their nightly excursions into the Thorapally town. The guard sat in the brightly lit hut by the side of the road, the forest to the north and the town to the South. He talked fast and passionately.

*“You tell me what I can do? We, as the forest department have to protect all the animals in the forest. Down that side used to be bamboo forests before, where the elephants came all the time, and now people have taken it all. But then they protest when the poor elephants come out searching for food into land where they once roamed freely.”*³ (All quotes from the Forest Guard in this Section are from January 2013)

Shortly after the road closed, we could see the looming elephant silhouettes in the distance, walking towards us along the highway. The smiling guard told us to “*get ready for some fun*”, and pointed to a pile of rocks he had collected, urging us to get some of our own. As

³ All quotes in this thesis are from ethnographic interviews and discussions, from notes made at the time and are translated/ paraphrased from Tamil/Malayalam. All quotes were anonymised, the date and some context (if relevant) included at the end of the quote.

they got closer they slowed down and inched forward, watching us closely. When they were within striking range he leapt into action, apparently forgetting the empathetic words about the “poor elephants searching for food”. He hurled stones and abuses at them, shouting at the top of his voice. *“Why can't you just learn to stay inside the forest? Come and give me trouble every night, then after that the local people give me trouble every day. Why do you want to create all this trouble?”* The elephants quickly retreated back along the highway, and calm returned.

The guard continued with his narrative, seemingly unperturbed by his violent outburst, about how it was all the people's fault and the poor elephants were being persecuted. After about 20 minutes, with the outline of the elephants still visible in the distance, a loud trumpet erupted just behind, literally shaking the walls of the hut. All of us instinctively ran out of the hut, towards the town. We turned back from a safe distance, in time to watch the three males quickly making their way around the check post, into the town. The guard smiled widely, almost proud of the elephants that had helped each other and outsmarted us; *“Look at that... I thought there were only two of them, but they have got one more to help. No matter what we do, they will fool us and come across one way or another”*.

The man seemed completely unaware of the contradiction - to have great empathy for elephants in his words and great violence towards them in his actions - and left me perplexed. Diversity in humans in terms of their interactions with animals is an area of growing interest in the conservation literature (e.g. Kansky et al. 2016), but how do we account for this contradiction in the same person at the same time?



Image 2: Young tusker joins Bharathan.



Image 3: The guard throwing stones at the elephant

1.1.2 Varying local opinions, changing over time

I came back a few days after my first encounter with Bharathan (in 2013) to talk to the people in the area to find out what they all made of the elephants visiting every night. Everyone had strong opinions, where a restaurant owner was the biggest elephant supporter.

“Have you seen anything like this anywhere in India with wild elephants? They are very peaceful; they just come and go without causing trouble to anyone. Only the foolish tourists disturb them and can cause some trouble”⁴

But local farmers were less enthusiastic.

“It's all fine for those hotel people. The elephants only eat the waste from the hotels and they get more money from all the people standing around and watching the elephants and buying tea. But what about us? They also destroy all our crops in the night. How will we survive? Some 20 or 30 years ago herds used to come by at certain times of the year and we used to chase them away. But it was never like this – where only males come, and that too almost every night. There is no way we can chase them away, they are not scared of us any more”.

The social dynamics between the humans and the elephants had changed – where the locals believed the new generation of elephants were not like the older ones.

A local estate owner was more ambivalent, partly because most of the estates grew tea and coffee which elephants did not eat:

“There is of course a problem, but don't worry too much about the local people. See, this is quite a developed area; no one is completely dependent on agriculture like in the old days. Everyone has someone in the family who works outside or drives an auto-rickshaw or something. No one will starve because the elephants ate their crops. And besides, why do they all come out to watch the elephants? If they hate them they should all get together and make sure the elephants don't come out

⁴ All quotes from other local stake holders in the area also also from January 2013, over the course of a week when visiting the region every day to understand the problem.

rather than just fighting with the forest guard. It's fun to all sit together and watch the elephants, everyone enjoys it."

So the estate owner claimed the new generation of humans had also changed, and were developing a new relationship with the elephants.

I continued to visit the area on and off, and two years later, in 2015, there were still mixed feelings about the prospects of "peaceful" coexistence. The restaurant owners were still reasonably positive:

"It's not just Bharathan these days – there are more of them. But no one is excited about it like before. They come and go. Tourists like to watch them and they provide some entertainment. They have all learnt from Bharathan not to attack people, and there is not too much trouble".⁵

The farmers were still upset with the elephants and in the fact that no one was interested in finding a solution. The people next took it upon themselves to organise into an informal elephant committee to push the authorities to do something, but they could not decide on a particular set of demands to present to the government. We were sitting in the tea shop, and anyone and everyone passing by stopped to join in the conversation about the elephant problem.

"Every time some incident occurs we protest and they send some Kumkis [trained captive elephants] from Mudumalai. They stay here for two or three weeks, and then none of the wild elephants come out. But then they go back and the wild ones come the very next day."

Most of them agree that the elephant proof trench was a bad idea.

"They used to come and go quietly in the past – just move through without most people knowing about it. Only once in a way there used to be trouble. But now they can only come along the highway into like the middle of town, and there are lot more problems."

⁵ I revisited the "problem" with Bharathan in May 2015. It was the jackfruit season, and general a time when elephants visit more often. The following quotes are from this period.

Further, the compensation scheme designed to redress property losses had also become a sensitive issue, as an estate owner points out:

“The whole set up is basically flawed. I have title for my land, and can get compensation for any elephant damage. But the poor people, who comparatively lose a lot more when elephants damage their buildings or crops, are not eligible for anything since they don't have proper title. I never claim anything, to keep the peace. There is a basic justice problem if only well off people like us can get compensation. Anyway the government can't afford to give compensation to absolutely everyone who has elephant trouble – it will cost crores [10 million]⁶ a year for just this place, let alone the whole country. Some insurance scheme needs to be looked into. You conservation people should organise it, the department will never do anything.”

Land tenure in the region is highly complex. All the land belonged to Indian royal families, but was taken over by the British colonial government in the early 1800s, then given back to the royal families in the late 1800s, and finally leased on perpetual 99-year agreements to the colonial tea and coffee planters. Over the last 100 years, land has been sub-leased to Indian companies, sub-divided and further sub-leased or even sold or encroached upon by small farmers who have come in the waves of migration into the region. Today the majority of the land is caught up in litigation – with few people actually in possession of clear title for the land they occupy.

There was one indigenous⁷ village in the area, and I visited them to ask what the only “original inhabitants” thought of the elephants. It was a Paniya village, traditionally a

⁶ One crore rupees is about 150 thousand US dollars.

⁷ The question of indigeneity is much debated in India, and the Government does not acknowledge that any particular groups are “indigenous”, and instead recognises some people as “Scheduled Tribes” under the constitution. This is more of an administrative and political construct than an anthropological classification (Singh 1997). India's refusal to recognise “indigenous people”, a status denoting internationally recognised rights to natural resources and more importantly to self-determination is arguably based on a fear that in doing so it will encourage ethnic separatist tendencies jeopardising the state's territorial integrity (Karlsson

hunter-gatherer tribe, but who have been in bonded labour to the Chettys (another local community) for many generations, with their oral history starting with the story of bondage. They were the only ones who did not have much to say about the elephants:

“What to say? The elephants come, the elephants go. Some of them we know some we don’t. Nothing has changed.”

Over the years, an uneasy rhythm had set in. Most of the local people were resigned to the fact that elephants will come and go, and they have to live together. The trench had been breached at various points, and everyone had given up on maintaining it. Every few months there were protests from people, and the forest department intensifies its actions to contain the elephants within the park. As the ‘problem’ eases, the forest department’s efforts relax, and wild ones would start to have the upper hand. Bharathan was still not considered a problem and remains calm and composed around people⁸, but the young tusker remains uncomfortable around people and often charges at people⁹. There are two other middle-aged tuskers that also came out with them, but both of them preferred to completely stay away from people. In June 2018 the young tusker chased a group of school children, who narrowly escaped death. The forest department significantly upped its efforts and installed a high-tech double layered hanging wire electric fence. The people seemed to have the upper hand for a while.

The human-elephant interaction in this one village is complex, and the next Section identifies the relevant research questions, how they link and contribute to the literature on human-elephant interactions.

2004). The more widely used term in India however, is “adivasi” or original inhabitant. I use the terms tribal and indigenous to refer to the “scheduled tribes” in the region.

⁸ <https://youtu.be/bWo0S7K9kxo> <https://youtu.be/JPj056iDAd8> Bharathan unaffected by people (QR Codes 1, 2)

⁹ <https://youtu.be/Q0jB0M3RGdA> <https://youtu.be/nJOYUpzTeK4> MGT2 agitated by people and charging (QR Codes 3,4)

1.2 The research questions - how do elephants and people share space?

These interactions between Bharathan and the people of Thorapally throw up a number of strands that need to be better understood to manage the human-elephant shared space. I summarise these in point form, with each mapping onto a research question.

1. While I only touch on this in the Bharathan story, it is evident that there are a range of factors that mediate the human-elephant interaction – the colonial history and the varying land use in the region and the complexity of land tenure, the waves of migration and the power dynamic between different groups of people, and the various processes of change that are underway. This leads to my first question – ***What are the factors that shape the complex human-elephant interactions in the Nilgiris?***
2. Some elephants in the region show remarkable “habituation” and are not troubled by people. The elephants clearly all differ from each other in terms of their interactions with people, leading to my second question – ***How does the diversity in elephant behaviour influence the sharing of space with humans?***
3. The people sharing space with elephants are also clearly all very different from each in terms of their attitudes and interactions with elephants, and mirroring the second question, I ask of the people – ***How does the diversity in human attitudes influence the sharing of space with elephants?***
4. And finally, while there appears to be a sense of reconciliation about sharing space, there is some concern about how this is going to pan out in the future, or what needs to be done to better manage the human-elephant interface, leading to my final question - ***How can the complexity of human-elephant shared spaces be better understood and managed to minimise the tensions between the two species?***

1.2.1 Connecting with the literature

Situating these questions with the literature is a challenge, with work on people, elephants and their interactions spread across at least three distinct disciplines, each with various sub-fields and distinct bodies of work. While this is discussed in detail in Chapter 2, I briefly mention it here.

- Biology - including the “conservation literature”¹⁰ that has been very interested in “human-wildlife conflict” as well as a very different body of work on elephant ecology.
- Geography - including work on political ecology and also the growing sub-field of “more-than-human” geography.
- Anthropology - starting with deep ethnography in cultural anthropology, to newer “multispecies ethnography” and the “anthropology of life” that includes the non-human.

Undertaking interdisciplinary research has received significant attention, albeit with limited success. The social-natural science conversation has been described as a “dialogue between the deaf” (Agrawal and Ostrom 2006), confounded with inherent epistemological differences that are not clearly articulated or understood, particularly in the conservation literature. There is discussion about interdisciplinary “people” rather than “teams” (Adams 2007), and moving from “Mode 1 science” (characterized by the “hegemony of theoretical or experimental science”) to “Mode 2 science” (that is “socially distributed, application-oriented, trans-disciplinary, and subject to multiple accountabilities”) (Nowotny et al. 2013). Given my background and interest in the practice of nature conservation, I hope to fit my work into the “conservation literature,” but drawing strongly from a wide range of influences on my conceptual underpinnings and methodologies, which I describe in detail in Chapter 2.

On the first question – *the factors that shape human-elephant interactions* - political ecology is at the forefront of work along these lines, with work largely from anthropology

¹⁰ While discussed more in Chapter 2, I use this term to denote the body of work aiming to inform the practice of nature conservation, from journals such as Conservation Biology, Biological Conservation, Animal Conservation, Oryx etc.

and human geography. Political ecology has been criticised for some time now for prioritising the “political” and ignoring the “ecology” (Vayda and Walters 1999; Srinivasan and Kasturirangan 2016). I therefore do not attempt to fit this current work under the political ecology umbrella, but use this approach and draw on some of the literature, attempting to give due consideration to both the politics and the ecology.

The conservation literature has been interested in human-wildlife interactions, and is the largest in terms of the volume of published work, where the interaction is framed as a problem of “Human-Wildlife Conflict” (HWC) with over 1000 research articles tagged as such. The normative understanding is that “conflict” is inevitable in areas of overlap, as humans and animals compete for space and the same resources (Treves and Karanth 2003). The thrust has been to identify and quantify the immediate negative impact people and animals have on each other, while the broader context has arguably been under-represented. Much of this is changing, which I discuss in more detail in Chapter 2.

Second, on *understanding the diversity in the humans who interact with elephants*, some of the newer HWC literature aims to better understand the diversity in the human and tolerance to animals, looking beyond “conflict” (e.g. Treves and Bruskotter 2014). Much of this work is situated within a positivist epistemology, relying heavily on quantified data; Kansky et al. (2016) for example, put forth a “nested Wildlife Tolerance Model” to predict an individual’s tolerance to wildlife, with eleven variables including a score for “empathy”. Anthropologists have been critical of this approach for some time, particularly the prioritisation of western “scientific” knowledge over other knowledge systems (Knight 2000). Despite this somewhat problematic framing of the issue, this body of work is at the forefront of influencing conservation policy, and I therefore attempt to constructively engage with and contribute to this body of work.

The difference in how people interact with nature, one of the newer themes in the conservation literature, is the basis of much of the work in the anthropological literature. Ideas around indigenous communities’ “alternative world view” have been around for at least half a century. Animals, non-living beings (stone, the sun, ancestors) and natural phenomena (thunder or wind) are thought of as “other than human persons”, with values

and morals similar to human societies (Hallowell 1960), and there appears to be “a remarkable consistency of animism across the world” (Praet 2013:341). This body of work provides important insights into how traditional communities understand and interact with animals. In this thesis I build on these ideas and alternative world views, with a focus on how they can be relevant in allowing for more peaceful interactions between people and elephants on the ground, and also contribute to the conservation literature, moving beyond the positivist, quantified understanding of the human-elephant interaction.

Third, on *the question of the diversity within the elephants who share space with people*, much of our understanding of elephants comes from Biology, with a large body of work around the animal’s physiology, ecology, cognition, evolution and behaviour. Questions around elephant individuality and personality are beginning to emerge (Srinivasaiah et al. 2012; Lee and Moss 2012), but are perhaps limited by foundational ideas in ethology, where animal behaviour is studied largely in relation to how it maps back on to the evolution of the species within the Darwinian framework (Tinbergen 1963). This work is also arguably based on the nature-society dualism, where all interactions between (wild) elephants and people are deemed “unnatural” and the focus remains largely on elephants living in “pristine” and “natural” environments, with little or no work with wild elephants living alongside people.

The social sciences, and geography in particular, have witnessed an “animal turn” (Buller 2013) with critical and interpretivist approaches to understanding animals. There is a growing body of work that explores “the complex nexus of spatial relations between people and animals” (Wolch and Emel 1998:110), resulting in sub-disciplines of “more-than-human” and “hybrid” geographies (Whatmore 2002). Over the last few decades, the focus has shifted from using animals “to think with” (Lévi-Strauss 1962), to a series of suggestions in the post-animal-turn body of literature to “examine the bodies, ecologies and lived experiences of animals themselves” (Barua 2013:2). Elephants in particular, have featured significantly in this animal turn (Whatmore and Thorne 2000; Lorimer 2010; Barua 2014). While a number of new papers highlight the importance of (and call for) understanding the lives and experiences of animals, there remains a dearth of human geography literature that explicitly does this, particularly for “wild” animals. This is arguably on account of the lack of methodological tools within the social sciences and the reliance on natural scientist gatekeepers, with their very different epistemological approach (Hodgetts and Lorimer 2014).

Finally, *how can we better manage human-elephant shared spaces* to minimise the tensions between the species. I draw on various strands of literature that I have mentioned above, particularly human geography going beyond the Cartesian conceptualisations of space, with the objective of understanding the space differently, in a way that it can be managed more effectively, reducing the negative impact elephants and people have on each other.

While drawing on all of this literature may seem overly ambitious, the reality on the ground is that the interactions between elephants and people are highly complex and nuanced, and any meaningful contribution towards better understanding and managing the shared space must inevitably involve a multitude of ideas and approaches.

While the story of Bharathan and Thorapally touches on this, I continue with the grounded ethnographic descriptions of human-elephant interactions, using three case studies that highlight this complexity and challenge the dominant HWC narrative.

- First in the O'Valley region where people seems to enjoy chasing elephants, elephants show significant variation in their behaviour, and where elephant get entangled in local politics when they start feeding at a garbage dump.
- Second, the case of the contradiction between the “scientific” opinion around how elephants should be managed and the practical solutions that the forest department implement.
- And third, I describe an extreme event where people are killed and elephants are captured, and the reaction of both the elephants and people.

1.3 Positive interactions, varying elephant behaviour, and elephant agency

The interaction between elephants and people in the O'Valley region bring up a number of nuances. Chasing elephant using drums, torches and other make shift instruments is referred to as "traditional HEC mitigation strategies" in the conservation literature (Perera 2009; Hoare 2012), but I found sometimes there were not exclusively about mitigating conflict. It was as much about a night out for all the men, enjoying themselves, using the elephants as a legitimate excuse, as highlighted below.

1.3.1 Jolly elephant chasers

I sat through the night with a group of self-appointed elephant chasers, in the Devamalai village. There have been no elephants in the area in the last 30 years, since when people moved down to the current settlement from the plantations' more remote living quarters. A narrow winding concrete road leads up to the plantation from the highway, and the village grew along it. Elephants first came in 2010, but were not considered a huge problem since the dominant agriculture in the area is tea and coffee estates. They came a few times during the year, stayed in the hills during the day and came down to the village at night to eat the few banana trees planted around people's homes. When they were around the nights would come alive, and no one in the village slept peacefully. The men all sat around a fire waiting to chase the elephants away from the village, and their feelings about the elephants were a mix of awe, excitement, fear and bravado.

*1: "Last week the tusker put its trunk in through Selvan's window and took all the salt. It even went around to the bathroom and took the soap! I don't know why they like to eat soap. It tastes really bad. The whole family was really scared and didn't sleep all through the night. At least they have a pucca [permanent] house that can't easily be knocked down."*¹¹

¹¹ All quotes in this Section 1.3.1 are from 28th November 2010, when elephants were seen in the Devamalai region during the day for the first time.

2: *“Just let him try and put his trunk into my house and I’ll show him... I’ll chop the trunk right off with my machete. That will stop all of them from coming in and giving us all this trouble. Just wait and watch, I’m going to solve this problem once and for all.”*

3: *“Shut up, you stupid drunkard. You don’t know the first thing about elephants. The trunk is the strongest part. Your small little knife will just bounce off its trunk without making a mark. And then it will knock your house down because you made it angry. You should go home and sleep after drinking, not hang around here talking nonsense. If it comes now you won’t anyway be able to run off and escape.”*

A few hours later there were sounds of people shouting and fire crackers bursting. The elephants had arrived. All the male members of the village seemed to have gathered themselves into groups, running up and down the narrow road, some with burning torches, others with electric ones, throwing fire crackers and beating on makeshift drums. No one could actually see the elephants in the dark, but they could hear them, and were constantly speculating about what they were doing and where they were going.

An old lady, the wife of one of the elephant chasers, shook her head in despair,

“These men are all crazy. One group chases the elephants this way, another chases them back. There is no solution. They just all use this as an excuse to stay up in the night and drink, and then no one will go for work tomorrow. If some five of the boys sit and plan how to chase the elephants, the problem will be solved. Maybe the elephants just want to cross the road and go into the forest on the other side.”

There was clearly an element of “fun” and “recreation” in all the men getting together and chasing the elephants. While ecosystem services are defined to include cultural and recreational services that people derive from nature (Costanza et al. 1997), there is no discussion of this in the human-elephant conflict literature.

1.3.2 Peaceful mappers, troublesome youth and inexplicable house breakers

There is very limited work in the scientific literature on elephant “personality” and the variation in their behaviour (Lee and Moss 2012; Srinivasaiah et al. 2012), and there is a call to understand the elephant perspective in mitigation human wildlife conflict (Mumby and Plotnik 2018). But this is something that is arguable already recognised and understood by the people who share space with elephants, as is evident from the vignette below.

Everyone distinctly remembered when the elephants first came in 2010, starting with a small family owned estate. No one in the house had heard anything that night, and they were surprised to find a pile of elephant dung on their front steps in the morning. We visited the place, walked around the house looking for signs, and retraced the elephants' path. They had walked along the electric fence for about 50 meters, till they found the one fence post where the electrified wires had mistakenly been secured to the inside of the post. The post had been stepped on and neatly knocked over, after which the elephants had all carefully stepped between the wires. They had walked all around the house, between flower pots, bending under a low hanging roof, passing by large glass windows and even walking up and then retreating back down a narrow, stepped passage leading up to the kitchen. They then quietly went back the way they had come, over the fence and into the hills. They had not eaten anything around the house – not any of the flowers or the young mango and dadap saplings, or even a clump of yellow bamboo, all elephant delicacies. The only signs they left behind were the pile of dung and a knocked over broom near the kitchen. Why they visited was discussed at length, and the conclusion that the locals settled on was that they had undertaken a mapping exercise, to learn about the houses in their new territory. With the little ones also tagging along, the matriarch ensuring they were on their best behaviour, ensuring they did not disturb the humans.

But there were other elephants in the area that were less peaceful. In 2013 a young tusker had come to the same house, and walked around breaking all the windows on one side of the house. He had smashed both the plastic water tanks and almost rolled them into balls, and crumpled the television's dish antenna. These actions though, were tolerated, as brash

youthful behaviour that was unavoidable. And that he probably would not have done all this if there were people in the house to chase him away. There was talk of applying for compensation, but again for reasons similar to those cited in Thorapally, the family decided against claiming it as poorer families in the area not eligible to claim compensation would get upset by the inequality.

A few months later there was also another herd of five that destroyed a house. They first pulled down the tin roof sheets, and then slowly started knocking parts out of the 18-inch-thick stone and mud-mortar walls. The two elderly people inside, were hiding under the bed and screaming. The villagers all gathered together, shouting, beating makeshift drums and waving flaming torches. But it still took a lot of effort to move the elephants away from the house. The residents were shifted to a neighbour's house, but were severely traumatised, with the old man unable to talk at all for two days. The elephants stayed around the house all night, and only left the next morning. All the locals had something to say about the incident, displaying a wide spectrum of opinions on the matter.

For one person the whole relationship with the elephants had changed, with people now being afraid of the elephants for the first time.

“I watched them, all five walking in a straight line on that ridge. We were suddenly terrified. Till now we never knew how powerful these animals actually are and what they can do to us if they want. It was mostly fun games in chasing the elephants till now, we were not afraid for our lives.”¹²

Another tried to rationalise the incident and understand why the elephants behaved like this, shifting the blame away from the species to some bad individuals within elephant society:

“People all say that they must have been brewing illicit alcohol in the house – that's the only reason elephants completely break down houses in that way. But that old man would never do that, and there was no alcohol in the house – you saw it

¹² The next four quotes are from the same day in June 2015, soon after the elephants broke down a house and the Devamalai village had its first significant negative interactions with elephants.

yourself. Even then they never break down houses when people are inside and shouting. Some elephants are just bad. You know like in us humans there will always be some criminals? It's the same for elephants”

One person explained it through the dominant religious belief of elephants being Gods, and linked it to the idea of divine retribution, where the elephants themselves were not at fault.

“The people must have done something wrong in their lives and God is punishing them. There is no other explanation”

Five years after the elephants started coming to these areas, things seem to have calmed down. None of the people in the Devamalai village chase elephants any more. All the bananas around people's houses had either been eaten by the elephants or removed by the people. The elephants come by in the nights, but often go unnoticed. The people and elephants seem to have found a way to both not get in each other's way. Over the years we've seen the herd numerous times. They come close to human settlements and will be seen for a week or two, but then they move away and are not seen for a few weeks.

From these interactions, a number of points emerge. First, on the dominant idea of elephants being “victims” driven to extinction by an expanding human population and habitat destruction (Choudhary et al. 2008), is not always the case, elephants are also expanding their range and moving into new territories, sometimes at the cost of poor and impoverished communities who end up being the victims in human-elephant encounters. Second, relevant to my second and third research questions, is that there is clearly a lot of variation in elephant behaviour, some of it seemingly inexplicable, while the human reaction/rationalisation of this behaviour is also very diverse and varied. Third, something that also shows in the Bharathan-at-Thorapally case is that there is a process of mutual accommodation at play as elephants and humans forge new relationships and negotiate a sharing of space, but there remains uncertainty and unease about the future of these shared spaces.

1.3.3 Elephant caught up in garbage problems

The question of elephants as conservation actors, and more broadly elephant agency, has been discussed (Evans and Adams 2018), and this case is illustrative of this.

In March 2016, we noticed the same group of elephants feeding off a garbage dump close to the Devamalai village, which turned out to be a fascinating case study. Locals all complained about the smell and the flies, and wanted it closed down, but there was no action from the state. When the elephants started feeding, we passed on some photographs to the forest department. They in turn shot off notices to the Gudalur Municipality and district administration, and filed a case against the land owner for endangering wildlife. They could not actually stop these more powerful departments, but wanted to make sure they were not held liable in the future complications. We noticed some of the photos we had taken were being circulated on “WhatsApp”, and decided to publish the photos and videos directly on The Shola Trust Facebook page. The evocative images and videos circulated widely, and things escalated quickly. In two days, the video¹³ had 300,000 views (which went up to 1.5 million by the end of the week). The photos were published in all the regional and national newspapers, and even two UK based tabloids, The Sun and the Express.

The Gudalur elephants were famous, even if they didn't know it themselves. All this attention created considerable embarrassment for various arms of the bureaucracy, who sprang into action. Within a day, with the help of a large conservation organisation, they put up an electric fence around the dump, and publicly proclaimed that the problem had been “solved”.

¹³ <https://youtu.be/1qkahrX0bjE> GDK Herd at the garbage dump (QR code 5)

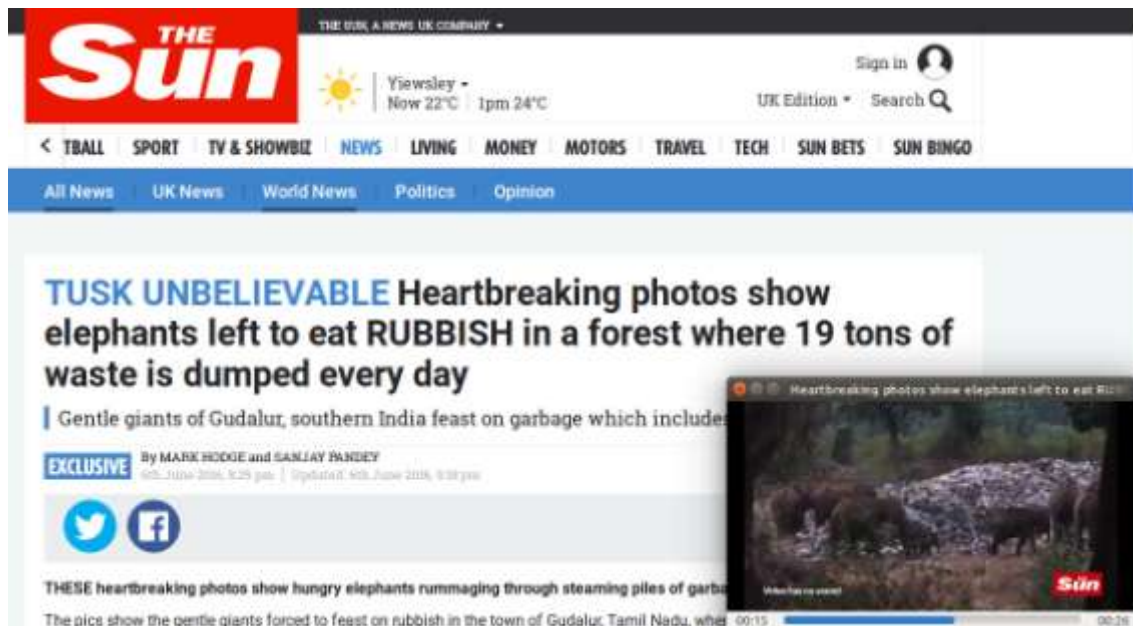


Image 4: Screenshot of The Sun website with article featuring the Gudalur elephants.

But the elephants broke through the fence on the same night. The fence was fixed and further fortified the next day, but the elephants broke it again, with one of the males becoming an expert at climbing over. The elephant took to breaking it at the gate, where the trucks came in and out, and specially designed roller were installed on the ground to prevent the elephants walking over the entrance. But they bent the roller bars and they no longer rolled, and a day later they found they could uproot and move aside the entire rolling mechanism. Another young tusker with long tusks learnt he could break the fence with his tusks, which we captured on one of our camera traps causing significant excitement. For about a week, there was this people vs. the elephants game, each trying to outsmart the other. Then there was peace for some time, where the fence was not broken for a few nights. There was relief all around, and everyone assumed the problem was “solved”. But we still found fresh dung inside the dump every morning. The “solution” was that municipal workers had found the best way to “solve” the problem was to leave the gate open and let the elephants inside to feed. Their problem was not the elephants feeding on garbage, but the public outcry around it.

The problem eased off when the monsoons came, with the elephants not feeding at the dump, probably on account of there being enough fodder around. But they were back after the monsoons. The local people living around the dump realised the elephants were more

effective at eliciting action from the state. They kept tipping off news reporters, and though the elephants usually came only at night, there were invariably some photographers dropping by to see if they could get some footage or photos of the elephants feeding on garbage. The people, forest department and municipality all continue to battle with each other over the issue, primarily through the elephants.

The elephants are not only conservation actors, but also lively and powerful actors even beyond conservation, playing a key role in the politics and governance of the region, with more agency than the local people and the forest department, the institution tasked with “protecting” the elephants.

1.4 Scientific vs. practical management of “problem” elephants

Conservationists and biologists are critical of many of the interventions by the local forest department, particularly on going “chase operation”, since they have no ecological basis – the elephants always come back, and they cause elevated stress levels in the elephants (Vijayakrishnan et al. 2018). But the forest department has its one, arguably more nuanced, reasons for undertaking these operations.

Chasing wild elephants “back” was a contentious issue. It sometimes worked when elephants were immediately outside a PA boundary, but almost never worked in a landscape like Gudalur, or with elephants that never seemed to go into a PA and were around people all through the year. In 2011 there was an attempt to chase a "rogue" single tusker back into Mudumalai after it had killed two people over the span of two weeks. It was a huge operation; the tusker was at the boundary of three forest divisions – Gudalur and Nilgiris North and Nilgiris South, while the kumkis (captive elephants that are at the forefront of these operations), their mahouts (handlers) and some support staff had to come from the Mudumalai camp, 30 km away. There 50 odd staff from the department, various big and small NGOs offering their help and advice, 100s of local onlookers, and a large number of tourists since it was close to the highway, plus the police to manage the crowds. The operation started at 6 am, and after a full day of chaos, by 6 pm they had moved about 700m from where they started in the morning. Only the wild tusker knew the mountainous terrain and the thick vegetation, and the kumkis could not easily follow him to chase him as he hid in small patches. The tusker was also highly agitated by the day's events, and was very active all through the night - breaking people's gates, water pipes and tanks, before moving to a neighbouring hill. Plotting his movement the next day, he had gone about 4 km on his own through the night, in the opposite direction of the chase.

I met one of the officers the next day to tell them about this movement, but he was least interested in how much or where the elephant was moving, with a completely different take on the chase:

“Gudalur is a highly problematic area. We cannot be seen to do nothing. So we put on this big show. The local people and politicians will all be happy for some time till there is some serious incident again. This is only like a PR exercise for us. The elephant cannot be chased back into Mudumalai.”¹⁴

So while the biologists are critical about the lack of an ecological basis for chasing these elephants, what they are less aware of (while the forest officials evidently are), is that there is a very clear political basis for undertaking these chases – there has to be at least a pretence of chasing the elephants “back”. While forest managers are often criticised for not using rigorous ecological “science” in the management (Karanth et al. 2003), the forest managers intuitive understanding and application of political “science” is missing from the conservation narrative.

The chase continued the next day, but with much less fanfare. Only the veterinary doctor and two Kumkis had gone out to the elephant, and they later announced that it been chased away. I found one of the mahouts later to ask exactly what had happened. The mahouts were all from a traditionally hunter-gatherer tribe, the Bettakurumbas, where animistic beliefs are still strong, and elephants are clearly other-than-human persons.

“We found the elephant quite soon since there were only our people. We went up quietly and doctor fired one injection into it. Then it was sleepy and not going anywhere, so we went up close from both sides with the Kumkis. We gave it a few good shots with our sticks, scolded it a lot and told it not to come back this side, and chased it away”

When discussing this incident in 2015 in the context of a different chase operation, the Range Forest Officer's (RFO) take was interesting:

“You remember that single tusker near silver cloud in 2011? We've not had any trouble from him since, or even seen him in the area. We just need to teach them

¹⁴ This “chase operation happened on the 29th of May 2011, and all the quotes from this Section (1.4), are from my interactions with people in the region at the time, examining the possibility of collaborating with WWF to put a collar on the elephant.

that they cannot go around killing people. We can't push all elephants to Mudumalai, but these are like classes for them, just like we do awareness programmes and sensitisation classes for people. They are very smart, they will learn quickly, and also pass the message to other elephants."

The indigenous animistic beliefs about elephants are well documented in the anthropological literature, but there has been some criticism that anthropologists themselves invariably consider these beliefs to be merely metaphorical and symbolic, and this prevents them from becoming a real and factual way of managing the human-wildlife interface (Nadasdy 2007). But in the Nilgiris, the indigenous mahouts believed they could communicate with the elephant, and at the local level they are considered the experts, and even the educated, non-tribal forest department staff have accepted this different ontology, and incorporate it into the management of the human elephant interface. The interplay of this indigenous world views, pragmatic management and "science-based management" are clearly complex, and something that I discuss in Chapter 6 of this thesis.

1.5 Significant “events” - the human and elephant reaction

In April 2016, three people were killed in the same week by elephants, and two of them by the same elephant. With protests around the region, the state Government decided to capture two of the elephants responsible for the accidental deaths. Given the highly political and sensitive situation, the state had sent a range of senior officers to the region, all tasked with “solving” the problem. Additional police and paramilitary forces had been sent in from neighbouring districts to suppress violent protests and assist the forest department in the capture of the elephants. After careful consideration, it was decided two problematic elephants should be captured – CT6, a sub-adult male, and CBT1, an older male.

We tried to continue on our major strand of work – going out with the field staff and watching the elephants and getting to know them better. But the elephants' reaction to all of this heightened human activity was unlike anything we had seen. On most days there were about 15-25 elephants in the Range, which the forest department got to know about through local people calling them, not by actually going out and searching for them.

Here were eight teams combing through the region, and there were no elephants to be found except Ganesan, who was an old and relatively peaceful tusk-less male who was well known in the region. But he too behaved differently. While he normally spent most of the day sleeping, now he kept coming to the state highway, where he held up traffic and created havoc. Most of the forest department staff had to be sent back to deal with him and chase him off the roads. This happened three times during day one of the capture operation.



Image 5: Nadodi Ganesan/CMK1 Chasing Forest Department Staff.

At the end of day 2 again only Ganesan was seen, until late evening, when one of the search parties located 13 elephants to the south of the Range, near one Kotamalai Dam. There was significant pressure on us to identify the individuals, and tell them which ones to target for tranquillisation. I was too far to get there, but one of my colleagues was with the group. He called me soon afterwards, quite agitated. We only knew two elephants from the 13 – we had not seen the rest in the four months we had been monitoring the elephants. I didn't quite believe it, but when we checked the photos and compared them closely with those in our database later that night he was right.

There was then an incident with the Kumkis, the trained captive elephants that are a key part of these operations. They carry the veterinary doctor close enough to get a shot at the elephant being captured, and then they hold the wild one in place with ropes and guide it to the truck. It is not only their physical presence that matters in these operations, there is complex communication between the mahouts (elephants handlers), Kumkis and wild elephant that is evident. In a previous chasing operation I've seen Vijay, an experienced Kumki, go up to a very agitated wild tusker and hold him by the tusk for a while. Though

the wild one tried to pull away, he was held firm. After a few minutes he calmed down, and they were able to lead him in the direction they wanted. Given the importance of this operation, two of the senior most Kumkis, Sujai and Wasim, were brought in from neighbouring districts to lead the operation.

On the night of day 2, a new young tusker that was seen at the Kotamalai dam the previous day attacked the Kumkis. Bomman, an 18-year-old kumki was wounded in the face. All the kumkis were tethered to trees and could not move around freely, so the smaller wild tusker had an advantage. There were no lights, and there was nothing the mahouts could do without endangering their own lives. They finally managed to chase it away with firecrackers and drums, but everyone was shaken. The kumkis and the wild tusker were non-human persons. The attack was a clear communication from the wild elephants. It was a bad sign for them and they felt the capture operation should not go ahead. But there was not much choice – too much was at stake and it had to proceed.

On day 3 again, no elephants were seen except Ganesan at various points. And finally, late afternoon, CT6 was spotted one of the targets for capture. I was not at the site, and the pressure was on my colleagues identify the individuals. Again there was some confusion - CT6 was with another young tusker, that *“maybe his brother or cousin, since they look exactly the same, and we can't tell the difference”*. After again comparing closely with the photos in the database, CT6 was identified. But then another young tusker joined them, and the three refused to separate. The tranquilliser was best shot into the thigh or rump of the elephant, but you could tell them apart only the front or side, and that too after a careful comparison against photos – which was close to impossible with the elephants constantly moving. He was finally darted late evening, loaded into the truck and taken to the elephant camp in Mudumalai. CBT1, the older male also targeted for capture, was not seen for three months after that, and no one was sure where he went.

For the mahouts and the local field staff, all this drama was a coordinated response from the elephants. Most of them left the region, except Ganesan to distract people and keep them from finding the others. CT9, another young tusker was sent to scare the kumkis and

people by attacking them at night. Finally CT6, who knew he had done something wrong and had to face the punishment, but with his cousins to give him support and company.

How is all of this elephant “behaviour” understood? Are they deterministic Darwinian animals making decisions based on instinct and triggers from their natural environment, are they thinking sentient beings, making decisions based on “culture” and complex cognitive processes? I explore this in more detail through two avenues; through the second question on the elephant diversity I examine how they all differ from each other in their interactions with people at both the level of herds or even populations, and through the third question on the human diversity I highlight the fact that even the very basic question of “what is an elephant?” or the ontological status accorded to an elephant, differs significantly across groups of people.

Through all of these grounded descriptions, I have made a case for better understanding the range of historical, social, political and ecological factors that create the context for the present human-elephant interactions, as well as the diversity in the humans and elephants in how they interact with each other. This clearly maps onto the first three questions of my thesis.

The final question relates to management of these spaces, and the interventions that can lead to reducing the negative impact humans and elephants have on each other. In the final Section of this Chapter, I therefore discuss some of the developments in the policy space over the last few years, and the various “expert opinions” on better managing the human-elephant shared space.

1.6 Expert opinion and the policy space

Given the complexity of conserving elephants in a crowded country like India, the policy space has seen significant activity in the last few years. In 2010 the central Ministry of Environment and Forest constituted an 'Elephant Task Force', of mostly academic scholars, to look into the long-term conservation of elephants across India. They noted that it was *“not immediate extinction as much as attrition of living spaces and the tense conditions of the human-elephant encounter on the ground that require redress”*, and made some significant suggestions on taking a more holistic approach that looked at “Elephant Landscapes” much beyond the conventional protected areas, governed more democratically by local “elephant reserve committees”, incorporating “Conflict Management Task Forces” (Rangarajan et al 2010:1). But none of these recommendations translated into government orders or policy documents, which changed the governance of the human-elephant shared space in any way.

In 2012, on account of mounting tensions between the needs of people and wild elephants in the south Indian state of Karnataka, the High Court constituted yet another expert “Elephant Task Force”, with a mix of natural and social scientists as well as conservation managers/practitioners, to look into the issue and make suggestions for lasting elephant conservation and management recommendations. The task force, after much deliberation suggested a zonation exercise, under three categories; Elephant Conservation Zones, where primarily elephant conservation takes priority over competing livelihood goals; Elephant-Human Coexistence Zones, where both elephant conservation and human livelihoods have to be balanced and reconciled; and Elephant Removal Zones, where concerns of human safety and livelihood take precedence over competing conservation concerns about elephants (Sukumar et al. 2012). While there was broad based support for this approach, none of the experts could agree on how this would unfold on the ground in terms of actual maps. What is the process by which these maps are made? Do local communities decide that their lands and homes become a part of an elephant coexistence zone? Urban areas would of course be removal zones, and protected areas would of course be conservation zones, but what about all the zones in between? Where and how do you draw the boundaries of coexistence and shared space? (Madhusudhan, pers. comm.)

The question of how to deal with elephants in such landscapes is highly debated, from the high powered “task forces” to the field staff on the ground and is finally based mostly on the views of individual “experts”. What is to be done with places like Gudalur – over 300,000 people in an area of about 500 km², interspersed with patches of forests and about 100 to 150 elephants? The majority view is that while sharing space is inevitable now, coexistence is untenable in the long term, and elephants have no future in these landscapes.

The first argument is around people and the negative impact elephants have on them, from a senior forest department official:

“It's all fine for you as a conservationist to want to have elephants in that landscape. But what about the local people? They don't want to coexist with elephants, how can we force it on them? They suffer huge losses. Can the government keep on paying out compensation continuously? Irrespective of what we all would like, leaving aside the trauma that local people face, the financial cost of this coexistence is not viable.”¹⁵

Then on the idea of “natural” and negative impacts on elephants, from a senior biologist:

“There are hardly any forests around... the basic needs of the species cannot be naturally met there. They need food, water and adequate shade. They spend all day hiding in small forest patches, and then raid people's crops at night, and drink water from tanks built for local people's water needs. Is this really the natural living condition for a wild elephant?”

Crop raiding has traditionally been assumed to be “natural” and explained around the “optimum foraging theory” (Sukumar 1994) where raiding high nutrient crops for a few hours is much more efficient for an elephant than foraging all day on low nutrition vegetation. But another side of the argument also exists, also from a senior biologist:

¹⁵ All quotes in this Section are from discussions with senior scientists, elephant experts and forest department officials. They are all drawn from two meetings, one on 4th May 2009, and one more from 4-6th April 2016. Formal consent was not sought, and so individuals are not named; the arguments are representative and aimed to highlight the tensions in the policy space.

“The crop raiding is not good for the elephants... Across history humans as a species have had very limited access to salts, sugars and fats. Now when they are abundantly available we over indulge, and obesity, hypertension and diabetes are rampant across the developed world. The identical thing is happening with elephants. In their natural environment, in feeding for 12-18 hours a day they get a range of micro nutrients, macro nutrients and exercise. In these landscapes they remain relatively stationary all day, then feed on agricultural crops for a few hours and get the needed macro nutrients, but no micro-nutrients or exercise. Obesity is clearly visible; the crop raiders are huge! And we don't know about their other health problems. We have to keep them out of places like Gudalur for their own benefit!”

There are then various narratives in favour of coexistence. On the relatively new phenomena of all male herds in human dominated landscapes which a young biologist studying these points out:

“Look at it in terms of reproductive success. In the wild, young males only get to mate when they are large enough to take on the adult bulls, and this happens when they are around 25 years old. But you should see the size of these crop raiders. Ranga, the leader, is huge! And the youngsters also bulk up really quickly – almost full size in 15 years. And they've somehow managed to ensure they all come into musth at different times. So a 15-year-old comes into musth, goes back into the forest and is able to mate with females with very little competition. They can't survive in the agricultural landscape alone, so both the old and young bulls come together when they are there, and are solitary when they are in the forest looking for females. It all makes perfect evolutionary sense!”

Forest department officials and wildlife activists often use the arguments of animal rights. That animals have a right to be there in these human dominated landscapes, and are the victims of habitat destruction and degradation as humans encroach on forest land. So the least that can be done by people is to allow the animals to share the space.

Central to both sets of arguments both for and against coexistence, are elephant numbers and whether they are increasing or decreasing, which is highly disputed. The global narrative is clearly one of dropping numbers – being classified as an endangered species by the IUCN is based on dropping numbers. About 50-100 elephants are killed every year by people, with the gruesome train accidents catching global attention and keeping this narrative alive. But official figures for elephant population in India show a consistent increase, from a little over 20,000 individuals in 2002 to almost 30,000 individuals in 2017 (Project Elephant 2017). Again, the figures are contested by various experts as the estimation methodology has been constantly evolving.

As a senior biologist put it:

“I will not say anything about numbers. Our previous estimation methods were very poor, and God only knows exactly how many elephants there were. So actually, now only “God” can tell us if the numbers have increased, it has nothing to do with science!”

But the “elephant numbers are increasing” narrative is clearly prevalent among the forest department officials and the local communities who share space with elephants. Some elephant contraceptive programmes are also being discussed. It is relatively clear that ranges have expanded over the last few decades at local scales. And while these debates about elephant rights, habitats and numbers continue at various levels, the forest department and other relevant institutions continue to implement a variety of “conflict mitigation strategies”.

Barriers – elephant proof trenches (EPTs) and electric fences – are the most popular in separating human and elephant spaces by both the forest department and NGOs. But they are very expensive, where the budget/length of fence/trench allocated to each forest division is invariably an order of magnitude less than what they think they require, and they remain effective for a very limited period in relation to the amount of money spent. The trenches are guaranteed to work in the short term, but the elephants invariably find a way across in less than a year, particularly in high rainfall areas, where the trenches fill up with eroded soil after the first monsoon. The electric fences also fail quite quickly, either

because of being broken by elephants or when vegetation grows under the fence and comes into contact with the wires, causing a short circuit and damaging the energiser. They tend to work better at keeping elephants out, particularly around individual private landholdings, but less so in a communal context, around a village or in the commons, where no one takes particular responsibility for it. And they almost never work at the edges of parks to keep elephants in; local people themselves sometimes take down the fence in order to allow their livestock into the park to graze. But those not in favour of the coexistence agenda insist, again from a biologist:

“yes, EPTs and fences often fail, but that's because of corruption and lack of will; they are not done properly since half the funds are swallowed, and then they are not maintained year after year. This is what we must push for – better implementation. There is just no other option”

And the other side of the argument (during the same discussion):

“you can't have these utopian ideas. This is how the forest department will always function. Mitigation has to be planned keeping the context in mind.”

Compensation is the other key element of HEC mitigation that is being widely used, and also supported by a number of conservation groups. While this is often crucial for impoverished families who lose their year's agriculture to elephants in one night, this approach also has its shortcomings. While the prevalent view is that it could act as a perverse subsidy that dis-incentivises farmers from protecting their fields (Bulte and Rondeau 2005), another problem, raised by a forest official, that is perhaps more relevant to India, with limited funds for conservation and large areas of human-wildlife overlap:

“.. Forest officers' biggest headache is finding crores of rupees to pay compensation every year. And that too all you people try to be very efficient and help every single farmer file claims. NGOs and all other departments should also help in paying compensation, elephants belong to all of India, not only to the forest department.”

The pro-coexistence groups have their own set of mitigation measures that aim to 'solve' the problem of human wildlife conflict. More “organic” and community-based fences are being experimented with, particularly beehive and chilli fences, that act more as soft rather than hard barriers. They have met with some success, and seem to be growing in popularity (Hedges and Gunaryadi 2010; King et al. 2011). A mobile phone text message based early warning system has also been implemented in one area, and informing people in advance about elephant presence is showing considerable promise in reducing human deaths in accidental encounters (Howard 2015).

All of these strategies are being used widely across India and the world, with varying degrees of success and failure. The literature is full of uni-dimensional studies that measure the effectiveness of one mitigation strategy or another, without considering the gamut of ecological, social, economic and cultural contexts within which the strategy is implemented. Various groups and individuals strongly advocate one approach over another, but the primary quest to find a universal solution to the HEC problem continues.

This is what I hope to examine in the fourth question – *How can all of this complexity be understood and managed to minimise the tensions between the two species?* The first step should of course be to abandon the push to find any one universal solution to the problem of HEC, and allow for a multitude of local innovation at various scales. There still is however, some scope to better understand and manage these spaces, starting with re-conceptualising the way the space is understood.

1.7 This thesis

The complexity of living with large and dangerous animals is of critical importance in a country like India. But the challenge is not limited to India, and is arguably going to be one of the biggest conservation challenges of the future. Across much of the developed world, numerous “rewilding” projects are under way to bring back a suite of locally extinct animals or other suitable replacements (Donlan 2005; Vera 2009). While most of these projects are experimental and restricted within fenced off, human free regions, some large and dangerous mammals, including wolves and bears, are making significant comebacks with populations increasing and ranges expanding across Europe, North America and Japan (Saito et al. 2016; Boitani 2003; Chapron et al. 2014), putting them into direct contact with people. People and wildlife already live in close proximity and at very high densities across much of South and South East Asia, though with seemingly rising levels of “conflict” with each other. Africa, which Attenborough presents as “the world's greatest wilderness”, is perhaps only now beginning to see a significant human population expansion (World Bank 2014), but is already experiencing significant and increasing HWC (Weladji and Tchamba 2003; F. M. Madden 2008), which could potentially become worse in the future. Living with animals is perhaps going to be the key future challenge for conservation across the world.

India at the very outset is an interesting case study, with a large elephant (and tiger) population alongside people living at a very high density. Unlike most of the developed world that decimated large mammals around them as people developed, India has not seen a large-scale extermination of its mega-fauna assemblages. People and animals are sharing space in ways that are unimaginable in a developed context. Understanding this better and aiming to conserve this traditional “tolerance” is perhaps a key way forward for conservation.

Over the course of this thesis I aim to delve into the spectrum of complexities relating to human-elephant interactions and shared space. I focus on the Nilgiris in South India, and explore these questions at some depth, based on my long immersion in the issues around people, elephants and the political and ecological space within which they interact. I

highlight the methodological implications of this research for the broader question of undertaking interdisciplinary work at the human-wildlife interface.

Starting with this grounded introduction, this thesis consists of the following Chapters.

2. Chapter 2, the literature and methods, discusses the literature relating to the broad subject of human-animals interactions. Drawing from the work in anthropology, human geography, the “conservation literature” and ecology, I examine the strands that are useful in informing the approach and final ideas that are discussed in this thesis. I also describe the interdisciplinary methodology and particular methods I use to answer the various questions.
3. Chapter 3, the political and ecological context of human-elephant interactions, is the identification and description of a range of political *and* ecological factors that are important as a “baseline” in understanding human-elephant interactions both in Gudalur and beyond.
4. In Chapter 4, living with people, I examine the diversity in the elephants that live with people in Gudalur, looking at how they differ from other elephants at the population level, and also how they differ from each other at the level of herds and individuals, in terms of their interactions with people.
5. In Chapter 5, living with elephants, I use a similar approach for people, showing that culture and “ethnic community” is an important factor in understanding “tolerance” of elephants. There are four indigenous groups and then three waves of immigration, all with varying modes of subsistence and world views and histories. I examine how these cultural differences make a significant difference in their interaction with elephants, and the importance of this in better managing human-elephant shared space.
6. Chapter 6 is on understanding and managing the shared space. The previous Chapters highlight the range of factors that underpin human-elephant interactions, and that there is significant diversity in both the people and elephants in terms of how they interact with each other. I then discuss how all the complexity can come together to re-conceptualise how the space is understood, and how it can be managed to minimise the negative impact elephants and people have on each other.

7. Finally, in Chapter 7, to conclude, I use a reflexive approach to examine my own journey of undertaking interdisciplinary research, and highlight the methodological implications, particularly for “multispecies ethnography” (Kirksey and Helmreich 2010). I then discuss the potential future of this co-existence in Gudalur, and how I, as an inhabitant of the landscape, can live with elephants.

2. The literature and methods

From the grounded introductory Chapter, it is evident that there are a range of complexities around the human-elephant interaction, and using any one framework, discipline or methodological approach to understand this is inadequate. An interdisciplinary approach is ideal, and a key part of the conservation narrative as I discuss later in this Chapter, but I argue that the epistemological basis and boundaries of the various disciplines are not clearly articulated or understood in much of the work aiming to be interdisciplinary. In this Chapter, I review the literature from the disciplines that are relevant to my question of how human-elephant shared landscapes can be better understood and managed, and chart out my methodological approach and the particular methods I use to answer these questions.

2.1 Situating this thesis in the literature

Reviewing and classifying the literature is a challenge, given that it spans various disciplines (anthropology, geography and biology) and various diverse sub-fields as mentioned in Section 1.2.1 of the introduction. There is considerable overlap and flexibility in the disciplinary boundaries, with significant work claiming to be interdisciplinary. Given my background (no formal training in any of the disciplines at an undergraduate level, followed by an interdisciplinary “biodiversity conservation and management” master’s degree) the “conservation literature” was the only body of work I had some familiarity with, though aware of many of its limitations in understanding human-wildlife interaction. Since then I have engaged extensively with the relevant work in anthropology, human geography and physical geography that look at human-animal interactions, and this thesis draws on these diverse literatures. Accessing these diverse bodies of work was a challenge, which I describe in more detail in the next Section.

While conservation is not a discipline and more of a “pragmatic inter-discipline” drawing from multiple disciplines (Max-Neef 2005), there are still a number of journals (*Conservation Biology*, *Biological Conservation*, *Conservation Letters*, *Animal Conservation*, *Biodiversity Conservation*, *Environmental Conservation* and about eight more) that describe themselves as “conservation journals”, and the literature remains rooted in Biology and the natural sciences. The “conservation literature” I refer to in this thesis all comes out of these journals. This literature engages with a wide range of topics

relevant to the practice of nature conservation (with a significant focus on animals), but the sub-strand that I examine in this thesis relates to human-wildlife interactions (Madden 2004; Woodroffe et al. 2005 - framed as human-wildlife conflict, which I discuss in subsequent Sections), elephant ecology (Sukumar 2003; Choudhary et al. 2008 - the relation between organism and their natural environment) and ethology (Tinbergen 1963; Shettleworth 2001 - animal behavioural science) are other sub disciplines of Biology (though largely independent of the conservation literature) that are also relevant to my thesis and understanding elephants.

The critical social sciences have significant bodies of work that are relevant to this thesis. First in terms of the diversity among the different groups of people; work from anthropology around animism¹⁶ and alternative worldviews among indigenous communities (Hallowell 1960) with respect to their relationship with nature. Second, a growing interest in animals (and their interactions with people) in the social sciences, especially geography, with the “hybrid” (Whatmore 2002) and “more-than-human” (Braun 2005) approaches to understanding animals in human geography, and anthropology’s “multispecies ethnography” (Kirksey and Helmreich 2010) and “anthropology of life” (Kohn 2007).

For this thesis, I choose to categorise the literature broadly along epistemological lines, where the social and natural sciences have very different approaches to research. Methodology across the different disciplines is another aspect I pay attention to in the literature review, because formulating and applying interdisciplinary methods is another area that this thesis intends to contribute to.

2.1.1 Accessing the literature

A database search was my first point of reference, where Scopus (www.scopus.com) was chosen over Web of Science, since it indexed a wider collection particularly in the social

¹⁶ I use this term with one of its simpler definitions - “the attribution of a living soul to [animals], plants, inanimate objects, and natural phenomena (OED 2018).

sciences (Norris and Oppenheim 2007). Based on a preliminary review of the literature, I generated a list of relevant phrases and terms to use in structured database search.

In biology, for work in the conservation literature I used ((human wildlife conflict) OR (human elephant conflict)) with 2104 results, while for elephants I used (("Asian elephant" OR "African elephant") AND (behaviour OR biology)) with 434 results. For human geography ("animal geography" OR "more than human geography") with 133 results and for anthropology ("human animal relations" OR "nonhuman persons" OR "multispecies ethnography") with 281 results. All of these terms were then used in a combined search, with 1830 results. The database classification of 'subjects' differs from the classification I refer to above, and there is some overlap between the various subjects. Broadly, the natural sciences, which I assume account for the majority of work in conservation biology and ethology (including subjects like "agricultural and biological sciences", "environmental science") account for about 70% of the literature. The "social sciences", which includes most of the human geography literature accounts for 15%, and the "arts and humanities", which includes journals such as cultural anthropology account for 5%. Scopus also included "multidisciplinary" as a subject, which accounts for less than 1% of the literature. The majority of the results were journal articles (84%), then reviews (6%), book chapters (3%) and conference papers (2%).

The database search was far from comprehensive; it included only 25 books in total, but clearly there are many more books written on the subject, which were accessed through recommendations from researcher networks that I am a part of. This broad set of publications was used as a baseline to understand the literature, following through the references using the snowballing technique to access a much larger body of relevant work, particularly in the social sciences.

2.1.2 Policy relevance

Given my commitment to the practice of conservation and the desire for this work to be relevant on the ground, a brief discussion on how the literature interacts with policy is warranted. This has been a topic of discussion for some time in the critical social sciences. Applied anthropology was discussed in the 1950s, where it could be "used in a common-

sense way to solve social problems” (Evans-Pritchard 1946), and continued to attempt work with and for government agencies to directly contribute to policy for a few decades (Willner 1980; Cochrane et al. 1980). But the focus has now shifted to anthropology of policy, where the process of policy making itself is more closely examined (Okongwu and Mencher 2000; Wedel et al. 2005; Shore 2012). Geography has also had its share of discussion around its interaction with public policy. Massey (2001), during the Progress in Human Geography Annual Lecture in 2000, discusses the role of geography in society and its inability to significantly influence policy, argues that it should “be more confident of its own specificity”, particularly the “coexistence of physical and human geography” and the need for reformulation of “many popular and political concepts of space”. Martin (2001) laments the lack of relevance and influence of geography on policy, and makes a plea for a “policy turn” in the discipline since “geographers could – indeed should – be having a much greater influence on policy”. Dorling and Shaw (2002) also lament the fact that geography has “turned its back on public policy” and examine the debate around this concluding that the discipline is unlikely to make a large shift towards policy oriented research.

Geography and anthropology literature, therefore, is more muted in its interaction with the policy space (particularly so in the realm of conservation), where the reluctance to proactively engage with policy stems from the understanding that the policy-making process is inherently political (Hoggart 1996), and the concern that any superficial engagement or broad-based, oversimplified policy recommendations arising from research may be problematic.

This debate and understanding of the policy process is largely absent in the conservation literature, with a more clearly stated objective of being directly relevant to policy. The interaction between conservation science, values, advocacy and policy has been discussed for some time now (Barry and Oelschlaeger 1996; Noss 1996). While there was some debate about the conflict and questionable objectivity around scientists engaging in advocacy, the normative position is that conservation science should impact policy, with one article even evocatively titled “How to lose your political virginity while keeping your scientific credibility” (Blockstein 2002). A review of all the published papers in the five major conservation journals from 2000-2004 found that they all contained significant

policy suggestions (Scott et al. 2007). These suggestions are also taken up by the IUCN, where the same group of “conservation biologists” are a part of United Nations Conventions (e.g. the Convention on Biological Diversity, the Framework Convention on Climate Change, Convention on the Law of the Sea) and the annual Conference of Parties produces a range of policy recommendations around conservation that are legally binding for all the nations and have been ratified through these global treaties.

Given this very direct link to policy, this is the literature I (cautiously) situate most my work in this literature, whilst being aware of my positionality and the political underpinnings of the policy process (which is discussed in detail in Chapter 3).

With my background, of a practical engagement with the community contexts and practice of a human-inclusive form of nature conservation, I take a “bottom up” approach to influence policy. I use this body of research to change policy locally and make a positive difference to the lives of people and elephants on the ground, and to then work upward into more regional and national policy changes around the human-elephant interface.

In the subsequent Sections, I review the work around understanding humans, elephants and their interactions, across the various disciplines and highlight what I take from these various disciplines and the limitations that this thesis aims to address.

2.2 Biology

There are two major strands in biology that are relevant to my thesis: (1) the conservation literature which links to all the four research questions, and (2) the literature on elephant biology, which is linked to the third question on elephant diversity.

2.2.1 Conservation and “Human-Wildlife Conflict”

The conservation literature is leading in terms of the volume of published work on human-animal interactions, though it is framed largely as a problem of human-wildlife conflict (HWC), defined by the IUCN as:

“Human-wildlife conflict occurs when the needs and behaviour of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife. These conflicts may result when wildlife damage crops, injure or kill domestic animals, threaten or kill people”. Recommendation 5.20 (WPC 2005).

Arguably, the traditional view among biologists and conservationists is that humans and wildlife are inherently incompatible; as human densities increased wild animals were wiped out (Woodroffe 2000), and given that people and animals compete for the same resources (Balmford et al. 2001), “conflict” was inevitable in shared spaces or at the human-wildlife interface (Treves and Karanth 2003). There were over 2000 journal articles that included HWC or HEC as a keyword, growing at a significant pace with over four articles added every week (Scopus, 2018).

Documents by year

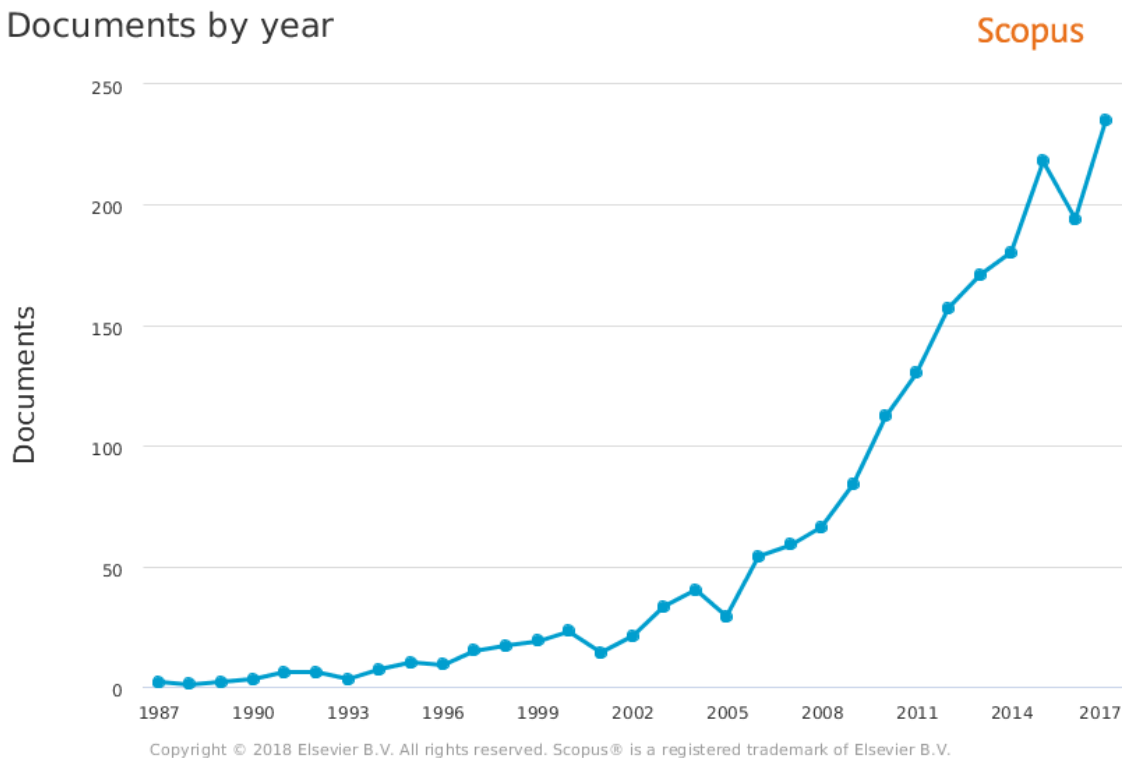


Figure 1: Journal articles published every year with human-wildlife conflict or human-elephant conflict as a keyword.

Making sense of these 2000+ studies is a challenge, and rather than attempt a systematic quantified review, I first summarise the evolution of this literature over the last three decades, and then describe some of the key thematic areas that are currently being discussed and that are relevant to this thesis.

2.2.1.1 The history of HWC

The first mention of HWC in the Scopus database is in 1987, as “human/wildlife conflict” where an Indian government official describes a conservation challenge on account of human habitation adjoining a national park boundary, where “*wild animals ravage the crops of poor villagers, and domestic stock cross the boundary to graze*” (Choudhury 1987). The same term is mentioned in a document discussing community based natural resource management in Zimbabwe (Murphree 1990). Conflict with elephants also first manifests as “human/elephant conflict” by Smith and Mishra (1992), and Sukumar (1991) mentions “elephant-human conflict”.

In all of the early HWC work (through the 1990s, with about 20 articles with HWC as a keyword) the focus is on recognising that wild animals have a significant negative impact on local communities, with efforts to quantify this impact (Sukumar 1991; Barnes 1996; Oli et al. 1994; Saberwal et al. 1994; Sekhar 1998), with the economic loss per family sometimes as high as half the Indian national average income (Mishra 1997). There is an expectation that the problem will escalate as wildlife populations grow on account of successful conservation efforts (Tchamba and Elkan 1995) and as human populations continue to expand (Gichuki 1999; Samuels and Altmann 1991). Some studies aim to find some patterns and predictors of conflict (Naughton-Treves 1997; Saberwal et al. 1994), but often find none (Hoare 1999). The “solution” proposed most often in this period is culling to reduce animal numbers (Pirta et al. 1997; Ali 1999; Tehamba 1996; R1 Sukumar 1991), particularly in North America, where HWC is framed more as a problem around the management of “wildlife damage” (Conover and Decker 1991; Rutberg 1997; Craven et al. 1998). Other proposed solutions include financial compensation to humans for the loss, and some mention of spatial separation of spaces (Hoare 1992; Thouless and Sakwa 1995), with one study suggesting an insurance scheme to compensate people (Mishra 1997). A few studies aimed to understand local people's attitudes to animals and conservation (Oli et al. 1994; Barnes 1996; Badola 1998), with one study differentiating between “real” and “perceived” conflict and suggesting no management intervention was required as conflict was more perceived than real (Siex and Struhsaker 1999).

The early 2000s (up to 2005, where close to 100 HWC papers were added) saw a shift in the framing of the problem, from increasing wildlife populations adversely impacting local communities, to human and wildlife competing for the same resources and being inherently incompatible (Woodroffe 2000; Harcourt et al. 2001; Balmford et al. 2001; Treves and Karanth 2003). Quantification of the losses to local communities continued (Madhusudan 2003; Sitati et al. 2003), and the majority of the proposed solutions shifted to fences and barriers, with a sense that separation was inevitable even though not the most desirable or practical solution (Nyhus and Sumianto 2000; Williams et al. 2001; Vollrath and Douglas-Hamilton 2002; Sitati et al. 2003;), and some more organic forms of barriers like chilli or bee hive fences were mentioned (Osborn 2002; Vollrath and Douglas-Hamilton 2002). The first significant criticism of compensation schemes emerges, where payments could act as a perverse subsidy for unsustainable livestock and agricultural

practices and dis-incentivised farmers from better protecting their crops or livestock (Bulte and Rondeau 2005).

A slightly more nuanced understanding of human-animal interactions began to emerge during this period, to include conflict between different groups of people over wildlife (Messmer 2000; Redpath et al. 2004). People's perceptions of wildlife, parks and conservation were assessed and found to be very variable (Carpenter et al. 2000; Bauer 2003; Hill 2004), and the idea of "coexistence" is first mentioned (Weladji and Tchamba 2003). In India it was found there was very little conflict with animals in tea plantations (Kumara et al. 2004), and there were some "*traditional coexistence propensities*" since large animals had not been exterminated in India in the same way as the developed world (Venkataraman 2000). In Europe also, it was found that conservation of large carnivores was possible outside protected areas (PAs) at high human densities if management policies were favourable (Linnell et al. 2001).

In 2003, the International Union for the Conservation of Nature held its 5th World Parks Congress in Durban, South Africa, with over 3000 conservation practitioners, experts and policy makers, with the proceeding and recommendations published two years later (WPC 2005). The idea of HWC was central to the meeting, with the term officially being defined for the first time as above. A technical workshop titled "Creating Coexistence Between Humans and Wildlife: Global Perspectives on Local Efforts to Address Human-Wildlife Conflict" resulted in a special issue of the journal "Human Dimensions of Wildlife" being published with articles by participants of this workshop. A list of "lessons learnt and guiding principles" was recorded: (a) HWC is often human-human conflict, (b) Biology is a part of the solution, but not sufficient in itself, (c) perceptions of conflict matter and must be addressed (in a reversal of the previous suggestion that only "real" conflict mattered), (d) global insights had to be balanced with local variability, (e) multiple adaptable tools were required for successful coexistence and finally (e) conservationists had to demonstrate a genuine effort to mitigate HWC for local communities and build trust (F. Madden 2004).

This meeting and the publications from it appears to be a watershed moment for HWC, where the publications rate drastically increased (See Figure 1); about 100 articles were published in the decade before 2005 and about 700 in the decade after. The range and diversity in the scope of the work has changed significantly, which I describe in the next Section. But the key point is that HWC started as a problem of increasing wildlife populations causing damage to local communities' livelihoods at very local scales. From there, it grew into a more generalised global problem, of humans (as a species, with little distinction between the different groups of humans) expanding into natural habitats, and since they were unable to exterminate endangered wildlife as they had done in the past, coming into greater contact and conflict with wild animals over the same resources with negative impacts on both humans and wildlife (Woodroffe et al. 2005).

The literature has moved on considerably since the 2004 World Parks Congress, but the framing of HWC, of *Homo sapiens* being inherently incompatible with all other species, is highly problematic. Much of this is changing in the newer literature as I describe in the next Section on the “current conservation literature”, but the roots of HWC and its construction remain relevant to this thesis.

2.2.1.2 The current conservation literature

Since the Durban congress, while the volume of published literature has grown greatly, the majority of the articles are still case studies from different parts of the world, quantifying the negative impacts of HWC on either wildlife or people, or attempts to find patterns and drivers of conflict, (recent examples are Neupane et al. (2017), van de Water and Matteson (2018), with a review by Inskip and Zimmermann (2009)). On account of calls to standardize the reporting and data collection around HWC (Hoare 1999), the IUCN's African elephant specialist group created a standardised protocol for HWC data collection, but a comparison shows the Botswana Governments' data collection protocol has better spatial coverage and needs fewer resources, while the IUCN protocol has better temporal coverage (Songhurst 2017). A few papers also criticise the simplistic quantification of the negative impact animals have on people, and highlight the “hidden costs” of conflict, which include fear for physical safety and a “diminished psychosocial wellbeing” (Barua et al. 2013), and that women often bear a disproportionate burden of these costs, yet the

general perception is that men and women were equally affected (Ogra 2008; Khumalo and Yung 2015).

In addition to this on-going quantified understanding of HWC that forms the majority of literature, I chart out some key thematic areas in the literature that are relevant to my thesis.

Deeper understanding or re-framing of HWC

The final theme is call for a deeper understanding of HWC, or a critique of elements of HWC and mitigation, some of this work coming from the disciplines of geography and anthropology, using the Political Ecology framework. Fences to mitigate HWC are discussed, and Evans and Adams (2016) show that in Kenya while touted as a solution to HEC, are used by (white) rangers to keep (black) pastoralists out of their lands, and *“behind their technical façade, fences are highly political”*. Rust et al. (2016) show that in Namibia the level of livestock loss reported depends more on the relationship between (white) farmers and their (black) workers and inequalities left over from the apartheid regime. McGuinness (2016) shows that perceptions around crop raiding were significantly impacted by *“land tenure limitations and restrictions on agricultural autonomy, often driven by neoliberal trade”* rather than the usual assumed proximal causes. Ghosal et al. (2015), comparing Norway and India, show that people’s perceptions of large carnivores stem from the social constructions of the landscape. There is also a call for biologists to embrace the differing opinions between stakeholder groups as a way of improving conservation decision making, rather than prioritising the scientific opinion over other competing interests as *“democracies cannot function without dissent”* (Peterson et al. 2013).

There is a growing call to re-frame the idea of human-wildlife conflict. One study shows that while it posits animals and humans as conscious antagonists, in 95% of the 442 studies reviewed the issue was more about loss to humans than “conflict” between the species (M. N. Peterson et al. 2010). In another review almost all the studies that were not about economic loss actually describe human-human conflict (Redpath et al. 2015). Redpath et al. (2013) also frame human-human conflict as “conservation conflicts” and define it as

“situations that occur when two or more parties with strongly held opinions clash over conservation objectives and when one party is perceived to assert its interests at the expense of another”, and claim *“conservation outcomes will be less durable when conservationists assert their interests to the detriment of others”*. Most recently, Davidar (2018) argues that the term HWC creates more problems than it solves, and needs to be re-phrased to indicate the exact nature of the negative interaction between people and animals, if any.

This strand of the literature links to my first research question – on better understanding the range of political and ecological factors that create the context of human-elephant interactions, I chart out factors that mediate human-elephant interactions, and understand them in a way that is relevant to improving human-elephant relations.

Animal perspective

A second theme, with relatively fewer studies, aims to look at the impact of HWC (and more broadly human-wildlife interactions) on the lives of animals themselves, beyond the obvious culling and reduction in population. While translocation of problem animals is generally thought of as being more humane than killing the animals, there is very limited monitoring after animals are released to measure the effectiveness of the translocation (Massei et al. 2010). The question of immuno-contraceptives that affect wild animals' fertility as a way to check the population is also discussed (Massei and Cowan 2014). With American black bears it was found that males were quicker to adapt to human food sources than females (Ditmer et al. 2015). Coyotes adapt well to urban landscapes and learn to avoid roads during the day, but their diet changes considerably in urban spaces leading to poorer health conditions (Murray et al. 2015). Many other predators across the world are adapting to semi urban landscapes and consuming foods wasted by humans, but this results in detrimental changes in survival, reproduction and sociality and also significant changes in home ranges, activities and movement patterns, and could also worsen conflict (Newsome et al. 2015; Newsome and van Eeden 2017). Elephants living in human dominated landscapes were also found to “facultatively” change their behaviour to better adapt to the new conditions (Graham et al. 2009). Pumas in human-dominated landscapes were found to move more in the nights and less in the day, and their daily calorific expenditure increased by about 10%, which translates into 3-4 deer per year (though the

paper does not examine what the pumas are eating in semi-urban landscapes and assume it is still deer) (Wang et al. 2017). Hyenas exposed to people show some changes in personality traits – more exploratory and less neophobic (Greenberg and Holekamp 2017). Honda et al. (2018) review urban wildlife management from animal personality perspective, and find bold individual deer cause conflicting encounters and advocate selective culling of these individuals for a deliberate genetic selection of shyness as a desirable personality trait in wild deer.

Understanding the interaction from the animal's perspective is clearly useful, but the limitation is again the approach to question. There are certain deterministic assumptions about animal behaviour that fail to capture the complexity around how animals make choices, and how these change or evolve over time in response to humans. Khorozyan et al. (2018) for example, find leopards prefer to prey on native and natural coloured cattle as compared to black and white exotic breeds, and advocate more exotic cattle as a means of reducing HWC. They admit that this may change if the majority cattle end up being exotic black and white animals, but in the natural sciences framework, animal behaviour is assumed to be highly mechanistic, with little room to understand animals as thinking, sentient beings, adapting to living alongside humans. The literature on elephant biology and behaviour also offers some insights into understanding the interaction from an elephant's perspective, and this is something I do with the elephants in Gudalur through the second research question, presented in Chapter 4.

Human diversity

The most significant theme pertains to people – to measure and quantify their attitudes and perceptions of conflict, and to better understand “tolerance” to wildlife (Lute et al. 2016; Wilbur et al. 2018). Some of the key articles on this theme suggest that: the likelihood of retaliatory killing is not related to the economic and financial loss the wild animals caused, but more to other social beliefs and peer group norms (Dickman 2010; Treves and Bruskotter 2014; Gangaas et al. 2015), including aspects like connections to evangelical groups (Hazzah et al. 2009). How tolerant they were depended more on “intangible costs” rather than “tangible costs or benefits” (Kansky and Knight 2014) and people's beliefs about population trends, behaviour and ecology of the wild animals took priority over the people's real interactions with the animals and the damage they caused (Inskip et al. 2016).

There are also some studies that show that people's attitudes are linked to governance-related issues like 'elite capture' in community based natural resource management (Matema and Andersson 2015). There is also a call to have more structured, uniform and quantified approaches to understanding attitudes and tolerance that allows for a more systematic review (Browne-Nuñez and Jonker 2008), and the potential of using psychological theory to more effectively understand people (Bruskotter and Wilson 2014). A recent study in this thread is a nested 'Wildlife Tolerance Model', where an outer model, based on people's positive or negative interaction with wildlife results in benefits or costs, that predict how tolerant they are, and an inner model consisting of eleven variables - "*Wildlife Value Orientations, Anthropomorphism, Interest in animals, Taxonomic Group, Personal norm, Institutions, Empathy, Values, Norms, Habits, Perceived Behavioural Control*", each with its own hypothesis about how it will affect tolerance - further refining the prediction of a person's tolerance (Kansky et al. 2016).

Understanding the diversity among people is clearly important, and it is now reasonably well established in the literature that people are considerably different from each other in their tolerance of wildlife. The focus is now on better understanding the range of variables that predict tolerance. What is missing from this narrative is a deeper engagement with questions around culture from other disciplinary perspectives, particularly anthropology. Can call of the cultural diversity among people and their relations with animals be understood through quantified variables? This is an area I explore further in Chapter 5, where I examine the diversity among the people who interact with elephants.

Mitigation and solutions to HWC

The next thematic area of work relates to the mitigation and solution to the problem of HWC. There are numerous studies that compare the various forms of lethal control (e.g. state sponsored culls, public hunting, trophy hunting selective culling of problem individuals etc.) and there is significant discussion around the details, but the general consensus is that this form of mitigation may be useful for herbivores (Williams et al. 2013; Honda et al. 2018), but is not effective or socially acceptable for carnivores (Mech 2010; Way and Bruskotter 2012; Funston et al. 2013). Lethal control and culling were the key strategies suggested by biologists in much of the earlier literature, but new work claims this is increasingly a less acceptable solution (Treves and Naughton-Treves 2005;

Sijtsma et al. 2012; Van Eeden et al. 2018), and non-lethal methods are more successful in reducing conflict (McManus et al. 2015). Culling almost never happens with Asian elephants on account of religious sentiments (Stracey 1963) and is not discussed, but does happen occasionally for African elephants, but is again not considered appropriate given the endangered status of the animal and the public perceptions around culling (Erukwa 2017; Adams et al. 2017). A paper reporting the workshop proceedings highlight that number of experts (from the global north) all agree that lethal control should no longer be pursued as a solution to HWC (S. Dubois et al. 2017).

Compensation schemes are discussed; Watve et al. (2016) discuss the modalities by which compensation is disbursed in India and suggest changes to it. Bulte and Rondeau (2007) apply a mathematical model to compensation schemes in the developing world to suggest they were not ideal, as they could “*lower the wildlife stock, and may result in a net welfare loss for local people*”. Marino et al. (2016) examine compensation schemes in Italy over two decades of wolves expanding their range, and conclude that it fails to improve tolerance to wolves, and exacerbates conflict in the absence of a participatory process.

The fences continue to be discussed, and while there are numerous case studies where fences have seemingly been successful in the short term (Sitati and Walpole 2006; Gehring et al. 2011), a global review of the ecological and economic costs and benefits of fencing suggests that while they may be a useful stop gap measure, the long-term consequences may be negative (Hayward and Kerley 2009). There is a claim that while “*fences have spurred socio-economic activities in the area, they are not only ineffective in reducing human–wildlife conflicts but have given rise to other critical conflicts*” (Okello and D’Amour 2008). More organic forms of fencing, based on chilli plants or bee hives also gains significant attention ((King et al. 2011).

While barriers and compensation are the pillars of mitigation, they are clearly failing at some level, and not “solving” the problem of HWC, with interest in these two mitigation measures waning. There is a strand of the mitigation theme which suggests that HWC is extremely complex and that there can never be one “solution” to the problem (Marker and Boast 2015; Jochum et al. 2014). HWC is described as a “wicked” problem (a problem that

is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognise) that should draw on a range of other disciplines (including military strategy) to deal with the complexity (Game et al. 2014; Mason et al. 2018), and that mitigation is better thought of as an art rather than a science (Hoare 2012). A survey of over 500 conservation professionals across the world found that there is a common agreement about the problems, but not the solutions (Lute et al. 2018). Given the stated objective of contributing to policy and solving conservation problems that I have described in Section 2.1.2 earlier, this literature appears to have reached its limit, with no clear path ahead. I intend to take this strand of literature forward; on how the space can be better managed to minimise the negative impact people and elephants have on each other, primarily through the conceptualisation of the space, through the fourth research question presented in Chapter 6.

2.2.1.3 Interdisciplinarity

The conservation literature has also seen significant discussion around the question of interdisciplinary work as a way forwards in dealing with HWC (Mascia et al. 2003; Fox et al. 2006). Some early work on 'Wildlife Damage Management' laments the fact that wildlife managers *“tend to be well-trained in their technologies and wildlife biology, and not well-trained in sociology, anthropology, economics, history, psychology and political science”* (Schmidt and Beach 1994:1). Knight (2000), who brings the first “anthropological perspectives” - indigenous knowledge systems and locally relevant and sensitive management regimes completely missing from the HWC mitigation narrative.

Despite the importance of interdisciplinary conservation projects, there remains the challenge of social scientists are often called in too late, and assigned the task of answering seemingly arbitrary questions set by natural scientists, with numerous “philosophical obstacles” between better integration (Campbell 2005), where the interaction between Conservation Biology and political science is often “dialogue of the deaf” (Agrawal and Ostrom 2006). Conservation scientists criticise social scientists for only being critical and not offering constructive suggestion (Redford 2011), while social scientists argue that the role of the critical social sciences is to critique the practice of nature conservation projects so they can be improved (Sandbrook et al. 2013). There are a number of suggestions on how conservation and social scientists can better engage to achieve positive conservation

outcomes despite the “great epistemological gulf” (Brosius 2006). Adams (2007) highlights the complexity of language used by social scientists that makes it unintelligible to natural scientists, with epistemological differences forming both academic and practical barriers, and ends with calling on natural scientists to “think like a human”, with the need being to have “interdisciplinary people” rather than “interdisciplinary teams”. Sandbrook et al (2013) make an important distinction between social science *for* conservation (to better help achieve positive conservation outcomes) and *of* conservation (to examine conservation as a social process), while accepting there is very little social science *for* conservation.

The question of interdisciplinarity is clearly important, with numerous calls for more interdisciplinary work as I have described above, with the key limitation being a lack of the clear understanding of the epistemological differences, and very little social science *for* conservation. Much of this is limited by methodological constraints which I describe later in this Chapter, but one of the key contributions of this thesis is to clearly chart out and constructively work with the epistemological requirements of both the social and natural sciences.

2.2.1.4 This thesis and HWC

The idea of HWC has clearly evolved considerably over the years, with a much more nuanced understanding of the multitude of issues involved. It started by recognising that rural people living alongside nature reserves suffered significant losses on account of wildlife, then moved on to (and continues to) quantify the losses and looking for determinants and patterns.

I briefly summarise the key thematic areas in the conservation literature that link to this thesis:

- The call for a deeper understanding of HWC or criticism of the way it is constructed is a key theme in the HWC literature. Throughout this thesis that is an area I contribute to, where the interaction between elephants and people is not constructed as one of merely conflict. The first question examines the range of ecological, social and political factors that underpin human-elephant interactions and allow for a deeper and more nuanced understanding of the issue.

- Understanding the diversity in the humans in terms of their attitudes and beliefs about animals and conflict is a growing theme. But the approach is limited by the framing of all interactions as “conflict” and also that it remains firmly rooted in the positivist epistemology with quantified data (which I discuss more in Section 2.4 on methodology), and does not interface with ideas of human diversity in other disciplines like anthropology, which have been engaging with “alternative worldviews” for decades (described later in Section 2.3.1). Through the second question on understanding the varied human practices that impact the shared space, I engage with and contribute to this thematic area of research by adding some depth through disciplinary lenses other than those conventionally used in the conservation literature.
- Understanding HWC from the animal’s perspective is a growing area of interest in the literature, but again like above is limited by the same framing and epistemological boundaries of biology I have mentioned above. Emerging work in “more-than-human geography”, “multispecies ethnography” and the “anthropology of life” that examines the interactions between people and animals (discussed more in Section 2.4 on methodology) find no mention in this literature. I contribute to this through my third research question on understanding the diversity in elephants in their interactions with people, where behaviour is understood as the outcome of complex cultural, social and cognitive process, and not merely mechanistic reactions to ecological and evolutionary needs.
- The fourth theme is around mitigation and solutions to HWC. The consensus, arguably, is that HWC is a complex and “wicked” problem, with the solutions is more of an “art” than a science, with there being uncertainty about the future of how these interactions will pan out as human populations continue to expand and some wildlife populations also recover. I address this in my fourth question, framed more as a question of how the shared space can be better conceptualised and managed to minimise the negative impact people and elephants have on each other.
- Finally, suggestions have been made that interdisciplinary research has been a failed endeavour in the conservation literature. I address this through a part of my last question on how shared spaces can be better understood, and argue that this is largely on account of a limited understanding of the epistemological boundaries of

the disciplines and the lack of genuinely interdisciplinary methodological approaches.

2.2.2 Elephant Biology

The literature on elephant biology is vast, and responsible for much of our understanding of elephants. It maps directly onto my third question, of understanding the diversity among the elephants and their interaction with people, and I use this literature at two levels. First the biological understanding of an elephant – physiology (function of its various bodily parts), demography and home range, to compare the elephants of Gudalur with other populations. An important factor to consider is that almost all the research I describe in this Section comes from elephants living in largely intact forests, and only a few studies (which I explicitly highlight) are from elephants that live alongside people. The second way in which I use this literature is to describe the (limited) work on elephant behaviour and personality, to better understand how the elephants within Gudalur differ from each other in their interactions with people. This is a gap in the literature that I will address in the thesis. I pay particular attention to the methods used to answer these questions, to help inform the methods I use to study the Gudalur elephants which I describe later in this Chapter.

In describing the existing ecological knowledge of the Asian Elephant, I rely on a few key sources of information rather than reviewing the history of elephant research¹⁷.

Asian Elephants are one of the largest land mammals, being slightly smaller than their African counterparts. They live in female led herds, where males leave their natal herd at puberty and live solitary lives, or in loosely linked, often temporary, small, all-male herds. The herds are usually led by the oldest female, or matriarch, and operate within a fission-fusion society, with large herds coming together in some seasons and splitting up into

¹⁷ I use three comprehensive sources – the IUCN redlist report on the elephant (Choudhary et al. 2008), and comprehensive books “The Asian Elephant - Ecology and Management” (Sukumar 1992) and “The Living Elephants- Evolutionary Ecology, Behaviour, and Conservation” (Sukumar 2003), along with other papers that highlight newer work on elephants.

smaller units in other seasons, resulting in extended social networks across a large number of individuals (Sukumar 2003). Asian elephant societies show a less rigid dominance hierarchy within the herd compared to African elephants, with different individuals playing leadership roles at various points of time (de Silva et al. 2011). They are one of the few herbivores that are not preyed upon, with the largest of carnivores at best occasionally targeting young calves. Their lifespans are comparable to humans; about 60 years in the wild and 80 in captivity. Both sexes reach sexual maturity at about 15-18 years. The gestation period is 18-22 months, with the calves suckling for about three years, and an inter-calving duration of about 5 years. This is one of the longest among mammals, making population growth within the species very slow (Sukumar 2003).

They are spread across most of South and South-east Asia, but India is home to about 28,000 of the estimated 46,000 Asian elephants in the world. They spend 14-19 hours a day feeding on a wide variety of plants, with a requirement of about 150 kilograms of fodder and 80-200 litres of water every day, and can never be too far from a water source. They are crepuscular – most active at dawn and dusk, and sleep for only about four hours/day, usually at night. Males have tusks while females have smaller, almost hidden “tushes”. A significant number of males, called “makhnas”, do not have tusks, ranging from 5% to over 90% in some populations, where an increase in the percentage of such males could possibly be in response to the poaching of the males for ivory (Choudhary et al. 2008).

2.2.2.1 Physiology

Musth

Musth is a key feature in males, its origin in the Urdu word for intoxication, has been written about for centuries. Sukumar (2003) argues that the most apt description of musth can be found in Nilakantha's *Matangalila* (a Sanskrit text of unknown/debated origin but believed to be not later than 300 AD): "*Excitement, swiftness, odour, love, passion, complete florescence of the body, wrath, prowess, and fearlessness are declared to be the eight excellences of musth*", which alludes to aggressive behaviour, chemical signalling, and the sexual connotations of musth. For a period in the year, they experience heightened testosterone levels (45-150 times the normal), with visible secretions from the temporal glands located between the eye and the ear. It lasts from one day to four months, depending on the age/sexual maturity and body condition of the elephant, and environmental conditions. While traditionally the focus has been on the aggression in captive elephants during this phase, newer work with wild elephants suggests that from an evolutionary perspective, reproductive success is the most important aspect of musth, where they range over much larger distances looking for mates and younger males in musth are able to compete with older more dominant males (Chelliah and Sukumar 2013).

Body condition and stress

Some recent work on body condition and stress is worth mentioning briefly, given its relevance to the Gudalur elephants. Pokharel et al. (2017) examined body condition (with a score from 1 to 5 indicating very thin to very fat) and faecal glucocorticoid metabolites (fGCMs) levels. fGCMs are generally used as an indicator of stress (Mostl et al. 2002, Shutt et al. 2012). They find that fGCMs are high in elephants with low body condition scores and in the summer, which broadly implies thinner elephants are more stressed out, though they are careful in using "physiological health" rather than "stress". Vijaykrishnan et al. (2018) also examine fGCMs in elephant living outside protected areas and find elephants close to human habitation have higher levels of stress than those away from humans. Or taken together, the two studies show that elephants are more stressed with less food, when they are close to people.

Sleep

Though most of the work around sleep in Asian elephants has been with individuals in captivity, there has been a recent paper on African elephants that has received significant attention (reports in 17 popular media outlets), where elephants were found to be the shortest sleepers of all mammals. They sleep between 0-5 hours a day (mostly at night), with an average of two hours, both standing and lying down, with recumbent, non-rapid eye movement sleep occurring only when perfectly undisturbed. They can go up to two days without sleep in disturbed environments, and don't show rebound sleep after these periods (Gravett et al. 2017).

Perceptual systems

Their eyesight is poor, particularly in bright light, and limited to less than fifty metres (Tokoyama et al 2005). They are highly tactile, using their trunk, ears, tusks, feet, tail, and whole body to touch each other in aggressive, defensive, affiliative, sexual, playful and exploratory contexts. But it is their auditory and olfactory senses that are the most significant.

They are able to produce sounds ranging for 5 Hz to 9000 Hz (humans hear from 20 to 20,000 Hz), relying more on low frequency rumblings for normal communication and high frequency trumpets and 'barks' when alarmed or stressed. The low frequency rumbles are known to travel up to 10 kilometres in certain conditions, making them effectively able to communicate over an area of over 250 square kilometres. These vibrations also travel through the ground, and they are able to detect the seismic waves through transmission through from their bones to the middle ear, or possibly through specialised receptors in their feet and trunk (Sukumar 2003, Byrne et al. 2009).

Their sense of smell and chemical communication is perhaps the most important. Their nasal cavity has 7 "turbinates", scrolls of bone and tissue specialised for olfaction (dogs have five and humans three). They also have the highest number of olfactory receptors and genes associated with smell compared to any other species (Niimura et al. 2014). Chemical processing and communication is significant, through a specialised "vomeronasal" organ on the roof of their mouths. They use the tips of their trunks to touch pick up signals and

put it into their mouths to process these signals. These include secretions and fluids from the bodies of other elephants, particularly in relation to mating and reproduction. From inspecting urine spots and dung on the ground they are able to pick up on chemical cues to distinguish individual elephants (Byrne et al. 2009).

In any human-elephant interaction, the two species sense each other very differently. Humans rely largely on their visual sense, while elephants have poor vision and rely more on their other senses. This is relevant in understanding the human-elephant interaction, and also from a methodological perspective for a researcher engaging with elephants, both of which I discuss at various points through this thesis.

2.2.2.2 Demography and home range

Demography

Estimating age and sex has been done in numerous studies (Santiapillai et al. 1984; Katugaha et al. 1999; Sukumar et al. 1988; Sukumar 1989; Varma et al. 2006; Goswami et al. 2007) but with no methodological consistency between the studies. For generalisations about demography, sex ratio is perhaps the only factor that can reasonably be examined – males: females (not including the calves, whose sex cannot be determined in wild elephants). Given the significant variation in context, it is perhaps appropriate to consider the studies undertaken in different locations in the south of India, with a contiguous population of elephants (Arivazhagan and Sukumar 2008; Goswami et al. 2007; Varma et al. 2006). The male: female ratios across all these studies are very similar, on average about 18% males and 70% females (and 12% calves), or an approximate male: female ratio of 1:4.

Home range

Home range has been an endearing concern for elephant biologists, with the long ranging and nomadic nature of elephants being central to the animal's description in the literature (Choudhary et al. 2008). All of the early work on studying the extent of elephant home range began with identifying individuals in multiple locations, both in Africa (e.g. Douglas-Hamilton 1972), and Asia (e.g. Olivier 1978; Easa 1988). The technology then

moved on to very high frequency (VHF) radio collars on the elephants that allowed the researcher to locate the elephant if they were able to get within a few kilometres of the animals, and more recently satellite/global positioning system (GPS) collars with an embedded global system for mobile (GSM) communication unit to send data in and out of the collar, where data on the elephant's location is sent directly to the researcher's computer. The newer methods are considered superior in that (a) they allow for a much finer and controllable temporal scale of data collection and (2) they are more easily replicable/verifiable, and not heavily reliant on the expertise of the observer. A summary and comparison of all the published studies on Asian elephant home range is presented in the table below.

<i>Method</i>	<i>Study</i>	<i>Region</i>	<i>Sex</i>	<i>Range (km²)</i>	<i>Time in months</i>	<i>No. of Locations</i>	<i>Locations per month</i>	<i>Habitat</i>
Observation – Individual Identification	Easa 1988	South India, Kerala	Herd	124	12	226	19	Forests and plantations
			Herd	157	12	200	17	Forests and plantations
	Sukumar 1989, Data from 1985-1986.	South India, Nilgiris	Male	320	26	12	0.5	Dry deciduous forests, grasslands
			Male	215	9	7	1	Dry deciduous forests, grasslands
			Male	170	20	11	1	Dry deciduous forests, grasslands
			Herd	105	24	14	1	Dry deciduous forests, grasslands
			Herd	115	23	15	1	Dry deciduous forests, grasslands
	Desai 1991	South India, Mudumalai	Male	200	66	209	3	Deciduous and thorn forests
			Male	243	19	103	5	Deciduous and thorn forests
			Male	168	51	53	1	Deciduous and thorn forests
			Herd	232	69	257	4	Deciduous and thorn forests
			Herd	111	61	60	1	Deciduous and thorn forests
			Herd	266	57	56	1	Deciduous and thorn forests
	Datye and Bhagwat 1995	North-east India	Male	259	36	41	1	Fragmented dry deciduous forests
			Male	3343	36	39	1	Fragmented dry deciduous forests
			Male	4349	36	18	1	Fragmented dry deciduous forests
Female			339	36	31	1	Fragmented dry deciduous forests	
VHF Collars	Olivier 1978	Malaysia	Male	38	10	16	2	Secondary forests
			Female	167	7	17	2	Secondary forests
			Female	59	6	16	3	Primary forests
	Joshua and Johnsingh 1993	North-central India	Male	200	22	469	21	Sal (dry deciduous) forests
			Female	34	22	277	13	Sal (dry deciduous) forests
	Baskaran et al. 1995	South India, Nilgiris	Female	623	24	341	14	Deciduous and thorn forests
			Female	530	21	294	14	Deciduous and thorn forests
			Female	800	22	106	5	Deciduous and thorn forests
			Male	375	15	113	8	Deciduous and thorn forests
			Male	211	18	224	12	Deciduous and thorn forests
	Fernando et al 2008 Data from 1996-2001.	Southern Srilanka	Male	459	34	94	3	Dry, semi deciduous and thorn forests
			Female	176	36	172	5	Dry, semi deciduous and thorn forests
			Female	64	33	179	5	Dry, semi deciduous and thorn forests
			Female	56	29	52	2	Dry, semi deciduous and thorn forests
			Female	185	34	109	3	Dry, semi deciduous and thorn forests
			Male	83	20	39	2	Dry, semi deciduous and thorn forests
Female			78	20	141	7	Dry, semi deciduous and thorn forests	
Male			92	17	21	1	Dry, semi deciduous and thorn forests	
Female	125	19	37	2	Dry, semi deciduous and thorn forests			

<i>Method</i>	<i>Study</i>	<i>Region</i>	<i>Sex</i>	<i>Range (km²)</i>	<i>Time in months</i>	<i>No. of Locations</i>	<i>Locations per month</i>	<i>Habitat</i>
			Female	41	22	169	8	Dry, semi deciduous and thorn forests
	Williams et al 2008, data from 1998-2001.	North India, Rajaji	Male	407	24	253	11	Deciduous, scrub forest and grasslands
			Male	188	24	285	12	Deciduous, scrub forest and grasslands
			Male	255	10	123	12	Deciduous, scrub forest and grasslands
			Female	184	21	233	11	Deciduous, scrub forest and grasslands
			Female	327	24	235	10	Deciduous, scrub forest and grasslands
			Female	306	24	211	9	Deciduous, scrub forest and grasslands
			Female	252	24	264	11	Deciduous, scrub forest and grasslands
Satellite/GPS Collars	Stüwe et al. 1998	Malaysia	Male	343	6	43	7	Rainforest, plantations
			Female	6804	11	41	4	Rainforest, plantations
	Alfred et al 2012	Borneo	Female	316	7	58	8	Rainforest
			Female	292	12	165	14	Rainforest
			Female	779	12	277	23	Fragmented Rainforest

*Table 1: Comparison of all published literature on elephant home ranges.*¹⁸

From the table, there are two elements that are relevant to my thesis (a) the methods used to determine how far elephants range and, (b) the area that individual elephants range over, which is very relevant to their conservation.

First in terms of methods, there is some temporal overlap, but the trend is towards the newer more sophisticated methods, and direct observation is no longer used. The most important element in home range data is how often the elephants are located, and the interval between successive locations, yet none of the studies except Sukumar (1989) report this.¹⁹

¹⁸ Studies with data over periods of less than 6 month were omitted, since ranging behaviour varies across seasons

¹⁹ In a radio collaring project in 2005 in central India, at the end of October an adult male suddenly made a long journey of about 50-60 km to the east, and then returned to the original location in less than two weeks. If no data was collected over this two week period, it would have made a difference of about 60% to the observed home range (Sukumar, pers. comm.). With the GPS collars this is not likely to be a significant problem, but it could well be with some of the older studies, and therefore reporting the temporal spread of location data is relevant.

<i>Method</i>	<i>Average locations per month [number (\pmSD)]</i>
Direct Observation	3.46 (\pm 5.59)
VHF Collars	7.48 (\pm 4.01)
GPS Collars	11.43 (\pm 6.60)

Table 2: Summary of frequency of locating elephants with different methods.

In the direct observation, with the exception of Easa (1988) (who was exceptional in that he continuously followed the same herd for two years and saw them 17-19 times a month), all the other studies located the elephant 1.5 times a month on average. With radio collars this improved considerably, where many of the studies (Baskaran et al. 1995; Fernando et al. 2008; Williams et al. 2008), locate the elephants at least once a week, with the average locations going up to about 7.5 per month. Finally, with the GPS collars, the technology allows researchers to know where the elephants are almost every day or even multiple times in the same day. However, this does not seem to reflect in the data, and there is only an incremental improvement to 11.5 locations per month. Even with the maximum of 23 locations per month (Alfred et al. 2012), the best technology today provides only marginally better data than what Easa (1988) achieved almost three decades ago, with dedicated manual tracking of the elephants. This could be on account of a time lag in publications, where many studies that have been undertaken over the last few years have not been published.

Second is quantitatively defining the extent of an Asian elephant's home range. The habitat type and rainfall could play an important role in home range, with the availability of water being a key factor. I therefore use this to broadly categorise the forests into wet (studies in peninsular Malaysia, Borneo and Kerala) and dry (all other studies), and then compare home range between males and females, which is presented in Table 3 below.

<i>Forest Type</i>	<i>Females [km² (±SD)]</i>	<i>Males [km² (±SD)]</i>
Dry (scrub, deciduous, grassland, thorn, fragmented)	236 (±202)	240 (±105)
Wet (primary/secondary rainforest, fragmented plantations)	270 (±242)	191 (±216)

*Table 3: Summary of home range results.*²⁰

With the high standard deviation, it is evident that no generalisations can be made about home range, despite the narrative around elephants being “long ranging animals” being echoed by the IUCN Asian elephant specialist group (Choudhary et al. 2008).

A note on the changing methods to track elephants is relevant, which has moved from direct observation, to VHF collars, to GPS-GSM collars. The newer methods offer significantly more data, but there is also a change in fieldwork patterns that has gone unnoticed. Direct observation involved the researchers going into the field and actually finding elephants and getting close enough to carefully watch and engage with them. VHF collars and radio telemetry involved going into the field and getting at least within a few kilometres of the elephants to triangulate position, with researchers often moving up to the elephants to collect some observational data. The satellite GPS-GSM collars send the data straight to the researcher’s computers and trips into the field to see or interact with the elephants themselves are not integral to understanding how the elephants move. There is a decreasing focus on significantly engaging with elephants, following them over years and spending extended periods of time with them. While there is a lot more quantitative data available with the newer methods, there is much less qualitative data and an engagement with the elephants. All of the early researchers spent long hours observing and interacting with the elephants they studied, and while not central to their scientific research, gained significant insights into the lives of elephants. This is completely missed by much of the newer work with the focus on the mathematical robustness of the data rather than the lives of the elephants themselves.

²⁰ Three instances show very large ranges of over 3000 km² (Datye and Bhagwat 1995; Stüwe et al. 1998), but these are on account of the elephants dispersing, and are not representative of the elephants’ range.

This literature on demography and home range provide a “baseline” to compare with the Gudalur elephants, and this is something I examine in Chapter 4, on the diversity in the elephants.

2.2.2.3 Cognition, behaviour and personality

Cognition

Based on human indices of cognition, elephants are one of the most intelligent animals. Their brains are comparable to humans in terms of structure and complexity, with the cortex having as many neurons as humans (Roth 2012). They are able to use tools, learn quickly and cooperate with each other in complex tasks (Plotnik et al. 2011), are one of the few animals that are self-aware and respond to the mirror test (Plotnik et al. 2006), and are even able to do basic arithmetic beyond what any other nonhuman species is capable of (Callaway 2008).

The level of cognition is similar to primates, cetaceans (dolphins) and corvids (crows) (Clayton 2012), but Byrne et al. (2009) argue that elephants could be more advanced than any other species if “more naturalistic” measures of cognition are used, outside of labs and experimental scenarios. They have been observed to be altruistic (Holdrege 2011) and show empathy for problems faced by others. They are the only other species known to sometimes have rituals around death (O’Connell 2008). They can sub-categorise people based on scent and colour of their clothes (Bates et al. 2007) They have immense spatial memory and are able to remember large-scale space over long periods, and also continuously keep track of the current locations of many family members (Bates et al. 2008).

Given this intelligence, it is evident that simple barriers and other technological approaches to separating human elephant spaces to reduce “HEC” will have limited success as elephants learn to breach them. This is very relevant for the elephant I study that co-inhabit spaces with people, and is discussed more in Chapter 4 on elephant diversity and also Chapter 6 on better managing the shared space.

Behaviour and personality

The methods and history of ethological work (studying animal behaviour) is a useful starting point in understanding the history and evolution of animal behavioural studies and the current work. The majority of the modern work on animal behaviour has its roots in Darwinism (Darwin 1859), and how a species evolves over time to adapt to its environment. Tinbergen (1963), regarded as one of the founders of ethology, and Mayr (1982) identified and refined four major questions in ethology that explained all animal behaviour.

Proximate explanations:

1. Causation (mechanism): what structure, process or particular feature of the animals causes the particular behaviour (hormones, pheromones, the brain etc.)?
2. Development (ontogeny): what part of the animal's nature (genes) or nurture (learning) is responsible for the behaviour?

Evolutionary/ultimate explanations:

3. Function (adaptation): how does the long-term survival/fitness of the species improve with the behaviour?
4. Evolution (phylogeny): how does the behaviour differ from other closely related species, and how did the species evolve to behave in this way?

These four questions formed the basic underlying framework for most ethological work through most of the 20th century, focussing on explaining animal behaviour, although the range of nuance in the questions has however broadened considerably in the last few decades (Manning and Dawkins 2012).

The question of animal personality has, however, not been a focus area in ethological research (Shettleworth 2001). But this plays an important role in understanding their varied interactions with people as I will explore in this thesis. Personality is defined as “certain behavioural traits that are stable over time and context”, and also “potentially hereditary” (Stamps and Groothuis 2010). Personality among animals has now been demonstrated in

over 200 nonhuman species, but coming largely from psychologists, with the focus being on studying animal personality to understand the implications of it for better understanding human personality (Gosling 2001).

Lee and Moss (2012) have published the only work done on personality of African elephants in the wild. Based on their combined observation of the herds over a few decades they rank individuals on a seven-point Likert scale across 28 adjectives (playful, protective, irritable etc.). They undertake a principle component analysis with this data, and find they all load onto four factors – leadership, playfulness, gentleness and constancy – which were found to differ significantly among the various individuals. The ranking of individual elephants is a subjective process based on 38 years of fieldwork in Kenya, and therefore clearly not something that can be replicated.

There are only two studies that attempt to examine elephants' behaviour in agricultural landscapes. Kumar and Singh (2010) study two herds of elephants in Valparai, also in South India, examining the nearest neighbour distance and feeding/vigilance behaviour against a range of land use/habitat types and proximity to people. As expected, reinforcing the human-nature dichotomy, elephants exhibit more “natural” behaviour away from people and in less disturbed habitats. Srinivasaiah et al. (2012) present some interesting work that attempts to understand decision making in elephants at both the individual and population levels. They examine a range of behavioural attributes – residence time, movement rates, time-activity budgets, social interactions and group dynamics (groups size, all male groups) – in response to resource availability (water and fodder) and human disturbance both inside and outside a protected area in South India. At the population level, decisions were somewhat predictable, based on biological and ecological attributes, but at an individual level, *“variation could be explained only by the idiosyncratic behaviours of individuals and that of their associating conspecific individuals”* (2012:1). That is, individual elephants' decisions are not based on the availability of fodder and water, level of human disturbance, or biological factors like age and sex, but based on some other personality traits or cognitive processes, and they are also learning some of these idiosyncratic behaviours from each other. These findings are arguably very new and radical for biology, since the attempt in the traditional biological framework is to understand most of animal behaviour in evolutionary terms. These findings therefore, call for

methodological and epistemological innovation in terms of how elephants are understood, which I attempt to do in this thesis.

2.2.2.3 Understanding the Gudalur elephants and their human interactions

Based on all the work I have described above we now have a fairly sophisticated understanding of the biological elephant. How this can be used to allow people and elephants to share space more peacefully is most relevant to my thesis. Biology as a discipline does not claim to be directly interested in the conservation of elephants; the focus is more on understanding organisms and their interactions with their “natural” environment. Interactions with people, or even elephants living in highly human-modified landscapes, are not considered natural, and there is understandably limited interest in studying this interface. There is no work within the ecological framework that explicitly attempts to understand elephants’ interactions with people, and very limited work (two studies described above) that even attempt to study elephants outside intact forests.

While ecology lacks the mandate and tools to understand elephants’ interactions with people, with 80% of the Asian elephant home range outside the PA network in India, there is clearly a gap in the understanding of elephants, since the majority of the studies come from only 20% of the elephants’ habitat. Many of the generalisations made about elephants are perhaps not true for all elephants, and understanding how the Gudalur “urban” elephants compare with the wild ones is an important starting point. What is therefore important in the work I undertake is that it can relate and contribute to the literature in the ecological framework rather than to work outside of it.

An important element of this literature and where I intend to contribute is methodological – how do I study the Gudalur elephants? The natural sciences rely on the ethogram (which I discuss in Section 2.4 on Methodology) to collect quantified data, but is a simple chart with multiple check boxes a reasonable way to understand the complex lives of elephants? This is a clear limitation, and I attempt to draw on numerous ideas from the critical social sciences to overcome this, which I discuss in the subsequent Section.

2.3 The critical social sciences

While biology and the conservation literature lead in terms of published work on the human-wildlife interface and in understanding elephant ecology, the critical social sciences have also significant bodies of work on these subjects, offering interesting insights into overcoming the epistemological limitations of biology. Both anthropology and human geography are seeing a growing interest in animals, which I review in this Section.

2.3.1 Anthropology

Cultural anthropology has been at the helm of understanding human cultures and how they evolved and differ from each other, and consequently has significant insights into the human relationships with nonhumans. Human geography appears to be growing as a discipline with a very similar mandate, but for a more direct and stated link to *space*, with significant overlap in methods and journals. The work I discuss in this Section is based largely on ethnographic field work with indigenous communities and diverse worldviews, with their embodied interactions with wild animals. This subset of literature pertaining to the human-animal interface is not as extensive as the literature on conservation or human geography. I do not attempt to classify or cluster the work in anyway, but instead attempt to highlight some of the key ideas that are relevant to this thesis.

2.3.1.1 Alternative worldviews

One of the most fundamental ideas that anthropology contributes to the better understanding of the human-animal interface is that of “other than human persons” that Irving Hallowell describes in 1960. The Ojibwa in North America thought of animals, non-living beings (stone, the sun, ancestors) and natural phenomena (thunder or wind) as “other than human persons” (Hallowell 1960). The most important implication of this is perhaps that it reconfigured the understanding of Native American (and many other) animistic religions, where the stress had been on the “supernatural”. This ontological status accorded to nonhumans is completely at odds with the dominant Judeo-Christian worldview where “man” is at the pinnacle of creation with all of nature at his disposal, where “*the Lord God sent him forth from the Garden of Eden, to till the ground...*” (Genesis 3: 23). These differing worldviews clearly have a significant impact on the human-wildlife interface and

provide key insights into what it means to *'live with'* animals from indigenous cultural perspectives, which have often negotiated these relationships in particular locales for centuries if not millennia (Nelson 1993). This “nonhuman person” ontology was found to be a common thread across many hunter-gather communities across the world, including some cultures in the tropics – the Batek Negritos people of Malaysia (Endicott 1979), the Mbuti Pygmies of the Congo (Turnbull 1965) and the Kattunayakans in the Nilgiri hills of South India (Nurit Bird-David 1999) Even more recent reviews of ethnographies in the Americas, Asia, and Africa find a “*remarkable consistency of animism across the world*” (Praet 2013:341).

Closely linked to this is the interaction between humans and nonhumans, particularly with respect to hunting. A “collaborative reciprocity” is expected between human and nonhuman persons, and when hunting *"the animals gave themselves to the hunter in response to the hunter's respectful treatment of them as nonhuman persons"* (Fienup-Riordan 1995:50). In accepting these “gifts” from animals, there is a debt accumulated which needs to be repaid through ritual practices, which include *"food taboos, ritual feasts, and prescribed methods for disposing of animal remains, as well as injunctions against overhunting and talking badly about, or playing with, animals"* (Nadasdy 2007:25). Ingold describes the hunter-gatherers' relationship with nature as one of trust, with no separation between people and their environment, where *"the hunter does not transform the world, rather the world opens itself up to him"* (2000:16). Similar views also exist among the Kattunayakan people in the Nilgiris who *"look to the forest as they do on a mother or father. For them it is not something 'out there' that responds mechanically or passively, but like a parent, it provides food unconditionally to its children"* (Bird-David 1999:190)²¹. Praet (2013) also extends this animistic worldview, showing that hunters, shamans or diviners sometimes temporarily “die” in particular rituals, and also routine shape-change into their nonhuman counterparts.

Michael Candea (2013) makes a further interesting observation about the alternative other-than-human ontology, beyond indigenous or traditional hunter-gatherer communities.

²¹ The critique – that similar perspectives emerge in from anthropologists in multiple locations since they are all looking for similar practices among local communities – remains, but is something that I do not attempt to delve into in this thesis.

Based on ethnographic fieldwork with two sets of “British-led” ethological research projects studying meerkats and crows in very different settings, he notes that as human beings, these researchers also anthropomorphise and engage in “*intersubjective relations with the nonhuman animals they study*”, but as scientists they are able to simultaneously detach themselves “*from propositional beliefs about the latter's inner lives*”.

These alternative worldviews, shape-shifting and ideas around reciprocity clearly have a real impact on how animals and humans share space. Baynes-Rock describes people's almost remarkable tolerance of hyenas in Ethiopia despite a series of attacks on people on account of their nonhuman person status, where they are respected “*due to their propensity to kill and consume unseen spirits, and their capacity to act in accordance with human societal values*” (Baynes-Rock 2013:241). Moore (2009) describes the equal value of myths and detailed knowledge of elephant behaviour among farmers in Namibia in defining social norms and behaviour in the context of mediating human-elephant conflict. She also argues that Indigenous Traditional Knowledge is more flexible and dynamic than has been recognised, making it ideal for its application in the “adaptive management” framework of Conservation Biology, possibly as “adaptive co-management” (Armitage et al. 2009).

Some work also argues that anthropologists are not taking these different ontologies seriously enough, where these conceptions of reciprocity and other-than-human are seen as being merely symbolic and metaphorical. Western theories do not adequately accept the validity of these differing ontologies, which prevent them from becoming a “*factual basis for making wildlife management policy*” (Nadasdy 2007:25).

Despite this direct relevance to conservation, none of these ideas find any place in the conservation literature on human tolerance of wildlife. They have a very clear bearing on how people interact with and share space with elephants, as I show in Chapter 4 where I examine the human diversity. Further, as in the case of the mahouts chasing the elephant and telling it not to kill people, I also demonstrate that in non-Western settings, these differing ontologies already are, and can be more widely used as “a factual basis for managing the human-wildlife interface”.

2.3.1.2 Anthropology beyond humans

In addition to better understanding human cultures, anthropology also has insights into the interconnectedness of life. Kohn (2007) examines the dreams dogs have and how they fit into the worldview of the Upper Amazonian Runa people, and calls for expanding the boundaries of ethnography to more explicitly focus on the nonhuman under the rubric of an “anthropology of life”, since most of the current work on understanding animals is in the natural sciences, and “*biological reduction is not a viable alternative*”. Baynes-Rock (2013a) examines the human-hyena entanglement in Harar, Ethiopia, where the accidental poisoning of one hyena triggers a fight between two hyena clans, with humans involved as active participants, where they shape each other’s worlds in a “multi-species commons”, where social, biological and historical processes are inseparable.

There has since been significant discussion around extending the realm of ethnographic research to nonhumans; van Dooren et al. (2016) highlight the importance of cultivating “arts of attentiveness” in immersive methods, when studying nonhumans and in engagements and collaborations with scientists, farmers, hunters, indigenous peoples, activists, and artists. Ogden et al. (2013) review the progress in “multispecies ethnography”, where they discuss a set of “productive tensions” in the literature, and urge “*ethnographers to bring a 'speculative wonder' to their mode of inquiry and writing*”. While the focus in both these papers is not methodological, the interest in the immersive experience in these multispecies “contact zones” (Haraway 2008) that allows for the accumulation of rich empirical data is especially relevant for my thesis at the human-elephant interface.

This approach, of multi-species ethnography and anthropology of life, given the broad aim of this thesis, has a clear parallel in human geography – or the “more-than-human” geography approach to understanding human-wildlife entanglements, which I discuss in the next Section.

2.3.2 Human and “more-than-human” geography

Geography’s interest in animals starts with “zoogeography” in the early 1900s, with efforts to map the biogeographic regions of the world and the animal distributions associated with them (Bartholomew et al. 1911; Newbiggin 1913), and this effort continued for some decades (Hesse et al. 1937; Allee and Schmidt 1951). The focus of this work was to understand animals in relation to their environment, and the question of people and human-animal interactions only emerged in the 1950s through “Cultural animal geography”, which as a new field aimed to “*encompass those aspects of animal geography which accumulate, analyse, and systematize data relevant to the interactions of animals and human culture*” (Bennett 1960). A few case studies examined the ways in which animals and humans shaped each other’s cultures, largely through livestock and domesticated animals (Sauer 1969; Gade 1967; Simoons and Simoons 1967), with a review by Baldwin (1987).

The mid 1990s then saw a renewed interest in animal geography, with the “animal turn”, to “*bring the animals back in*” to the social sciences, with the “*resolutely human social science journal*” (Buller 2013) *Environment and Planning D: Society and Space* publishing a themed issue with that title, criticising human geography for its “*deafening silence about nonhuman animals*” (Wolch and Emel 1995). There has since been a deluge of work in Human geography “*to explore the complex nexus of spatial relations between people and animals*” (Wolch and Emel 1998:110). Philo (1995) criticises the “*human chauvinism*” in animal studies, where animals are only studied in terms of their usefulness in furthering our understanding of human society, and suggests they are also thought of as a “*marginal social group, subjected to all manner of socio-political inclusions and exclusions*”. Emel et al. (2002) claim that the focus of this animal turn is to understand “*animals’ role in the social construction of culture and individual human subjects, the nature of animal subjectivity, and agency itself*”. Whatmore (2002) introduces the term “*hybrid geographies*”, that challenges the conventional dualist thinking on nature and society (that was arguably the basis of much of the work after the “*animal turn*”), and calls on animal geographers to study the “*bi-directional influences and effects animals and people have on each other to co-produce realities*”. There is also “*more-than-human geographies*” (MTHG) (Braun 2005; Hinchliffe 2007), that extends this approach to understanding nonhumans beyond just animals, to “*examine the bodies, ecologies and*

lived experience of animals themselves, rather than simply 'adding nature in' to the social sciences" (Barua 2013:3).

Since the animal turn, there has been a growing interest in MTHG, and breadth of contemporary work on the subject is vast. I do not attempt to thematically summarise the work, but provide a list to highlight the range of research, and then describe the work that is relevant to this thesis in more detail.

- There is work on animals in urban spaces and the implications of a multi-species "zoopolis" (Braun 2005; Wolch 2002), including understanding chickens in cities (Blecha and Leitner 2014) even in the global south (Hovorka 2008)
- On farm animals - their welfare and the ethics of industrial farming and commodification of animals in the neoliberal capitalist economy (Holloway 2007; Buller and Morris 2003)
- On pets – how we mould them to fit into our lives (Fox 2006; Lulka 2009) and "*critical pet studies*" (Nast 2006)
- Linked to race and gender - understanding how animals are used to forward gendered and racist narratives by linking different groups of people to particular animals (K. Anderson 2000; Neo 2012; Gillespie 2013)
- On wild animals and the practice of saving animals or wildlife that critiques the basis of "conservation science" (Lulka 2004; Vaccaro and Beltran 2009; Buller 2008)
- There is work on lower life forms – how genetically modified organisms come into and interact with the world of "*bees, butterflies and bacteria*" and the diverse sets of people that are interested in them (Bingham 2006). This perhaps includes biosecurity and the idea of national borders as the points of control as being better understood as topological borderlands instead of borderlines (Hinchliffe et al. 2013), and the challenges of living with "*less cosy species*" like mosquitoes, bugs, viruses and parasites.
- And finally, there is a significant body of work on theorising using animals – Whatmore's (2000) "*hybrid geographies*", Hobson's (2007) "*political animals*" or

Acampora's (2004) "*morality of multi-species neighbourhoods*" that all highlight new theoretical approaches to studying the human-animal interface.

Elephants have featured significantly in the animal turn in geography. Lorimer (2010) discusses potential for elephants to be considered "companion species"²², and calls for more significant interdisciplinary engagement between physical and human geographers to develop "lively biogeographies" that are relevant to their conservation. Whatmore and Thorne (2000) show that the very nature of an elephant differs based on the context – in captive breeding in zoos they are configured through the coding and the computerised tracking of lineages in elephant databases, and wilderness conservation programmes framed as free animals that help define wilderness. These ideas are further developed in Whatmore's (2002) theoretical work on hybrid geographies; the question of 'what is a self' is asked in the context of the lived experience of 'Duchess', a solitary zoo elephant who is constantly being provided with stimuli and a more 'natural' environment, which is completely at odds with the free roaming, yet 'intensively' managed wild population in the Chobe National Park. Lorimer and Whatmore (2009) engage in mapping some "embodied historical geographies" through elephant hunting by Samuel Baker in the mid nineteenth century. Much of Barua's work is based on elephants; in addition to the work mentioned above he examines the role of "*lively commodities and encounter value*" in the commodification process of elephants (Barua 2016), and that the idea of cosmopolitanism can be extended to nonhumans, demonstrating that elephants circulate across the globe and forge connections across difference (Barua 2014b). Moore (2011) highlights the "*commodification and neoliberalisation of elephants*" in Namibia, where two supposedly opposing elephant conservation groups promoting sustainable use (the sale of ivory from selectively culled elephants) and the preservationist ideal (of generating revenue through tourism), were in fact very similar as they both relied largely on the same market mechanisms for their conservation.

Methods for undertaking MTHG are also discussed; (Lorimer 2010b) makes a case for using moving imagery to "*grasp the more-than-human and non-representational*

²²Along the lines of Haraway's (2003) notion of a "companion species", one which shares a long and meaningful history and relationship with people, beyond wild animals or pests, or those bred for meat, work etc. While not discussed in detail, much of the MTHG literature has been influenced by Haraway's work.

dimensions of life”, drawing from work in film theory, anthropology and ethology. He again uses elephants, with images of their behaviour and interactions with people, and “maps and compares four of the many affective logics according to which elephants are evoked in popular moving imagery”, and concludes with the claim that “elephants provide an accessible, popular and telegenic nonhuman case study”. Pitt (2015) discusses an interesting approach for human-plant geographers that is based on Ingold's (2000) ideas of showing, where the researcher as a novice focuses on “*showing and being shown.. through techniques of walking, talking, doing and picturing, which encourage guides – human and nonhuman – to share their expertise.*” The work most relevant for my thesis, is Hodgetts and Lorimer (2014) claim that work in the animal geography “renaissance”, is skewed towards “animal spaces” (ordered spaces that humans create for animals) rather than “beastly places” (places that animals make for themselves, often transgressing human boundaries), and suggest the reason for the imbalance being methodological, where the methods developed for studying humans are inadequate for animals. They describe the progress in the natural sciences and ethology, and how these can be used by animal geographers. First is the “tracking of animal cultures” using video technologies and spatial tracking devices possibly employing the animals themselves in auto-ethnographic work, second the “scientific and artistic forms of interspecies communication”, that starts with a range of technology aided aural forms of communication but with significant potential to go much further possibly using “virtual reality” technologies and finally “genomics”, where modern DNA sequencing techniques have opened up a dazzling array of possibilities for understanding relatedness, historic lineages, geographic connectivity. Although not discussed at length, these methods allow geographers engaging directly with animals, and bypass the traditional ethologist 'gatekeepers' and their positivist modes of engagement. Using methods from across disciplines can provide valuable new insights into the lives of animals, but this also requires careful considerations of the underlying methodological approach, which I discuss in more detail in Section 7.2 in the conclusions.

2.3.2.1 Animals in “beastly places”

A useful way of categorising the contemporary MTHG literature is Philo and Wilbert’s (2000) “animal spaces” and “beastly places”. My main interest is in the latter, where elephants continually challenge the cartographic ordering of wildlife and human space live alongside people, but the majority of work has been in the former – of elephant in “protected areas” set aside for nature. I therefore attempt to discuss all the published hybrid and MTHG work in “beastly places”, where the focus is on the lives, experiences and agency of animals themselves, particularly of “wild” animals.

The most recent is Evans and Adams (2018) who work with an on-going conservation project in Kenya, and use spatial data from satellite GPS-GSM collared elephants in conjunction with interviews, to understand how they use space around them both in areas set aside for conservation (protected areas, ranches, conservancies) as well as small-holder agriculture, to highlight the *“agency of African elephants as important actors in the political ecology of human–elephant conflict”* (p.1). They explicitly aim to fill the gap that Lorimer and Hodgetts (2014) highlight, by using technological methods from the natural sciences along with interviews, questionnaires and focus group discussions from the social sciences. Barua (2014a) also uses *“animal ecology, and more-than-human Geography”* where he works with elephant trackers and follows elephants to get an “embodied” understanding of the animals he was studying, to show how they politicize the dynamics and distribution of life. He argues that the landscape is shaped by the “dwelling” of people and elephant both with and against the cartographic design, calls for new conversations between MTHG and subaltern Political Ecology. Hayden Lorimer (2006) engages in work *“where ethnography and ethology meet”* in studying reindeer reintroductions in Scotland from the 1950s, where the story of the animals is interwoven with the people behind the project and how they shape each other. He engages directly with the animals, but within the context of a few limited domesticated individuals of an otherwise wild species. Buller (2008) examines the reintroduction of wolves into the southern French Alps, and how the conceptualisation of nature is challenged through conflicting ideas of biodiversity and biosafety. He does not directly engage with the wolves, but attempts to understand their lives through the literature. Lulka (2008) describes the paradox between the ideal of bison restoration and the lives of bison on private ranches, and the economic, cultural and

material variables that have generated this paradox, but without a direct engagement with the animals.

2.3.2.1 MTHG and this thesis

For my thesis, I focus on ideas from the MTHG approach that can be useful in better understanding how people and elephants share space, and highlight some of the gaps that my thesis can help fill.

The other lacuna in most of the modern work on Animal geography, outlined by Braun (2008), in his report on “inventive life”, is a continued focus on establishing emergence (highlighting the hybrid nature of life or that agency is also distributed across animals), but there is a very limited effort to move beyond this, and understand how this nonhuman agency impacts the human-animal interface, in a way that is relevant to policy, planning and politics. The focus remains on “animal spaces”, largely with pets and livestock (Hodgetts and Lorimer 2014). Significant work in “beastly places”, with wild and potentially dangerous animals, is still waiting to happen even a decade after Braun (2008) pointed out the shortcoming, with Barua (2014a) and Evans and Adams (2018) are the only two studies attempting to over-come this.

With the rise of the Anthropocene and human dominance of the earth, questions of sharing space with other life forms are taking centre stage, and many of these ideas in geography have significant potential to inform the conservation discourse. There has been notable theoretical progress in the approaches and basis of understanding the nonhuman neighbours we share space with, which opens up an exciting array of possibilities for further research.

In summary, this thesis interacts with MTHG in two ways, first, in an attempt to overcome some of the limitations in the literature, in the third question on the elephant diversity, I engage in “elephant geographies” in a “beastly place”. Second, I use this approach to inform my methodology (which I outline in Section 2.4 on Methodology), and create interdisciplinary methods to study the lives of the elephants sharing space with people, that

can be taken seriously by critical social scientists, biologists and conservationists, whilst being relevant to the policies and practices of how humans interact with elephants.

Cohesively bringing together the literature from across biology and the critical social sciences as I have described in the preceding Sections is a challenge. The overall endeavour is to engage with a range of the ideas from the various disciplines that can better inform the practice of nature conservation, particularly around elephants and people sharing space. I summarise the key ideas, gaps and contributions to all the disciplines at the end of this Chapter.

The methods, and more importantly the methodology for undertaking this interdisciplinary work also warrant significant attention, which I discuss in some detail in subsequent Sections.

2.4 Methodology

Through the literature review, a number of the shortcomings and gaps I highlight are methodological – (a) the biological reduction and positivist epistemology of the natural sciences that rejects other ways of knowing, and (b) the dearth of literature in human geography that undertake MTHG in beastly places. Overcoming these limitations and formulating methods for interdisciplinary research warrants some discussion around the underlying research philosophy.

Some of the key considerations are:²³

- Ontology – whether entities have an inherent reality or whether they can only be constructed through the perceptions action of social actors (objectivism, constructivism etc.)
- Role of theory – deductive, where research is used to test theory or inductive where research generates theory
- Epistemology – positivism (rejects knowledge not collected through empiricism and subject to mathematical or logical proof) or post-positivism/interpretivism
- Data – qualitative or quantitative

Bryman (2012) groups these considerations along the type of data, where quantitative research is linked to the deductive approach to test theory (or hypotheses), a positivist²⁴ epistemology, and objectivism as an ontological position, while qualitative research is grouped with an inductive approach to generate theory, an interpretivist or post-positivist epistemology and constructionism as an ontological position. These are not rigid boundaries, and qualitative positivism is also a part social science research (Prasad and

²³ I do not attempt an in-depth discussion on the underlying philosophical approach to research, but choose to use terms and ideas from Alan Bryman's (2012) *Social Research Methods*.

²⁴ Positivism is understood in many ways, and I assume its dictionary meaning "A philosophical system recognizing only that which can be scientifically verified or which is capable of logical or mathematical proof, and therefore rejecting metaphysics and theism (OED 2018)". While theism is not particularly relevant to this thesis, I assume this epistemological position rejects all other ways of knowing.

Prasad 2002), but I find this generalisation useful in formulating a methodology for this thesis.

The literature I have described in this Chapter, from biology, geography and anthropology have different approaches to research, and understanding the ontological and epistemological boundaries are an important starting point for charting out the methodology for undertaking interdisciplinary work. I discuss this for both biology and the critical social sciences.

2.4.1 Biology

The “scientific method” of the natural sciences is a good starting point, defined as “a method of procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses” (OED 2018). This is a method, and not a methodology²⁵, and is based on positivism as the epistemological foundation, with a focus on quantified empirical data, mathematical analysis, objectivity, and verifiability/replicability (Bryman 2012). The key limitations of this method are:

- (a) Reductionism in the process of quantification; whittling down all aspects of human- elephant interactions to basic measurable variables arguably loses more than it gains, and has not been able to “solve” the “complex” and “wicked” problem of HWC (Lute et al. 2016). A qualitative study that examined livestock depredation in Namibia noted, *“successfully addressing this situation therefore requires recognition and understanding of its complexity, rather than reducing it to its most simplistic parts”* (Rust et al 2016:1079).
- (b) The positivist epistemology that rejects other ways of knowing and does not allow for factoring diverse worldviews, which are clearly relevant to how people live with animals, particularly so animism, where nonhumans are ontological equals. Despite these limitations, as discussed earlier in this Chapter, this body of work offers generalisable suggestions for the practice of nature conservation or to better manage the human-wildlife

²⁵I define methodology as the logic and justification for using particular methods (the specific tools and techniques used in undertaking any research), while theory is the “explanations for empirical phenomena that have already attained a level of generality by virtue of prior confirmation elsewhere” (Walters 2012), and a theoretical frame introduces and describes the theory and guides the research (Abend 2008).

interface and is at the forefront of influencing policy, and I therefore remain committed to contributing to it.

The positivist epistemology also extends to ethology, where Tinbergen's (1963) four questions are still used as a basis for understanding all animal behaviour, with the broader objective of understanding how the behaviour benefits the species in evolutionary terms. Some discussion around the methods used for animal behavioural studies is also warranted, in particular - the "ethogram". This is a list of all the behaviours an animal exhibits with very precise definitions that are mutually exclusive, usually grouped into categories like feeding, social, solitary, aggressive etc. This list is made for each species based on preliminary observations, where the underlying objective is to allow for a quantified measurement/classification of the animal behaviour that is independent of the observer, with a stated objective of avoiding subjective, anthropomorphic generalisations, descriptions and interpretations about the animals being studied. Schleidt et al. (1984) attempted to create a general ethogram for standardised coding and comparisons across different taxonomic groups, with 60 different behaviour categories. There was criticism of this approach at the time, where Drummond (1985) argued that such a universal approach will not work on account of the "*complexity of behavioural output, whose multidimensionality in space and time beggars both verbal and graphical representation*", while Gordon (1985) argued that this limits the kinds of questions that can be asked about animals. While a standardized ethogram for all animal behaviour has never gained traction, a number of attempts to create this for particular species or taxa continue (MacNulty et al. 2007; Stanton et al. 2015), and most of the research relating to elephant behaviour uses some form of an ethogram to categorize and quantify behaviour. This approach and method is limiting for my thesis and the questions I hope to ask of elephants. But given my commitment to remaining relevant to elephant biologists who have been studying the species for decades and are the forefront of policy around elephant conservation, I attempt some level of quantification that I describe in Section 2.5.2.

An interesting opportunity for interdisciplinary work emerges from the natural sciences' debatable disinterest in ontology. While Bryman (2012) argues that objectivism is the ontological basis of the natural sciences (and quantitative research in the social sciences), there are papers dealing with animal behaviour arguably discussing ontology, titled for

example “What are animals?”, which discusses animal mind and anthropomorphism²⁶ (Wynne 2007). Before Darwin’s (1859) “Origin of Species”, the biblical creationist view clearly puts humans above animals. While Darwin blurred these categories and pointed to a common evolution, he was also careful to note the “difference in mental power between the highest ape and the lowest savage” is “immense” (Darwin 1871:45). This debate has since continued, with a range of arguments for and against anthropomorphising animals and treating them as human equals (Tinbergen 1951; Griffin 1976). While the majority view appears to accept various nuanced forms of anthropomorphism given the complexity observed in animal behaviour (Burghardt 1991; Bekoff 2000), there remains the view that “the reintroduction of anthropomorphism risks bringing back the dirty bathwater as we rescue the baby” (Wynne 2004:606). Shettleworth (2001:277) states that “*studying animal cognition does not entail any particular position on whether or to what degree animals are conscious*”. It is within this ontological neutrality that I cautiously attempt to draw in the MTGH and multispecies ethnography to understanding elephants, while producing quantitative data that is relevant to the natural sciences.

A key element of methodology in the biological sciences that is relevant to this is the duration of fieldwork. The minimum duration of fieldwork for the average PhD in the biological sciences is one year with many studies based on multiple years’ observations, often driven by the need to have statistically significant data. Engaging with large and potentially dangerous animals like wild elephants is invariably guided by indigenous “trackers”, people with long experience in being in the presence of these animals (Sukumar 1989; Easa 1988). It takes a few months to get “attuned” to the field site and for the animals (in some cases) to get habituated to the researcher before data collection can start, which is arguably a more dangerous version of “finding your feet” in ethnography (Geertz 2001:13). Human geography relies on fieldwork of much shorter durations (usually on the scale of months), and this inherent structural difference between the disciplines could prevent a more significant engagement with the lives of animals studied.

In summary, through this thesis and methods I attempt constructively critique the positivist epistemology and methodological approach of the natural sciences, while at the same time

²⁶ The attribution of human characteristics or behaviour to a god, animal, or object (OED, 2018)

being firmly committed to empirical field work of extended durations and collecting some form of quantified data to produce some generalisable results that are relevant to policy.

2.4.2 The critical social sciences

For the purposes of this thesis, I work with Bryman's (2012) arguably simplistic categorisation of research, and use 'critical social sciences' to describe the body of work in geography and anthropology that relies on qualitative data, an inductive approach where the focus is to generate new theory, an interpretive approach, with constructionism as an ontological position. Within this there still exist a range of methodologies and theoretical frameworks that I discuss briefly to help formulate my research methods.

Political Ecology

Political Ecology is a popular theoretical framework used in human geography that has had a significant influence on this thesis. There are a number of definitions of political ecology. Robbins (2004:12) describes it as "*empirical, research-based explorations to explain linkages in the condition and change of social/environmental systems, with explicit consideration of relations of power*". He further (2012) categorises the contemporary political ecology work along the five broad strands or processes that they aim to study – degradation and marginalisation, conservation and control, environmental conflict and exclusion, environmental subjects and identity, political object and actors. The application of the political ecology framework involves choosing a particular region and process, and examining the social, political and economic linkages within these processes to critically examine and challenge the normative assumptions about these narratives in the field.

In the early work in political ecology the emphasis was clearly on "putting politics first" (Bryant 1991), but it has grown considerably, with some debate in the current discourse around the overall objectives of political ecology. Walker (2005) highlights the growing popularity of political ecology but asks "where is the ecology?". Srinivasan and Kasturirangan (2016) argue that much of the work is underpinned by anthropocentrism and human exceptionalism, limited in its ability to deal with nonhumans. Menon and Karthik (2017) argue that the main aim of political ecology is to critique the discourses and

practices of conservation and development, with anthropocentrism being a normative choice, but not so human exceptionalism. Srinivasan and Kasturirangan (2017) urge for a “refocusing of political ecological attention from limited and limiting critiques of conservation”, and Barua (2014a) attempts to revitalise political ecology and bring the liveliness of animals back in through more-than-human geography.

My thesis does not clearly fit into any one of the five strands Robbins (2012) describes, but does critique some of the discourses and simplistic assumptions around conservation, while also offering alternatives. I do not attempt to use the political ecology framework all through this thesis, but draw from much of the literature and use this critical methodological approach, particularly in Chapter 3 on the range of political and ecological factors that underpin human-elephant interactions.

Other useful methodological approaches

There are other ideas that have been useful in informing and rationalising my methodological approach and particularly methods, and I briefly mention those here.

The first is *grounded theory* (Glaser and Strauss 1980; Strauss and Corbin 1990), which allows for thematic coding and a quantified analysis that is still completely empirical, based on a wide range of observations and data from the ground, rather than relying on a hypothesis or theoretical framework at the start. This approach is useful, and I have applied it to a large extent in Chapter 4 in studying the elephants, where I started with ethnographic observations and then used the qualitative data to create quantitative categories, and “code” or tag various forms of elephant behaviour for statistical analyses. This method cannot be used in entirety, since a prerequisite is to be unfamiliar with the literature and the study region before embarking on the research, and my own grounded engagement with the issues and familiarity with some of the existing literature contradict this.

Abductive Causal Eventism (ACE) (Vayda and Walters 1999; Walters and Vayda 2009; Walters 2012) is another approach I have found useful, which emerged in response to the limitation of political ecology described above, of prioritising politics. It is an “*analytical methodology based on a pragmatic view of research methods and explanation that places at the centre of research inquiry the answering of ‘why’ questions about events*” and

involves “*constructing causal histories of interrelated social and/or biophysical events backward in time through a process of eliminative inference and reasoning from effects to causes, called abduction*” (Walters 2012:135). This methodological approach started as “event ecology” (Walters and Vayda 2009) and the focus “events”, and unravelling the complexity around why and how the event occurs is an approach I use throughout this thesis. Given my long engagement with the region over the last decade, there is no one singular event used for analysis, but I do pay particular attention to events, particularly so in Chapter 3, where I use one significant event to link up a number of otherwise disparate strands of information.

More-than-human or hybrid geography and multispecies ethnography is another key approach that I have discussed at some length in the previous Sections, which offers an interesting alternative to biology’s reductionist approach to understanding elephants or the dualist separation of human and animal subjects across the disciplines. Kirksey and Helmreich (2010) describe multispecies ethnography as an approach where “creatures previously appearing on the margins of anthropology” are “pressed into the foreground” and “appear alongside humans in the realm of bios with legibly biographical and political lives” whose “livelihoods shape and are shaped by political, economic, and cultural forces”. Where the focus is not just to give voice, agency or subjectivity to the nonhuman, but to “radically rethink these categories of analysis” (Kirksey and Helmreich 2010:545). This methodological approach is useful and a key part of thesis, where elephants and people are considered ontological equals.

There have also been calls in MTHG to use new innovations in the natural sciences (Hodgetts and Lorimer 2014), and this is beginning to happen, with work on elephants undertaken so far having been in collaboration with biologists (Barua 2014a), or with satellite-GSM collars on the elephants that are regularly deployed by biologists (Evans and Adams 2018).

Finally, ***action research*** is another idea that I have used in this thesis. While not a methodology often used in the critical social sciences, it is growing in popularity where it “privileges the context of practice over disembodied theory” (Bradbury-Huang 2010:93). Bryman (2012:397) defines it “*as an approach in which the action researcher and members of a social setting collaborate in the diagnosis of a problem and in the*

development of a solution based on the diagnosis.” This approach has been useful in negotiating the researcher-practitioner role that I have played over the years, where various sub-questions and datasets that I present in this thesis were the outcome of collaborative work with four of my colleague-assistants at The Shola Trust. This is discussed in more detail in the particular methods that were used in this thesis.

In summary, from a methodological perspective, this thesis orients itself to the interpretivist epistemology of the critical social sciences, and draws from a range of theories, frameworks and approaches to answer the different research questions as discussed above, and in doing so contributes to each in modest ways.

2.4.3 Interdisciplinary methodology in this thesis

The importance of qualitative data in the conservation literature, which is dominated by quantitative data, has been discussed (Drury et al. 2011). Mixed methods, where qualitative data adds depth to the results of the mathematical/statistical analyses, has been suggested and applied as the solution (Newing 2010; Farmer et al. 2011; Silva and Mosimane 2013). But the more fundamental questions around epistemology and ontology have not been recognised, and this is something I intend to emphasize in this thesis: to remain rooted in an interpretivist epistemology and qualitative data, while using some quantitative data to support the narrative and make it more generalisable. Can the conservation literature move beyond the positivist framework and take seriously indigenous worldviews and animistic beliefs as a basis for better managing the human-elephant interface?

The more-than-human approach offers an interesting alternative to biology’s reductionist approach to understanding animals, but there remains limited work that does this on account of methodological limitations (Hodgetts and Lorimer 2014). The suggestion has therefore been to engage with the methods of the natural sciences, but this warrants some discussion. As I have described, in Section 2.2.2, tracking elephants (or using genomic tools to answer a range of questions around relatedness and historical elephant movement), no longer requires any direct engagement with elephants. Critical social scientists relying too heavily on these methods and not directly engaging with the elephants again fall into the trap of biological reduction that they strive to overcome. Adams and Evans (2018) use

GPS-GSM collars as a tracking method to map the movement of elephants, and also use camera traps to “watch” the elephants interact with a fence. Barua (2014a) works with biologists, and while he directly engages with elephants on occasion, he also uses local people’s descriptions of them to gain insights into the elephants’ lives. Directly engaging with the elephants must also be a key part of any MTH methodology, and ethnographic methods are arguably the most suited for this.

Ethnography, or more specifically multispecies ethnography, therefore forms the backbone of the methodology throughout this thesis. This is a relatively new yet rapidly growing area of research, which arguably takes on slightly different meanings in different contexts. Locke and Munster (2015:1) provide one of the most recent descriptions of the phrase, from which I selectively highlight the key elements that used in this thesis:

“Multispecies ethnography is a rubric for a more-than-human approach to ethnographic research... acknowledges the interconnectedness and inseparability of humans and other life forms, and thus seeks to extend ethnography beyond the solely human realm... attentive to the agency of other-than-human species... a challenge to the humanist epistemology upon which conventional ethnography is predicated, specifically its ontological distinctions between nature and culture, human and nonhuman, subject and object”.

The narrative is woven around qualitative sources using a post positivist or relational approach, while including various smaller quantitative “datasets” that add to and “validate” the narrative within the natural science framework. The overall task of remaining “epistemologically neutral” and undertaking this expansive interdisciplinary work has been challenging at times, but through this approach I intend to also make significant interdisciplinary methodological contributions through this thesis.

Bringing together these arguably contradictory ontological and epistemological positions, types of data, and range of methodological approaches from the natural and critical social sciences can best be summarised and tied together under the rubric of “bricolage research”. While it has been used largely in the context of the critical social sciences and with qualitative data (Denzin and Lincoln 1999, Kincheloe 2001), the term has older roots,

stemming from the methods of crafts people who are “adept at performing a large number of diverse tasks; but, unlike the engineer, he (sic) does not subordinate each of them to the availability of raw materials and tools conceived and procured for the purpose of the project” (Levi-Strauss, 1966:17). In a more contemporary review, bricolage is described as being adept at pushing the “borders of traditional multi-methods”, while addressing the “the plurality and complex political dimensions of knowledge” (Rogers 2012:14).

When applied to this thesis, bricolage was used to remain true to the questions on the ground relating the human-elephant interactions, with a focus on informing the management of the shared space to minimise the negative impacts elephants and people have on each other. I use whatever tools and methods are the most relevant and contextually appropriate to answer these questions, without attempting to modify the range and nuance of the questions to fit into any one theoretical framework, methodological approach, or epistemology.

The particular tools and methods are described in the subsequent Sections of this Chapter, and a reflection on how I arrived at these particular methods to undertake this interdisciplinary body of work is articulated in Chapter 7.

2.5 Methods

While multi-species ethnography provides an important methodological approach to simultaneously engage with the humans and nonhumans sharing the landscape, how this translates into a field method depends to a large extent on the context and the species (other than humans) that is being studied. I therefore fall back onto ethnography. The term has varying meanings in different contexts, with the traditional “ethno” (people, cultures) and “graphy” (write) not relevant for this thesis. I use the term as described by (Hammersley and Atkinson 2007:3), where it involves:

“the researcher participating, overtly or covertly, in people’s daily lives for an extended period of time, watching what happens, listening to what is said, and/or asking questions through informal and formal interviews, collecting documents and artefacts – in fact, gathering whatever data are available to throw light on the issues that are the emerging focus of inquiry. Generally speaking ethnographers draw on a range of sources of data, though they may sometimes rely primarily on one.”

This aptly describes my method; participant observation (humans and nonhuman), and unstructured interviews (humans) formed the majority of the field work. A range of other tools and methods were used to at various points through the thesis, best described as a “make do methods” that have been used/advocated by Baynes-Rock (2014), Lorimer (2006), Braun (2008). A more detailed description of the method used for each of the different questions are described in subsequent Sections. The exact tools used are relevant in the natural science framework – cameras, camera traps, GPS units, satellite imagery, software etc. and this is listed in Appendix 1.

2.5.1 A political and ecological baseline of human-elephant interactions

Identifying the varied political and ecological factors that create the current context of human-elephant interactions was based largely on my engagement with the region as a practitioner through a range of conservation interventions. Some factors also emerged from viewing key events (like people getting killed and elephants being captured, described in

the introduction), using the ACE approach to draw out the political and ecological elements. For understanding these factors and how they impact the human-elephant shared space, I use a mix of methods, broadly split into categories of “political” and “ecological”.

For the political factors (conservation conflict – over land tenure, elephant corridors and indigenous rights, ecology of the region and the high conservation value accorded to it, global influences of processes of change), I draw on my own work and experiences in the region, key informant interviews, and various other literature sources – government reports, news article, published papers and historical documents.

For the ecological factors (distribution of elephant, people, natural cover and land use and patterns in human fatalities) I use a range of mapping techniques. The exact tools used are relevant in the natural science framework, and I briefly mention these. I use free and open source software for all our work; QGIS v 1.4-2.18 (the most up to date version was used all through, and this changed from 1.4 to 2.18 between 2010 and 2017), Open Office/Libre Office (currently version v 5) for all the word processing and spread sheet related requirements, and R for all statistical analysis, all running on Ubuntu/Linux machines. We use Garmin etrex 10 or 30 GPS devices for all of our on-ground work, but increasingly rely on GPS units within smart phones. For all of the work identifying and monitoring individual elephants high zoom “bridge cameras” were used – a Nikon P900 (maximum zoom of 83x or a 35mm equivalent focal length of 2000mm), B700 (60x), P510 (42x), Samsung EKG100 (21x, but also with a SIM card and fully functional android smart phone interface, that allowed for very easy photo sharing). The cost of these cameras was about one-fifth that of Digital SLRs (with 500mm vibration reduction lenses) that were used in other similar studies (Fernando et al. 2008), which is an important factor for “mode 2 science” in a developing country.

For each of the maps generated, the details of how data was collected and mapped is described in more detail in Appendix 1, and all of these mapping efforts align closely with the action research methodology, where many of them were made in collaboration with local stakeholder to address a particular conservation problem.

Given the extensive use of maps in this thesis, it is worth mentioning some of the historical cartographical controversies around map making, the most famous being Korzybski (1958:58) “*A map is not the territory it represents, but, if correct, it has a similar structure to the territory, which accounts for its usefulness.*” The subjective processes that are often hidden when “*ideology is an instrumental aspect of cartography*” (Crampton 1994), and the more complicated issue around “*post-modern thinking that redefines the nature of maps as representations of power*” (Harley 1989). All of the maps I have presented are indeed subject to both of these caveats – the coordinate reference system and projections used, the icons, the thickness of the lines, and the colours – they all represent certain choices on the part of the cartographer. Despite these limitations, I still use them for their “usefulness”, while cognizant of the subjective and relative nature of the creation and presentation of information through these maps. Red is used to show elephant presence all through the year, while green is for elephant free areas, where the map is made from the perspective of the safety of the humans who encounter elephants. Forests are always represented in variable shades of green, and there is an accepted value judgement about forests being useful and important. Elephant home ranges (presented in subsequent Chapters) also include a range of human layers, where the elephants can never be separated from the people. Maps involving Mudumalai (the neighbouring protected area) always show the human habitation within, so the people are not forgotten. These are particular choices, and while I do not attempt to focus on the detailed cognitive processes behind these choices, there is a rationale that is informed by cartographic conventions used in map making.

2.5.2 Methods for human-elephant ethnography

Understanding the diversity in the people and how they interact with elephants started with my work around implementation of the Forest Rights Act (2006) in 2008-2009, where I spent, as part a project hosted by The Shola Trust, an extended period of time interacting with the indigenous groups across the 360 hamlets in the region to help organise into village councils to claim forest rights. No formal ethnographic notes were kept at that point, but I maintained a blog with a range of stories I found interesting, mostly around indigenous peoples’ interaction with the forests, and elephants featured regularly in them. I draw on limited material from this period, but it gives me a grounding and creates a network of informants and people I knew across the region who I have subsequently

interacted with regularly. Lorimer (2006) describes this as a “sweep of the land”, to understand its “topography and its peculiar brand of local information”, which has been vital in all of my interactions with the landscape. In 2010 I undertook more formal field work to understand the differences between people’s tolerance of elephants for my MSc thesis, which involved 20 semi-structured interviews and 250 questionnaire surveys. I reference this work and the quantitative ‘dataset’ it produced, but rely more on participant observation and unstructured interviews conducted subsequently. Between 2010 and 2015 I worked on several conservation projects hosted by the The Shola Trust (TST – the organisation I worked with), largely with local communities in helping them to cope with elephants, and interacted with people across the landscape extensively. Given my interest in the diversity among people in their perceptions and actions relating to elephants, notes were made when any interesting anecdotes about human-elephant interactions emerged. Some material from this period is used in Chapter 5 on human diversity. Discussions were in multiple languages, with notes made in English. No attempt was made to name or assign pseudonyms to each quote, but the context and date is mentioned either in the text or as a footnote, as I have done in Chapter 1.

In 2015 and 2016, I undertook more formal field work, specifically as part of this PhD research, using a multi-species ethnography approach. This demanded significant methodological innovation. Spending time and interacting with humans was easily achievable given my background and location, but working with the elephants was an entirely new endeavour. I systematically and intensively focussed on engaging with elephants, actively following, identifying individuals and watching their interactions with people and people’s reactions to them. From these observations, photographs, videos and notes, I collected significant qualitative data around both the elephants and the people, and also drew out quantitative datasets that could be used within the natural science framework. This process involved multiple steps, which I describe in more detail below.

2.5.2.1 Finding elephants - the CEMEWS platform

Knowing where the elephants were to go and watch them was the first step. For this we used a “Crowd sourced elephant monitoring and early warning system” (CEMEWS) was developed at TST in the on-going work to allow people and elephants to better share space. The full working of the system is described in Appendix 2. Relevant to this thesis is that I

received mobile phone text messages whenever elephants were seen by our network of 160 informers in the region, most of whom were forest department field staff.

When an elephant was reported, an effort was made to go to the location and photo-, video-graph and observe the elephants for as long as possible. In two locations we also used camera traps to get photographs and videos of elephants that were not easily seen during the day. The first was at Thorapally, as described in the introduction, to capture the less visible and shy males that came out of the reserve at night. The other was at the Municipal garbage dump, where some elephants were observed feeding routinely in the day, but others came only at night, which is also described in the introduction.

The work on monitoring individual elephants is on-going, but the data presented in this thesis is from December 2015 to December 2016. During this period elephants were reported in CEMEWS 415 times, and they were directly observed and photo- and video-graphed 165 times, with the camera traps capturing elephants on 56 occasions. This was undertaken by myself and four research assistants, (which I describe in more details in the next Section of positionality and limitations), where I was present for 74 of the sightings, or about 45%.

Crowd-sourcing of elephant sightings (as compared to a more systematic sampling) is biased towards elephants that interact with people more often rather than the ones that stay away from people. This fits with my mandate of attempting to understand human-elephant interactions, but given that the field staff who report elephant presence patrol/comb through the region, I am confident that the majority of the elephants using the region have been sighted at least once.

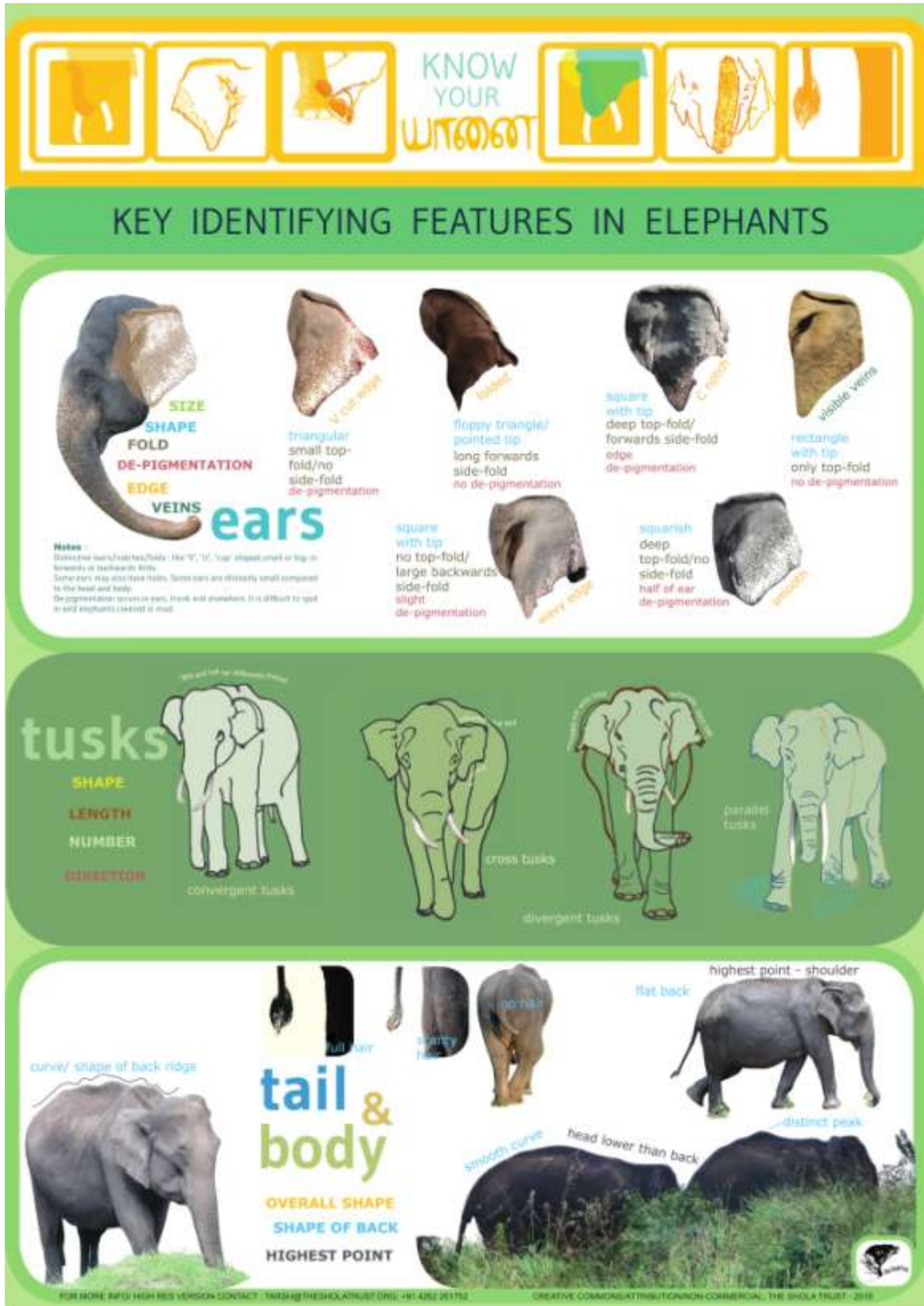


Image 6: Poster for identifying individual elephants.



Image 7: MGMK1/Bharathan's "Individual Elephant Profile".

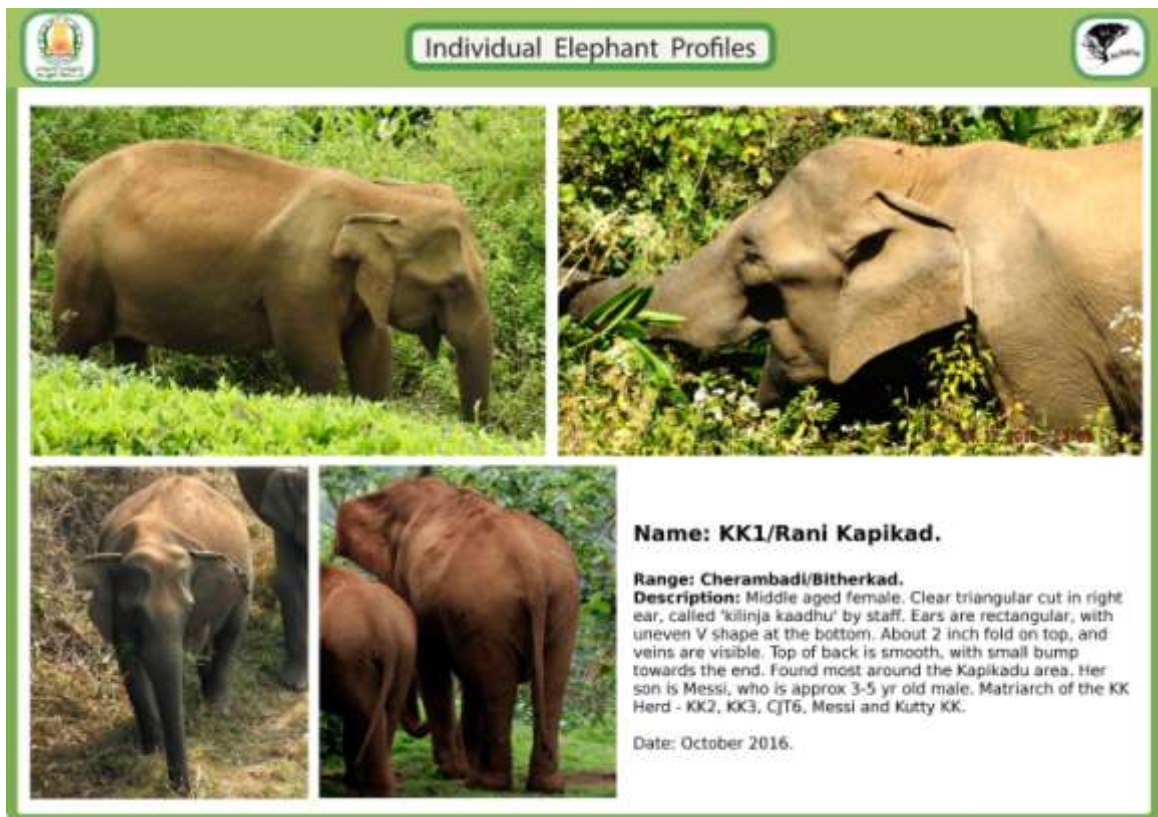


Image 8: KK1/Rani Kaapikad's "Individual Elephant Profile".

2.5.2.2 Identifying and observing individuals

Vidya et al. (2014) describe a range of morphological features that could be used to identify individual elephants after photographing them, based on which a poster for individual elephant identification was made (Image 6, earlier). The characteristics of their ears were the most important feature: overall shape, tears/cuts, top folds, veins and depigmentation. Tusks were the simplest identifiable feature for males, and curvature of the back and condition of the tail were the other main features used for identification. This was shared widely with field staff on the ground through informal interactions, a few formal training sessions, followed by on-going joint fieldwork over the year.

When an elephant had been sighted and photographed clearly enough to note the key features, it was given an alpha-numeric identity (ID) based on geography. For the males CMK1, CT1, CT2 etc. were the Cherambadi Makhnas (tusk less male) or Tuskers, while for the female led herds were first given an ID - OVH is the O'Valley Herd or KMH the Kotamalai Herd – and individuals within it were numbered OV1, OV2 or KM1 KM2 etc. A detailed description of all the key features of each individual maintained in a spreadsheet (see Appendix 3). Once there were reasonably clear images from the right, left, front and back, the images were laid out along with some notes about the elephant to create an 'Individual Elephant Profile' (IEP, see earlier Images 7 and 8). In conjunction with field staff, each elephant was also then given a name. The naming was done based on some of the characteristics or personality traits of the elephant. OVT7/Alibaba Basheer was the O'Valley tusker 7, who had perfected breaking electric fences with his tusks and could open any gate. KK1/Rani Kapikaad was the matriarch or “queen” of the Kapikaad forests.

By the end of 2016, 90 adult or sub-adult elephants were individually identified, and of this, IEPs (with clear images from all sides) were created for 55 individuals. A further 35 calves or juveniles were sighted, but were associated with their mothers and not given individual IDs.

The IEPs were shared with the field staff and printed A4 sheets, and digitally through web-based applications like “WhatsApp” and “Telegram”, and offline Bluetooth and other mobile media sharing applications like “Xender” and “ShareIt”, as a means of motivating informers to keep sending in information about elephant sightings.

2.5.2.3 Observation and behavioural data

In the majority of the sightings, elephants were not on their own, but were in constant interaction with people, being chased away from human habitation, elephants being held at bay with smoke/fire screens to allow local people right of way, elephants given right of way while traffic/people were held up, elephants being monitored over a period of several hours, in forest patches amidst intense human activity (labourers in plantations, traffic, school children playing/walking etc.), elephants watched or chased from feeding at a garbage dump, and on the rare occasion, elephant quietly browsing/ sleeping etc. in the hills.

Some qualitative and quantitative information was noted immediately after each sighting, including time, duration of observation, geographic location, elephant behaviour, and type of land-use around, and a detailed description of everything that occurred, including anything relevant people had said during discussions. All this data was entered into a spread sheet. Individual elephants were identified while observing them or as soon afterwards as possible. The durations of the sightings varied significantly, from three minutes to six hours, with a mean (\pm SD) of 98.1 (\pm 88.4) minutes and a total of 266.6 hours.

Collecting quantifiable data to fit within the natural sciences was a key objective, and therefore selected a few key parameters around the human elephant interaction that could be categorised and ranked. The human presence/reaction, level of land use modification, elephant's reaction to people and overall behaviour of the elephant were all scored based on the notes, photos/videos made at each sighting. For the female led herds, individual behaviour and reaction to people it was not possible for a single observer to watch the reactions of all the individuals, and only the main elephant playing a leadership role was observed. In the scoring therefore, the herds are all grouped together. The Table 4 below describes the various categories and the ranking, from decreasing level of "natural" or increasing level of human "disturbance".

<i>Score</i>	<i>Human presence</i>	<i>Level of land use modification around elephant</i>	<i>Elephant reaction to people around them</i>	<i>Elephant behavioural categories</i>
1	Just us and one or two staff (1-3 people), with member of the public	Natural vegetation, more than 250m from human habitation	Unaware of people (few people, more than 250m away)	Most of the time spent resting/sleeping
2	Us and a few forest department staff (less than 10 people)	Plantation, more than 250m from habitation	Scared of people and moved away/were trying to move away	Most of the time spent feeding/moving, not visibly influenced by people
3	Us, forest department staff and members of the public (more than 10 people)	Forest patch (less than 5ha) less than 250m from human habitation	Showed signs of aggression towards people	Most of the time spent moving and being actively chased by people
4	People actively chasing the elephants.	Semi-urban (main roads, alongside houses, villages/town etc.)	Didn't react significantly to people	-

Table 4: Scores for quantification of the context around human-elephant interactions

Any categorisation involves some loss of richness and nuance; in the context of the people, for example, we noted the number of people around, but were not able to note how far from the elephants they were, which is important – a large number of people say more than 500m away will perhaps have less impact on the elephants than a few people relatively close. In terms of elephant's reaction to people; aggression while being chased, scared and running from people, or running without provocation by people are all significantly different reactions. In the gradient of land use modification, we have scored a plantation away from human habitation as less disturbed than a patch of forest surrounded by more intense human activity, and this is debatable. Generalisations, while subjective and slightly problematic, provide some qualitative data and variables can be analysed in conjunction with each other.

All of these quantified variables were then used in some simple descriptive statistics that I present in Chapter 4, to quantitatively compare the elephants with elephants in other more intact forests and also among themselves.

During this period of fieldwork, no recordings or even notes were taken during the conversations (with people) on account of the politically charged atmosphere of human-wildlife interactions. One of my colleagues was once chased into the forests along with the Divisional Forest Officer (DFO; the senior-most State Forest Department in the district) by an angry mob after a person had been killed by a tiger (discussed in next Section)²⁷. None of my colleagues at The Shola Trust or any of the forest department field staff venture to the location of accidental human deaths soon after the event occurred, since the staff were physically assaulted by mobs in the past. I used my popular writing/journalist role, and even then, invariably ensure I had a local point of contact. On account of these tensions, any attempt to record what people were saying or even conduct a structured interview would put me in the “wildlife supporter” group, i.e. gathering information that could be used against the people. All discussions were free flowing casual conversations, where notes were made in the evenings or later in the day when the opportunity arose, but full anonymity was maintained in all the quotes, and I often did know the names of the people talking given the nature of the conversations.

In addition to this, there were a number of formal meetings that occurred between 2013 and 2017 to discuss problems around elephant-human interactions. My position as a researcher was made clear and more formal notes were made during most of these meetings, and this material is used in the descriptions.

²⁷ A popular article describes the incident - <https://www.thehindu.com/features/magazine/a-fragile-coexistence/article6989721.ece> . At the time, I thought my focus on elephants was meaningless in the ‘Multi-species’ framework, where ignoring the agency and role tigers played in the landscape was problematic. But after a few incidents of tigers killing people (which were much more political than elephants given the intentionality of the kill and tigers eating people combined with the much more politicised tiger vs. tribal debate cross India (Taghioff and Menon 2010, Thekaekara 2010)), tigers have faded into the background, and elephants remain the most relevant nonhuman actor in the landscape. Ignoring other wild animals remains a shortcoming, but engaging with the lives of all the nonhumans is beyond the scope of this thesis.

2.6 Positionality and limitations

My engagement with the landscape stems from multiple stakeholder positions – first as a tribal rights activist working on implementing the forest rights act, then a wildlife NGO representative through the work at The Shola Trust, and finally an elephant researcher over the last few years. And through all of this, I was also a small plantation owner, on account of my house being on my parents small tea estate. These varying positions have been useful in gaining access to various groups of people as an insider and seeing the landscape through different lenses, but some of the limitations are also worth mentioning.

First, on account of my ‘tribal rights’ position, I have an inherent “pro-people” approach to conservation, and have never explicitly examined the negative impact people have on the landscape or on elephants. This is arguably the normative position in conservation – to examine how people are negatively affecting nature (or at least how people *and* elephant negatively impact each other). While this thesis is not about “human-elephant conflict” the question of the negative impact people have on elephants is not something I have examined closely. Another limitation is around access to the newer immigrant communities in the early years on account of the conflict between the indigenous communities and some of the newer immigrants. Most of my interactions with them has been in the last two years, as an “elephant researcher”, but I did not enjoy the insider position that I have with many of the indigenous communities, and consequently insights into these newer communities’ interactions with elephants is not as deep as that of the indigenous communities.

Second, on the wildlife conservationist/researcher position that I occupy, working closely with the state forest department and depending on them for research permits limits the scope of being critical of the forest management bureaucracy. The question of corruption, for example, has been examined to formulate a “theory of natural resource corruption” (Robbins 2000). Some petty corruption exists in the region, but I don’t believe it has a very significant bearing on elephant-human interactions. This is not a core element and is beyond the scope of my thesis, but my inability to engage in serious criticism of the forest department is a limitation. Ultimately any impact on policy (which I intend to make through this work) is unlikely to happen without engagement and support from the forest

department, so working with them was arguably more important than having complete independence.

Finally, on the limitations of an “insider” position and doing field work at “home”. I did not have any of the usual challenges of language, or gaining access and acceptance (Hammersley and Atkinson 2007), or “finding our feet, an unnerving business which never more than distantly succeeds, is what ethnographic research consists of as a personal experience” (Geertz 2001:13). I already had access to the region, and spoke all three of the local languages. But the comfortable familiarity with the region, people and problems often numb inquisitiveness and create an unwillingness to question the assumptions of the world (Latour 1999). There was therefore, a constant effort to suspend my preconceptions and focus on a continuous curiosity without taking anything for granted.

Despite these limitations, I believe my background in the landscape and work over the last decade has been more of an advantage rather than a burden, giving me unique insights into the nuance of human-elephant interaction that would not otherwise be possible from an outsider position undertaking a brief period of fieldwork.

The overlap between my work at TST and my thesis also warrants some discussion. While there have been numerous projects and people involved in the past, since 2015, my focus has been entirely on understanding how elephants and people share space. All of the research and conservation projects around this were conceptualised and executed by me (including grant and report writing), assisted by four research assistants - Ramesh, Prakash, Vishnu and Manikandan. Drawing a clear line separating my thesis and work at TST is futile; the thesis represents a subset of the work undertaken by me at TST, but more clarity around the role of Ramesh, Prakash, Vishnu and Manikandan is warranted. In the natural science, purportedly objective, quantified data is very often collected entirely by field assistants or volunteers without significant discussion around their role, but given the subjective qualitative nature of some of the social sciences, fieldwork is most often undertaken directly by the researcher. I have tried to balance both these approaches. While the majority of the intellectual inputs came from me, their role was significant. They were

from the same tribes as some of the forest department field staff, and enjoyed much more of an insider position than myself. Field staff on occasion would talk to elephants for example, and this did not happen when I was alone with the staff. All of them lived locally and had good social networks that I tapped into. Vishnu came from a family of *mahouts*, and grew up surrounded by camp elephants - none of us could match his insights or ability to identify individual elephants. The exact division of work among us remains relevant. All the data collection from participant observation and unstructured interviews with people was undertaken by myself. Work on collecting data for the maps was shared as described in detail in Appendix 1, with the final maps being made by myself. For the elephant observation, all early work was undertaken together and we collectively refined our process, and through 2016 I was present for almost half of the observations, and the remaining work was undertaken by colleagues. The videos and photographs of elephants and all the quantified data was analysed by myself. Given their significant input into understanding the lives of elephants, I do not feel full ownership over all of the fieldwork. Therefore, in presenting all of the elephant observational work, I use “we” rather than “I” to indicate the collective effort.

2.7 Summary – the literature and methods used in this thesis

I draw on literature from conservation biology, elephant biology, more-than-human geography and anthropology as I have described throughout this Chapter. While I have described the relevant ideas, limitations, and how I intend to contribute to all the literatures in detail in above, making sense of this remains challenging, and I therefore summarise this in the Table 5 below.

The methods and methodology for all of this interdisciplinary research across the various disciplines are equally complex, entangled and improvised. I therefore also summarise the methods used to answer each of the research questions in the Table 6 below.

<i>Literature</i>	<i>Ideas relevant to sharing space</i>	<i>Gaps/ limitations in the literature</i>	<i>Contribution through this thesis</i>
Conservation	Emerging literature looking beyond conflict, diversity in the people and tolerance to wildlife. Description of HWC as a “wicked problem” with no single solution.	Positivist/quantified approach to understanding human diversity. Limited depth/ insight into alternative worldviews/ culture among humans or nonhuman actors and agency and how that relates to conservation. Limited interdisciplinary research.	Recognising the complex factors that underpin human-elephant interactions (Chapter 3). Deeper examination of the diversity among humans who interact with wildlife (Chapter 5). Conceptualisation of the shared space for better decision making/management (Chapter 6).
Elephant biology	Contributed the majority of research/ knowledge on elephants, and continues to do so. Feeds into policy and practice around conservation. Growing interest in individuality.	Limited interest in elephants living alongside and interacting with people beyond “conflict”. No work on individual variability in elephant behaviour with respect to human interactions.	Chart out a post-positivist yet quantified approach to understanding human-elephant interactions, glean significant insights into elephants that live alongside people (Chapter 4)
More-than-human geography	Non-positivist, relational / interpretivist, “hybrid” approach to understanding the lives of animals and how they “co-produce realities” with people.	Focus largely on “animal spaces” rather than “beastly places”, particularly with large and dangerous wild animals. Little or no work that actually does what the “animal turn” calls for. Focus largely theoretical, with (arguably) a limited interest in how the ideas unfold in the world.	Exploring elephant geographies in a “beastly place” (Chapter 4). Methodological contributions towards undertaking geographies of large and dangerous wild animals (Chapters 4 and 7).
Anthropology	Alternative worldviews linked to animistic beliefs. Animals as “other-than-human-persons”. Emerging interest beyond humans.	Still limited focus on nonhumans, and alternative worldviews / animistic ontologies are treated as symbolic and metaphorical, and not allowed to be a factual basis for managing the human-wildlife interface. Limited interest in getting the ideas to permeate into the world of policy/ practice.	Seriously consider these alternative worldviews, and demonstrate how they can be useful in better managing the human-wildlife interface (Chapter 5).

Table 5: Summary of literature used in this thesis

<i>Chapter/ research question</i>	<i>Methodological considerations</i>	<i>Methods</i>
Chapter 3: Political and ecological baseline of human-elephant interaction	Use an “event” from ACE to draw out the various political and ecological factors. Subjective process of map making.	Key informant interviews. Literature review (including NGO/Govt. Reports, news articles, historical reports etc.). Mapping/GIS tools.
Chapter 4: Living with people – elephant diversity	Cognisant of the limitations of the quantified positivist approach of the natural sciences, but acknowledge the commitment to extended fieldwork. Align with the post-positivist	Elephant ethnography: Crowd-sourced location of elephants. Individual identification and observation, particularly around human interactions.
Chapter 5: Living with elephants – human diversity	epistemology of the social sciences, while also collecting some quantified data to produce generalisable results for local policy and remain relevant to elephant biologists/ conservation practitioners.	Literature review, including non-academic sources. Ethnography: Interviews, discussions, participant observation.

Table 6: Summary of methods used in this thesis

Bringing together these varied bodies of literature and the mixed and improvised methods is an ambitious undertaking. It is possible only on account of my varied academic training as well as my work over the last decade, which I hope to successfully explore in the subsequent Chapters.

In the next Chapter, I answer the first research questions that sets the context of human elephant interactions - *What are the factors that shape the complex human-elephant interactions in the Nilgiris?*

3. The political and ecological context of human-elephant interactions

Any understanding of human-elephant interactions must start with the context, which varies significantly across time and space. There are a wide range of social, historical, geographical and ecological factors that are important to understand the context of the interspecies interactions (or HEC), but these are rarely examined.

A pertinent example is perhaps the Ecoexist Project in Botswana, which “*seeks to reduce conflict and foster coexistence between elephants and people*”²⁸, and The Nature Conservation Foundation’s Elephant Hills project in India, which aims to move “*from conflicts to coexistence in the Anamalai hills*”.²⁹ They both seemingly address the problem of “Human-Elephant Conflict” (HEC), and claim to learn from each other to find solutions, but the problem is vastly different. Botswana has 4 people and 0.3 elephants per km², while India has 400 people and 0.008 elephants per km². The basic human and elephant densities within their shared spaces (rather than at national scales) are key metrics to understand interactions, but are seldom published and perhaps not even known.

Gudalur has a long and complex history that has shaped both the political and ecological context of the region, and understanding this is vital. In this Chapter, I ask - “***what are the factors that shape the complex human-elephant interactions in the Nilgiris?***” The region is accorded a “high conservation value” and there are inherent tensions between people’s rights and wildlife conservation. A complex history over land has resulted in insecure tenure and conflict between the state and the people, and has impacted the land use and change, which is further complicated by global commodity prices particularly tea and coffee. The creation of “elephant corridors” has again resulted in significant conflict. I use an “event”, of people getting killed and elephants being captured, (which I have mentioned in Section 1.5 of the introduction, and describe in more detail here) to draw out political and ecological factors that form a “baseline” for understanding human-elephant interactions, and then describe them in more detail through the Chapter.

²⁸ www.ecoexistproject.org

²⁹ <http://ncf-india.org/projects/in-the-elephant-hills>

3.1 An event - people killed and elephants captured

People being killed are highly politicized events, with an inevitable flurry of activity within the forest department. At the end of March 2016, three people were killed by elephants over three days, triggering the most significant reaction from the state in the last few decades. I use this “event” to draw out a range of complexities and history of the shared space that shape the present reality that need to be understood as a “baseline” context of human-elephant interactions”.

3.1.1 A person killed by an elephant in O’Valley

The morning the first person got killed I got a call from the DFO.

“Did you hear about the death in O’Valley? Can your team confirm which elephant was responsible? Two people were walking together when the incident happened, and one is in the Gudalur Govt. hospital. Please go there immediately and get a description from him. If possible even take prints of the elephant photos and get him to ID the correct elephant. None of our people can go that side; it’s a very volatile situation.”³⁰

Identifying exactly what occurred during the fatal encounters was important; the state forest department and conservation bodies invariably blame the victim for getting in the elephants’ way³¹, while the politicians and human rights group blame the elephant for straying into human habitation³², and getting the chance to talk to a witness immediately after an incident was a rare opportunity.

I didn’t manage to get photos of all the elephants printed, but I did get to the hospital shortly after his call. There were policemen all around. The DFO had spoken to the Police Inspector, and I was escorted in. The duty doctor informed me that the “patient” was

³⁰ All the quotes in these two Sections (3.1.1 and 3.1.2) are from incidents that occurred between 30/03/2016 and 03/04/2016, when three people were killed.

³¹ <https://timesofindia.indiatimes.com/city/puducherry/man-trampled-to-death-by-elephant-2-injured/articleshow/64021503.cms>

³² <https://english.manoramaonline.com/news/kerala/wild-elephant-kills-men-nilgiri-animal-attack-locals-protest.html>

suffering from mental trauma, but no significant physical injuries. The patient started narrating the story, almost eager to off-load it onto others. They were both night watchmen at the estate bungalow and were walking back home at about 7 am when the tusker charged them. He ran back along the road, but his colleague ran into the coffee. He then heard his colleague screaming, and knew it was over. He tripped and fell and hurt his knee, but picked himself up and kept running all the way to main road. I was just starting to ask him about whether he saw the elephant clearly, but was interrupted. Local politicians had arrived. They were all dressed in white, except for the thin, striped borders of their dhotis³³, which distinguished one political party from another. It was unusual to see different parties come together on anything, but they seemed united in their stand against wildlife. The patient was informed that he was not to speak to me or any other “wildlife people”. Only they could help the local people solve the wildlife problems. I tried to use the opportunity to talk to the politicians – what did they think was the solution? They were not quite sure, but one of them spoke up:

“Capture all these elephants and take them back to the Mudumalai forests. There is nothing more to say. We will not negotiate on this.”

This was said with significant aggression. I tried to talk more, but they only wanted to talk to “media people”, and didn't want any “wildlife people” wasting their time. A policeman drew me to the side and suggested I leave.

“It's no use talking to politicians – nothing good will happen. They are only interested in themselves, not the people or the elephants. All this is because of elections in a few months. After that they will be out of the picture and then you should see if you can do something to better the situation”.

My colleagues had split up into teams searching for the elephant in the surrounding mountains. None of the forest department staff wanted to be in public, crowded places, and were happy to stay hidden away in the forests. About six months earlier a tiger had killed a woman in the region, and there were large protests with the mobs turning violent. The crowds had sat on the highway with the body, blocking the road in protest. The decaying

³³ Traditional South Indian garment, a rectangular cloth wrapped around the legs and waist and tied at the waist.

body amidst protesters was hugely emotive and effective, and with high ranking officials forced to immediately come to the area and negotiate with the protesters. Forest department jeeps were burnt down, their offices vandalised and many of the staff beaten up. Even senior officers had to run and hide in the forests, away from the crowds. So their fear was real. My own colleagues refused to go to places where someone was killed soon after the incident, fearing for their safety.

I could use my journalist role to get by, and went to the place where the man was killed. It was in one of the tea estates, and I had been there many times before. I was hoping to meet some of the locals and figure out exactly what happened, but Section 144 of the Criminal Procedure Code had been imposed, that prevented people from assembling in groups. There were policemen and paramilitary forces everywhere with their vehicles causing a traffic jam on the small road. I found many of the senior officers together, walking up the hill to the spot where the man was killed. There was one “plain clothes” person briefing them, who I assumed was from the estate management, but I later found he was from the “intelligence department”, and heading the special task force. It felt a bit like a war zone, with armed guards all around, dressed in camouflage clothing. Even a Range Forest Officer (RFO), who I interacted with on a weekly basis, had a gun holstered to his hip. I didn't know he was authorised to carry a weapon, and even less sure about whether he knew how to use it. I joked about it, and he laughed back:

“RFO rank onwards we all have weapons, but last time I shot one was in practice during training some 20 years ago. So yes, I don't know what will happen if I actually try to shoot it! But in these situations we've been advised to keep it visible. Why should I run the risk of getting beaten up in my old age by these local rowdies? So long as they see it it's enough, they won't try anything funny”.

A jeep full of local people was going past, and they stopped when they saw the officials, in the hope of coming up and talking to them. But the police had cordoned off the area and were not letting anyone through. There was a heated argument unfolding – how could residents of the area be prevented in moving along a public road? The people were clearly not getting anywhere, and were greatly outnumbered by the uniforms. As they were all leaving an old man talked very loudly, to no one in particular:

“We know exactly what is going on here. All these guns are not to protect us from wild animals, it's just to frighten us local people and hope we will not protest. You come like swarms after people get killed and snatch away the body before we even know about it. You don't even allow the local people to mourn and have a proper funeral. You take the family away and give them big compensation, and with this you think you have solved everything. It is going to get worse, and we will fight. You cannot keep doing this all the time.”

You could feel the tension in the air, and a visceral anger; even after a person was killed on a coffee plantation outside forests, the Government was more concerned about subduing protests than protecting the people from animals and preventing deaths in the future. A reaction from the police may have triggered something violent, but they pretended they didn't hear what he said, and the Jeep full of people left. I hung around for a while and tried to engage the police in conversation, but they had been instructed not to interact with local people or the media, and decide to play it safe with me too.

My colleagues then called to say they had tracked down the elephant, but it was in the tea bushes, not clearly visible. Tea bushes are usually 2-4 feet tall, but the estates are faced with a crisis – unstable land tenure, unavailability of labour, high costs of fertilisers, volatile international tea markets and of course the elephants. Many of the more remote fields are abandoned, and in less than a year the tea forms a thick, impenetrable mass of vegetation. We kept seeing the bushes move, but couldn't see the elephant. After about three hours it finally came out. It was a tusker, and one that the staff had seen many times. The question was whether they were going to capture it. The forest department had not yet made any official decision about it, and given the sensitivity of the issue I did not want to broach the subject with the officers. But a local lawyer I met in the evening had his own take on it:

“They are not going to do anything about it now. When people get killed inside these big estates the managers side with the officials against the locals – even if it is their own workers. Even before the family can find out they take the body to the hospital and finish the post mortem. Then they take the family to the big offices and given them some lakhs in compensation. How can they then object to so many

senior officers and the estate managers? Only when people get killed in public places can we organise a proper protest and ensure some action is taken.”

The volatile, highly politicised situations that arise out of human elephant encounters is something that is largely missed in the conservation literature. In any superficial engagement with the problem of HEC, the reactions from both the state and the local people will seem disproportionate. But the reactions are not solely on account of the accidental deaths – these are merely triggers that flare up a long standing, underlying conflict between people and the state, primarily over land tenure and the state’s greater interest in the rights and conservation of wild animals over the welfare of the local people. Both of these are discussed in more details in later Sections. The level of management of the tea estates, linked to the fluctuating global markets is also relevant to the human-elephant interface, and is discussed later in this Chapter.

3.1.2 More people killed in Cherambadi, and elephant captured

Three days after the O’Valley incident, before any decision could be made, there was another accident. This time two people were killed on the same night in an area about 30 kilometres away. This time also both people were in a large estate. Manishekhar was walking along the main road – a state highway – when he was killed. An elephant was on the left of the road, and charged. He was with a friend; the friend ran back along the road, but he went off the road into the bushes, and was killed.

There was chaos the next few days, with a similar unfolding of events as the previous week - politicians and local people gearing up for a protest, and the state gearing up to quell it. While we were out looking for the elephants in the middle of the next day, another body was at the side of the road, hidden in the tea bushes, about 300m away from us. The police didn’t wait for the ambulance or protocol, they bundled the body into their jeep and sped off. There were already hundreds of people in the locality, and they all started swarming to the spot where the man was killed. You could feel the anger in the air. Two of my colleagues came running towards me and insisted we also leave right away. A few hours

later, after the crowds had dissipated we went back. Karnan was at home in the night, but missing all morning, and his family assumed he had left really early for work. But he had stepped out of his house at some point to relieve himself, and got killed by an elephant. His body was barely 20 meters from his house hidden in the tea bushes, but no one had noticed.

Things then moved very quickly. The head of the state forest department was on his way to Gudalur, along with a large contingent of senior police officers and the special task forces. In total I overheard the head of the district say that 600 paramilitary personnel and policemen had been deployed in the region. Though protests did happen, the strong arm of the state was very visible, and everything was kept under control. It was the first time in the history of Gudalur that such high-ranking officials from the police or forest department were visiting for official work.

I was summoned later that night to present our work on identifying individual elephants. I was in a complicated position, as we had only started systematically following the elephants for about three months, and didn't know them well enough to pass judgement and decide who was aggressive or dangerous and who was not. I had been "warned" by my fellow conservationist colleagues to not casually label the elephants' behaviour "aggressive" and legitimise the forest department's "unscientific" capture operations. I was told to make sure we presented our "data" on human death across communities to show none of the tribal³⁴ people were being killed, and that all deaths were accidents. There was no room for terms like "rogue" elephant from a scientific perspective, and I should not perpetuate these "anthropomorphic" ideas.³⁵

I had to be careful and measured in what I said. I only presented what we knew about the elephants so far regarding the three elephants sighted soon after the incident and did not speculate or offer opinions on what should be done. CMK1/Ganesan was an older (50+

³⁴ The term "tribal" arguably has pejorative connotations, and usually only used for communities in the global south (Krishnamurthy 2013), but with the complications around classifying people (described in Chapter 5) I use the term tribal to align with the government's "Scheduled Tribes", which I have explained in Chapter 1.

³⁵ I use the quote to highlight the complex nature of these terms and that I do not take them at face value.

years) male relatively peaceful, and had often been seen around people without any signs of aggression or fear. CT6/Chullikompan was a young male, probably recently separated from his natal herd, and was seen quite often near habitation, but quite uncomfortable around people either charging or running away. CBT1/Shankar was also older, and not seen near habitation as often, but also not comfortable around people in the way CMK1 was.

The consensus, from the forest department talking to local people, was that both CBT1 and CT6 (See Appendix 3) were responsible, and would be captured. Older males were known to have “high site fidelity”, invariably coming back to their former ranges, so CBT1 would be released in the neighbouring PA (Mudumalai) with a GPS-GSM collar on him; if he came back to Gudalur his movements would be monitored carefully, alerting people if he came near habitation. The younger male, CT6, would be taken to another disconnected reserve over 200 km away where there was a paucity of males. There were very few settlements around, and hopefully he would settle down there. I was quite impressed with the decision-making process when the senior people were all together.

The response by one of the officers I knew personally at the end of our presentation was interesting:

“Thank you for all this information Mr Tarsh. We are grateful to you for profiling all the individuals [elephants] in this region and having so much background information on all of them. It is probably the first time we have such detailed information before we start on a capture or translocation operation. But I should also warn you of some things. You are very young and idealistic, and have lots of good opinions about how this should all be handled. But keep in mind, decisions are not made only on the basis of your science and research. The socio-political factors all also have to be considered along with your research when we make decisions. We ultimately report to the politicians, and they are democratically elected by the people of Tamilnadu. We cannot ignore their wishes...”

Later in the evening over dinner the officer carried on, keen to make sure I was not disillusioned by my first encounter with the inner workings of the bureaucracy:

“Let me tell you a bit about my experience with you biologists over the last few decades. I can never swear by science, it is not absolute. Mathematics for example, we can all swear by. Two plus two will always be four no matter what you do or which mathematician you ask. But it’s not like that with you biologists. Two different biologists can have completely opposite hypotheses, and collected data to prove it perfectly well and publish in International journals. Same person can also change their opinion over some time, and start showing different things with their research. I have seen this numerous times in the decades as working as a forest officer and seeing the research undertaken in the forest we manage.”

“Your work is good, and we thank you once again. But please bear in mind that the role of science and scientists are to inform management decision, not to take them. Don’t get upset with the decisions we take if you don’t agree with them. Neither the public nor the wildlife scientists ever like the decisions we take, but still we have to take such hard decisions. ”

The next day I heard from field staff that there was a change in decisions. The District Collector had pointed out that with the collars on, they would be recognised as the problem elephants from Gudalur wherever they were released, and there would be public protests. Therefore, both elephants would be captured and kept in captivity till the state elections, scheduled to happen in 2 months, after which the situations would be reviewed.

The interplay of science, democracy and expediency was clearly evident! The conservation literature routinely calls for “science-based conservation” or “evidence-based conservation”, with one journal even titled “Conservation Evidence – providing evidence to improve conservation practice”³⁶. The question is how and by whom is the evidence or science generated and how does it interplay with all the other complexity that managers have to deal with? While biologists often ignore this complexity, some forest department managers (who are often criticised by the biologists for their unscientific approach), seem to have a very astute understanding of this, to the point of attempting to placate me (assumed to be the scientist) in advance. I discuss this in more detail in Chapter 6.

³⁶ <https://www.conservationevidence.com/collection/view>

Through this event, a number of strands emerge that are relevant to better understanding the human-elephant interface, which I present in point form for the sake of brevity.

- First is the “high conservation value” that is accorded to the region that almost puts conservation (or elephant rights) above the welfare or rights of local people, and the complications and conflict this entails.
- Second is the “Conservation Conflict” (Redpath et al. 2014), or conflict between different groups of people – primarily between the state and the residents, but also to a lesser extent between the different groups of people. Insecurity over land tenure is a key factor that is linked backward to the colonial history of the region.
- Third is the physical geography of the region that mediates the human-elephant interaction; the tea and coffee plantations that elephants don’t feed on allow people to be relatively more tolerant, the forest fragments that allow the elephants to better use the landscape. The distribution and density of elephants and people across the region determine the frequency of interaction between the species. The spatial patterns in human fatalities and the possibility of mitigating some of them is relevant to reducing the intensity of the problem.
- Finally, the various changes at play, both internal and external (fluctuating international markets that result in thick unmanaged tea plantations) and how they affect all of these factors.

Through this Chapter, I examine each of these factors more closely to understand their impact on the human-elephant interface.



Image 9: Police, Forest Department and Special Task force staff with District Collector and Inspector of Police.



Image 10: Forest Department Jeeps burnt in protest.



Image 11: Forest Department staff preparing for darting and capturing an elephant.

3.2 The region's "high conservation value" and people's rights

My "study region" is the Gudalur forest division in the Nilgiri district, in Tamilnadu state, Southern India, bordering Kerala to the west and Karnataka to the north, described as the Gudalur-Wayanaad plateau in colonial era literature. It is now identified as the Gudalur Forest Division, a "human-dominated landscape" of about 500km², surrounded by protected areas. Gudalur town, from where the region borrows its name, is a municipality with about 50,000 people. But all references to Gudalur in this thesis relate to the wider region, not the town. This area is known for "human-wildlife conflict", with about 10 deaths annually through accidental encounters with elephants. In 2016 two people were killed by tigers, adding a further layer of complexity.

Ecologically, the region is well known, with the Western Ghats–Sri Lanka being classified as the 8th most bio-diverse "hotspot" in the world (Myers et al. 2000), and a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site. The Nilgiri Biosphere Reserve is a part of these Ghats, and India's first UNESCO biosphere reserve. It consists of about 5500 km² of forests, across the states of Tamilnadu, Karnataka and Kerala, encompassing a network of six protected areas. There is large variation in elevation (from 80m to 2600m above sea level), and rainfall (500 mm to 7000 mm per year) resulting in high diversity in climate, vegetation and forest types, from thick evergreen rainforests to dry, semi-arid scrub jungle, as well as frost controlled high altitude Sholas - rolling montane grasslands and patches of forests (Reddy et al. 2008). This drastic variation in forest types correspondingly hosts a wide range of plants and animals, including the single largest populations of elephants and tigers in India (Johnsingh et al. 2008). Over 20 animal species are named after the Nilgiris, several endangered and almost all endemic to the region. There are also over 2000 plant species, with the "neel" (blue) "giris" (hills) named after the blue Kurunji (*Strobilanthes kunthiana*) flower that carpets the hill when it blooms (Hockings 1989). Many major south Indian rivers originate in the NBR – the Moyar, Bhavani, Kabini, Cauvery and Chaliyar, - providing water for millions living downstream (Puyravaud and Davidar 2013).

The region is highly populated with significant diversity in the humans; c. 3 million people across 30 different ethnic communities (Daniels 1996). The region has witnessed successive waves of immigration, discussed in more detail later in this Chapter and again in Chapter 5, as this is relevant at various levels. From the “conservation biology” perspective, the region is also a human-wildlife conflict “hotspot” since a large number of people and wild animals share space (Baskaran et al. 2012). While the nuances of this position are further discussed and dissected later in this thesis, the “baseline” is important – a large human population sharing space with dangerous yet highly protected animals like elephants and tigers.

While the ecological importance is recognised, the social processes of environmental prioritisation warrant brief discussion. Various approaches to prioritisation exist; “Ecoregions”, formulated by World Wide Fund for Nature (WWF), “Important Bird Areas” that was later broadened to “Key Biodiversity Areas” by Birdlife International. But it is the “biodiversity hotspots” scheme put forward by Conservation International, a multinational conservation non-governmental organisation (NGO), that dominates the prioritisation schemes. It is based on a region having at least 5% of the world's vascular plants endemic, and 70% of the habitat destroyed (Myers et al 2000). But all plants have not been described and classified by western “science”, so data on the number of endemic plants relies heavily on “expert opinion”, which in turn depends on the research interest in a region. The hills of South India were preferred by the colonial government (the Nilgiris in particular, where Ooty was the summer capital of the Madras Presidency), and the region has been the focus of innumerable scientific studies for 300 years, where Hockings (1996) lists over 6300 titles in the Nilgiri bibliography. The definition of a geographic region is also subjective, where Western Ghats-Sri Lanka has more species and is therefore “hotter” than just the Western Ghats of India. The hotspots approach has arguably been “marketed” more than all the others, has captured the popular imagination and raised 750 Million US dollars soon after it was conceptualised, and is perhaps the most “successful” (Myers 2003). While the political ecology framework provides a useful lens to critique the process of prioritisation, what is also relevant is that there is broad scale acceptance that the hills are important, particularly in comparison with the surrounding plains, and worthy of conservation efforts. Locally this is framed largely around the question of water, as the hills are the catchment areas for most of the major rivers in South India and sustain agriculture and millions of livelihoods downstream.

The underlying ecological importance of the region, even if subjectively constructed, cannot be entirely ignored, and there is a stronger legal framework for conservation of the flora and fauna in this region. When there are negative interactions between people and wildlife in an area that is accorded high conservation value at various scales, the conservation of animals often takes priority over the welfare of local people.

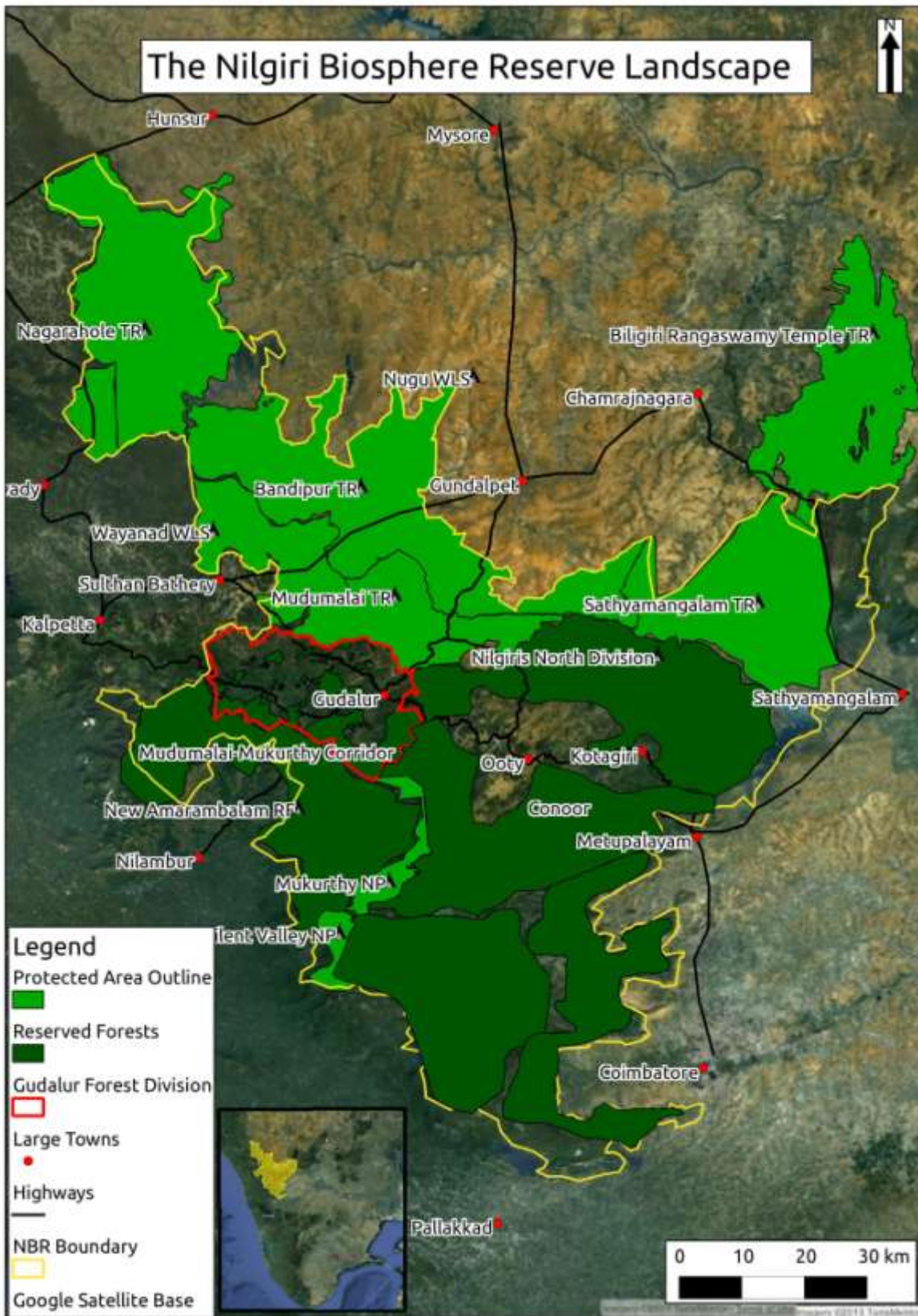


Image 12: Map of the Nilgiri Biosphere Reserve.

3.3 History and contested land tenure

Much of what appears to be “conflict” between elephants and people is in fact conflict between different groups of people (Redpath et al. 2013), and in this Section I discuss the roots of the conflict over land tenure and how it affects with the human-elephant interface.

O’Valley, where the watchman was killed by an elephant as described above, is a good example of this. Not a single one of the 20,000 residents in the valley legally own the land or houses they occupy. They are all considered squatters on forest land, despite the fact that the Lauriston coffee estate is one of the oldest in South India, established in 1845. A ruling from the Supreme Court of India³⁷ in the mid-1990s prohibited any development on any of these lands; people are not allowed to repair their houses or put up electric fences – both essential in protecting themselves from elephants. This is clearly at odds with the significant resources invested by the state to prevent accidental human deaths in elephant encounters, but the complex history of contested land rights going back two centuries cannot be swept away to implement a “solution” to HEC. Understanding human-elephant interactions must start with understanding of this long history and the conflict over land.

The colonial Government's first significant engagement with the Nilgiri hills was in 1819, when John Sullivan, the Collector of Coimbatore, came to the “Neilgherries”, and decided to establish a base in the hills³⁸. The climate and vegetation suited the British well, Sullivan persuasively describes to the colonial Government:

“... it resembles Switzerland, more than any country of Europe... the hills beautifully wooded and fine strong spring with running water in every valley..There is no Asiatic or African climate known to us (with the exception of the Nepal mountains) so cool and equal throughout the year as the Neilgherries” (From Grigg 1880:282)

³⁷ The Supreme Court of India is the highest judicial body, and the final court of appeal under the Constitution of India, hence forth the Supreme Court.

³⁸ Through this Section, I rely largely on a few key sources – (Buchanan 1807; Grigg 1880; Francis 1908; Folke 1966; Hockings 1989). I mentioned specific references for quoted text, but otherwise do not cite these sources multiple times

His efforts paid off, where a Toda village, Ootacamund, grew to become the summer capital of the Madras Presidency, and are today a famous tourist attraction, described as the “queen of hill stations”³⁹. Tea was a prized global commodity since the mid-1800s, and played a key part in the development of the region. The first experiments with tea were in 1834, where seeds were brought from China at a considerable cost and effort, and Chinese prisoners of war were used to plant tea in the Thaishola Estate in 1859. Tea cultivation began to spread through the upper plateau, and by the turn of the century, there were about 2800 hectares of tea being cultivated in the Nilgiris. Tea is today the dominant agricultural land use of the region, and the backbone of the local economy. This particular interest in the region and in plantation crops by the colonial government attracted significant attention to the region, and arguably, conflict over land

3.3.1 The Janmam land leases

The majority of the land in Gudalur belonged to various Indian Royal families, who gave it out to colonial planters on virtually perpetual 99-year leases, starting in the mid-1800s. A steady stream of workers from various south Indian states moved into the region to work on these plantations, which was the first slow wave of migration into the region. As the Royal families’ control over the region weakened, the workers began to occupy and cultivate patches of lands within the leases that were not cultivated by the estates. This accelerated after the 1950s, when malaria was eradicated in Gudalur, and a “second wave” of migration occurred, largely from the neighbouring state of Kerala.

The late 1960s saw the passing of new legislation that aimed to correct this ambiguity over land tenure – the Gudalur Janmam Estates (Abolition and Conversion into Ryotwari) of 1969 (hence forth the Janmam Act). These leased lands did not fall under the purview of agrarian reforms across India, and this act aimed to correct this by transferring the land ownership from the Royal families to the Government. Forested lands should have been transferred to the Forest Department, large plantation leases terminated (under Section 17 of the Act) and the lands vested with the Revenue Department, and small holder tenants and occupiers were to be given title for the land in their cultivation.

³⁹ <https://nilgiris.nic.in/>

In 1976 a survey was conducted and the status of the Gudalur land was roughly:

- 35% held by the Government with no dispute – the non Janmam lands that were not initially owned by the Royal families.
- 35% was leased out to 11 of the major estates, roughly half of which was forested and should have been transferred to the forest department and the other half to the government.
- 8% leased out to 80 minor tenants, who should have been granted title.
- 22% remained with the royal families, all of which was forested and should have been transferred to the forest department.

A further complication is that about 15% of the land (held by either the royal family or the large estates) was estimated to have been encroached upon by small farmers, and should have also been granted title. In short of the 65% disputed land, about 23% should have been granted title, 29% declared forests and 13% taken over by the Government. But instead, about 14% was granted titled, 10% declared forests, and the vast majority of the land – about 41%, was notified for acquisition by the Government under Section 17 of the act.

The large discrepancy in granting of title implied that a large number of small farmers were also liable for eviction. Violent and highly controversial evictions started in 1978, and stopped in 1981, when an immigrant land holder from Kerala immolated himself in front of the Government office in protest, triggering an inter-state political problem between Kerala and Tamilnadu. A local advocate filed a petition in the Supreme Court, and all evictions were halted, with the final judgement passed in 1988, asking the government to view the requests for title from small landholders “sympathetically”. The volatile political nature of evictions meant that the Government did not proceed with further evictions, and only acquired 6% of the land instead of the 41% they were supposed to take over as per their own assessment.

The large plantations with the Nilambur Royal family immediately challenged the Act in 1970, even before the rules were passed, first in the High Court at the state level and then in the Supreme Court, arguing that the perpetual 99-year leases were as good as title, and that the stated intent of agrarian reform was not valid since the majority of the land was forested. This also involved a question of Constitutional validity of the Janmam Act, and it could not be decided by a single judge, and was posted before a five-judge bench, and then a nine-judge bench, and the litigation went on for two decades. In 1999 the large estates then withdrew their cases in the Supreme Court, as they were unlikely to win, but were confident that evictions would not be carried out given the political nature of the situation, and the legally ambiguous status quo remained for almost two decades. In 2017, the issue of Section 17 lands in Gudalur came up in the Supreme Court as a part of different case, and the judges admonished the state government for their inaction. In June 2018, a new committee was constituted to look into the matter, and the litigation has now gone on for almost 40 years.

The 1970s saw another major immigration of about half a million Sri Lankan repatriates. While this is discussed in more detail in Chapter 5, the impact on the land, forests and elephants was significant. To provide them a livelihood, 3400 hectares of forests (almost 7% of the total land in the Gudalur Division) were cleared for tea plantations, with management kept under the Forest Department, and the land still legally classified as forests. With the existing ambiguity over land ownership, a number of these immigrants also encroached and started cultivating forest land, while the older encroachers and large estates also expanded their areas under cultivation.

Over the last decade or so, there has been another influx of people on account of two major drivers. First, the rapid growth of the Information Technology industry in Bangalore and Coimbatore produced an upper middle class, many of whom invested their surplus income in a second home in the hills. The other driver is a growing Indian workforce in the Middle Eastern countries from neighbouring Kerala. Since land is scarce and therefore unaffordable in densely populated Kerala, the Nilgiris became an attractive option. While the majority of investors during the last decade have been cautious regarding the legality of their land purchases, many have taken possession of the land with little or no documentation legalising the transfer of land. Corruption in these transactions is rife and

the complicity of forest and revenue departments and confidence on the part of the buyers is on account of this impasse over solving the land conflict.

Ownership over much of the land in Gudalur is still unclear, as is shown in the Table 7 below.

<i>Main Category</i>	<i>Sub Category</i>	<i>Area (ha)/ Percentage</i>	<i>Description</i>
Non Janmam lands	TANTEA, classified as forests/managed by Forest Department	3400 7%	Largely undisputed. Established in the 1970s, with boundaries reasonably clear, but a number of the workers are now squatting the residential quarters and cultivating small patches of land around them.
	Private, Government/ Revenue and forest department land	14600 29%	Partially disputed. This includes some large estates who bought land from some of the Royal families, scattered parts of government/revenue department and forest department land, with a number of small scale encroachers.
Janmam land	Handed over to forest department under Section 53	5200 10%	Partially disputed. Settled in 1976, forested land that is legally classified as forests, but with some encroachment.
	Settled/title granted under Section 8, 9 and 10	6800 14%	Largely undisputed. Most of these lands are held privately with no dispute, except in a few cases between large estates and small farmers.
	Disputed under Section 17	16800 34%	Disputed. This is the most problematic category of land in the region.
	Handed over to the government under various Sections	3200 06%	Partially disputed. Much of this has since been encroached upon by small farmers.

Table 7: Summary of the categories and ownership

In summary, only about 20% of the land tenure is relatively stable, without dispute of ownership. A further 45% is partially disputed, the legal ownership is clear, but the land is in possession of someone other than the legal owner. And finally, there is the 35% of “Section 17” land that is highly disputed; the legal ownership is not established.

How does this long, complicated history resulting in a highly disputed ownership of land impact human-elephant interaction? The most important factor is that there is no correlation between that is legally classified as forests (and controlled by the forest department), and what is actually natural vegetation cover. The forest department controls

large areas cultivated with tea under the government's TANTEA plantations, and private estates control large areas covered by natural vegetation. Most of the land (both forested and not) is disputed with a number of stakeholders claiming ownership. This complicates the management of human-elephant interactions. As mentioned at the start of this Section, it is illegal for anyone living on the disputed lands to put up electric fences, or to transport construction materials to repair, rebuild or strengthen their houses. Both these are relevant to protecting people from elephants, and much of this is done through bribery and informal social networks. In the case of crop damage (though it is minimal as tea and coffee are the main crops), or in cases of property destruction, damage cannot be compensated through official mechanisms since the people living on the lands are considered illegal squatters. There is significant animosity between the people and the forest department on account of this ambiguity around land ownership. Elephants are almost caught in the cross fire, where much of what is perceived as HEC in fact conflict between different groups of people (i.e., human-human conflict, or "conservation conflict"), and this conflict has a negative impact on the human-elephant relationship (Steve M. Redpath et al. 2013).

The implication of this conflict at a broader scale is also worth mentioning. The normative assumption within the traditional conservation paradigm is that successful conservation depends setting aside land for nature. "HWC" occurs since wildlife habitats are destroyed, and can be mitigated by protecting or restoring forests, particularly "corridors"⁴⁰ in the case of elephants outside protected areas. This starts with the control of land, but the complexity of land ownership and tenure has received little attention in the conservation literature. Gudalur is perhaps exceptional in the scale of the conflict over land, but some level of complexity arguably exists in all post-colonial landscapes. Conservation plans based on simplistic assumptions about land without understanding its history and ownership is unlikely to succeed. Relevant to this thesis is that any discussion around sharing space is inherently linked to land, so must be linked to the history and various claims to and conflict over it.

⁴⁰ Elephant corridors are discussed in more detail later in Section 3.4 later in this Chapter.

3.3.2 Indigenous land rights

With this long drawn out dispute over land between people and the state, the question of indigenous land rights have largely been ignored, since they constitute barely 1% of the state population in Tamilnadu (compared to 8% at a national level where they are a significant vote bank). But discussion around the right of indigenous people, which have global recognition⁴¹, are key part of understanding the variation between different communities, and how this changes the relationship with elephants.

This is rooted in the larger context of India's colonial and post-colonial forest management, where the objective of the colonial government through the Imperial Forest Service in part to control the forests for “orderly exploitation” of forest resources (largely timber), but also as a means of exerting further control over the people of India:

“[I]t was decided to treat the customary use of the forest by the Indian villager as based on ‘privilege’ and not on ‘right’. ... The provisions of the new (1878) act [sought to] assert the absolute control and ownership right of the state...” (Guha 2001).

The subsequent legislation (1927 Indian Forest Act) involved settling the rights of locals, though this was an arbitrary and one-sided process with no room for review or appeal, and while some rights were granted, in most cases they were abolished. The Wildlife Protection Act, 1972 and Forest Conservation Act, 1980, though shifting the focus from revenue generation to conservation (arguably based on the North American “preservationist” approach – (Guha 1997) ownership and control was still retained by the State. Thus over the last century, all of India's forest dwellers, the majority of whom are scheduled tribes and whose entire livelihood is forest dependent, became de facto violators of law (Ghosh et al. 2009). Millions were forcibly relocated, and widespread atrocities were perpetrated, including extra-judicial killings by the Forest Department⁴².

⁴¹ See the UN declaration on the rights of Indigenous People - <https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html>

⁴² This history of violence against India's tribal people has not been specifically fully described or analysed academically, but the news article <http://www.thehindu.com/opinion/op-ed/seshachalam-forest-encounter-tribals/article7106092.ece> describes the most recent case, and the People's Union for Civil Liberties website outlines a history of this violence - <http://www.pucl.org/Topics/Dalit-tribal/2003/adviasi.htm>

Reacting to the oppressive policies, India saw waves of protests erupting across the country by a range of people's organisations and movements (Springate-Baginski and Blaikie 2013), which led to a new legislation when the United Progressive Alliance (UPA) came to power in 2004 - a coalition of parties, including for the first time Left parties, which controlled over 30% of the alliance (Shastri 2009). The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (The Forest Rights Act or FRA) - broadly recognises individual rights over land, and community or collective rights over larger forested areas around the villages, or an area that is defined as a “community forest resource”, including the right to collectively manage the surrounding forests.

There was intense debate before the act was passed, continuing for many years after it was notified (Rangarajan 2005; Madhusudan 2005; Bhargav and Dattatri 2011 and many others⁴³), where conservationists argued that granting rights to tribals was detrimental to conservation, and numerous cases were filed in state High Courts and the Supreme Court. The debate has now died down, with a ten-year review of the FRA⁴⁴ focussing more on the lack of a systematic implementation of the Act on the ground, and the positive impact it has had on biodiversity conservation in terms of stopping large developments projects (Kumar et al. 2017; Broome et al. 2017).

The relevance of this for the human-elephant interface is at multiple levels. First, there is a general antagonism and conflict between local people and forest managers globally (Dowie 2011) and India is no exception. Any attempt to understand human-wildlife interactions anywhere, must recognise this conflict and its nuanced local history. Second, complexity of the relationship between indigenous communities, other newer immigrants and the state. While they were largely a forgotten minority, they are now being noticed, and treated differently from the rest of the “immigrants”. Starting with a proactive forest officer in 2008 who tried to include tribals in some of the forest department's conservation

⁴³ The entire debate in the media is too wide ranging to report here, but two key sources that document this are a special issue by the magazine “Seminar” in August 2005 - <http://www.india-seminar.com/semframe.html> and the Campaign for Survival and Dignity website - <https://forestrightsact.com/>

⁴⁴ Economic and Political Weekly, [Vol. 52, Issue No. 25-26, 24 Jun, 2017](#)

initiatives⁴⁵, they are now favourably viewed as allies, particularly in comparison to the newer “illegal” encroachers. Their rights are not yet fully recognised, partly because of a stay in the Madras High Court, which was withdrawn by the Supreme Court only in 2016⁴⁶. In 2017, the Supreme Court directed the state to proceed with development activities (roads, electricity, housing schemes, water supply etc.) for all the tribal villages on the disputed Section 17 lands, but to also ensure this is not abused by other encroachers. In “HWC-mitigation” efforts the state is now pragmatically reaching out to tribal groups with government subsidies and schemes to construct household or village level community owned and operated electric fences. In comparison, for the other communities living on disputed land, construction of electric fences even at their own expense is illegal. Linked to this, is the changing relationship between indigenous people and the other groups. As their rights are recognised and they are seen as allies by the state, there could arguably be a negative impact on their relationship with other groups of people in the region.

A larger issue around indigenous land rights is worth mentioning. Part of the reason tribals do not feature in the land litigation over the last half a century is their view of land, which is seen more as a common property resource or even other-than-human person, with no effort to claim individual ownership over it. This has been discussed widely in the Australian (Altman and Hinkson 2007) and North American contexts (Jostad et al. 1996), but less so in India, where the idea of “indigenous” is more complicated. Most schemes around conservation and mitigating HEC, as well as the majority of the literature on HEC originates in the global north, with strong ideas around individual property rights, especially around land. If this is not the case around the world, and people do not view land as a shared resource across both humans and nonhumans, the very question of “competition over resources” does not arise. This is something that I examine in more detail in Chapter 5, but again, any understanding of human-elephant interactions and shared space must include alternative indigenous world views around land.

⁴⁵ See the newsletter that describes the meeting, which was the first time an official of that rank had met and talked to the indigenous people - <http://adivasi.net/Newsletters/news21.htm>

⁴⁶ <http://www.thehindu.com/news/national/tamil-nadu/tribal-council-welcomes-apex-court-order-on-forest-rights-act/article8185997.ece>

3.4 Corridors and conflict

Elephant corridors are a key element in understanding human elephant interactions, at two levels. First is the biological understanding of an elephant corridor, and how elephants actually move through the landscape – are there parts of the region that are vital for elephant movement and conservation? Second, whether this idea of a corridor can be implemented in a manner that is acceptable to the various stakeholder groups? I examine how this idea permeates and circulates through public fora – the media, policymaking and legislation, and finally the implementation on the ground, which in the case of the Nilgiris, has generated significant conflict between different groups of people.

3.4.1 Elephant corridors – from biology to policy

The biological understanding of a corridor is nuanced and complex, with the precise definition still debated (Hess and Fischer 2001), where it is understood in terms of structure (the physical dimensions they take on the ground) and function (how animals use them) (Saunders and Hobbs 1991). For Asian elephants, this is described (but not concisely defined) by Venkataraman et al. (2017), in an edited volume that claims to map all the elephant corridors in India (Menon et al 2005, 2017). In terms of structure he describes linear corridors (thin strips of habitat between human settlements that connect two larger blocks of habitat), and landscape corridors (multiple strips of habitats in-between a patchwork of human settlements. In terms of function, he describes them as “linear landscape elements which facilitate accelerated movement across habitat patches” (2017:31). The focus remains on describing the kind of habitat that the corridor connects; that it should only be between source populations, since sinks (that depend on the continuous inflow of individuals to sustain the population) are not viable anyway, and connecting to them to source population is not desirable. Habitats, where elephants are resident for extended periods of time should not be considered corridors. The corridors the book maps across India are largely structural (strips of natural vegetation among other land use types) – there is no robust data on how elephants actually move through landscapes, except for a few radio collaring projects in the early 1990s.

These early radio collaring projects are important as they laid the foundation for the idea of an elephant corridor, and were undertaken in the Nilgiris, on the Segur plateau to the east

of Gudalur. There are six settlements on the plateau (see Image 14 ahead), and elephant locations are presented below (Image 13)⁴⁷, where this data was used to identify the first elephant corridors in India (Image 14).

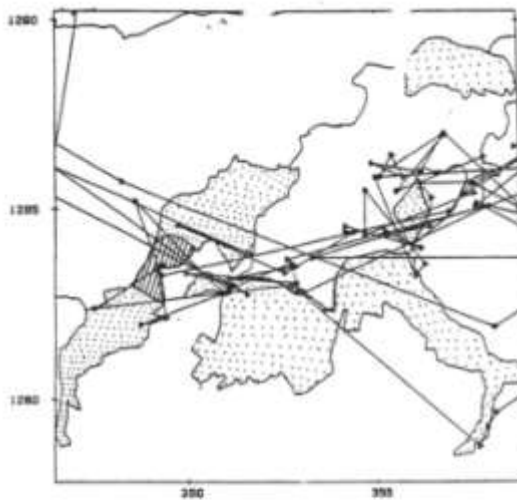


Fig 10. Corridors used by clan # 525

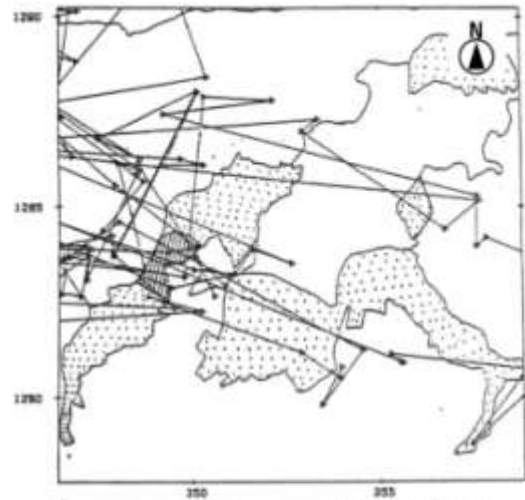


Fig 11. Corridors used by clan # 462

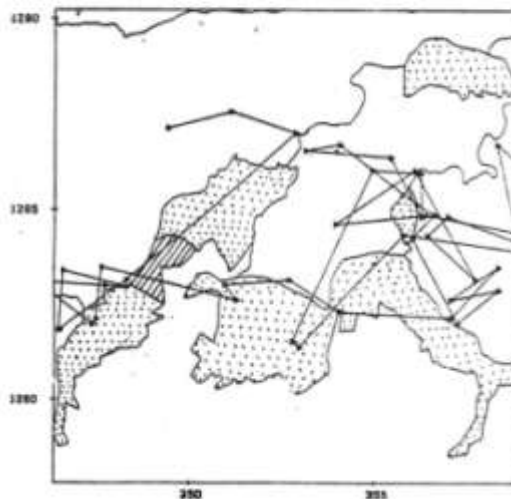


Fig 12. Corridors used by clan # 522

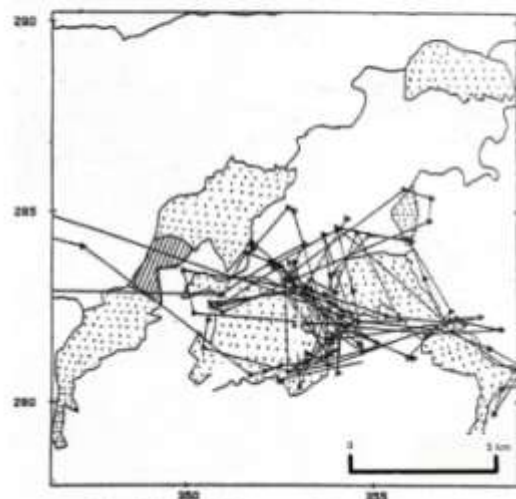


Fig 13. Corridors used by bull # 464

Image 13: Elephants' use of the landscape from the first radio collaring project in India (Baskaran and Desai 1996).

⁴⁷ A number of the maps reproduced in this chapter lack a clear scale and legend in the original publication, and I have attempted to add a written description of the scale below it.

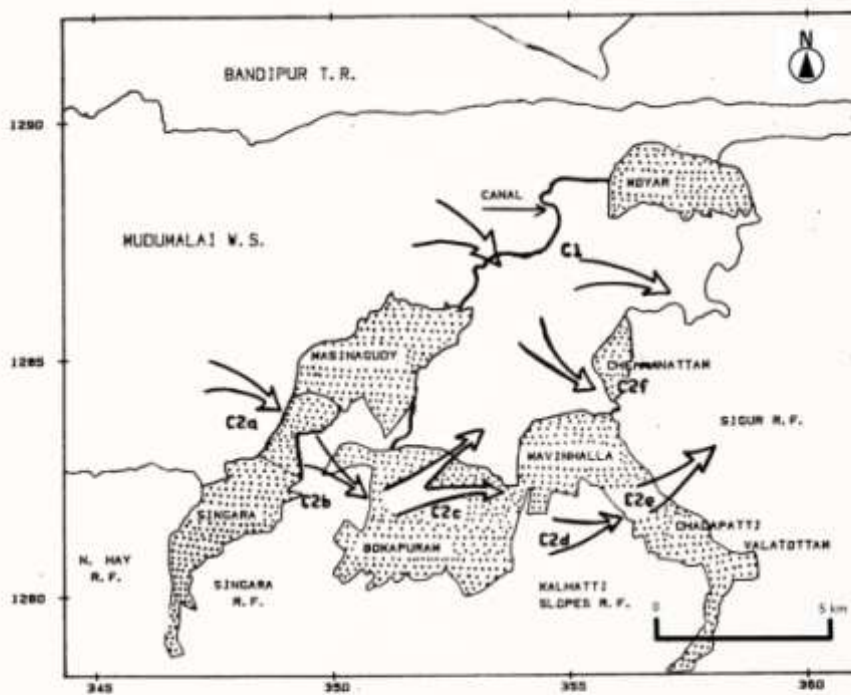


Fig. 4. Corridors between Mudumalai W.S. and Sigur R.F. Arrows indicate routes used by elephants to move into Sigur R.F. They also move back into Mudumalai W.S. along the same routes. Alphanumeric code represent the following corridor areas. C1. Canal between Masinagudi and Moyar villages, C2a. Singara estate land (forested) between Masinagudi and Singara villages, C2b. Singara R.F., C2c. Revenue land between Bokkapuram village and Mudumalai W.S., C2d. Kadhutti Slopes R.F., C2e. Revenue land between Mavinhalla and Chadapatti villages, C2f. Revenue land between Mavinhalla and Chemmanattam villages.

Image 14: Earliest map of corridors in the region, from (Desai 1991).

The conclusions drawn – corridors identified to show how elephants moved across the region from east to west – were not clearly supported by the data. Points were all taken in the day, by locating the elephants. That the straight lines between the points represent the actual movement of the elephants is an arguably oversimplified assumption – the elephants may well have moved through the private lands during the nights. Further, the data does not suggest that the elephants move from east to west, while the arrows showing the corridors clearly do. The region could well be elephant habitat, where during the day elephants are seen most often outside peoples' lands and in the forests. But lines were drawn to connect these points, and elephant corridors were “constructed” (and defined) as strips of elephant habitat between human habitation. Menon et al. (2017) map 101 corridors across India, and the fact that there is no data to show that elephants move through these corridors is forgotten. Corridors are now a key part of the discussion on elephant conservation and HEC mitigation, and a part of case law, which I discuss in the next Section.

3.4.2 Elephant corridors in Gudalur

Varma (2000) uses the idea of corridors more loosely, where it is not clearly defined, and maps four corridors in the Gudalur region, two of which appear to lead from intact forest into agricultural lands (Image 15).

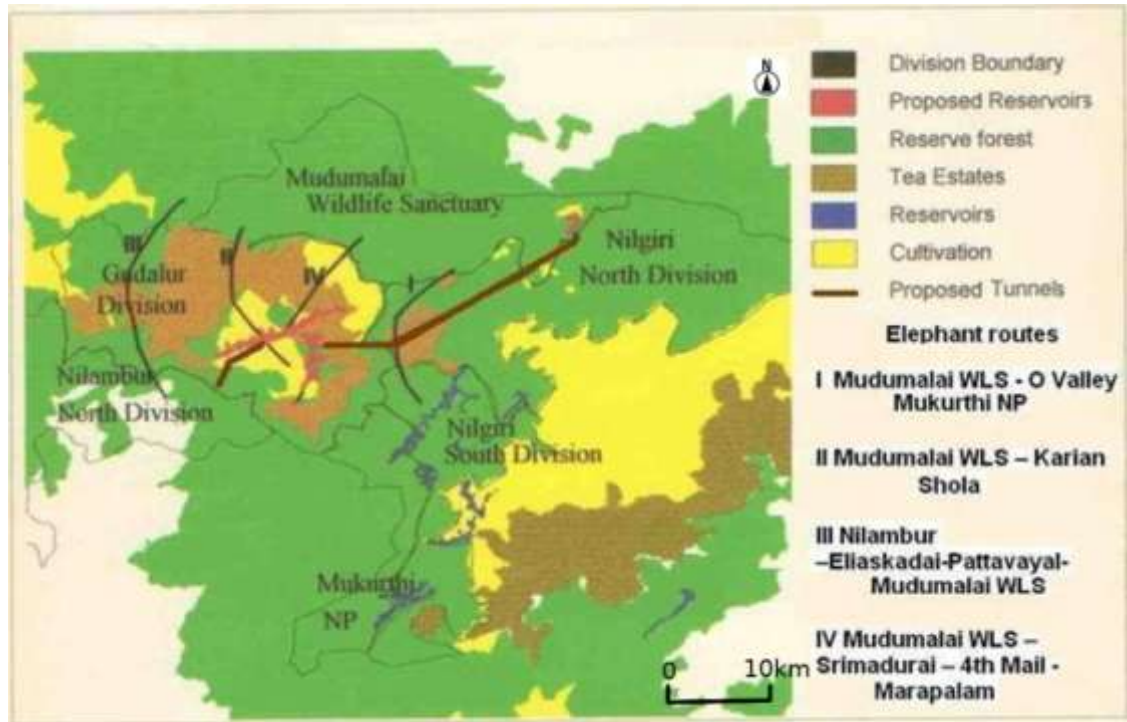


Image 15: Corridors described in Gudalur (from Varma 2000).

As per the Menon et al. (2017) mapping, one corridor is defined in the Gudalur region – Corridor 8.20, the Mudumalai-Nilambur via O’Valley (see Image 16 ahead). Relevant to this thesis, is whether these defined corridors play a critical role in facilitating elephant movement between two adjacent forest blocks – Mudumalai to the north and Nilambur to the south. First in terms of ‘structure’ are there linear strips of elephant habitat through the landscape? From our mapping of natural cover, it is evident that there is little or no natural cover in the corridor defined by Menon et al 2017. The land use in the O’Valley region is predominantly coffee plantations, and so the region does not conform to the

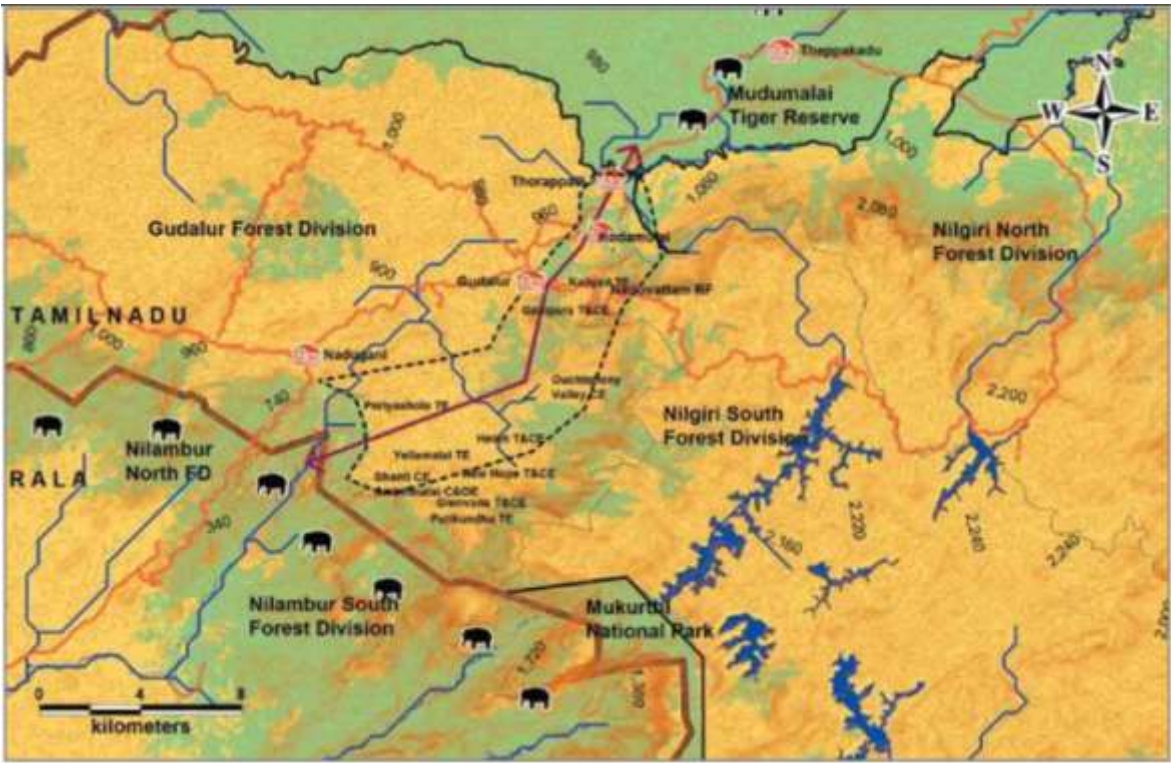


Image 16: Elephant Corridor Described in Gudalur (From Menon et al. 2017).

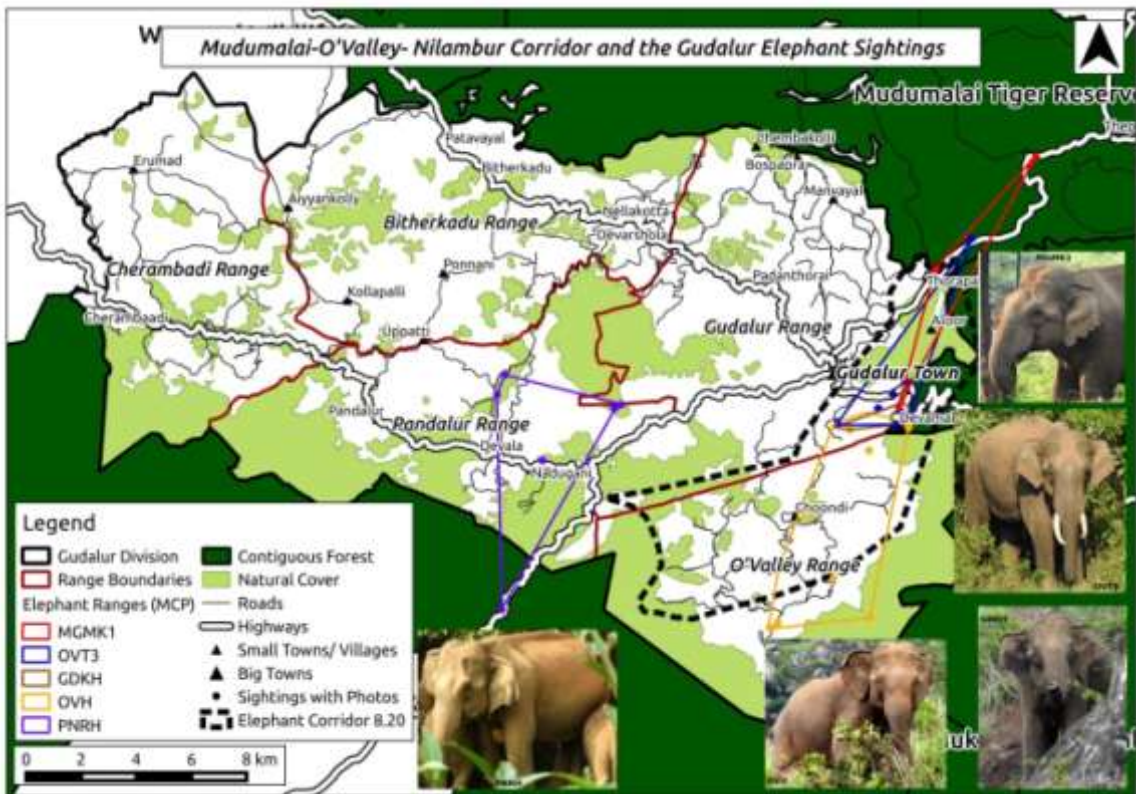


Image 17: Corridor defined by Menon et al. (2017) overlaid with natural vegetation in the region and individual elephant sightings from our fieldwork.

structural idea of a corridor that is described, unless the definition of “elephant habitat” is extended to include plantation landscapes. The second question is in terms of function. Menon et al.’s (2017) notion of accelerated elephant movement cannot be empirically verified, so a more useful way of understanding function of an elephant corridor is (a) does it allow genetic connectivity between two adjacent populations and (b) does it allow for the seasonal movement of the same individual elephants across the landscape (irrespective of whether it is accelerated or not). This was not a question we explicitly aimed to answer, and we have not looked at elephants in adjacent regions, but some insights can still be offered.

The question of genetic connectivity is not a meaningful, since all the elephant in the NBR are considered to be a single population, with the same beta-haplotype in mitochondrial DNA (Vidya and Sukumar 2005).

In terms of seasonal movement of the same individuals, from opportunistically photographing some elephants in the neighbouring more intact forests, we find there is some movement of individuals between Gudalur and either one of the neighbouring regions (see earlier Image 17), but the same individuals do not seem to move across Gudalur from Mudumalai to Nilambur. But this is speculative at this stage, and can be conclusively be answered only with a more systematic photographing of elephants in both the neighbouring regions.

The more important definitive conclusion that can be drawn from our work (which is described in more details in Chapter 4) is that a number of elephants are resident in Gudalur all through the year, including in what Menon et al. (2017) define as the O’Valley corridor. So the region, despite having very little natural cover, acts as elephant habitat, and therefore cannot be a corridor as stressed by Venkatraman (2005).

In summary, the idea of an elephant corridor remains nuanced and complicated, and attempts to “scientifically define” this concept are counter-productive – as more empirical data is collected about how elephants move and evolve in response to humans, these static definitions will arguably be invalidated. When these ideas interact with policy and the

public spheres this becomes more complex. The idea of elephant corridors has become popular in the public eye as a “solution” to HEC⁴⁸, where the DFO has routinely claimed that the high level of conflict in Gudalur is an account of corridors getting disturbed⁴⁹. This highlights the biggest problem around the idea of corridors, they relegate elephants to one kind of natural “habitat” and re-enforce the human-nature dichotomy. These broad scale generalisations and assumptions around how and where elephants choose to live are not rooted in any reality, since in India about 80% of their home range lies outside protected areas (Rangarajan et al. 2010).

3.4.3 Corridors creating conflict

The above (problematic) scientific definition and mapping of a corridor is now a key part of elephant conservation narrative in the public sphere. There has been significant intervention from the judiciary, with a move to now close and evict all the people living in the elephant corridor, severely exacerbating conservation conflict.

In the absence of any legal framework to protect corridors, conservationists and biologists lobbied India’s “Project Elephant”, a Central Ministry of Environment and Forests scheme, to recognise and notify all the corridors mapped by Menon et al. 2005. In 2006, the Ministry wrote to all states asking them to ensure “*the elephant corridors are provided with some legal protection like under EP Act [Environment Protection Act of 1986]*” (Ref. No. WL5/9537/2005). But the implications of this are unclear since the EP act does not deal with matters around land or conservation and is more about pollution and regulating industries. In 2008, the Government of Tamilnadu wrote back to the centre, asking for approximately 190 million rupees (3 million USD) to acquire 515 acres of land in patches from five different land owners on the Segur plateau to create some gaps between the

⁴⁸ <http://www.worldlandtrust.org/projects/elephant-corridor-appeal>

<http://www.thehindu.com/sci-tech/energy-and-environment/corridors-for-free-movement-of-elephants-in-valparai-plateau-will-prevent-human-deaths-says-study/article2331408.ece>

⁴⁹ <https://timesofindia.indiatimes.com/city/puducherry/man-trampled-to-death-by-elephant-2-injured/articleshow/64021503.cms>

<https://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/man-killed-in-elephant-attack/article23765797.ece>

different settlements (See the purple areas in Image 18 ahead)(Letter no. 5790/FR.5/2008). The same year, in response to the rapid development and urbanisation in the region, a public interest litigation was filed by “Elephant G. Rajendran” (In Defence of Environment and Animals v. Chief Conservator of Forests and Ors., WP 10098/2008), urging the courts to instruct the Government to safeguard the elephant movement and acquire the land for the corridor.

The court formed an expert committee of exclusively forest department officials in 2009, to give advice on securing the corridor. The committee decided that these five narrow strips of land were not adequate to safeguard elephant movement, and suggested a corridor one kilometre wide⁵⁰. Since a much larger area was now being discussed numerous other landowners also filed cases in the Madras High Court objecting to the corridor process. In early 2010, the final corridor map was published, being about 1 km wide and 22 km long, and covering about 7000 acres belonging to the revenue department and other private land holders. All the occupants were to be evicted, except the Schedule Tribes and Other Traditional Forest Dwellers', in keeping with the Forest Rights Act, 2006. This involved about 1500 acres of land belonging to over 270 people, ranging from 115 to .005 acres. The final judgement was passed in September 2011, and in an ironic twist, the court also ruled that since the land use conversion from agricultural to commercial was in contravention of the Madras Preservation of Private Forest Act, 1949, the land could be acquired without paying compensation as per the Land Acquisition Act. Almost immediately several stakeholders, led by the hospitality association, appealed the decision in the Supreme Court. A stay against evictions and an order to maintain status quo was granted right away⁵¹. The matter has been pending in the country's apex court since then. While the general consensus locally was that it would be impossible to pass an order to arbitrarily evict all the people in the region, an interim order was issued in August 2018 to seal all the resorts in the region, and wildlife activists demand that all the building also be razed to the allow for the unhindered movement of elephants⁵².

⁵⁰ Report of the Expert Committee formed in pursuance of the direction of the Hon'ble High Court in W.P.NO.10098/2008, 2762 & 2839 of 2009.

⁵¹ <http://www.thehindu.com/todays-paper/tp-national/supreme-court-stays-high-court-order-on-elephant-corridor/article2289322.ece>

⁵² <https://www.ucanews.com/news/indian-bishops-prefer-tribal-people-over-elephants/80756>

This “judicial activism” around the corridor, is the result of sustained lobbying by wildlife activists. In 2008, I was coordinating a movement on behalf of a range of NGOs – the NBR Alliance – against the establishment 180M USD neutrino research station under the Nilgiri hills⁵³. I was invited to give a talk to “senior officials” about the importance of the Segur region for conservation. I was younger, more eager, and less critical, and made an impassioned plea to protect the region and not allow the mega science project. I later found the official was the sitting judge on the corridor case, who had come on a personal family trip to the Nilgiris (with all expenses arguably borne by the forest department and conservation NGOs).

This lobbying has resulted in a form of environmental land grabbing. Elephant biologists attempted to secure about 500 acres of land for elephant movement, but by the time the biological idea of an elephant corridor got taken up and pushed by various interested groups, they ended up with 7000 acres as the elephant corridor (See Image 18 ahead). For the last decade, the elephant corridor has resulted in growing conservation conflict that goes much beyond the people directly affected by it. The actual relevance of elephants moving through and even the geographic nature of the corridor is completely lost. Regulation happens at the district level, where the corridor is converted into a list of survey numbers, and any new development - repairing a house, getting an electricity connection, construction of any structure, sale of property etc., - has to have a “no objection certificate” from the respective village officer, even if the land is nowhere near the corridor. If the development is within one of the notified survey numbers in the corridor, there is a far more rigorous process to obtain a NOC from the forest department, senior revenue officials etc., In reality, it is close to impossible to get a NOC in any of the notified areas, and repairs/maintenance happen “unofficially”, allegedly through bribery of low-level staff. While there were initially varied opinions among the various interest groups in the region (jeep drivers association, resort owners, homestay owners, small shops and trader, farmers groups, tribal groups etc.) around the impact of tourism industry and whether it needed to be regulated, almost all of the half a million residents of the Nilgiris district are now united in their opposition of the corridor.

⁵³ <https://newint.org/features/special/2008/08/04/tigers-neutrinos> ,
<https://www.nature.com/news/2009/091124/full/462397b.html>

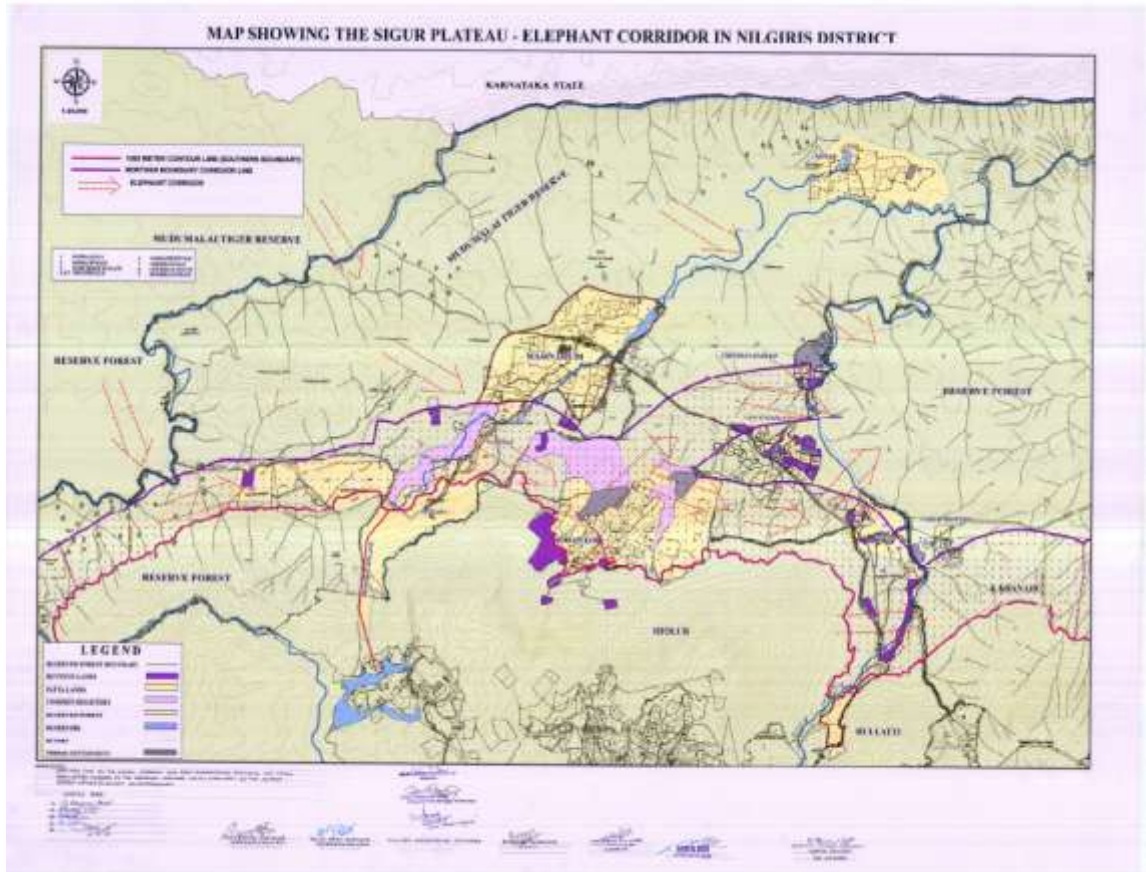


Image 18: The Final Elephant Corridor published by the Madras High Court, from the Expert Committee Report. Purple patches indicate original lands that biologists proposed to acquire to secure the movement of elephants and dotted area bounded by pink and purple lines indicate final corridor declared.



Image 19: Google earth visualisation of the region, from Desai et al. (2008). It shows natural barriers to the north (Moyar Gorge) and South (Nilgiris hills), making the region an east-west “corridor”.



Image 20: Google Earth visualisation of the large landscape from Desai et al. (2008) that shows the Segur plateau as a corridor bounded on the north and south, connecting forested areas to the east and west.

3.4.4. Ecological concerns

The manner in which biologists have “constructed” elephant corridors and pushed through with policy and legal provisions to “secure” them is clearly problematic. The authoritarian misuse of conservation legislation by the state and the adverse impact on dis-empowered local people has been documented in the political ecology framework at global, national and even local scales (Taghioff and Menon 2010; Menon et al. 2013). But what is missing from this state vs. the people narrative is the diversity of the people, and a very real conservation problem that needs to be addressed. Elephants do use and move through the region, and this is being disrupted with large scale urbanisation.

The region is clearly a wildlife “corridor” in the broader sense, bounded on the north by the Moyar gorge and the south by the Nilgiri hills, and plays an important role in connecting two major habitats as is evident from the earlier Images 19 and 20.

The development and urbanisation in this region is significant. There are at least 44 licensed tourist resorts, and many more unlicensed ones. Most have electric fences, loud music and all night outdoor parties, firework displays at festivals, swimming pools in a dry scrub jungle landscape, and illegal jeep safaris through the night etc., which are considered to be at odds with the conservation objective of the landscape (Chanchani et al. 2018). Over the years, there has been a rapid growth in human population in the region, triggered by a large hydroelectric project around the mid-1990s, and sustained by the tourism industry. There has been a 300% population increase in the Segur plateau between 1991 and 2008, which cannot be sustained without negatively impacting the local environment.

There are powerful commercial interests at play, that drive the widespread construction and urbanisation – “development” that is incompatible with elephant or biodiversity conservation. The Masinagudi hospitality association includes celebrities such as Mithun Chakraborty (a famous actor in the Indian film industry)⁵⁴ and Nawab Shafath Ali Khan (of the Hyderabad Royal family)⁵⁵, who own tourism resorts in the region. Chakraborty, in

⁵⁴ https://en.wikipedia.org/wiki/Mithun_Chakraborty

⁵⁵ <https://www.thehindu.com/news/cities/Hyderabad/nawab-shafath-ali-khan-at-ease-in-the-wild/article19370828.ece>

his affidavit in the Supreme Court, claims he had a positive impact on conservation since the local tribals involved in extensive poaching and over extraction of fuel wood, stopped these activities since his resort employed many of them. Khan is an infamous hunter offering to hunt “rogue” wild animals for the benefit of society. He was first arrested in the 1990s for supplying arms to Maoist insurgents. Then again in 2005 by the Karnataka Crime Investigation Department for illegal hunting. He allegedly had the charges against him dropped through political connections, but is still believed to be involved in illegal wildlife hunting expeditions for the rich and famous through his resort⁵⁶.

While all of these genuine ecological concerns should be addressed through more reasonable regulatory channels, it is the absence of this regulatory framework that prompts judicial intervention and the subversion of democratic processes.

The other key element missing from the political ecology framework, is that the “locals” are not a homogeneous group and cannot be assumed to be all affected in the same way. The celebrities and range of elites who own the tourism establishments use their properties in the region and holiday homes, and cannot be treated in the same way as the indigenous people and other disadvantaged groups whose sole livelihood is at stake.

The High Court’s expert committee's report is emphatic about the distinction between tribals and the “others”, noting that they were instigated to oppose the corridor by the tourism industry and other powerful groups:

“They have stated to the Committee Chairman that people from Masinagudi came to their village and informed them not to give statements because the Forest Department will throw the people out from the Siryur village if they cooperate with the Forest Department and give statements.” (PCCF-TN, 2009:63)

<https://www.firstpost.com/india/bihar-nilgai-culling-controversial-shooter-shafat-ali-khan-claims-250-kills-were-free-social-service-2837810.html>

⁵⁶ <http://timesofindia.indiatimes.com/india/Actor-Mithun-Chakraborty-moves-SC-to-save-his-resort-that-falls-in-Tamil-Nadu-elephant-corridor/articleshow/9303404.cms>

<http://www.firstpost.com/india/bihar-nilgai-culling-controversial-shooter-shafat-ali-khan-claims-250-kills-were-free-social-service-2837810.html>

The High Court interim judgement of 2009 also highlights the rights of tribals at various points, including:

“ensure that scheduled tribes and other forest traditional dwellers are not affected” and “those who are tribals and traditional forest dwellers...their rights will be protected and they will not be evicted from the Corridor.” (PCCF-TN, 2009:68)

In summary, through this Section I have demonstrated that the original data on how elephants move does not support the assumption that elephant only move through strips of natural vegetation between other land use types. Yet this has been forgotten in the definition of elephant corridors, which have now been mapped across India, and the definition even a part of case law from the Supreme Court ruling. This idea is not relevant to how elephants use the Gudalur landscape, yet it is being used by the state and wildlife conservationists to tackle broader processes of urbanisation and unsustainable development that block elephant movement and also have significant wider negative impacts beyond just elephants. But this approach has led to the whole district becoming increasingly antagonistic towards the forest department and all many other conservation interventions. Arguably, in the long term this negatively impacts the elephants as well. The conflict can intensify across the country as the push to “secure” elephant corridors grows, where the Supreme Court has already asked states to make 27 corridors human-free⁵⁷. In the state of Jharkhand in central India, under the threat of evicting 25,000 tribals to secure an elephant corridor, the Catholic Church in India has sided with the tribals and has opposed the declaration of the elephant corridor⁵⁸.

⁵⁷ <http://timesofindia.indiatimes.com/india/make-27-elephant-corridors-human-free-sc-urges-govt/articleshow/59924611.cms>

⁵⁸ <https://www.ucanews.com/news/indian-bishops-prefer-tribal-people-over-elephants/80756>

3.5 The ecological context of human-elephant interactions

The political and economic strands described above have directly impacted the physical geography and ecology in terms of the distribution of forests, people and elephants. This ecological understanding is often missing from the political ecology discourse (Walker 2005). In this Section, I use a range of maps to visualise these aspects of human-elephant shared space, where the methodology and tools used to make them is described in Chapter 2 and Appendix 1. These act as an important “baseline” for understanding the interactions between species.

3.5.1 Natural vegetation vs. legal forests

With the complexity over land tenure that I have described earlier, understanding the extent of natural cover is important in understanding how people and elephants interact. I use two layers to visualise and understand this. First, of the actual natural cover in the region based on satellite imagery and second the land legally classified as forests (Image 21 ahead).

The contrast between the two layer shows that a much larger area in Gudalur is forested than is officially recognised. The Forest Department's planning, administration and staffing is based on the area that is legally classified as forests. As per the Supreme Court's ruling in the Janmam case and the MPPF Act, the department has to patrol and manage all forests, despite being understaffed and underfunded to do this. Even ecological ideas of "carrying capacity" and how many elephants can be supported by the landscape, or whether elephants have a future in this region at all, is based on the extent of forest area. Yet, the official numbers do not reflect the true on-ground position. This is a vital factor to bear in mind in all discussions relating to human-elephant interactions.

3.5.2 Agricultural land use

Elephants being mega herbivores, the most important factor to consider is the agricultural land use beyond the forest boundaries. Tea and coffee plantations have traditionally been

the major crops planted in the Nilgiris (Image 22 ahead). Neither of these crops face any direct threat from elephants or other wild animals, as they are not eaten by herbivores. There is only minimal incidental damage that occurs when animals walk through. While both are traditionally large plantation crops, many small-scale farmers and even some tribal communities have planted tea and coffee.

<i>Land use Type</i>	<i>Hectares/ Percentage</i>
Natural Cover	23272 / 48%
Coffee or Aboriculture	11872 / 24%
Tea	9001 / 18%
Dryland agriculture	4712 / 10%

Table 8: Areas/percentage of different land use types, calculated from Image 22

While the data is somewhat dated, it is evident that tea and coffee were the dominant agricultural land use types in the region in 1996, and this continues to date. Without direct competition over resources, assumptions of invariably incompatible human-elephant coexistence are clearly questionable.

3.5.3 Human and elephant distribution

Understanding how the people and elephants are spread out across the region is a key part of understanding the context of their interaction. As described in Section 2.5.1 and further elaborated in Appendix 1, for the people each house was marked from satellite imagery, and for the elephant presence interviews with locals and a gridded approach was used. The natural cover (Image 21 ahead) was also overlaid onto this, and these three layers are presented below (Image 23 ahead).

In the traditional PA approach, the assumption is that elephants would largely occupy the natural habitat away from people, and there would be conflict in areas of overlap. In Gudalur, this appears to hold true for some areas in the south and south-east of the region (O’Valley Range) – larger tracts of forests, little or no human settlements, and permanent elephant presence. But in other parts it is less straightforward. To the north-east (Gudalur Range), though there are a high density of houses, given the proximity to the tiger reserve

and large contiguous elephant habitat some elephants would be expected to stray in, but they are completely absent. To the west, there is a high density of houses, almost no forests, but elephant presence all through the year. The dominant narrative – around elephants using only forests – is not entirely valid for this region, and there is a much more complex set of factors that influence the distribution of elephants, which I describe more in Chapter 5.

This mapping also shows that using barriers (fences and trenches) at a landscape level to separate human and elephant spaces is not viable, since there are no distinct areas that are separately occupied by either people or elephant. Barriers are in place at multiple locations, but there is no correlation with the presence of elephants, and none of them have successfully kept elephants out or in for an extended period of time. Yet, the forest department and large conservation NGOs continue to advocate the use of more sophisticated fences and trenches as a means of "mitigating" HEC.

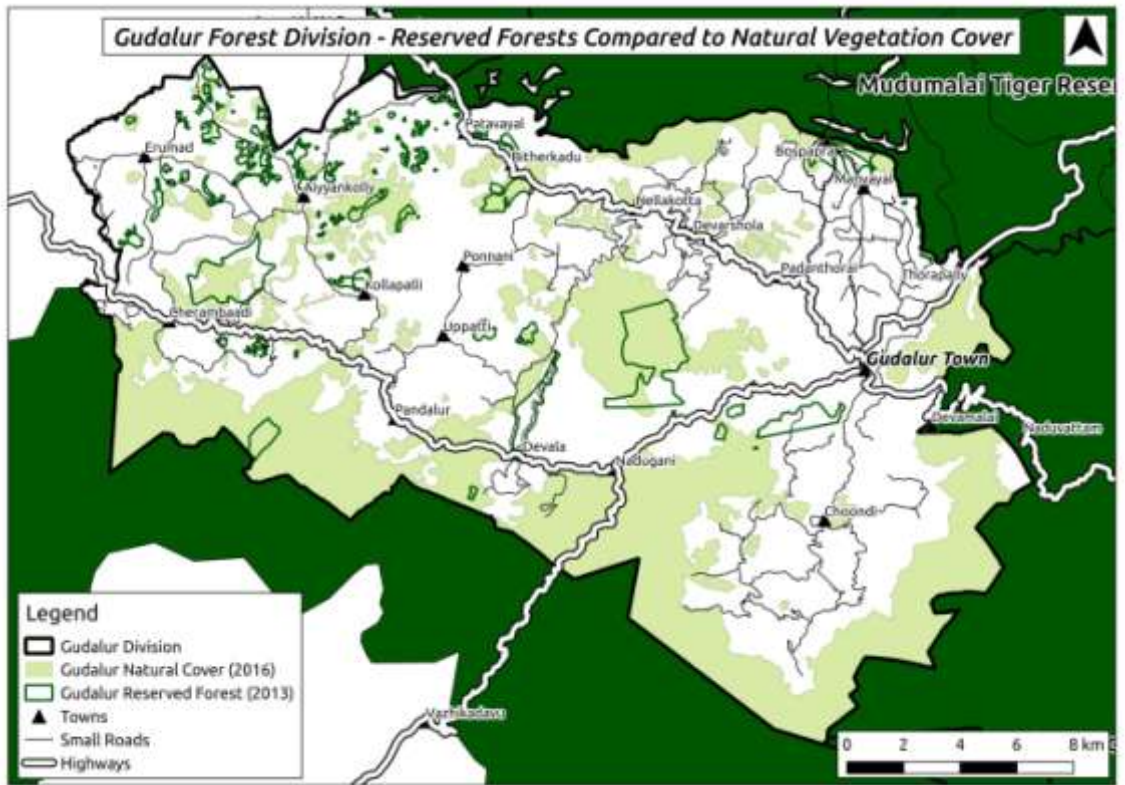


Image 21: Comparison of natural vegetation and legally classified forests.

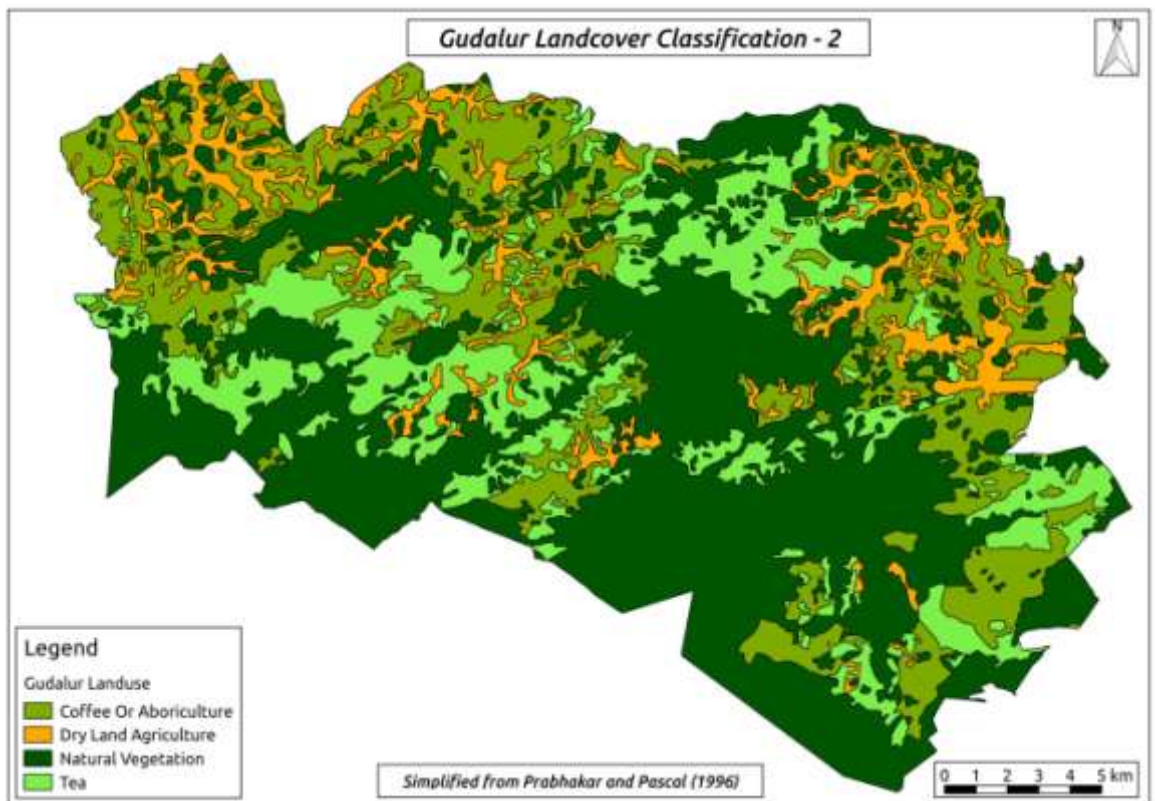


Image 22: Land use classification in the Nilgiri Biosphere Reserve, derived from Prabhakar and Pascal (1996).

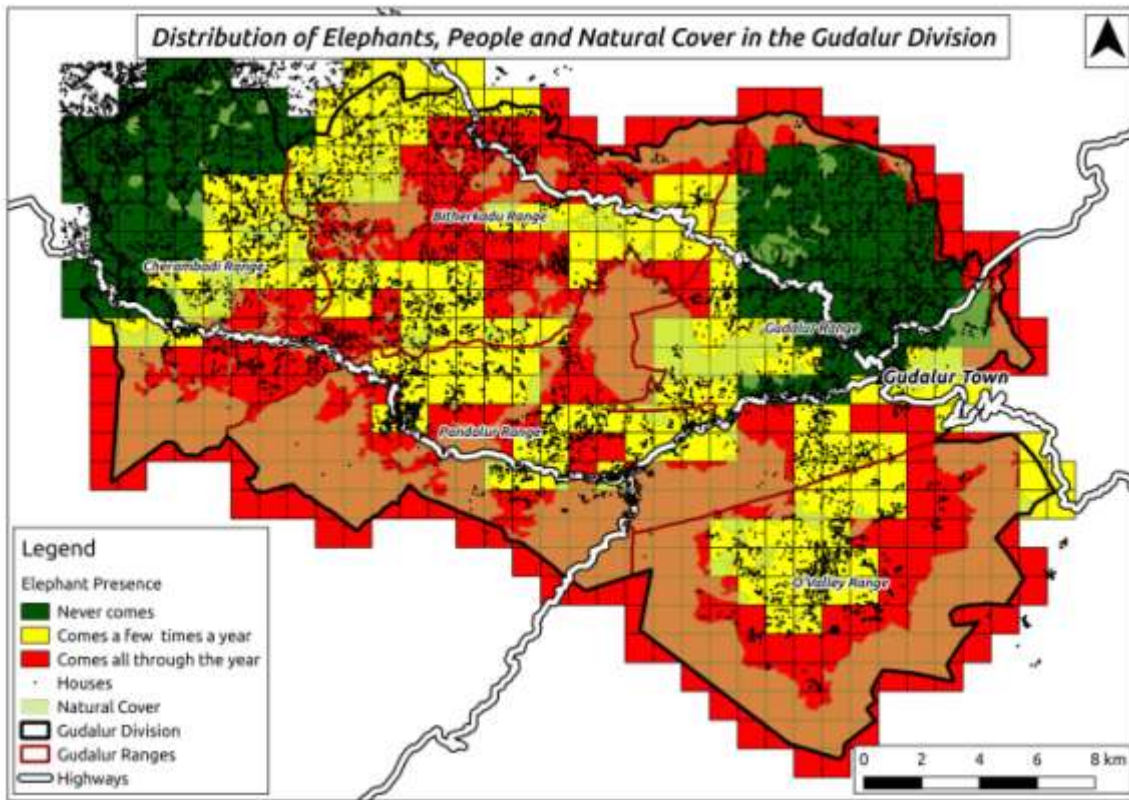


Image 23: Distribution of forests, elephants and people across Gudalur

3.5.4 Patterns in elephant related human fatalities

Finally, I examine the actual negative interactions between people and elephants. Human-wildlife conflict in the conservation literature is understood to occur “... *when wildlife damage crops, injure or kill domestic animals, threaten or kill people*” Recommendation 5.20 (WPC 2005). But even this basic definition of what the problem is differs greatly across landscapes, and the problem caused by wild animals or even elephants varies in different regions.

Since crop damage by elephants is not a significant problem, the major concern is damage to property - elephants often destroy fences and houses. In Gudalur, most people believe the house wrecking happens out of curiosity when no one is at home or when elephants “*smell salt or food grains*” stored in the house. Poor and impoverished families face the brunt of this damage. Their dwellings are less resilient than the concrete structures of more affluent families, and they are less able to cope with the financial burden of repairing elephant damaged houses. Mapping and analysing this damage would be useful, but there is no official record of houses damaged, since the majority of property owners have no title, they are not eligible for government compensation. The most serious challenge of living with elephants is the accidental fatal encounters people suffer. These deaths are monetarily compensated irrespective of the legal status of the land. But collecting data around this was a challenge, since this data is not maintained at any one place (either at the Range or Division level) in Gudalur, as compensation payments come directly from the state government headquarters.

In mapping the human fatalities, in 2012, the most noticeable aspect was that very few deaths occurred along the edges of the intact forests (Image 24 ahead). This was before we knew anything about the lives of the elephants, and we assumed they lived largely in the neighbouring PA and moved through Gudalur. The edges therefore had the most frequent interactions between elephants and people, yet very few people died in accidental encounters. We concluded that people who encounter elephants on an almost daily basis are more aware of the danger, and therefore more careful in their movements, thus avoiding these accidents. This line of thinking corresponded with the findings in a neighbouring “human-elephant coexistence” landscape - Valparai. When people were

given early warnings about elephant movement, the incidence of human death reduced significantly (Howard 2015).

However, when overlaying human death onto the elephant distribution, we found some of our basic assumptions were wrong. Elephants never used some of the areas adjacent to the PA, but were present all through the year in other areas with almost no forest cover. This opened up a much more in-depth line of enquiry into the issue, which is discussed in Chapter 4. The most significant findings from the spatial mapping of human fatality is that most of the deaths occur in the Cherambadi and O'Valley Ranges, where elephants are present through most of the year, but other than that there are no significant spatial patterns.



Image 24: The 2012 map of human fatalities, which in the absence of elephant distribution led us to wrong conclusions.

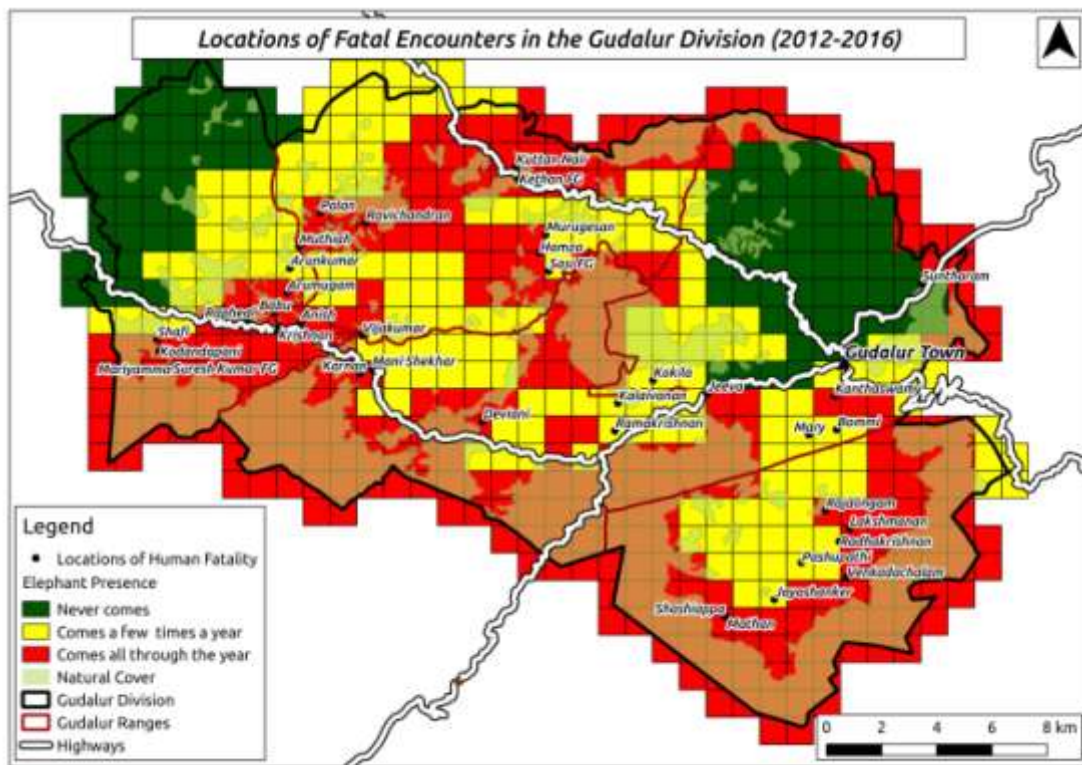


Image 25: Map of human fatality in elephant encounters, including elephant distribution.

There were other aspects of human fatalities in elephant encounters where some patterns do emerge. First on the temporal distribution – over the years, months, days of the week and time of day. This is visualised in the graphic below.

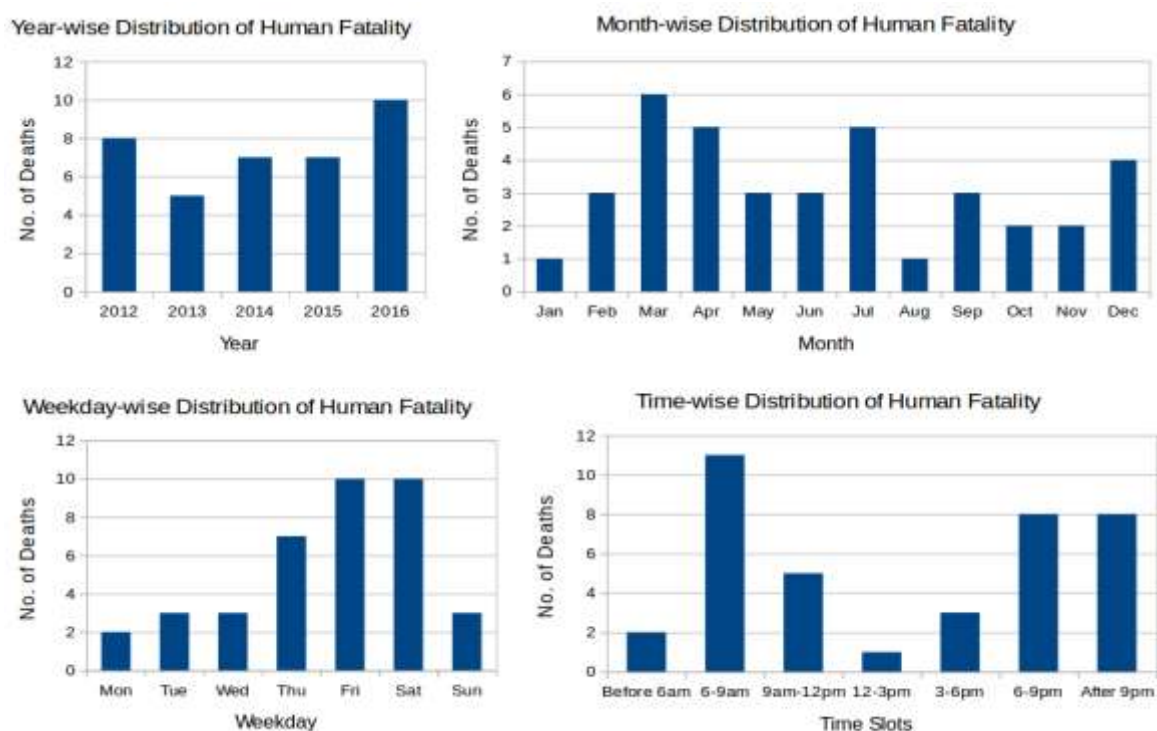


Figure 2: Temporal distribution of human fatality in elephant encounters.

Some patterns from this are worth briefly discussing, which I present here:

- The number of deaths are not increasing every year, contrary to the popular narrative around “increasing human-elephant conflict” in the mainstream media and within the policy sphere. This is particularly interesting given that the elephant range and the human population and distribution are increasing.⁵⁹
- In terms of the spread of deaths through the year, there is a slight peak in the summer months and also in the monsoons. This needs to be examined closely. There is no descriptive or qualitative narrative around this. One possibility is that elephants are under higher stress in summer (Pokharel et al. 2017), though this was

⁵⁹ This is over a 5 year period. Over longer temporal scales, this is a very different picture. Across the entire Coimbatore forest circle which comprises of Gudalur and 3 more such divisions, between 1995 and 2005, 20 people were killed by elephants. Between 2005 and 2015 about 140 people were killed with 23 people killed in 2015 alone. This is arguably on account of a significant elephant range expansion around 2010, where elephants are reported to be coming “out” of the forest much more. But it remains relevant that since 2010 there is no significant increase.

studied in the case of elephants in habitats with summer water and fodder scarcity, not as much of a problem in the Gudalur region. Lower visibility for people in misty/rainy conditions in the monsoons is also a possibility, but both of these observations are largely speculative and need more research.

- There is a peak in deaths on Fridays and Saturdays. Wages for most of the estate workers are paid on a weekly basis, local narratives suggest most deaths occurred because people were drunk. Examining this premise more closely is difficult – questioning family members about a victim's alcohol level soon after his death is untenable. We did try to ascertain this information from others and by attempting to reconstruct the person's activities before death. But apparently alcohol was a problem only in about 5-6 cases, or in 16% of the deaths, ruling it out as a serious concern.
- There is a clear temporal trend, where 76% of the deaths occur in the early mornings and late evenings, when people are proceeding to or from work. This corroborates closely with the qualitative narrative around changing working hours where many estates are contracting out the labour. This results in the people working longer, starting work earlier and returning later, putting them into greater contact with elephants.
- Another pattern or problem that emerged from the human deaths is the lack of toilet facilities. Nine out of thirty-eight deaths, or 24%, were killed when going outdoors to urinate or defecate. Most of the estate labour quarters have their toilets built slightly away from the row houses, with people having to walk a short distance to them. This again, is a larger development issue that I cannot attempt to discuss further in this thesis, but is relevant for local policy.
- Finally, age seems to be a factor, with over 60% of the people killed being 50 and above.

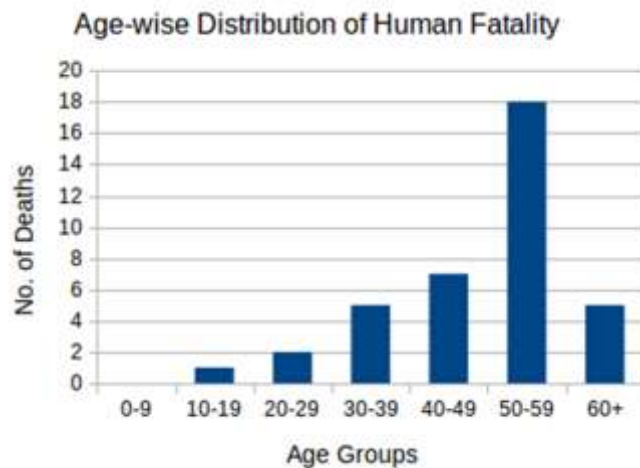


Figure 3: Age-wise distribution of people killed in accidental encounters with elephants

In conclusion, the two important patterns that emerge are that 76% of the deaths occur in the morning and evenings, and 60% of the deaths are people aged 50 or more, and these trends are something that could perhaps be used to reduce the number of human fatalities.

In addition to the quantitative “data” around people getting killed in accidental encounters, the biggest problem from a management perspective is the protests from the local people and the politicisation of the deaths. Every time a person is killed there are, understandably, large protests from angry local people, followed by equally severe reactions from the state, which I have described at the start of this Chapter. Police and forest department staff have been beaten up, vehicles burnt and buildings ransacked. The state in turn imposes curfew in the region and deploys a large number of police and paramilitary forces to maintain the peace. The unrest is perhaps best described by a quote from a local resident after one such tense situation described in the introduction, *“All these guns are not to protect us from wild animals, it's just to frighten and intimidate us local people and hope we will not protest”*.

A key element in human fatalities, is that the majority of families who have lost someone, still do not hold the elephant responsible or bear any antagonism towards the species. The deaths are most often seen as inevitable accidents, which I describe in more detail in Chapter 4. The individual reaction is very different from the collective reaction, largely on account of conflict between the state and the people.

In summary, first – simplistic assumptions around the underlying drivers of human fatalities could be problematic and invalidated with more data as I have discovered with our mapping exercise, second – there are some patterns that could potentially be useful in reducing the number of human fatalities, and third – the collective protests and anger after deaths are often not shared by the family who suffered a loss, and are more symptoms of wider conflict between different groups of people.

3.6 Processes of change at play

All of the social and political factors I have described above are clearly relevant to understanding the human-elephant interface, but identifying the various processes of change at play, and how they impact all of these factors is very relevant to better managing the space. Understanding all of the changes are not feasible, but in this Section I attempt to discuss some of these change processes that are clearly evident.

3.6.1 Tea, coffee and global agricultural commodities

Tea and coffee were the backbone of the local economy through most of the 19th and 20th centuries, but their markets were highly regulated with all sales taking place through government-controlled auctions⁶⁰. Liberalisation of the Indian economy in 1991 led to a deregulation of the market, and soon after that coffee prices almost doubled, with locals assuming this was a vindication of free market economics. But a more definitive explanation for the price spike was perhaps a frost in Brazil, responsible for one-third of the world's coffee production⁶¹. The global price spike appeared to have had an impact on the Nilgiris, where more areas of natural vegetation were converted into coffee, and existing areas were more intensively managed, putting elephants into greater contact with people. The late 1990s saw another global frost incident, and prices stayed high. In the early 2000s the prices fell sharply, to levels below the early 1990s where government regulations were in place, again resulting in local estates neglecting their coffee for a few years, until prices partially recovered, with “weeds” inside coffee plantations increasing significantly, offering better habitat for elephants.

A similar fluctuation in global prices occurred with tea, starting with the collapse of the South-east Asian economy in 1997 where currencies, and correspondingly the price of South-East Asian tea, fell sharply. Despite most of tea being grown in India consumed domestically, and with little or no change in the retail prices in India, the auction prices fell steeply. This drop was passed on to the growers, and by around 2000, the cost of

⁶⁰ Much of this Section draws on personal experience, where my parents grow tea and some coffee.

⁶¹ The international coffee organisation – www.ico.org is a comprehensive source of all coffee related information, of both international prices and frosts.

production of a kilogram of green leaf became higher than the price it could be sold at. Several small plantations were abandoned, or the large plantations mismanaged. Tea is highly labour intensive, with the picking of leaf occurring in 6 to 10-day cycles, requiring continuous investment and labour throughout the year. Tea, though maintained at bush height, is in fact a tree; if not picked continuously and maintained, a field quickly grows into an impenetrable patch of dense woody vegetation. All of these agricultural changes, from an elephant perspective, imply changing extent and quality of habitat, keeping the boundaries in a state of flux.

Vanilla is another crop that has had some impact on the region. The flavour comes from *Vanilla planifolia*. Most of the plant's cultivated area was in Madagascar. In the early 2000s, the Madagascan vanilla was affected by disease, leading to similar cascading effects as coffee described above, and significant areas in Gudalur were planted with vanilla for the first time. The unique part of vanilla cultivation is that the plant requires manual pollination, within a short flowering window, often at irregular hours in the middle of the night. Workers now had to be available at odd hours, a complete break from the routine plantation 8-5 work culture increasing potential encounters with elephants. While elephants do not eat Vanilla, the plant is a creeper, where Dadap trees (*Erythrina varigeta*) were the preferred choice of support, and elephant did feed on dadap, invariably destroying the support trees. Vanilla therefore created some competition over resources, which did not exist with tea and coffee.

These agricultural changes outside the Nilgiris have resulted in significant change for elephant habitat in the Nilgiris. The management of the plantation landscape is now in a constant state of flux – weeding/fertiliser/pesticide regimes change, remote areas are abandoned in lean years and more labour is contracted rather than permanently employed. The entire plantation structure was altered, with a breakdown of the spatial and temporal ordering of how people and elephants used the same space. Human timings were no longer predictable, increasing encounters between elephants and people, particularly at dawn and dusk when elephants are most active. The tenacity of humans and elephants being able to share space is now intrinsically linked to international markets and global commodity price

fluctuation. To factor this into conservation projects is a challenge, but recognising it is the first step.

3.6.2 Elephant and human distribution

The normative view in the conservation literature is that elephant numbers are decreasing while human numbers are increasing, while in reality the increase in conflict in Gudalur is because of an increase in elephant numbers. Therefore, understanding the changes in elephant and human population density and distribution is a key part of understanding how the sharing of space may pan out in the future.

The initial mapping of elephant distribution was undertaken in 2013, and this was repeated again in 2017, with the objective of quantitatively corroborating the local narrative around elephants expanding their range. We found that there is a significant increase in the areas used by elephants in the region. What is also significant is a ‘hard edge’ that now exists; that is, there are almost no areas where elephants are seasonal visitors, they are either present all through the year and using it as habitat, or they are kept completely out of it by the people. This is discussed more in Chapter 4, but this change – of elephants significantly expanding their range to now occupy most of the region is important (Image 26 ahead).

In terms of elephant numbers, while it is highly debated on account of changing estimation procedures, the official data suggests that the elephant populations across India is stable, while the population in the Nilgiri Biosphere Reserve is increasing⁶².

To understand the changes in the human population we did not attempt to map the houses again from satellite images on account of the extremely tedious nature of the task, that becomes even more complicated when looking for new houses. But the census figures provide some estimation of the trends. While the human population at national scales is increasing, it is stable for the southern four states in India. The fertility rate in Tamilnadu is

⁶² Data from the Indian Government’s Project Elephant website - <http://www.moef.nic.in/division/introduction-4>

1.7, with the national average being 2.23 and the replacement rate of 2.1⁶³. Gudalur has been growing at a rate of 50% every decade, but from the 2001-2011 this has levelled off, with only an incremental increase, while Nilgiris district as a whole showed an overall negative growth.

The narrative around increasing humans and dwindling wildlife is clearly not true at a local scale; in Gudalur the elephants ranges are expanding (exact numbers are not known since the population is contiguous with neighbouring areas), and the human population is stable.

⁶³ [Chapter 3](#) - Vital Statistics of India, Estimates of Fertility Indicators, Census of India, Government of India (2013), page 48

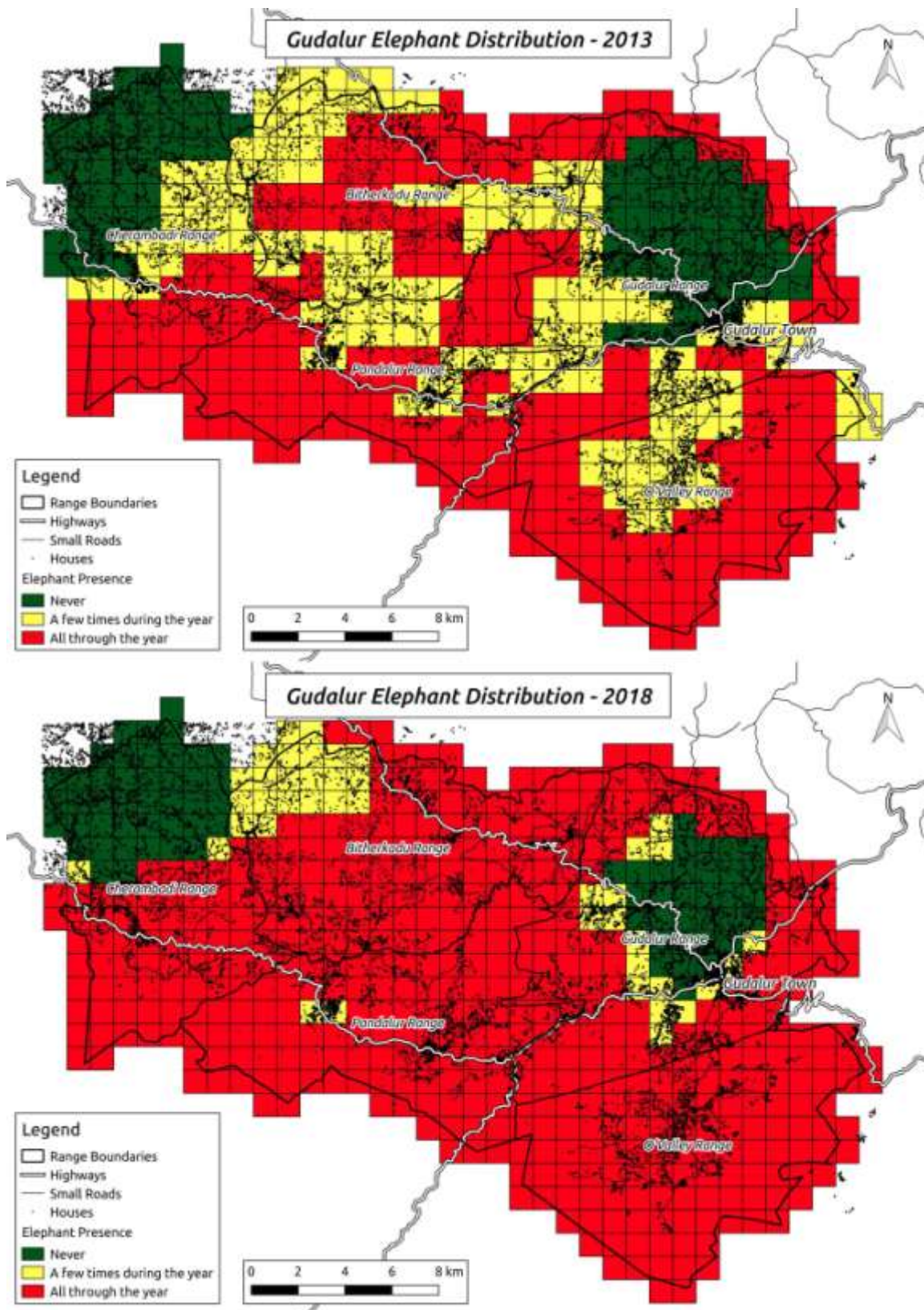


Image 26: Change in elephant distribution from 2013 to 2018.

3.7 Conclusions

In this Chapter, I have outlined a number of factors in the Gudalur region that create the context, and are essential for understanding human-elephant interactions, which are arguably overlooked in much of the conservation literature. My first research question asks “*What are the factors that shape the complex human-elephant interactions in the Nilgiris?*”, and in summary these are:

- The region is accorded a very high conservation value at global, national and regional scales, and is also home to a large number of people. There is significantly more focus on the conservation of wildlife than on the welfare of the local people, arguably giving the animals an advantage or at least less of a disadvantage in the “competition over space and resources”.
- “Conservation conflict” between different groups of people is an important element to understand, and in Gudalur this manifests at multiple levels.
 - First between the state and the people; there has been a long and protracted battle over land, with only 20% of the land tenure stable and without dispute. There is no security over tenure or the freedom to develop the land and property people occupy, or even adequately protect themselves against damage by elephants. This has led to a situation of constant conflict between the people and the various state departments, which often manifests itself around negative human-elephant interactions, particularly when people get killed.
 - Indigenous communities have traditionally been ignored and are starting to have their rights recognised and are increasingly being considered conservation allies by the state forest department. These are positive steps for the indigenous people, but could also lead to conflict with other groups in the future.
 - The idea of an elephant corridor is again a source of significant conservation conflict. The very idea and definition of a corridor, as thin strips of elephant habitat between other land use types that are essential for elephant movement, is problematic and not supported by any data. Further, in Gudalur the corridor that has been identified and mapped does not fit the definition of a corridor when examined with empirical data. Despite there being some serious ecological concerns around the rapid urbanisation and development in the

region, using elephant corridors as a blunt tool do curb this has led to widespread antagonism and conflict much beyond the affected people.

- A number of factors relating to the ecological context of the region are relevant to understanding human-elephant interactions.
 - The area covered by natural vegetation is much higher than the area that is officially classified as forests, posing a challenge for managers who have to manage areas much larger than they are allocated resources and staff for.
 - The majority of agricultural land use in the region is tea and coffee plantations which elephants do not feed on, and there is therefore no inherent “competition for resources” that the conservation literature identifies as one of the underlying drivers of conflict.
 - The distribution of people and elephants show there is very significant overlap, and a spatial separation of spaces (using fences and trenches) is not viable at the landscape level. Elephant are also found in many areas all through the year where there is little or no natural vegetation.
 - The patterns and trends in the actual negative interactions (people getting killed in accidental encounters) are relevant for a more peaceful sharing of space, where there are some temporal patterns that conservation managers can possibly use to reduce the frequency of human deaths.
- Finally, there are a number of changes at play in the region that are relevant to the human elephant interface. Global agricultural commodity prices have direct impact on the land use and intensity of agricultural management in the plantations, which change the “habitat” for elephants and how they interact with people. Elephant are expanding their range locally, and the human population is stable or even decreasing, which is contrary to the normative narrative in the conservation literature.

Looking beyond the Nilgiris, HEC, or more broadly interactions between elephants and people, cannot be understood in isolation of the context of the shared space. Identifying and understanding all the range of factors that mediate human-elephant interactions must ideally be a key part of all research relating to HEC, and an integral first step towards any mitigation strategies to reduce the negative impact people and elephant have on each other.

Yet, as I have shown at the start of this Chapter and in the literature review (Chapter 2), even recent work on “HEC” attempt to establish correlation between one or two variables related to the interaction or quantify the negative impact elephant and people have on each other (van de Water and Matteson 2018; Neupane et al. 2017). There is often little or no effort to understand this underlying complexity and context, where interactions between elephants and people are assumed to be the same everywhere, with the same solutions applied universally.

The notion of a “shifting baseline syndrome” has been discussed for some time in the conservation literature, where the reference point from which ecological change (usually degradation) changes over time, and the real long-term extent of the change is not recognised (Pauly 1995; Papworth et al. 2009). I argue that much of the literature and interventions around HEC suffer from a “variable baseline syndrome”, where the context of the interactions are so completely different that the problem (and clearly the solution) cannot be understood as the same. I have highlighted this in comparing projects in Botswana and South India, but this is true almost everywhere – no two human-elephant shared landscapes are the same, and studying HEC without understanding this underlying context is meaningless. While understanding all of the complexity to the level I have described is perhaps not feasible in multiple landscapes, there are still some broad categorisations that can be undertaken relatively easily, which I discuss in Chapter 6 on better understanding and managing human-elephant shared spaces.

In addition to all of these factors that shape elephant-human interactions that I have described above, the other main questions I ask in this thesis are around the diversity in the human and the elephant that share space. In the next Chapter, I examine the range of varied practices of elephants that shape their interactions with people in the shared space.

4. Living with people

All of the complex factors that I have described in Chapter 3 are an integral part of understanding human-elephant interactions, and I now move on to my second research question - *“How does the diversity in elephant behaviour influence the sharing of space with humans?”* As I have discussed in Chapter 2, while the majority of the work on elephants comes from the biological sciences, there is emerging work in human geography, and both have very different epistemological approaches.

Biology is much more extensive in its study of elephants relating to the animal's physiology, demography, home range and behaviour as I have discussed in Chapter 2. From the perspectives in critical social science, biology is limited by reductionism stemming from its quantified positivism. Even without this epistemological problem, there are two other limitations in the biological literature. First is that individuality and personality of elephants has not been an area of interest in ethology, since the majority of the work is at the level of a species and understanding behaviour in evolutionary terms (Shettleworth 2001). There is only one attempt to understand personality in the wild, which is based on a subjective scoring of several traits, which are found to load onto four factors or “personality traits” relating to leadership, playfulness, gentleness and constancy (Lee and Moss 2012). The second major limitation is the lack of interest in elephants that live alongside people, where interactions between people and elephants are deemed “unnatural” (Lewis 2003). Almost all the literature on elephants is based on elephants living in more intact forests, and there is no work that explicitly aims to understand human-elephant interactions beyond the negative impact the two species have on each other. Only two papers even attempt to study elephants outside intact forests, and it is found that elephants exhibit more “natural” behaviour when away from people (Kumar and Singh 2010), and that at an individual level, elephants' decision-making is based more on “idiosyncratic behaviour” rather than the usual biological attributes (Srinivasaiah et al. 2012). In this Chapter I attempt to address these gaps in the biological literature, using a critical social science lens, but also collecting quantified data that fits within the natural science framework.

The critical social sciences offer an interesting opportunity to overcome the biological reductionism and the nature-society dualism. In particular, the work in more-than-human geography (MTHG) and multispecies ethnography is relevant here. While there have been numerous calls to explore the human-nature entanglements, there is very little work that does this beyond pets and livestock, largely on account of methodological limitations (Hodgetts and Lorimer 2014). Only two studies have taken the MTHG approach to study wild elephant and their interactions with people, looking at the agency of elephants in Kenya, showing they are powerful conservation actors (Evans and Adams 2018), and in India, Barua (2014) shows that elephants and humans co-create the shared space by the process of “dwelling”, with and against the cartographic design. Both these studies, while providing fascinating insights, are not based on field work that involves significant direct engagement with elephants, and this a key area I build on in order to make methodological contributions to MTHG and multispecies ethnography (discussed in greater detail in Chapter 7).

In this Chapter, I focus on the diversity in the elephants of Gudalur and their interaction with people. I start with comparing the lives of the Gudalur elephant with those in more intact forests (discussed this in Chapter 2). I then look at the variation between the individual elephants in Gudalur and how they choose to interact with people. I start from the position of understanding elephants as thinking sentient beings, and therefore engage in extended “participant observation” with a critical and reflexive approach. I start with qualitative notes, but also draw out quantifiable data from this to connect back to the biological literature on elephants whilst adopting a positivist framework for analysis.

4.1 Describing the Gudalur elephants

Through 2016, as described in the Section 2.5.2, elephants were sighted 165 times, caught in camera traps 56 times, and observed for about 270 hours. A total of 90 individuals were identified (plus 35 calves or juveniles), and 55 of them were photographed from all sides and individually “profiled”. Some individual elephants were seen a lot more often than others (maximum was 34 and minimum was zero, where some of the shy elephants were only seen in the camera traps), and qualitatively describing the elephant seen most often is a useful starting point.

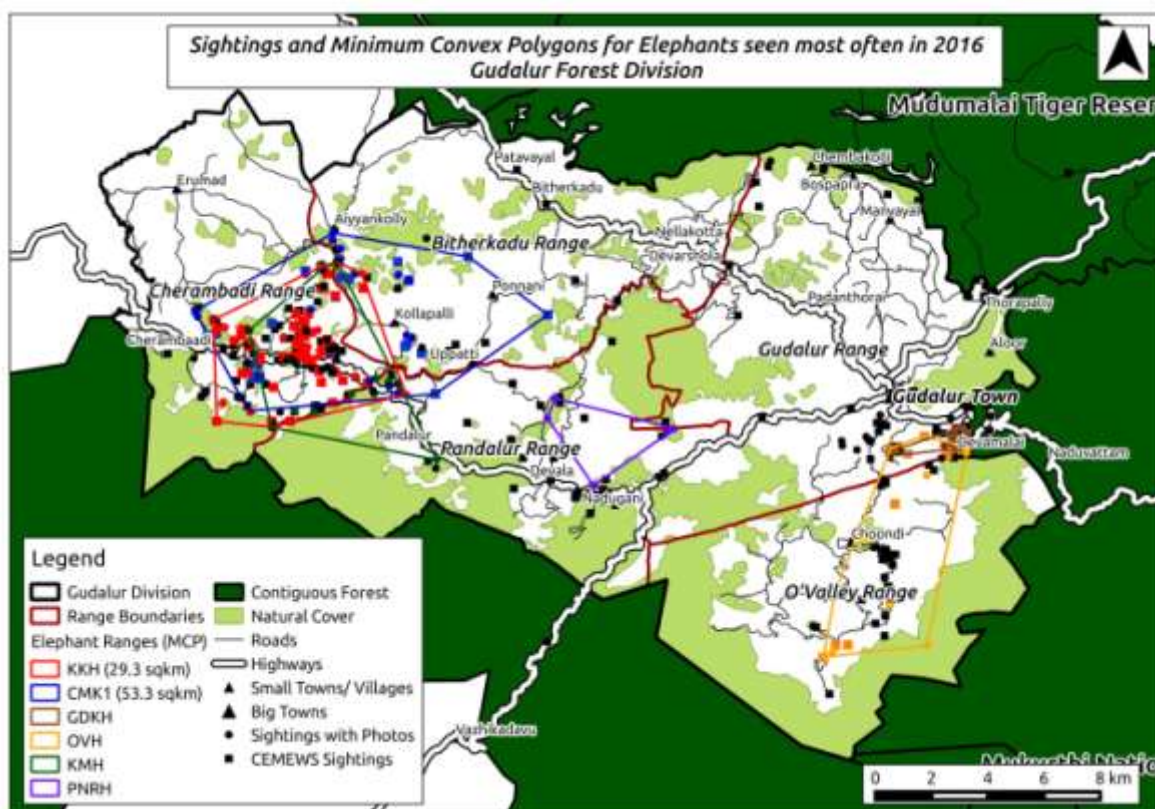


Image 27: Map of the distribution of the various elephants in the Gudalur region that were seen regularly. Note OVT8 and OVT7 were also seen regularly but always at the same location – the garbage dump. CT8 and CBT1 were the other two elephants seen more than 10 times, but their range overlapped completely with the KK Herd.

The map below shows the locations of the various elephants seen most often. As described in the methods (Section 2.5.2), we⁶⁴ gave each elephant an ID based on geography and more descriptive name.

The Kapikaad Herd (KKH): This herd of six was seen the most often (34 times), always in the Cherambadi region, often in the Kapikaad patch of forest. The matriarch, Rani Kapikaad/KK1 was distinctive, with a large tear in her right ear, making it shaped like a mirror image of a ‘3’ (see Image 28 ahead). She had a juvenile male calf who was named “Messi” (CJT14), after the Argentinian footballer, by local football enthusiasts who watched his birth. The other adult female, Radha/KK2 had a calf on the 19th of April 2016, and was also easy to recognise since her left ear had a top fold but the right did not. The herd included one more sub-adult female (Madhi/KK3) and a sub-adult male (Sasi Kumar/CJT6). The Cherambadi region was semi urban as described earlier, but had a large tract of contiguous forests to the south (Kotamalai), that extended into larger forests in the neighbouring state of Kerala. But this herd was seen around people in the fragmented patches of forests very often, and though they were routinely chased into the Kotamalai forests, they returned in less than two weeks, and seemed relatively comfortable around people. The six (or five before April 2016) individuals were always seen together, never breaking into smaller groups, though they have joined another group on multiple occasions – the KM herd. Rani used to be called ‘Kilinja Kadhu’ (torn ear) by the field staff even before we profiled her. This was the name we first gave the herd, with the KK acronym, but over the course of the year the staff thought it would be derogatory to have her permanently known by her torn ear, and so it was changed it to ‘Kaaipikad’ (coffee forest).

Videos are perhaps the best way show the interactions between these elephants and the people in the landscape, and three links are presented below.

<https://youtu.be/zT6I0RuROgE> - KK herd moving through Cherambadi Town (QR code 6)

<https://youtu.be/AYu1znheiV4> - KK herd sleeping with people watching all round (QR code 7)

<https://youtu.be/TjElQmxXlh8> – Madhi/KK3 going in and out of an Elephant Proof Trench (QR code 8)

⁶⁴ The work on elephants was not done entirely by myself as I have described in Chapter 2, and I use “we” in most of this Chapter rather than “I”.

Nadodi Ganesan/Cherambadi Makhna 1 (CMK1): He was the oldest (50+ years), biggest and most well-known elephant in the Cherambadi region, a “Makhna” (tusk less male). One of the first text messages in the CEMEWS was “big fat Makhna is sleeping in nayakanchola”. He seemed completely unafraid of people, and at the same time was never observed being aggressive. On two occasions we saw children chasing him along small roads, as they do with cattle. He was very easily identifiable and was called Ganesan before we profiled him, with “Naadodi” (semantically translating to “villager loafer”) being added almost as an adjective. He was often seen walking along main roads, and for a few weeks in June 2016 he took to using a relatively busy stretch of road, and got official escort from the police and forest department, to prevent people from getting too close to him. He was however, known for damaging auto-mobiles, with three vehicles damaged by him in 2016. He was also, ironically, the “poster boy” of human-elephant conflict in the region, with almost every media report on conflict featuring images or videos of him. Whenever there are serious incidents with people getting killed, there is a demand from the public (based largely on media reports of HEC) to capture him, only because he is the one elephant local people know and recognise (discussed more in Chapter 6). The forest department field staff have a mixed, love-hate relationship with him – while they know him intimately and he doesn’t attack people at all, they also feel he is the root cause elephants expanding their range, since he “*leads all elephants to places that elephants have never been before*”.

<https://youtu.be/32vHM9IHv1g> - Ganesan in Kolapalli with lots of people around (QR code 9)

<https://youtu.be/zIr0hsrJ9LE> - Ganesan outside house near Aiyankolli (QR code 10)

Kotamalai Herd (KMH): This herd was also seen in the Cherambadi region, and consisted of six adult females, one juvenile male, and four calves. The oldest female was KM6/Muniamma Kotamalai, but KM1/Badichi Kotamalai played the leadership role on most of the occasions we watched them. They were seen with the KK herd on 14 occasions, but were not as comfortable around people. They spent a lot more time in the more contiguous “Kotamalai” forests to the south, and though we often heard about them, we were unable to follow them into the dense forests to photograph them. While KM1 and

KM6 were reasonably distinctive, the others in the herd all looked very similar, and were hard to identify. Altogether they shied away from human interaction, unlike the KK herd.

Kullan Bolt/Cherambadi Tusker 8 (CT8): This sub-adult male was always seen with other males, often CMK1. His name came from his short (Kullan) and stocky build, and the fact that he often chased the field staff, who were impressed with his speed (with his surname coming from Usain Bolt, the famous Jamaican athlete). He was often seen around human habitation, but was also uncomfortable around people, and often charged at them.

Shankar Mahadevan/Cherambadi Broken Tusker 1 (CBT1): This was the second oldest male in the region after Ganesan, also 50+ years old. He had very short and thick tusks, with the right side completely broken off. The piece was found by Shankar, an anti-poaching watcher, which is how he got his name. His behaviour was ambivalent – on some occasions he appeared aggressive and uncomfortable with people around him, while on other occasions he seemed unconcerned.

Arumugam Kuppasami/O’Valley Tusker 8 (OVT8) and Alibaba Basheer/O’Valley Tusker 7(OVT7): These two young males, were seen only at one point all through the year – at the municipal garbage dump. OVT7 had learnt to snap electric wires with his tusks, and the name “alibaba” was based on his ability to open any barrier. OVT8 was bolder and seen quite often in the day, while OVT7 was seen more in the camera traps at night.

<https://youtu.be/RUF5rGF1Io> OVT8 climbing over the fence at the garbage dump (QR code 11)

<https://youtu.be/mE2NgXbDPCo> OVT7 breaking the electric fence at the garbage dump (QR code 12)

O’Valley Herd (OVH): This herd was seen in the O’Valley region 11 times, consisting of 7 adult females, 1 juvenile female and 5 calves. OV1/Bommamma had a calf in June or July 2016, but the exact date is not known. OV1, OV2 and OV7 play leadership roles in the herd. This herd was well known among local people for breaking down houses. Three houses were significantly damaged in 2016 by this herd. All the incidents happened in the

night, and we were not able to find out exactly what prompted the destruction, but based on what we found in the mornings we believe a calf went in first, and one of the adults then did significant damage in trying to get the calf out. No one was present in the houses during these incidents, but people have been present on one occasion in the past, in an incident that I have described in the introductory Chapter.

<https://youtu.be/UcM3uOHOMAQ> - OV Herd reacting to fire crackers (QR code 13)

Garbage Dump Kokkal Herd (GDKH): This herd was directly seen 10 times during the day (twice at the garbage dump and 8 times in the hills around) and photographed in camera traps at the garbage dump three times during the night. They were quite shy of people, and were never seen near houses. Even at the dump, they always moved away when we arrived. The herd consisted of 7 adults, 1 sub-adult male, and one sub-adult female and 4 calves.

<https://youtu.be/1qkahrX0bjE> - GDK Herd at the garbage dump (QR code 5)

Pandalur Needle Rock Herd (PNRH): This herd was seen only 6 times during the year, mostly around or on a large hill (needle rock) surrounded by grasslands. They were relatively uncomfortable around people, and usually moved away when they sensed the presence of people. The herd consisted of 10 adults, 2 sub adult females, and 4 calves, with P1, P8 and P10 playing leadership roles, and leading smaller groups one different occasion. Two sub adult males were also with this herd on some occasions. But we have not seen them often or for long periods, and always watched from afar.

Mudumalai Herd(s) (MTRH): Elephants were often reported along the edge of the Mudumalai Tiger Reserve to the north, but they ventured out only in the nights, and we only saw them twice when they were not able to return to the forests in the morning. We don't know much about these elephants – we are not sure if it was the same herd on both occasions, and have not even been able to age the entire herd or assign unique IDs to all of them. But they are relevant since a significant amount of damage occurs along the boundary of the Mudumalai Tiger Reserve. There were four males that came out regularly - Bharathan/Mudumalai-Gudalur Makhna 1 (MGMK1), Mudumalai-Gudalur Tuskers 1-3 (MGT1, MGT2, and MGT3). We have identified these individually, but have not profiled

them or given them names, except for Bharathan/MGMK1 who was well known and named before we formally started field work.

<https://youtu.be/1buz02keXSk> - Mudumalai elephants stuck on the wrong side of the trench in Chembakolli (QR code 14)

<https://youtu.be/JPj056iDAd8> - MGMK1/Bharathan unaffected by people (QR code 2)

Silver Monstera/ O'Valley Tusker 3 (OVT3) and Kokkal Moopan (OVT6): These two tuskers in the O'Valley region were seen only 6 and 8 times respectively, but again are worthy mention on account of relatively unusual behaviour, described later.

Through this qualitative description of the elephants, it is already apparent that many of the individuals are different to the normative idea around the life of a “wild” elephant. In the next Sections, I examine how the elephants of Gudalur are different from other elephant in more intact forests, and also among themselves, and the description of the elephants in this Section provides an important background to further discussion.



Image 28: Matriarch of the Kapikaad herd with distinctive torn ear, with other members seen in Image 41 ahead.



Image 29: Ganesan during a mid-morning sleep.



Image 30: The Kotamalai Herd.



Image 31: CT8/ Kullan Bolt



Image 32: CBT1/Shankar Mahadevan.



Image 33: OVT7 at the garbage dump.



Image 34: OVT8 Outside the electric fence around the garbage dump



Image 35: The O'Valley herd (OVH), known for their house breaking.



Image 36: The Garbage-Dump Kokkal Herd at the garbage dump.



Image 37: PNRH on Needle Rock Hill.



Image 38: The Mudumalai herd, near the boundary of MTR.



Image 39: OVT3/Silver Monstera



Image 40: OVT6/ Kokkal Moopan

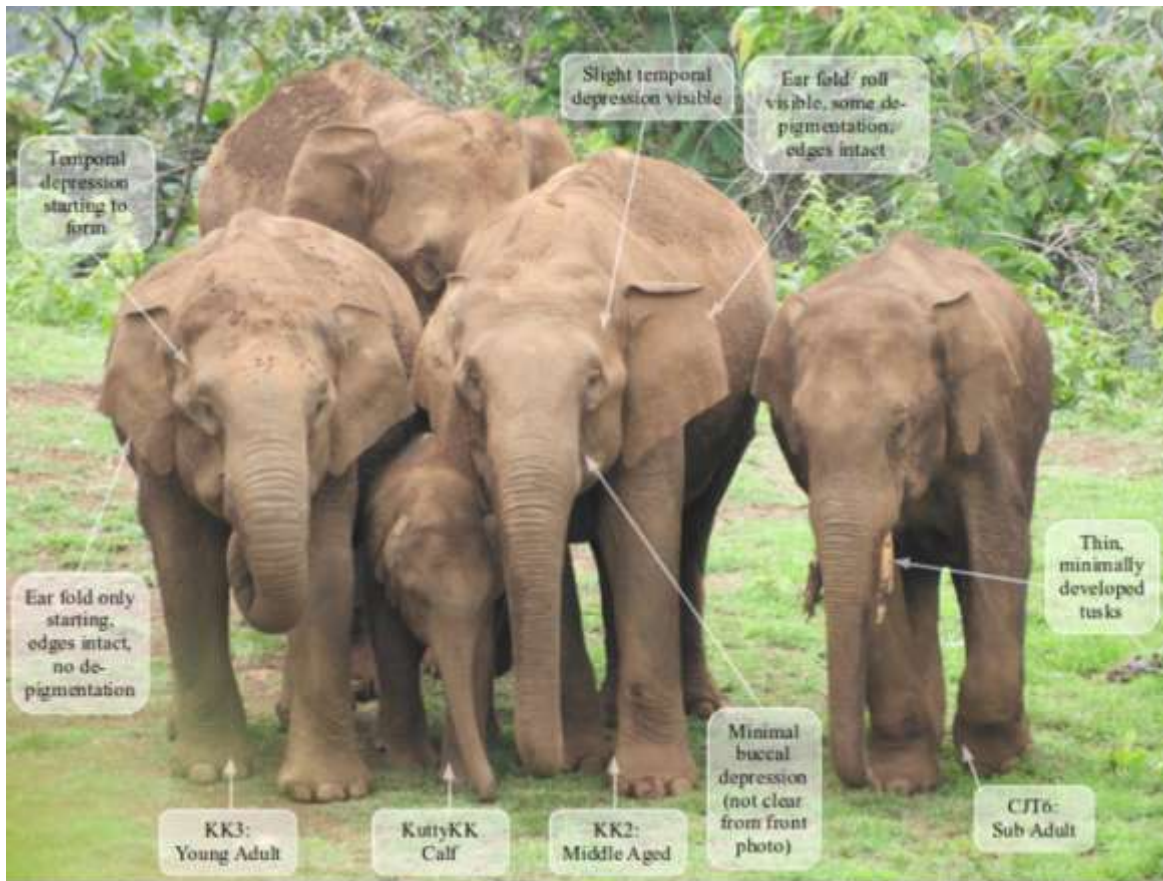


Image 41: Ageing elephants.



Image 42: KM6 and OV7, older elephants with no ear fold.

4.2 Population-level comparisons

Comparing the Gudalur elephants with elephants living in more intact forests is the first step, and this is done here by comparing the observations with the literature on physiology, demography and home ranges of elephant discussed in Section 2.2.2 on Elephant biology.

4.2.1 Demography

Classifying elephants according to age and sex has been done in multiple studies, and we do this for the Gudalur elephants. A challenge however, is the lack of consistency around how the elephant age is estimated, so the first step was to chart out a typology of age categories for elephants (going beyond “adult” and “young” that Goswami et al. (2007) use), but one which was not reliant on “experts” and could be undertaken by field staff who interact with elephants on a regular basis. Starting with Arivazhagan and Sukumar’s (2008) age classes, we met with a group of senior indigenous elephant handlers (mahouts) in the neighbouring Mudumalai Tiger Reserve, shared all our individual elephant profiles with them, and discussed the key characteristics that could be used to visually estimate the age of an elephant. About 40 captive elephants are looked after at the forest department camp, and much has been written about the life-long bond and intricate knowledge these mahouts have of elephants (Locke 2011; Hart and Locke 2007; Hart and Sundar 2000). The key characteristics that could be used to age elephants are height/body size for growing individuals, size development of the skull, thickness of the tusks for males, top folds in the ear and tears/cuts along the edges, depigmentation of the skin, and the buccal and temporal cavities in the face/head (see earlier Image 41).

The following features and age classes were agreed upon:

Category	Age (years)	Features
Calf	Less than 1	Height – able to walk under mother’s stomach, 3-4 feet.
Juvenile	1-5	Height – less than mother’s chin, 4-5 feet.
Sub Adult Male or Female	5-15	Height – up to matriarch’s ear cavity. 5.5-7 feet for females and 6-8 feet for males.
Young Adult Male or Female	15-30	No/just starting top-fold, mostly undamaged edge of ear, minimal de-pigmentation, moderate development of skull. Minimal wrinkles in skin.
Middle aged Male or Female	30-50	Ear fold/roll present, some damage to edge of ear, moderate de-pigmentation, well developed skull. Large body size, moderate thickness, but well-developed tusks for males.
Old Male or Female	50+	Large/flat ear fold, large tears at edges, well developed skull with pronounced buccal and temporal cavities. Large body size and thick tusks for males.

Table 9: Ageing Asian Elephants, see earlier Image 41

These are not rigid boundaries in this schema for categorisation. Some individuals for example, (OV7, KM6, earlier Image 42) had no ear fold, but wrinkled skin, significant tears at the ear edges and pronounced buccal or temporal cavities, and were classified as middle aged. Estimating the age of wild elephant can never be completely objective, and some subjectivity will always persist. But we believe these classes allow for the most reliable demographic categories, and hope that they will be used in the future.

Since none of the previous studies use as many age classes, we compare this with Arivazhagan and Sukumar (2008) who have the largest number of classes, undertaken in Mudumalai, the protected area neighbouring Gudalur.

The age structure of the elephants is visualised below:

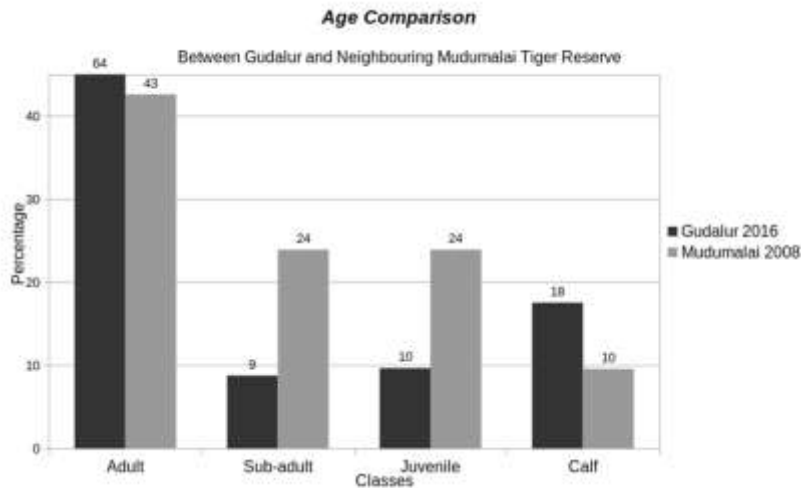


Figure 4: Age classification and comparison of the Gudalur Elephants

The notable comparison is that the Gudalur population is largely adults and calves, with very few sub-adults or juveniles.

Sex ratio is another metric that can be compared across different elephant populations:

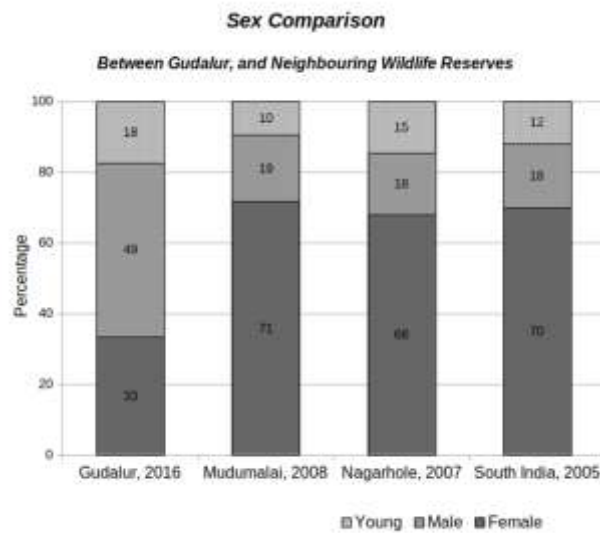


Figure 5: Sex comparison between Gudalur and neighbouring reserves.

The male to female ratio in Gudalur is significantly different from all the other populations. Most parts of India experienced rampant hunting or poaching of the males for ivory up to the 1980s, resulting in male: female ratios of up to 1:10 or even 1:20 (Sukumar

2006). Generally, the gap is now closing with better protection over the last few decades, but males are still much lower in numbers. But in Gudalur there seem to be a higher number of males than females (1:0.7), particularly young males, in the age group of 15-30.

The field staff all report that they first started encountering elephants around 2010. Within the herds, the disproportionate number of young females with calves perhaps indicates some disruptive event around 2010 that caused many young females to move into the landscape, who are now more settled with their calves. 2009 was a particularly bad monsoon, which could have possibly driven elephants out of the more intact habitats around. The large number of young males could be on account of them migrating into the Gudalur region when they leave their natal herds, tagging along with older males as in the case of Bharathan and the two young tuskers that I have described in the introduction. All male groups are not something often seen in intact forests, but are increasingly being reported in human-dominated landscapes. The drivers of this could be certain ecological changes within the forests, and perhaps calls for further research.

In summary, the Gudalur elephant population consists of largely adults and calves, and a high number of young males. Managing, or living with these young males in the Gudalur landscape is going to be a key challenge. Varma et al. (2010) have shown that in captive elephants, the majority of attacks on mahouts occur with male elephants around 30 years old, indicating that older males are perhaps less aggressive. This could mean a more peaceful coexistence in a few decades, but what will happen in the interim is less clear. The next point of comparison with elephants in more intact forests is around the question of home range and how far elephants move.

4.2.2 Home range

As I have summarised in Table 2 in Section 2.2.2.2, there are no generalisations to be made about home ranges of elephants, though the general perception of them being “long ranging animals” remains, even on the IUCN species page (Choudhary et al. 2008). Understanding how the Gudalur elephants compare is a useful starting point.

In mapping the home range of the Gudalur elephants, the “quality” of data warrants some discussion. The key element is that the elephants should be located as frequently as possible – if they are not located for weeks they may be moving large distances and returning without the movement being recorded. Direct sighting has been abandoned as a method since the elephant are located on average about 1.5 times per month, while this improves to 7.5 locations per month for radio collars and 11.5 per month for GPS-GSM collars. Direct sighting also relied on the expertise of the individual observer, and was not verifiable or replicable.

But with the deployment of relatively cheap cameras and the large number of people seeing elephants in the Gudalur region, direct sighting still remains a relevant method. The most sighted elephants in the region were CMK1/Nadodi Ganesan (57 sighting and photographed 25 times) and the Kapikaad herd (81 sightings and photographed 34 times). This is an average of 6.75 or 4.75 locations per month, with a maximum inter-sighting duration of 15 and 11 days respectively, making it comparable to the VHF collars in terms of quality of the data. All the photographs are in the public domain, making this method more verifiable than the traditional direct observation studies.

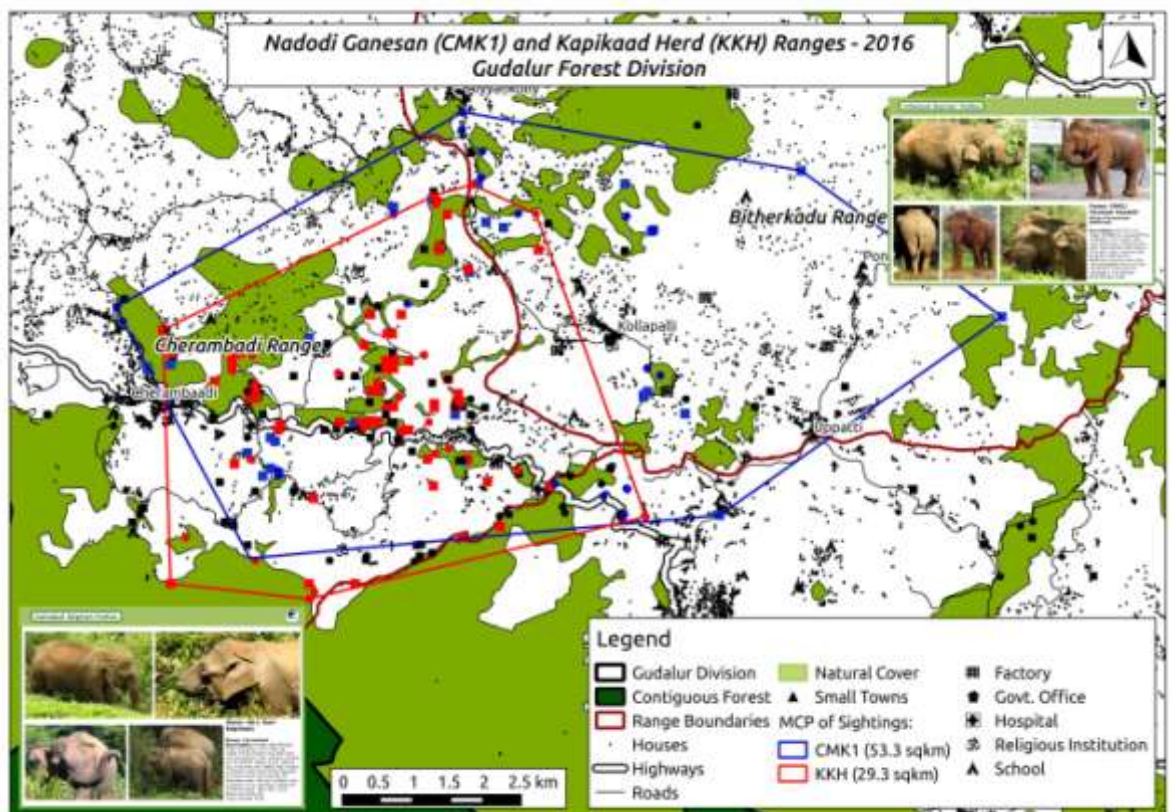


Image 43: Detailed home range of CMK1 and the KKH.

Mapping the home range for Ganesan and the KK herd, they both appear on the smaller side of what is reported in the literature, with the KKH's range of under 30 km² being smaller than anything reported so far. But what is perhaps more interesting are the other features within their home ranges. Only a small percentage of the area within their home range is natural vegetation, and the majority is plantations – tea which offers no fodder at all, and some coffee, which offer some browse and shade/cover. The significant spread of houses (black dots) is indicative of the kind of landscape these elephants live in. There are an estimated 15,000 people also living in this space, in a semi-urban setting, with a number of hospitals, schools, tea factories, a state highway and over 50 km of roads, numerous temples, mosques and churches, hotels/restaurants, small towns, shops and many more.

The natural cover in the area used by these two elephants is about 8 and 6 km² respectively. The literature suggests that the home ranges of elephants that live in fragmented forests are significantly larger than those in more intact forests, arguing that fragmentation could cause elephant home ranges to expand, putting them into greater contact with people and potentially escalating “HEC” (Alfred et al. 2012; Williams et al. 2008; Fernando et al. 2008). This narrative seems to be at odds with what is happening in Gudalur. The elephants live completely in an agricultural landscape, that is perhaps fragmented by patches of forests. That elephants are able to persist in an area of only 6 km² of natural cover does not fit with the narrative of elephants being “long ranging animals”.

A key factor however, is that most of this natural cover consists of swamps or wetlands, with perennial water sources and abundant green fodder. They are surrounded by relatively thick stands of trees, with species like *Eleocarpus tuberculatus*, *Macaranga peltata*, *Toona ciliata*, and bamboos (mainly *Bambusa arundinaceae*). Inside the swamps, there are thick stands of palms (mainly *Pandanus fascicularis*), and then tall grasses in-between (mainly *Isachne miliacea*, also *Cyperus* sp. and *Lindernia* sp.). The bamboos and palms are favoured foods for the elephants. There is extensive use of nitrogen, phosphorus and potassium fertilisers in the plantations around the swamps, and the quantities applied assume 30% run off in the water – which end up in the swamps. So, the natural vegetation in the swamps is being “fertilised” by the estates. The abundant vegetation in these swamps, could perhaps support a larger number of elephants than similar swamps within a

forested landscape. This offers one explanation into how and why the elephants are able to live in this highly human modified landscape. This should perhaps be studied in more detail, but there are clearly a number of other issues at play that allow this almost paradoxical sharing of space between humans and wild elephants.

In summary, we have found the home range of one herd of elephants is smaller than anything reported in the literature, and even within this small range of 30 km², only about 6 km² is natural vegetation, and sharing space with a very large number of people in a semi urban setting. Elephants are able to survive in a highly human modified landscape, and it is important to note that elephants are highly adaptable, with their biological characteristics evolving to cope with changes around them. The Gudalur elephants are therefore clearly different from elephant in more intact forests in terms of the age-sex distribution, and also in terms of their home range and how far they move, and in the next Sections I examine some of the more fundamental questions around elephant physiology.

4.2.3 Physiology

The Gudalur elephants also throw up some interesting questions about the general understanding of elephant physiology, relating to musth, body condition and stress and sleep.

4.2.3.1 Musth

Chelliah and Sukumar (2013) suggest that while musth is often accompanied by heightened aggression, its primary evolutionary function is to increase reproductive success, where elephants' range larger distances during musth in search of mates. In early January 2016, CMK1/Ganesan came into musth, and was seen almost every week during his musth cycle which lasted a little over two months. He moved over a small subset of his range to the west, an area of about 18 km². The next he came into musth was early November 2016, and this lasted for three months. He was seen less often this time, and also about 3 km further to the east than he was otherwise seen, with his home range increasing from about 30 km² to 50 km². So, in the first musth period he did not expand his range, and in the second musth period he did. But even with this expansion, the number of

female elephants that his range overlapped with did not significantly change, but if he had moved 5 km north he would have entered the Mudumalai tiger reserve, and then overlapped with a considerably larger population of female elephants.

Heightened aggression is mentioned, but Ganesan did not show any signs of this during either of his musth periods, either towards other male elephants or towards humans. At the start of 2016, he was seen with other adult males on three occasions, and on one occasion we saw children chasing him down a village road. During the second musth period at the end of 2016 he also became quite famous locally, when he broke the wind-screen of a bus full of passengers, with most of the action captured on a mobile phone camera⁶⁵. Again however, even this was not done in an aggressive manner. Sukumar (1996) and others have described agitated males in musth showing some signs of relief when pushing their tusks into the ground to have fluid flow out of their temporal glands, and Ganesan pushing against the bus could have been a similar action.

So, the understanding of musth in wild elephants arguably needs more research since there are very few studies on it, and our results do not corroborate the normative view.

4.2.3.2 Body condition and stress

As described in Section 2.2.2, two papers relating to this suggest that elephants are more stressed when they have poor body conditions during the summer when fodder is scarce (Pokharel et al. 2017), and when they are close to people and being chased (Vijayakrishnan et al. 2018).

In Gudalur, using the same scoring as Pokharel et al 2017, we assessed all the 90 individual adults or sub-adult elephants using the photographs. The majority get a body condition score of 4 or 5 (fat), and no individuals score less than 3, or, all the Gudalur elephants are well fed and there is no shortage of fodder. Based on the above literature this throws up a contradiction – they are often close to people and regularly chased away, but

⁶⁵ https://youtu.be/5WECCkR8_SE - CKM1/Nadodi Ganesan breaking bus wind-screen, QR code 15

also well fed. So, are they likely to be “stressed”? This is not something I attempt to discuss in detail, but I argue that it raises some questions about certain simplistic linear assumption in the biological literature. Using faecal Glucocorticoid metabolites as indicators of stress in animals is debated (Touma and Palme 2005), and in humans the connection between glucocorticoids and stress has been debated for some time (even when using blood samples rather than faecal matter, which is much less reliable) (Munck, Guyre, and Holbrook 1984). Overly simplistic linkages about complex phenomena such as stress are no longer drawn for humans, where social behaviour such as over-eating could also be linked to stress (Björntorp 2001), yet we continue with these linear and reductionist conclusions, even for complex animals like elephants. What is stress really? Could clearly obese elephants like Ganesan be overeating on account of stress from their constant interaction with people? Or are they content and peaceful because they get enough food all through the year? The changes these elephants are experiencing in their lifetimes is tremendous, and questions around stress, behaviour and human interactions are highly complex and nuanced, which cannot be answered by collecting trace chemicals from elephant dung.

4.2.3.3 Sleep

This is the final point in elephant physiology that warrants some comparison. Elephants are found to have the shortest spans of sleep among all mammals at a daily average of only two hours, where recumbent sleep happens only in perfectly undisturbed conditions, and between midnight and 2 am (Gravett et al. 2017).

In our observations of the Gudalur elephants, they were found to be sleeping or resting (with no movement other than ears flapping, or eyes closed if they were visible) in 34% of the 165 observations. Recumbent sleep (in at least one of more adults or sub adults in the group) was seen in 17% of the observations⁶⁶. The majority of sleep occurred between 12 noon and 5 pm (50% of the observations), followed by 9 am to 12 noon (36%) and then later than 5 pm (14%). Further, sleep (as a binary variable) was not correlated to level of human presence (0.02), and was even slightly negatively correlated to the level of land use

⁶⁶ See for example, CMK1/Ganesan sleeping in the day - <https://youtu.be/ZXtvx8zyTCs> (QR Code17)

modification (-0.15). It appears the Gudalur elephants are able to sleep in highly modified habitats in the middle of the day, even with lots of people around them.

A brief mention of the methods in the Gravett et al. (2017) paper is worth mentioning. “Materials and Methods” are now relegated to the end of many journal articles, and how they interacted with the elephants is almost forgotten. They fly in with helicopters, tranquillise the matriarchs, use sirens to chase away all the other elephants, they make a sizeable cut - 5 cm long, 15 cm deep - into the trunk (the most sensitive part of the elephant), and put in an “actiwatch” implant that monitors sleep for two weeks. I would argue that the paper more reliably reports on the sleep patterns of two post-traumatic, injured, elephants, and cannot be considered representative of elephants in general, yet the methods are often forgotten in all the media hype, and such poorly designed studies become scientific facts.

Irrespective of these problems, it is clear that the Gudalur elephants are very different in their sleep patterns from the elephant reported in the literature, and throws up some questions about the literature and the generalisations made about sleep and the “natural” lives of elephants.

4.2.4 Human Interaction

The last element of comparing the Gudalur elephants with the normative idea of the “natural” lives of elephants is around their interactions with people. There is almost no work that examines human-elephant interactions to compare the Gudalur elephants with, so I discuss the interactions with people using some descriptive statistics, and compare this with the normative idea around the lives of wild elephants.

4.2.4.1 Human Presence

The dominant idea is that human interaction is “unnatural” and elephants prefer undisturbed areas away from humans. Distancing the observer from the animals is a key part of most ethological work; Kumar et al. (2006) attempt to keep a minimum distance of 50m from the elephants in the hope that they will not influence behaviour, and Williams et al. (2008) go as far as to abandon field work when the elephants have sensed their

presence, as they believe that the behaviour they are observing is no longer “natural” (described in Lewis 2003).

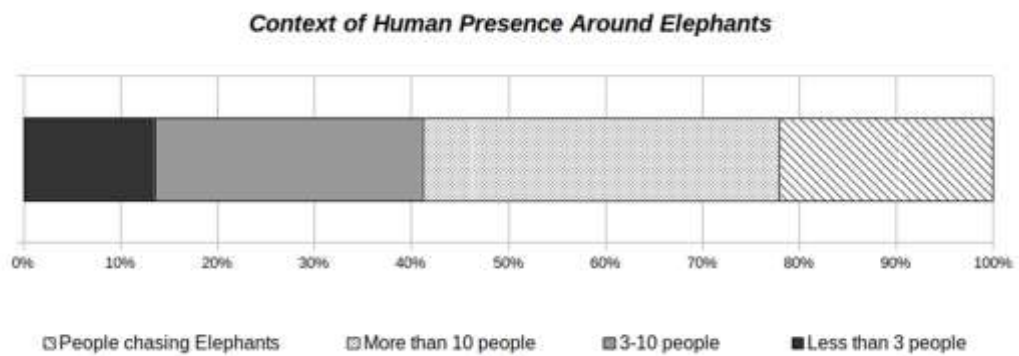


Figure 6: Human presence around the elephants being observed

Here, it is clear that the Gudalur elephants often have people around them. There were a large number of people with us watching the elephants in almost 60% of the observations, with the elephants being chased on 22% of the occasions. Therefore, using some of the more traditional ideas in elephant behavioural studies, about only observing elephant behaviour when they are unaware of people (Williams et al. 2008), it would not be possible to undertake any behavioural research with the Gudalur elephants.

4.2.4.2 Land use

The normative idea is that elephants prefer intact forests, using agricultural landscapes to move between forests (Kumar et al. 2010).

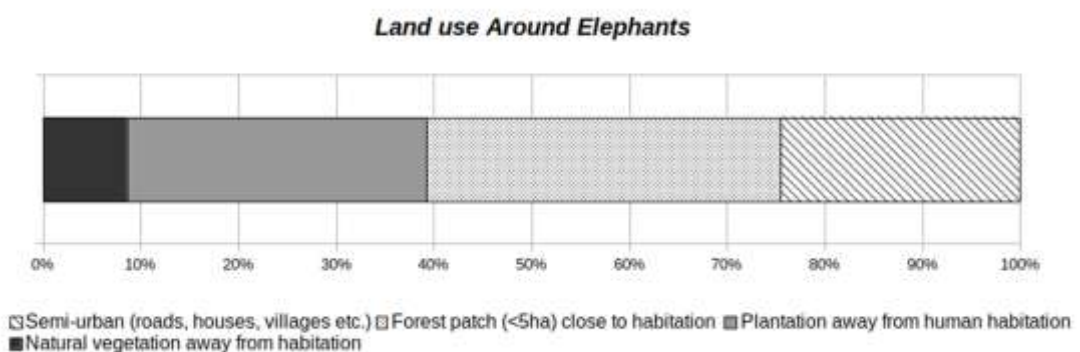


Figure 7: Land use around elephants being observed

The Gudalur elephants we have observed are living in highly modified land use types. Even the most “natural” landscape we have defined can be as close as 250m from human habitation, and the majority of observations (60%) are either in small patches of forests surrounded by habitation or in semi urban conditions.

4.2.4.3 Elephant’s reaction to people

The normative idea is perhaps that elephants perceive people as a threat and will respond with the “fight-or-flight” physiological response (Cannon 1932), to either show aggression toward or flee from people. But in over 60% of the observations the elephants were aware of people around them and did not significantly respond. Further the elephant’s reaction to people is not correlated to the human presence/reaction (0.11).

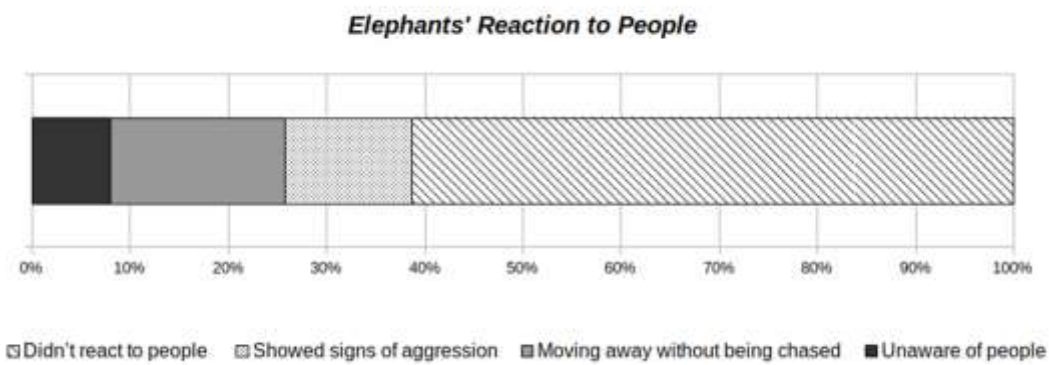


Figure 8: Elephants reaction to people

4.2.4.4 Elephant behavioural categories

The normative idea is that elephant behaviour becomes less “natural” when in the presence of people. In spite of this highly “unnatural” context of the elephants we have observed, 60% of their time was spent in relatively “natural” behaviour – either sleeping/resting or feeding/moving calmly, not on account of the human presence.

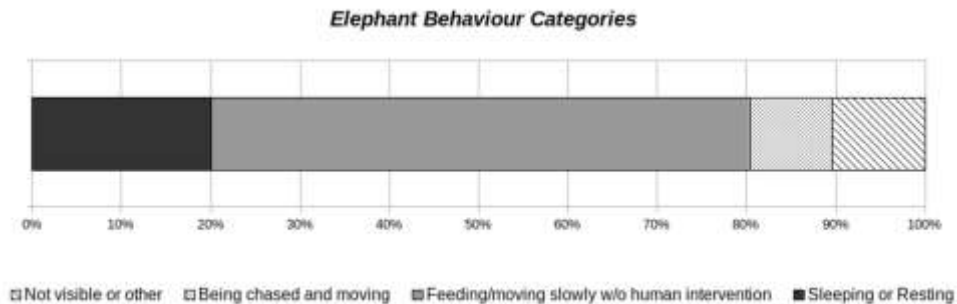


Figure 9: Elephant behaviour categories

In summary, through this Section I have showed that the Gudalur elephant vary significant from the elephants described in any of the literature.

- There are more (particularly young) males than females which is very unusual given that most other populations have 4 times as many females as males, and the age dynamic is skewed towards adults and calves, with almost a missing generation in-between. This could be on account of a disruptive event that forced elephants into the Gudalur region around 2010 that forest department field staff talk about, more importantly this highlights the need for more research into the lives of elephants living alongside people.
- The home ranges of some of these elephants are smaller than anything reported in the literature, and even within this only about 6 km² are covered by natural vegetation, the rest being largely tea and coffee plantations, tea factories, schools, hospitals etc. and a human population of about 15,000 people.
- Some physiological aspects around musth, body condition and stress, and sleep seem to be at odds with the literature, which also raises some questions around certain simplistic assumptions in the biological literature.

- And finally, the interaction between elephants and people is again unlike that of any of the other elephants that have been studied, where much of these interactions are considered “unnatural”.

So, it is clear that at a population level, these elephants are very different from any of the other elephants described in the literature, which partly could be on account of certain simplistic assumptions about elephants in the biological literature that are not generalisable for all elephants. The next question is how these elephants are different from each other in their interaction with people.

4.3 Individual variation

The motivation for understanding individual variation in behaviour arose out of a practical conservation problem, driven by the highly habituated individuals like Bharathan (described in Section 1.1). While he arguably posed a minimal risk to people on account of his seemingly peaceful behaviour, he could not be chased back or kept away from human habitation. It was important to know if there were more elephants like him, and what the behaviour of other elephants in the region were like in their interactions with people. From a management perspective, the key questions were:

- How many/which of these elephants are habituated and “peaceful” in their interactions with people?
- How many/which individuals are aggressive and pose a significant threat?
- Are some elephants resident in the region all through the year or do they just move through?

All of these had to be answered with quantified data to be considered “scientific” and incorporated into policy, and I chose to use an iterative, rational approach to classify them based on their interactions with people that I describe in the next Section.

4.3.1 Quantitative classification of behavioural types

I use the variables around the human-elephant interaction that I describe in Section 2.5.2.3 in the methods for the categorisation, starting from elephants that are seen rarely and probably only visit or pass through the region, to elephants that are highly habituated to people, and very comfortable around them. The graphic below charts out this typology of behavioural categories for the Gudalur elephants, and I then briefly explain the various categories.

Quantitative Categorisation of Elephant Behaviour

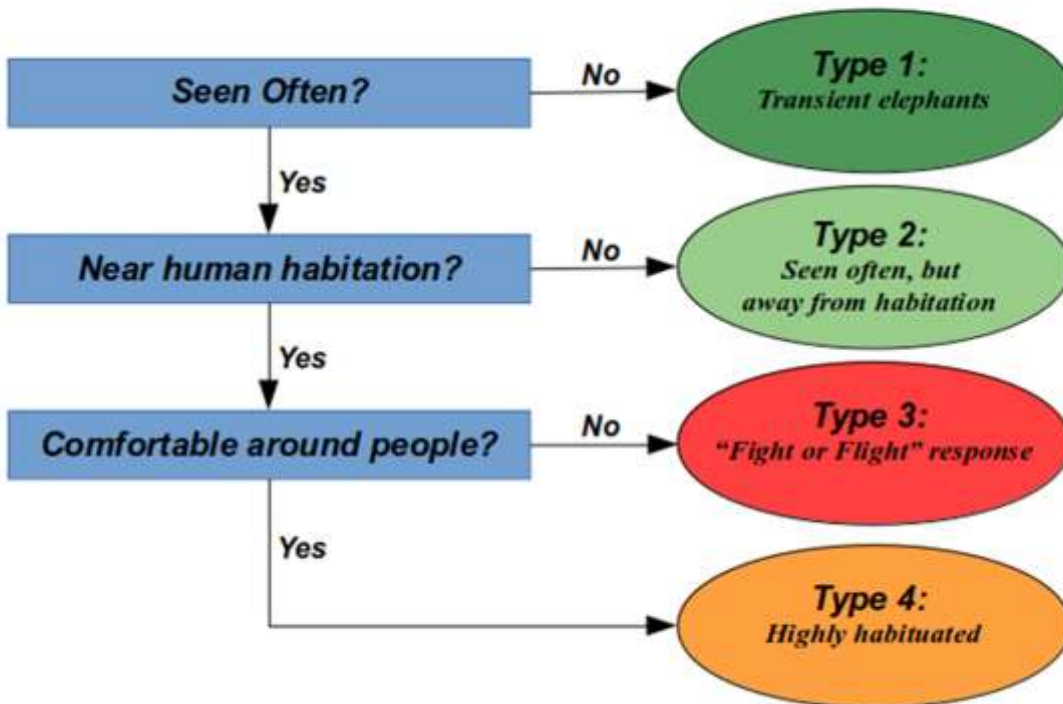


Figure 10: Flowchart showing the quantitative categorisation of elephant

Type 1 – Transient elephants

The first step was the number of times we saw the elephants, where elephants that were seen rarely clearly interacted with people much less. The most frequently seen elephants were the Kapikaad herd, photographed 34 times in the year, and some elephants were only seen in camera traps, and never directly sighted. The median number of sightings was 5, and qualitatively we all felt we did not “know” much about the elephants that we had seen less than 5 times, so this was used as the cut off. These elephants possibly spent most of their time in the more intact forests around, and ventured into the Gudalur region occasionally, or if they were in Gudalur often they made sure they were not seen often, even by the field staff who spend most of their time patrolling the forested parts of Gudalur.

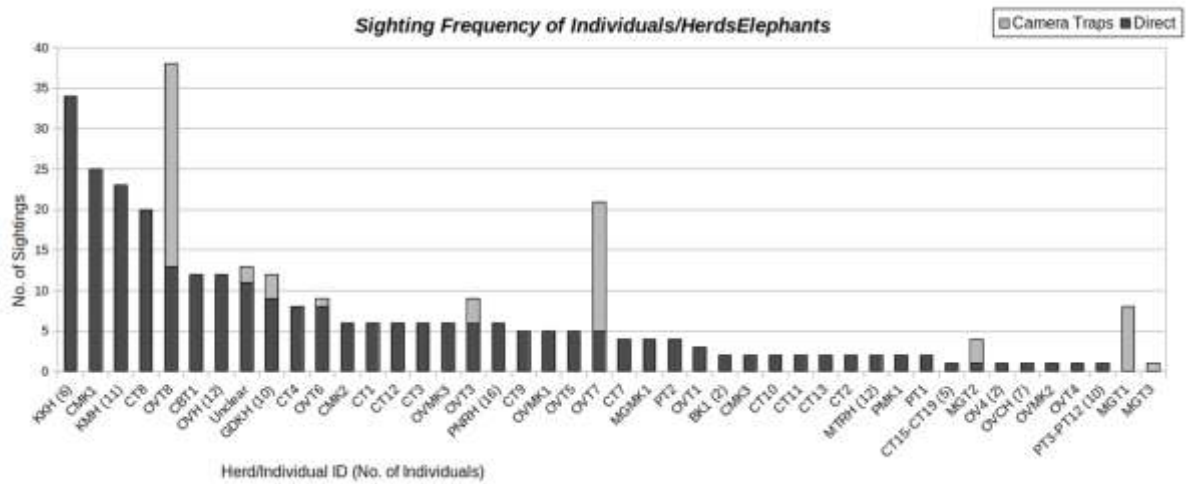


Figure 11: Number of sightings of each individual adult or sub-adult. Note that herds are combined into a single unit as described in Section 2.5.2, with the bracketed figure indicating the number of individuals in each herd. Some young males that were sighted only once are also grouped together for simpler visual representation – CT15-CT19(5) and PT3-PT12(10).

This category therefore consists of all the elephants after the PNR Herd on the graph above, or 58 individual elephants (listed in Figure 18 ahead) including the herds and calves.

Type 2 – Seen often, but away from human habitation

From the remaining 67 elephants, the next level of classification is along the level of land use modification around where the elephants are seen, or how close they come to human habitation. This is presented for all the elephants seen more than 5 times during the year.

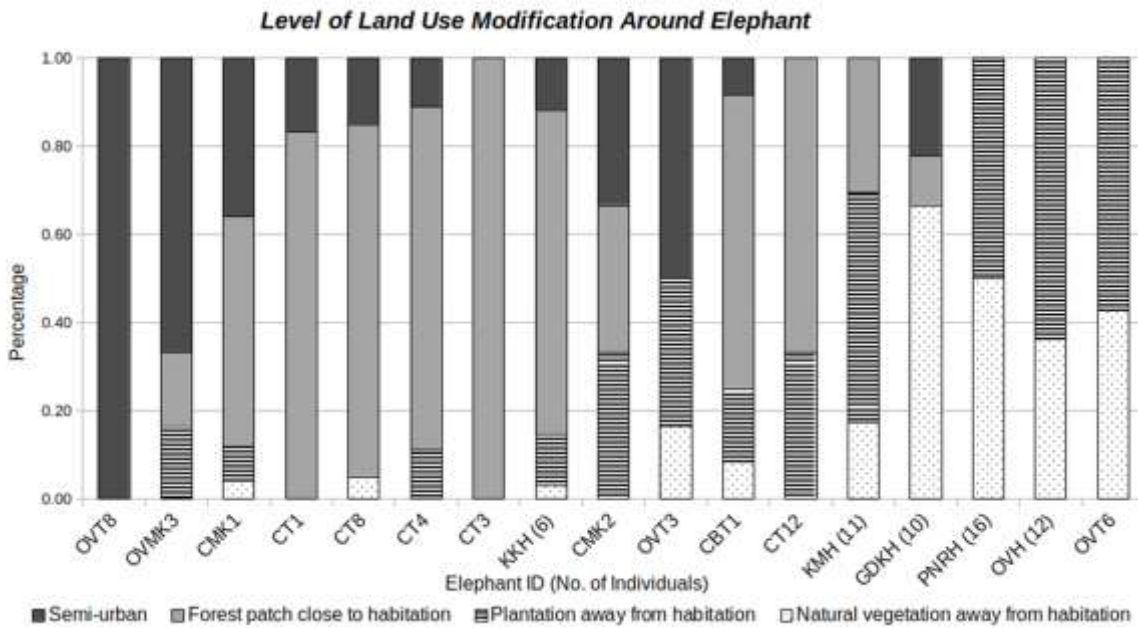


Figure 12: Varying land use modification around elephant individual elephants

While there is a gradient, there appears to be a clear difference between the last five herds/individuals and the rest, in that they most often seen away from habitation. These account for 50 elephants, or 40% of the population fall into the “Type 2 Category” of elephants that are seen relatively often, but not close to human habitation.

Type 3 – “Fight or Flight” response

There are then 17 elephants that were seen relatively regularly near human habitation, and of these, all but the Kapikaad herd and Males. Of the 125 elephants using the landscape, it is largely these 17 elephants that interact with, and form people’s perceptions of elephants in the region.

From these elephants, the key factor is how they differ from each other in terms of their reactions to people around them. Given that these elephants were all seen regularly close to habitation, there are no instances when they are unaware of people around them, and the three other potential reactions - signs of aggression, moving away without being actively chased, and no reaction to people - are represented in the graph below.

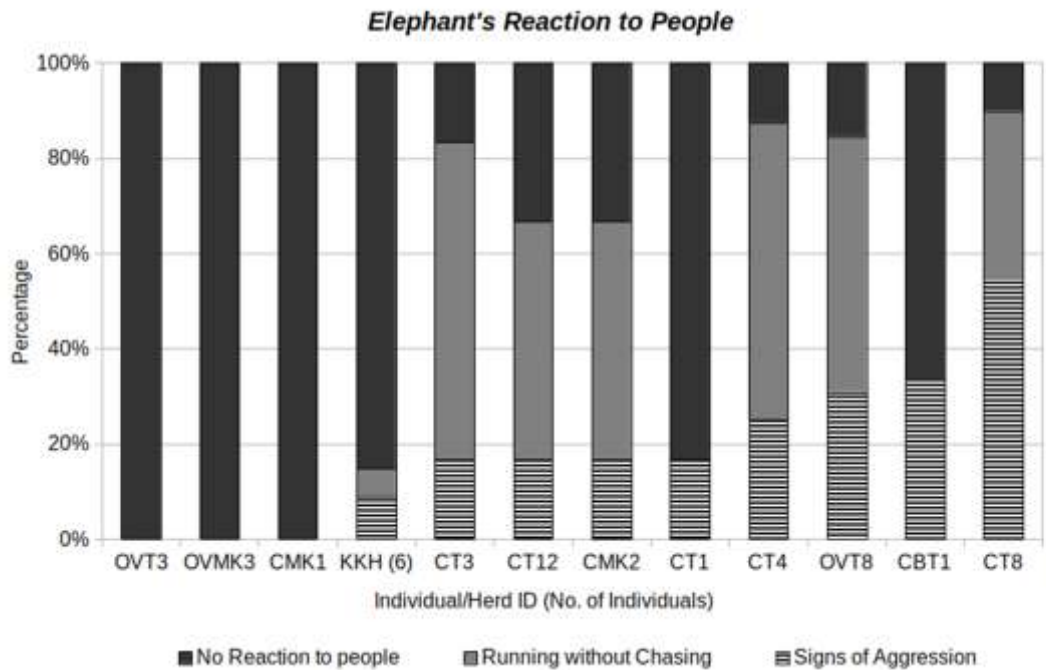


Figure 13: Elephants response to people

Based on “fight or flight” response to people as a threat, they can be classified into two groups; the elephants that exhibit this response more than 20% of the time and fit into the “Type 3 Category”. These involve seven males, six of them younger than 30 years, or just about 5% of the population. It is largely these elephants that are responsible for all of the negative interactions between people and elephant, particularly people getting killed.

Type 4 – Highly habituated

Finally, and the habituated elephants - “Type 4 Category”, which include ten elephants, or 8% of the population. Ganesan/CMK1, James/OVMK3 and Monstra/OVT3, show no response to people, but even the Kapikaad Herd and Raja/CT1 with flight or fight responses in less than 20% of the interactions. There is no sign of aggression or an attempt to run away from people, and could possibly imply that they do not consider people a threat.

All of these herds/individuals are listed in the chart below (Figure 14) according to behavioural type, with the area of the boxes representing the number of individuals.

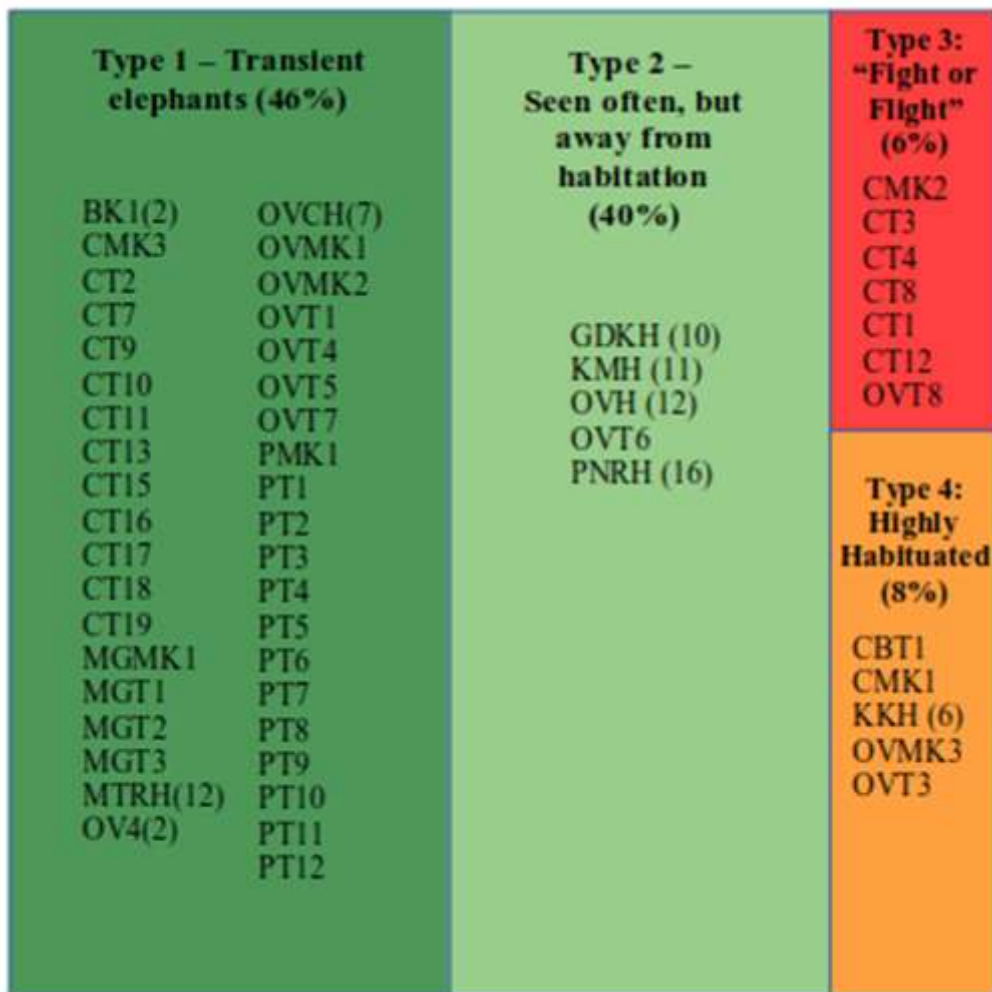


Figure 14: Quantitative categorisation of all the elephants in the Gudalur region, where area of each box represents the number of individuals in the category.

In summary, the elephants in Gudalur are all significantly different from each other in terms of their interactions with people, and this can be rationally categorised based on scores assigned to variables relating to the frequency of sighting, the level of land use modification around the sighting, and the elephant’s reaction to people during the interaction. In undertaking this categorisation, it is apparent that the majority of the interactions between people and elephants happen with only a small subset (14%) of the total number of elephants using the landscape, which is only 17 individual elephants. “Mitigation strategies” can therefore be targeted for these different behavioural types, which is something I discuss again in Chapter 6. But in addition to this quantitative classification, a qualitative discussion is also warranted.

4.3.2 Qualitative Classification

Any categorisation, particularly based solely on a few quantitative variables, is limiting. The first straightforward problem is that the Cherambadi region is more urban and densely populated with people than the O'Valley region, so elephants there will clearly score higher on human modification to the landscape and human presence, resulting in some positive spatial autocorrelation which I have not accounted for. Further, there is a gradient across all the variables – from the frequency of sightings, the level of land use modification around the sightings, and the reaction to people – choosing a cut off to put elephants in categories involves some level of subjectivity that is problematic in the natural science framework. There are arguably more sophisticated quantitative tools and analyses that can be undertaken to overcome these shortcomings, but that is not something I attempt to do.

The more significant shortcoming of the quantified approach is that it assumes all observations and interactions are the same, and rich, detailed and varied observations are reduced to single data-points. This reduction and abstraction also deadens the liveliness of human-elephant encounters and misses the lived experiences of the people and elephants that share space. I therefore also present our first-hand observations of elephants⁶⁷ to validate and bring alive the different behavioural categories, and add nuance and depth. I then discuss the complications when the qualitative and quantitative data contradict each other, and use the qualitative data to move certain individual elephants into different categories and discuss the questions of changing behaviour over time.

4.3.2.1 First hand observations on behavioural categories

I start with describing the Type 4 - Highly habituated elephants, since we interact with them the most.

⁶⁷ Not all of the observations are by myself, and I have included the name of the observer in each case.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
02/01/16, CMK1/ Nadodi Ganesan, Prakash	One of our first interactions with Nadodi Ganesan/ CMK1, when a group of local people wanted him chased away from the road as people were scared to pass by.	...But instead of moving away the fire crackers, he came walking towards the staff, calmly and surely. They all left the place and had to run.... finally after playing with the staff for some time the elephant was thirsty and it went to drink water in the nearby stream and then disappeared inside the bushy swamp.
10/05/16, CMK1, Ramesh	CMK1 was spotted outside a tea factory	...and when coming back I took internship boys through Aiyankolly to see the place. When we reached Amko factory, there was our big Makana standing on the road. And two Mullukurumba staff were with him, and talking to him telling him to go into the forests. They said this elephant can understand what we tell him.
23/06/16, CMK1, Vishnu	When CMK1 started walking along the main road every other day.	... he came to the hospital ground, and people offered him a jack fruit. After eating that he started to move along the road. People were all stopping and taking photos and selfies with him. Then staff said it will become dangerous, and split into two teams, one in front and one behind, and kept the local people and traffic away. The staff say he is a very peaceful, it never chases humans, only pushes the vehicles which are stopped in his path.
21/01/16, OVT3, Tarsh	At the side of National Highway 212, between Gudalur and Ooty. Seen in the Silver Cloud tea estate as I was driving back home.	He was standing about 50m off the road, and was not bothered at all by all the cars and tourists that had stopped to take photos. I thought it was a bit dangerous for them, but no one would listen to me, since he did not look dangerous at all. He was calmly pulling at branches on a small tree in the middle of the tea and eating some leaves. People started going closer to get better pictures with their phone cameras, but then the watchers from silver cloud came and chased the people away.
17/12/16, OVT3, Tarsh	Along the national highway, between Gudalur and Ooty, at 10.30 pm.	He was standing right by the edge of the highway and causing a lot of commotion. There was hardly enough space for vehicles to pass by. People were honking, flashing their headlights at him etc., but he refused to move. He was also not too agitated, and just kept on grazing. I also realised we was barely 100m from the garbage dump, and while OVT8 and OVT7 were going there almost every day to feed, it was strange that monstra never went to the dump to feed.
02/12/16, OVMK3, Tarsh, Ramesh, Manikandan	In a coffee estate at the edge of the Gudalur town, within the limits of the Municipality	..But he had the same round, large body (as Ganesan), slow and measured movement, eyes almost not visible, and seemingly disinterested in all the action around him. We didn't know if he was aggressive or not seeing him for the first time, but somehow, just by watching him for 10 mins we all felt it was safe, and went as close a 30m to get good photos to make a profile of him. He was not bothered by us, and did not react at all, even when a large number of estate workers stopped by to watch him. He stood like a model while we took photos from different sides. The coffee plants covered the bottom half of his body and we debated trying to move him to the road for clearer pictures, but then thought that was too much.
30/01/16, KKH, Prakash	On the 10 th of January, a young man had been killed by an elephant, and all the elephants	Kumki team was Bomman and Wilson. Mahouts said Wilson is good, but Bomman is only 18 years old, and will simply chase the elephants and make it dangerous for mahouts also. They went inside the forest patch about 1 pm. They were chasing a lot with lot of noise coming, but till 4 pm the KKH was taking the kumkis

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
	from Cherambadi were being chased to the south, by trained 'kumki' elephants from the neighbouring Mudumalai tiger reserve.	round and round in the forest patch, but not coming out. Finally by 6 pm they managed to chase them out, and they went till pungamaram check post then it got dark. Next day morning, they KKH had gone back to the same place! Selvanayagam and Subramani said these elephants will never leave this place no matter how much you chase.
18/02/16, CBT1, KKH, KMH, Vishnu	A large number of elephants were seen near the southern part of cherambadi, and it was decided to chase them deep into the forest so they don't come back for a while. A large number of staff were there.	When starting in the morning they were scared of the fire crackers, and were running. Then after some time comedy started. We will chase them 50m, then they will chase us back 100m. CBT1 was main elephant chasing us, others were calm or moving away. They went in and out from the (elephant proof) trench 3 times, and walked inside the trench also, but refused to go deep into the forest. After some time, they were not scared, and by afternoon while the staff were bursting crackers they were calmly grazing and feeding, some also slept. All the action stopped for some hours since we could not see the elephants in the thick forest patch. By late evening they came to the lake to drink water, and again they had become scared of the crackers. But still they wasted one full day of 30 staff, and took them for one full round around the hill and came back to the same point they started in the morning.
27/02/16, KKH, CT1, CT2, CT8, Tarsh, Vishnu	The elephants were in a small patch of forests on a hill slope, surrounded by houses and people on one side and the state highway and electricity sub-station on the other.	Staff finally decided there was nowhere to chase the elephants, and left the place. Immediately the KKH went to sleep. KK2, KK3 and Messi lay down, and KK1 and CJT6 were standing and sleeping. After some time the other males also slept, but they didn't lie down. CT2 was very shy, and we didn't see him all, only one photo of his ear. Around 100 people were watching from all the (labour) lines around the elephants, but they were only scared of staff.
09/03/16, KKH, Tarsh	We were looking for elephants that were reported in the cherambadi area, near some labour lines in a plantation.	...finally we found them on the hill side, in a small patch of lantana. They were resting without much movement. It was hard to see the elephants - finally we saw KK1's ear, and knew it was them. All day they were staying in that small patch of about 1 hectare. The people said they went inside that in the morning at about 10am, and evening at around 5 when we came back that way they were still there. The staff said everyday these elephants will be hiding in some patch like this, and night they roam around freely and eat from the swamps. But they never leave the area.

Table 10: Notes on some of the elephants that interact with people regularly but are not affected by people

From these notes, it is evident (arguably more convincingly than the graphs), that there are a subset of the elephants in the region that do not perceive people as a threat, and do not react even when there are large number of people around them sometimes attempting to chase them with firecrackers.

This is considerably different from some of the other elephants in the region, CT8/Kullan Bolt in particular, in the type three behavioural category, which do come close to habitation, but are also not comfortable near people and show signs of aggression or run away.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
14/01/16, CT1, Tarsh, Vishnu	Only short sighting with ACF [Assistant Conservator of Forests] along the side of main road when returning to Gudalur.	We were and telling him we were going to name CT1 after him since it was second time he was seeing it. He didn't want that, but said call it ACF, so all future ACFs also have to come to the field and at least see at least this one elephant! CT1 kept smelling/listening towards the road to see if any people were coming down. Was feeding now and then, but clearly afraid of people even though we were all on the other side of the swamp, some 80m away.
21/01/16, CT8, Prakash	The staff got news about one lone tusker in a swamp.	After getting that call we rushed to see the elephant and take photos of it... Me and the staff got down from the bike and went walking to see the elephant. We saw an elephant was quietly feeding in the swamp and it was CT8. He got scared thinking he may attack us since they told me he was aggressive, but when he heard us he ran away.
12/02/16, CT8, Prakash	The people near the kannanpally school junction informed the staffs that there is an elephant in the swamp behind. They were scared to take the children home, so wanted it to be chased.	The staff saw and said he is a dangerous fellow, not like our friend CMK1. Hard to chase him, but they have to since he may attack public. They called all the staff, and then only they fired crackers when they were in full strength. He was a young and angry fellow, and charged at them. They were all ready, and ran. Once it came out of the swamp then using jeep and crackers they managed to somehow chase it.
25/02/16, CMK1, CMK2, CT1, CT2, CT8, Tarsh, Vishnu	Five males were being chased away from behind a school. It was very loud, with fire crackers going off everywhere.	Ganesan was not bothered at all, and kept on feeding peacefully. The staff also gave up trying to move him. CT4 was the most agitated, and leading the others around, trying to find some way to get out of the area. CMK2 joined CMK1 for some time and try to be calm like him, but after a few mins a cracker burst near him and he ran off. CT8 would turn towards the noise and show some aggression whenever a cracker went off. The other 4 finally moved away after about half an hour, and CMK1 kept feeding quietly.
15/07/16, CT8, CMK1, Vishnu	In Cherambadi, the two elephants were in a small patch of forests near the main road.	As soon as they put crackers CT8 came running out of the forests, and crossed the road. The big giant our Ganesan was not moving, but they had to chase him at all cost. Finally he also moved and crossed. From there behaviour of two was very different. CMK1 was cooperating and moving slowly to Samiarmalai, but CT8 was more aggressive, and kept coming towards staff. Because CMK1 was there only CT8 also finally moved with him.

Table 11: Notes on CT8/Kullan Bolt's behaviour

When we started our work in 2015, our aim was to find out which elephants were “peaceful” and which were “aggressive”. But through the year of watching elephants, we found aggressive and “scared” often came together, and this fit with the biological idea of the “fight or flight” response and we decided to use that instead. I do not however dismiss

the notion that some elephant could be inherently more violent than others, and this is something I discuss more in Chapter 6.

Within this Type three category, there is also the case of one elephant that changed after consistent interaction with people at the garbage dump, from running away to chasing people. Only three interactions are presented to illustrate this, but OVT8 was seen 13 times.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
18/10/16, OVT8, Tarsh, Manikandan	We were seeing elephant at the garbage dump after a long time, since various fences and the monsoons kept them away/in other areas.	OVT8 was near the garbage dump, but moved away when we went to fix the camera traps. As soon as we moved away he came back. We watched him for a long time, he knew we were there, and when we made noise we would get a bit scared and leave, and then come back after a few mins. This was the first time we saw him climbing over the fence, up and down many times. He closed his eyes when getting a shock, but the wires were touching the ground and it was shorted, so it was only a light shock.
02/11/16, OVT8, Tarsh, Vishnu, Mani	At the garbage dump, while the fence was being repaired, and a lot of people were present.	We watched OVT8 for long time. WWF people and some municipality people were there before us, and they were chasing him a lot. But we was much less scared, and was not really running away like before. We also noticed he didn't care about the shock any more. Instead of climbing over he walked straight through it and broke all the wires. He was only careful to make sure his face and trunk didn't touch the wires.
08/11/18, OVT8, Tarsh	It was getting dark, but I stopped at the garbage dump on the way back home.	I didn't go close, but stayed quite high up in the tea. He sensed I was there, and kept putting his trunk up and smelling, but didn't move. Rather than shouting to chase him I tried to talk to him like the indigenous field staff did (and tell him not to eat so much waste!). He didn't move away, but was not too comfortable, and kept turning towards me now and then. From my voice I assume he knew I was quite far away. But he was clearly agitated by the talking.
29/11/16, OVT8, Vishnu	At the garbage dump	We were standing near the edge and taking photos and watching. Suddenly he turned towards us and came running. So in fear we also ran away. Then he also ran into the bushes. We didn't go close again, and stood far without disturbing and took photos and videos.

Table 12: Notes on OVT8 as behaviour changes

Finally, the more elusive Type 1 and Type 2 behavioural category, which we have very comparatively limited qualitative data as well, since we don't see them often and even when we do they are usually very far away.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
07/03/16, PNRH, Prakash	One elephant was in the hills, while about 15 people were in the valley on the road watching it.	It started moving along the hill slope, and some people saw it and started making noise. It put its trunk up and got the smell and started running. Ranger told me that these elephants are not like cherambadi, when they see people they run away from them. They don't have so much problem in Pandalur Range.
08/03/16, PNRH, Ramesh	Saw elephants far away on the hill side, only visible/identifiable through camera zoom.	After we stopped and started trying to take photos local people also saw the elephants and crowd started increasing. One or two people started whistling and making noise. It was very far and we thought elephants will not hear, but they immediately stopped feeding and were smelling the air. Then they moved away. We were surprised that they were so scared of people. It was so far that it will take half an hour to climb the hill and reach the elephants.
31/03/16, MTRH, Ramesh	Elephants from the Mudumalai Tiger Reserve, seen in a plantation near the boundary.	Lots of workers were chasing the elephants, and there was a lot of confusion. The department had dug a trench, and the elephants were stuck outside it and could not go back. This is the reason we are seeing the elephants. Otherwise regularly they come in the night and people tell us about them, but we cannot see them. The elephants were very agitated and scared of people.
13/09/16, OVH, Ramesh, Vishnu and Tarsh	We went up the Gudalur malai hill to try and find the elephants since locals told us they had seen them the previous day.	We first saw the elephants on the estate road. OVT2 was standing near the road, and got scared when he heard the bike sound and ran up. We left the bikes and walked ahead. They were hidden in the grass and we were quite far away. OV2 seemed to be the most careful and kept smelling the air. We could not find OV1, so we walked around the hill and came from the other side. They sensed something and were a bit careful, but did not know we there and kept feeding quietly. We were around 50m and the closest we had ever got to these elephants. After half an hour Ramesh sneezed and they got scared and went running with tail up.

Table 13: Notes on Type 1 and Type 2 elephants that do not significantly interact with people

While these elephants are categorised based on them not being seen often and when they are seen it is not close to human habitation, I have chosen to present some observation at instances where there were some interactions with people. And it is evident that when these elephants encounter people, they actively move away, without getting close enough to people to get into a “fight or flight” situation. These elephants perhaps do not pose much

trouble with very limited interactions with people even when they do use the landscape regularly; this is something I discuss more in Chapter 6 on managing the landscape.

Through all of these first-hand observation, I reinforce the idea of there being distinct behavioural categories at play, and understanding this diversity in the elephants is key element in better understanding and managing the shared space.

However, there are some individuals that do not fit into the above categorisation based on our qualitative data, and others that arguably change over time. Understanding the flexibility and dynamism in these boundaries is also a key part of understanding the diversity in the elephants that share space with people, and I do this in the next Section.

4.3.2.2 Quality over quantity, and changing behaviour

While these qualitative descriptions add depth to nuance and arguably validate the quantitative categorisation of behavioural types, there remain some elephants that do not fit into the quantitative categories. This poses a wider challenge of how to reconcile the differences when the qualitative and quantitative data do not support each other.

A further limitation of the quantitative approach, in addition the problem of biological reduction that I discuss above, is the inability to deal with “other ways of knowing”. Some elephants that are observed only occasionally still leave a lasting impact on the observer; or the forest department field staff, who see elephants and interact with some of these elephants on a daily basis “feel” some of them are more dangerous than others. A significant part of the story is missed through only relying on direct observation; local people’s narratives and stories about individual elephants and their encounters and feelings towards them, reconstructing what happened when a house is broken down even when no one saw what happened, or the severity of particular intense event or interactions. All of these sources of information are equally important, even if they do not fit into the quantifiable framework and statistical analysis.

I present and describe our interactions with some of the individuals that do not fit into the quantitative framework, and then make a case for using quality over quantity in the case of contradictions when used in in such “mixed methods”.

MGMK1/Bharathan and MGT1 were seen only once in 2016, and fit into the Type 1- Transient Elephants category. But Bharathan was the famous elephant that I describe at the start of this thesis. While we have seen and interacted with him for years, during 2016 when undertaking formal field work he did not come to Thorapally for most of the year, and even when he came we did not manage to see him ourselves but included him as a sighting since we got verifiable photographs of him. In 2017 and 2018, he has been regularly visiting again. So he should clearly be classified as a Type 4 – Highly Habituated individual.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
04/07/16, MGMK1, Tarsh	At Thorapally, a small town at the edge of the Mudumalai tiger reserve.	Thoufeek called me to say Bharathan had come after long time. He was seen walking back on the highway in the morning at 7.30 am. There were lots of people, vehicles and tourists on both sides of the road, and traffic also. But he didn't bother anyone and walked straight into the forests. We didn't see him ourselves, but got some good photos from Thoufeek from his mobile camera. The question of whether we should include this as a sighting was discussed, and finally decided to include it since we had the photos with the metadata of timestamp.

Table 14: Note on MGMK1/Bharathan – moved to type Type 4

MGT1 was the young tusker that accompanied Bharathan, and again, though we saw him only once when we were undertaking formal field work, we have interacted with him on numerous occasions and again, feel safe to place him in the Type 3 - “Fight of Flight” response.

OVT1/Radhakrishnan was seen twice in the year and fit the Type 1 category, but he did not fit this. He was seen soon after killing a man (described in Section 3.1), and the staff who all interact with him regularly are scared of him. He was moved to Type 3 – Fight or Flight.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
30/03/16, OVT1 Ramesh, Vishnu, Tarsh	When looking for the tuskier after a man got killed in Manjushree [O'Valley].	After 4pm finally the elephant came out and into the swamp slowly. 12 staff were there with us, and he got scared and moved back – only 5 min sighting. There was dried blood on his tusk, so we can confirm with Department that it was him. The other watch man saw him charge, and staff and local people all say there is one very aggressive tuskier chasing people for the last two weeks. It should be him only. None of the other O'Valley tuskiers are in the area now.

Table 15: Note on OVT1/Radhakrishnan, moved to Type 3

OVT7/Alibaba Basheer was also directly sighted 5 times and places in the Type 1 category, but with my own personal interactions with him, coupled with being caught in camera traps 16 times, I would put him in the type 3 category as well.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
01/05/16, OVT5, OVT7, Tarsh and Ramesh	Two tuskiers seen for the first time at the garbage dump.	Then we three came back in the evening to check at the garbage dump, and saw the two males there first. We were very close, but upwind and also uphill looking down at them. I think they knew we were there, and were not at ease, constantly smelling the air. Tarsh tried to talk to them and let them know we were there so they didn't suddenly get a shock if wind changed direction. But then OVT7 got a bit agitated and turned towards us threateningly and charged. We all ran, but it was only a few steps mock charge. Anyway we were out of reach. Then we kept watching them from further, and they knew we were there and were uncomfortable, but at the same time didn't leave the dump.
27/09/16, OVT7, OVT8, Tarsh	Two tuskiers seen on the Gudalur-Ooty highway, near the municipal garbage dump.	Two tuskiers crossed the highway and went straight towards the garbage dump. There was a line of vehicles, so we kept moving and stopped ahead. It was getting dark, so I got out and ran back trying to get a few photos. As I rounded the bend I noticed a pickup [truck] had stopped on the road, and there was OVT7 blocking the road ahead. I stayed behind the pickup, waiting. Vehicles started piling up on either side, and in a few mins, he charged at the vehicles coming downhill (away from us). They all backed up, and in panic one driver got stuck diagonally and blocked the road, but luckily, he didn't pursue the charge – only pushed vehicles away from him. He then moved off the road, and down into the tea out of sight. The pickup driver (over confident local) started moving forward, but as he got to the point, OVT7 came charging out of the bushes again! Luckily a big lorry also came in the opposite direction at the same time and horned, chasing him back. It looked like he intentionally ambushed the pickup!

Table 16: Notes on OVT7/Alibaba, moved to Type 3

CBT1/Shankar, while most often not aggressive towards people or afraid of them, he was probably responsible for killing one person (described in Section 3.1), and in a few interactions with him some of us thought he showed intentional and purposeful aggression, and would move him to Type 3 – Fight or Flight.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
19/02/16, Vishnu KKH, KMH, CBT1	Day two of the chase operation described above in table 10.	On other side of the hill some of the staff fired crackers. The herd ran down the hill and towards the Kotamalai dam. They relaxed there for some time and had a clay bath to cool themselves. Then again staff moved them into the forest towards Kotamalai RF. Inside the forest it was the same comedy as previous day. The moving herd stopped suddenly and started to chase us back. CBT1 was the leader for this chasing. We ran back, then after some time again started moving them to Kotamalai. At some 4 points this action repeated. There they made a big fire with the dead bamboo to stop elephants from coming back to the village. All of them are a bit scared of CBT1, and say he is the only one who will create problems from the group.

Table 17: Notes on CBT1/Shankar, moved to Type 3

OVT6/Kokkal Moopan was another interesting elephant, who was classified as Type 2 – Seen often but away from habitation, but then was moved to type 4 – Highly habituated. In the first few sighting in the year, he was only seen away from the houses, but towards the end of the year he spent a lot of time near the Devamalai village, and even our own home. This continued into 2017, though not formally a part of our field work.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
13/12/16, OVT6, Tarsh	In the Devamalai village, the first time we were seeing the elephant in the village during the day.	He came down to the village road at 5pm and caused major chaos. This was the first time an elephant was coming to the village during the day. The whole village came out and was following him down the road. He then walked up towards our house. He didn't seem too upset. He stood higher up on the hill and looked around for some time to decide what to do. Then he moved up into the hills. He knew the area well, since he carefully went under the single electrified wire. We have seen him in the hills many times before, but this was the first time he had come near houses.

<i>Date, Elephants, Observers</i>	<i>Context</i>	<i>Observation</i>
16/12/16, OVT6, Tarsh	At the Devamalai village, where the elephant had taken to coming every night.	After coming in the evening on 13 th , Kokkal Moopan started coming every night, feeding mainly on tall grasses and bamboo in and around the village, a lot of it outside our house. Whenever we came out and shone a torch he would move away, but not leave. And soon he would come back and keep feeding. He walked carefully around many of the houses, but did not damage anything. People (including myself) were all staying up to try and see him directly, but he came by the houses only very late in the night, when everyone was fast asleep.

Table 18: Notes on OVT6/Moopan, moved to Type 4

And finally there is the O'Valley Herd (OVH). All through 2016, based on our sightings of them they were classified as Type 2 – Seen often but away from habitation. But these were again elephants that we knew from before formal field work on elephants, and continued to monitor after. Over the last 3 years, they have broken into 11 houses, invariably in the night and when the houses were empty. So even though they were never seen in the day, they were routinely (negatively) interacting with people in the nights. These elephants are therefore better suited in the Type 3 - “fight or flight” category, where they do venture near houses at nights, but remain afraid of people.

The flowchart I present earlier (Figure 18 earlier), can therefore be modified to include to qualitative and quantitative data, as presented ahead (Figure 19).

Quantitative and Qualitative Categorisation of Elephant Behaviour

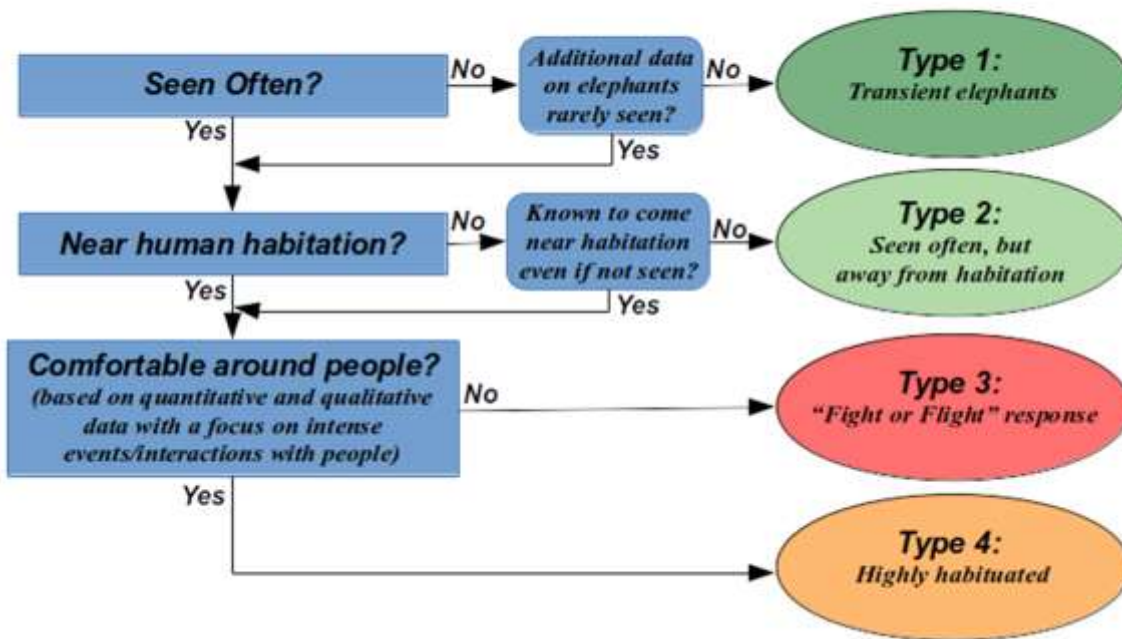


Figure 15: Flowchart showing the quantitative and qualitative categorisation of elephant

The number of elephant in each category also accordingly changes, which is indicated below, showing the various individuals that changed categories based on the inclusion of qualitative data.

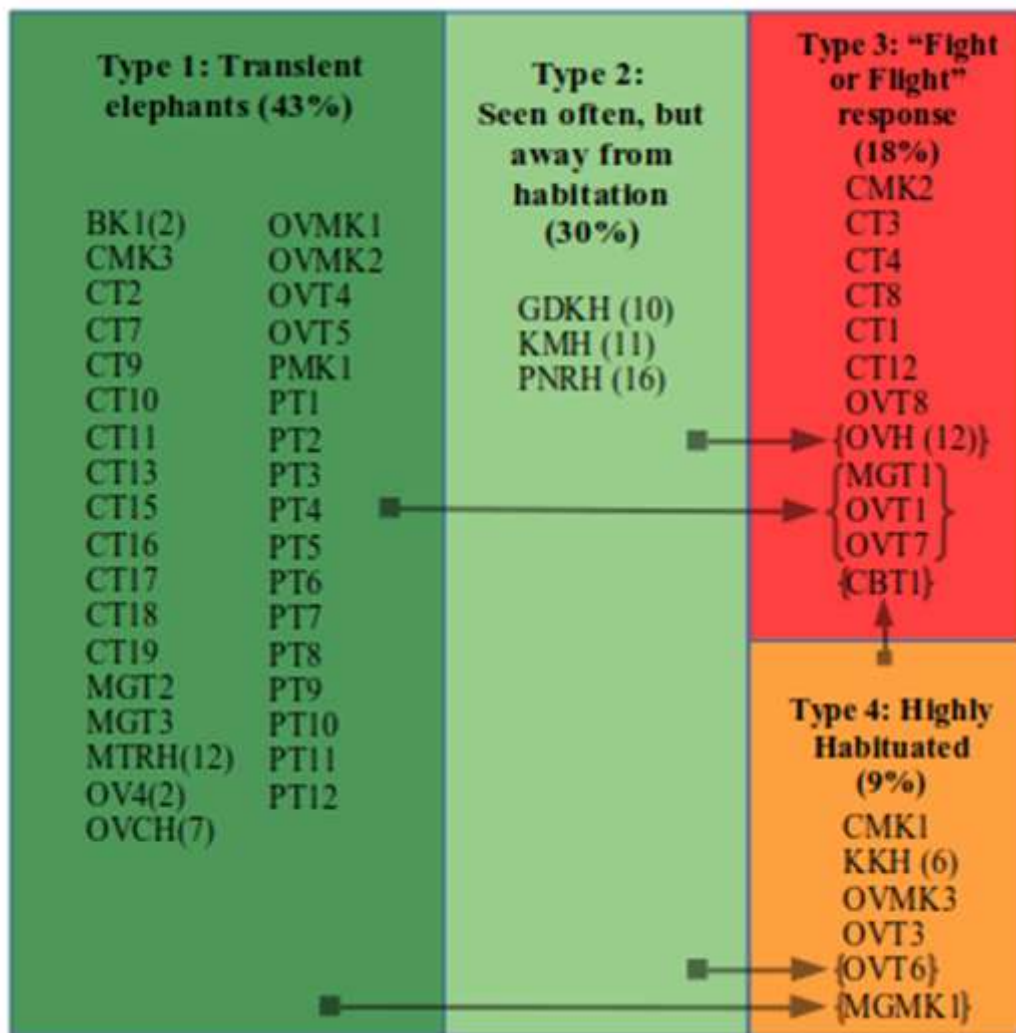


Figure 16: Quantitative categorisation of all the elephants in the Gudalur region, where area of each box represents the number of individuals in the category.

The behavioural categories, based on both qualitative and quantitative data, aptly captures the diversity in how the elephants in Gudalur choose to interact with people. What is evident, is that in only about a quarter of the elephants using the landscape regularly interact with people. Another 30% of them use the landscape regularly and are able to share space without significantly interaction with people, while the majority of the elephants are not often seen, and could be moving through the landscape or remaining completely hidden away from people in the region. These differences have significant implications for the management of the region.

I discuss the implications of these behavioural types for elephant management in the conclusion Section of this Chapter. While such a typology could clearly be useful for management, I am wary of treating these as rigid inflexible boundaries, and putting each elephant into one of these boxes, or calling them distinct “personalities”. The very definition of animal “personality” in the natural sciences refers to potentially hereditary behavioural traits that are stable over time and context (Stamps and Groothuis 2010), and this rigid definition is not something I am comfortable with. While there undoubtedly maybe some underlying “personality” of each of the elephants, there is also significant variation in their behaviour based on the context and over time. Some elephants changed considerably in the short span of one year while we have watched them. OVT6/Kokkal Moopan was not seen often enough to make significant statements about his behaviour, but he has clearly started venturing closer to human habitation, and is showing no signs of aggression towards people. OVT8/Arumugam Kupparaja was seen much more often, and his behaviour changed considerably in just a few months with almost daily interaction with people. But the most significant change is CMK1/Nadodi Ganesan though over a longer five year period. I present this observation with videos in the Table 19 below.

From these observations, it is clear that Ganesan has evolved significantly over the last 5 years in terms of his interaction with people. From being scared and moving away, he became very habituated and finally, arguably with constant harassment from people, he exhibited aggressive behaviour towards people. This emphasizes the fluidity and change in elephant behaviour over time, and that the behaviour of both elephants and people are shaped by each other. How elephants evolve – move between these categories and adapt their behaviour to the constantly changing context and people around them is perhaps the more interesting aspect that requires further study. This cannot of course be studied over the course of one year, but is something I hope to examine in the future.

<i>Date</i>	<i>Video</i>	<i>Notes</i>
2013, exact date unknown.	https://youtu.be/QiAATPI0_xw (QR code 16)	He was first seen in 2013 (in a poor-quality video from a local mobile phone camera), where he is walking up a small estate road with a large number of people around shouting and agitated. He is scared of people and moving away, even when in full musth. The people are equally excited/ frenetic at having an elephant among them.
26/05/16	https://youtu.be/32vHM9IHv1g (QR code 9) https://youtu.be/ZXtvx8zyTCs (QR code 17)	In 2016, when we started our more intensive monitoring of elephants we were amazed by how peaceful/habituated he was around people, and equally so the people around were calm and composed around him. The video shows him walking right outside a house, with the owner talking to him from the veranda, and a small group of people following him. He was also often seen sleeping in open, unsheltered areas as well, which is rare for wild elephants.
04/11/16	https://youtu.be/5WECCkR8_SE (QR code 15)	He became quite a celebrity when he broke a bus wind shield at the end of 2016, where a passenger captured the activity on a mobile phone camera. In the video, the passengers in the bus blame a car behind them for horning and scaring him, since he was not aggressive.
02/06/17	https://youtu.be/B4J07wUBhvw (QR code 18)	He was also amazingly unfazed by fire crackers and refused to be chased by people - he would always go wherever he wanted to go no matter what people around tried. Even when fire crackers are burst under his face, he keeps moving in the direction he wants to and does not turn back.
--	--	Generally he was peaceful, and no one thought he was a problem. All through 2016 and 2017, he was seen almost every week, and moved across an area of only about 50sqkm, which is very small, and that too in a human dominated landscape. Then in February 2018, he moved about 30 km to the south east into a new area - O'Valley, where the people had never seen elephants like him - unafraid of people and seen all through the day. There was generally a fair amount of confusion almost every day, with large numbers of people flocking to see him.
12/03/18	https://youtu.be/V7j_rf49Wfw (QR code 19) https://youtu.be/UasEbp5ZB4g (QR code 20)	He fell ill/was injured and couldn't move for two weeks, so was looked after (medicated, fed and watered) by the forest department field staff till he recovered.
11/04/18	https://youtu.be/Tf-ECITfzzI (QR code 21)	With pressure from the public, who didn't know how to deal with an elephant like him the efforts to chase him away became more intense: with louder firecrackers being thrown at him on a daily basis.
16/04/18,	https://youtu.be/PaQPfD7i3cc (QR code 22) https://youtu.be/AWJ-HE4jIsA (QR code 23)	His behaviour changed, becoming more aggressive. He intentionally charged at the rapid response team vehicle and for the first time even charged at people. The protests against "elephant problems" (beyond just Ganesan) in O'Valley are rising sharply, and he now arguably poses a threat to people unlike before when he was in Cherambadi. The calls to capture him are intensifying, and what will happen in the future is unclear.

Table 19: CMK1/ Ganesan's changing behaviour

4.4 Conclusions

In answering my research question “*How does the diversity in elephant behaviour influence the sharing of space with humans?*”, we have gained significant insights into the lives of the Gudalur elephants *in situ* and *in vivo*, which are useful in better managing the human-elephant interface in particular landscape of dwelling.

In terms of methods, we have attempted to look outside the traditional tool-kit used by the natural sciences, to find ways in which information on elephants could be crowd-sourced, including a range of local stakeholders in the process of research. With this, combined with the innovative use of technology, we have shown that it is possible to collect “data” that is verifiable and replicable, and able to fulfil some of the characteristics of the more traditional methodologies of the natural sciences, while answering a much wider range of questions about intra-species variation. The methodology aligns closely with the Nowotny et al. (2003) definition of “Mode 2” science that is “*socially distributed, application-oriented, trans-disciplinary, and subject to multiple accountabilities*”. The very process of conducting this research has had a significant impact on the field staff who worked with us, who now feel they know their elephants better, and are better informed to make decisions. While this work in Gudalur continues, we hope to also expand to neighbouring regions, allowing for a more “bottom up” approach to understanding and managing the human-elephant interface.

More specifically answering my question of the diversity among elephants:

- At a population, the Gudalur elephants are different from the elephants living in more intact habitats at multiple levels.
- The demography of the Gudalur elephants consists of an unusually high proportion of young males, and in the female led herd there are a proportionately higher number of calves and young adults, with almost no old adults and very few sub-adults. This demography, seen in conjunction with reports from the field staff, seem to suggest that a number of young elephants have “recolonised” this landscape about eight years ago, and young males seem to be moving in from the surrounding more intact forests. This would benefit from further research.

- The home range of some of these elephants is smaller than anything described in the literature, with 52.3 and 29.3 km² for a male and female led herd respectively. Further, the actual area of natural vegetation for the female led herd is only about 8 and 6 km². The remaining area is plantation and semi-urban landscape. How elephants are able to use the area or why they choose to live in such areas warrants further study.
- The lives of these elephants are completely unlike what is assumed to be the “natural” baseline for elephants, where they live in a highly modified landscape and interact with people on a very regular basis. Their behaviour does not appear to be overly influenced by people, continuing with “natural” activities like feeding and sleeping even with a large number of people around.
- At an individual level, while elephant individuality and “personality” has been studied before, this is perhaps the first time that this is examined in terms of their interaction with and reaction to people. We have demonstrated that there are varying behavioural types at play. About 72% of the elephants in the region are either not seen often, or if they are they stay (relatively) further away from human habitation (which the literature arguably would describe as “natural” behaviour). These elephants do not significantly interact with people and are not likely to be responsible for fatal encounters. A further 9% of the elephants seem to exhibit very unusual behaviour in that they appear very calm and composed, and do not show any signs of aggression towards people even where there are a large number of people around and the elephants are being troubled or even chased by people. And finally about 18% come close to human habitations regularly, and are uncomfortable around people and show signs of aggression towards people. This minority is most likely responsible for the majority of the human fatalities in the region. These consist of 11 individual males and one female led, and it is possible formulate plans of how to deal with each of these individuals differently, and work along these lines is underway.

All of these points have clear implications for both the human and elephant stakeholders in the region and in better managing human-elephant encounters. I engage in a deeper discussion around this in Chapter 6 on managing the human elephant interface, but briefly mention some of the implications here.

I have showed that a number of elephants are resident in Gudalur throughout the year, while it was earlier assumed that the Gudalur region acted as a corridor, and much of the narrative around reducing HEC revolves around the maintenance of forested strips between larger, more intact forest blocks. But we have found that they may be able to adapt to and live in human dominated landscapes reasonably well (with good body condition scores), questioning some of the assumptions about elephants preferring intact forest habitats (Menon et al 2005, 2017).

The very small and unusual context of the home range and their behaviour being unaffected by people perhaps points to a process of “adaptation” by the elephants. As human and elephant numbers increase, it is perhaps inevitable that they will have to share space at higher densities. The general narrative in the conservation literature is that this is going to lead to increased “conflict” on account of competition for resources, and assumed inherent incompatibility between the species interacting with each other. But these elephants appear to be learning how to adapt within a human modified landscape, and use a comparatively small amount of space without direct conflict over resources. It also appears that these elephants exhibit further adaptation in their behaviour, where they are able to continue with more “natural” behaviour even with people around them. At the individual level, some elephants exhibit significant habituation, where they seem to never show signs of aggression towards people. This could also be seen as an adaptation to living alongside people.

Finally on individual behavioural categories; I have shown that (1) some clear categories do exist, and (2) only a small percentage of the elephants are responsible for a disproportionate number of human deaths in accidental encounters. The immediate implications of this in terms of management relates to the highly controversial capture of “problem” elephants. In Gudalur and many other areas of shared space, there are invariably a few well known individual elephants - Ranga in Karnataka⁶⁸, Munnar Padayappa in central Kerala⁶⁹, Bharath SI⁷⁰ in Wayanad/North Kerala, and Madukarai Maharaj in

⁶⁸ <https://www.thehindu.com/news/national/karnataka/tamed-ranga-may-help-capture-other-troublesome-elephants/article19181990.ece>

⁶⁹ <https://www.thehindu.com/news/national/kerala/the-curious-case-of-elephant-padayappa/article6776986.ece>

Coimbatore/Tamilnadu⁷¹. These individuals become representative of all elephant related problems, and as problems escalate, these individuals end up getting captured. But as we have shown in Gudalur, these famous individuals are relatively more peaceful, and usually not responsible for the human deaths, and capturing these older males could possibly create instability within elephant society, leading to further complications and potentially more negative encounters between people and elephants.

The longer term and potentially interesting element of personalities and behaviour type, is perhaps how elephants change over time and move from one category to another. If we are able to better understand how elephants learn and adapt, “mitigation measures” could be based on elephants’ personality type, including ideas about their cognitive processes and aimed at changing elephant behaviour rather than just keeping elephants out. This opens up some interesting possibilities for interspecies communications, where the human response could potentially help elephants to be less aggressive and allow for a more peaceful sharing of space.

⁷⁰ <https://www.thehindu.com/news/national/kerala/Rogue-elephant-captured-in-Wayanad/article16676100.ece>

⁷¹ <https://timesofindia.indiatimes.com/city/coimbatore/Madukkarai-Maharajs-reign-comes-to-end/articleshow/52827222.cms>

5. Living with Elephants

In the previous Chapter I highlighted the diversity among the elephants in their interactions with people, and in this Chapter I do the same for people - “*How does the diversity in human attitudes influence the sharing of space with elephants?*” As I have described in Chapter 3, Gudalur has witnessed a series of migrations into the region over the last century, as plantation labourers and peasant farmers. There are also five indigenous groups, some being hunter-gatherers and others settled agriculturalists, both of whom also interact with elephant very differently. All of these people are clearly very different from each other and in how they interact with elephants, but all of the “HEC mitigation measures” locally, nationally and internationally assume all people are the same.

While the mitigation measures on the ground assume all the people to be the same, the conservation literature is showing a growing interest in the diversity in people’s attitudes and tolerance to wild animals. As I have described in Section 2.2.1.2, this is one of the most significant themes in the contemporary conservation literature around “human wildlife conflict” (HWC). Using the quantitative approach, it has been established that people’s tolerance and the probability of retaliating after a negative interaction was linked to a range of complex factors such as social beliefs and peer group norms (Dickman 2010; Gangaas et al. 2015). “Intangible costs” are found to be more important in tolerance rather than more tangible costs like economic loss or extent of damage by wild animals (Kansky and Knight 2014). There are also complex mathematical models constructed to predict an individual’s tolerance to wildlife based on a range of variables including a score for empathy (Kansky et al. 2016). The limitation in this literature is the inability to move beyond the mechanistic understanding of tolerance or the variation in how people interact with animals, and engage with deeper questions around diversity in human cultures from different disciplinary perspective. Anthropologists have been discussing indigenous world views and animistic beliefs about animals as “other-than-human” persons for over half a century (Hallowell 1960) and this clearly is relevant to how people and elephant interact, but is not a part of the conservation narrative around HWC. It is common knowledge that people are all different from each other, and the regression models from the articles above establish correlation between tolerance and a complex array of factors that vary across time, space and context. But the models fail to better understand causation, or to explain

what actually makes some people more tolerant than others. In this Chapter I engage in a deeper, largely qualitative exploration of the diversity among the people who interact with elephants, engaging with anthropological ideas around how people interact with their environment.

I start this Chapter with a range of grounded descriptions of people's varied beliefs, perceptions and interactions with elephants, then briefly describe some earlier quantitative work on understanding "tolerance" to elephants and how this varied across ethnic communities, and then undertake an in depth qualitative description of the each of the different communities and their interactions with elephants, and finally look at how this can be categorised to have a more nuanced understanding of the diversity among the people who share space with elephants and how this can be used to minimise the differing negative impacts elephants have on different groups of people.

5.1 Conflict and coexistence

I had heard about the Kattunayakan village that had no elephant problems, and visited to see if I could talk to some of the elders about what made them different from the other villages. They are a hunter-gatherer community known for being closely linked to the forests and shying away from "development", which I describe later in this Chapter.

"We have no problem with these elephants. We know them, and they know us. Every year we do pooja for 'Aane devaru'⁷², and ask them not to disturb our village. They listen to us. They don't come and trouble us here even though there are lots of jack fruit trees, but all the other people in this whole area have lot of problems with elephants."⁷³

72 While literally translating to 'elephant god', the phrase is more nuanced in the Kattunayakan context, relating to their animistic relationship with elephants and other 'nonhuman persons', which is discussed in more detail later in this Chapter.

73 Details around how quotes are used is discussed in the methods Section of Chapter 2. This quote and the next are from October 2011.

But assuming all the Kattunayakans are the same in their beliefs and interactions with elephants is simplistic, where a few weeks later, talking about this in just the neighbouring (also Kattunayakan) village of Gulimoola, they were less sure about elephants as “other-than-human persons” with various changes at play:

“There is no Aane devaru here anymore. They have all gone to other forests. These are all different elephants and we don't know them. They just come through the village all through the year, and have no respect for us. Nothing serious has happened so far, but it's getting very dangerous. Only last week my uncle and his family had to run away from their house to escape the elephants. The only thing left to do is put up electric fences or trenches like the chettans and kakas⁷⁴. What else can we do?”

But the hunter-gatherers and other indigenous groups are a small minority in the region, and the agriculturalist immigrants arguably face a lot more trouble, which is highlighted at a regional meeting on reducing “human-elephant conflict”.

“We urgently need better protection from the elephants. The forest department is not doing anything to help us. A poor family invests all their savings, taking loans against their gold to plant a few acres of bananas, and in just one night their whole life is destroyed by elephants. We don't even get compensation from the Government since we don't have patta⁷⁵ for the land. We have had many protests demanding that proper trenches and electric fences are built to keep the elephants inside the forests, but no one is listening.”⁷⁶

But a Bettakurumba leader (another hunter-gatherer tribe) almost immediately has a counterpoint at the same meeting:

⁷⁴ Both groups were of immigrants from the neighbouring state of Kerala.

⁷⁵ 'Patta' refers to a legal title deed for the land. Many of the immigrants do not have this, with contested land rights being a key part of the problem, highlighted in Chapter 3.

⁷⁶ The local Panchayat (local self-government) ward member, representing a region dominated by Malayali immigrants, June 30th, 2013.

“No matter what you do, elephants will come to eat bananas. No matter how big your fence or how deep your trench, if not today or tomorrow, the elephants will break it and come sooner or later. Even if there is only one Mudumalai Tiger Reserve, the forests and elephants are everywhere. You have to stop planting bananas, that is the only option. Because you plant bananas there is more risk for everyone in the area. You must stop planting these things that elephants like to eat.” - at the same meeting with Government officials described above.

A higher ‘tolerance’ is perhaps expected from traditional hunter gatherer communities (like the Bettakurumbas and Kattunayakans), since they do not engage in significant agriculture, with no “competition” over resources in the traditional framing of “human-wildlife conflict”. Sri Lankan Tamil repatriates, another migrant group, like the Malayalis, also view elephants as a constant and growing threat:

“You have to help us somehow. We live in constant fear. Elephants never used to be here before, but in the last few years they are always here. They come at night and break down houses. We can't go out to the toilet in the morning without fearing for our lives. We can't come back to our houses from the bus stand if it gets later than six in the evening. More and more people are getting killed every year. Either the government should give us land somewhere else or they should chase all these elephants back to Mudumalai” - Sri Lankan Tamil from the O'Valley region. 10th October, 2013

The settled agriculturalist indigenous groups, who have arguably always had competition from elephants over their crops, have a more nuanced take on the elephants and why the problems are increasing:

“Growing paddy is very difficult. We have always had problems with elephants. In the old days there was no other choice, we needed the rice to eat. We had various bell systems to warn us when elephants came. Then we would all get together and beat drums and chase them away. Now people can't take that much trouble. If the elephants come and start eating the paddy no one comes to help. Children will not want this hard lifestyle. Once they go to school and college they will not come back to this. They will get good jobs and move to other places.”

“In the long term we will have to do something about elephants. Once my son grows up he may want to buy a motorbike. Then we will need a road here and that won't be good for the animals. And it's dangerous as well, people on bikes get killed by elephants quite often we hear.”

Wildlife activists and the forest department have their own take on the problem, laying the blame largely on the people in the region:

“These people have all destroyed the elephant habitat, and now they claim that they have problems with elephants. All of Gudalur used to be pristine forests before all the encroachers came in and destroyed it. The elephants have no forests left to live in or food to eat. Of course they will have problems with the people. We need to evict all the encroachers and let the forests grow back and elephants roam freely. Only then all this human-elephant conflict will stop” - a senior forest official when discussing elephant research in the region.

Plantation owners and managers have yet another view of the elephant problem and what needs to be done:

“Ah yes, elephants. As if the tea industry didn't have enough trouble already! Elephants living on our estates is a growing concern, but I have to say it's not yet a very serious issue. Some of the labour lines and living quarters have needed electric fences around them and we have to be careful about moving around in the evenings. We have to also sometimes chase elephants out of certain plots or move labourers to other plots, but it's all still manageable. There is no real damage to tea – a few bushes get trampled from time to time, but nothing significant. What the future holds I don't know though. If elephant numbers keep going up there will be a lot more trouble, and I don't see what can be done. You guys⁷⁷ have to start thinking of things like contraception for elephants, I hear they are doing it very successfully in South Africa”.

⁷⁷ The quote is from a discussion about what the problems with elephants were and what needed to be done in the future, and 'you guys' broadly refers to the wildlife conservationists in the region.

There are also the smaller family owned tea estates, and their opinions about elephants vary widely:

“What is this nonsense about coexisting with elephants? All you people talk big about saving elephants, but who will save the people? What will you tell the mother of the boy who got killed by an elephant last week in Pandalur? Elephant numbers are increasing everywhere – you know this well yourself – but still you all keep talking about saving elephants. From British times rogue elephants that attack people have been killed, and we should continue to do so. Elephants will never go extinct or anything” - a small estate owner, at the Gudalur Cosmopolitan Club in a discussion about the elephant problem.

“Don't listen to all these people, my boy. The elephants are our Gods, don't forget that. The British came and stole all this land from the elephants and killed so many of them. Now the elephants are just coming back to their ancestral homes. They have every right to be here, irrespective of what all these people say. This land first belongs to the animals. You must make sure people all understand this, and at the very least allow the elephants to come through their lands. They have no problems with elephants, they are just small minded.” - an 80-year-old woman who lives with her daughter and son-in law on their estate, at the same meeting as above.

“I keep our gate locked during the day to keep unwanted people out. But I leave it open at night, to allow the elephants to move in and out, without having to knock the gate down! .. The herd comes right up to the veranda. Last week, there were seven of them, they ate up all the flowers, but didn't do any other damage. They are actually very peaceful animals if you don't trouble them.” - Another family who regularly has elephants visiting their lands.

“We do have considerable damage from elephants on the whole, but actually we are quite proud of it. Whenever relatives and friends come over, we walk them through our estate and show them all the signs of where the elephants have been and what they have done. It's all part of this estate life.” - Another small estate owner.

The people who share space with elephants are all clearly very different from each other in a number of ways, and this diversity in views manifests itself in people's attitudes towards and interactions with elephants. Individuals carefully negotiate interactions with elephants based on their varying perceptions, beliefs and experiences. Making sense of this diversity, and understanding "tolerance" towards elephants is a useful first step in allowing for a more nuanced approach to reducing the negative impact and interactions between elephants and people and allowing for a more peaceful sharing of space.

Through this Chapter, I first briefly describe my MSc thesis, where I used a quantitative approach to understand how people in the region differ from each other in their "tolerance" of elephants. For this thesis, I then use a qualitative approach based on ethnographic fieldwork, to understand the varied human beliefs, ideas, practices and interactions with elephants across the different communities in the region and how this can be relevant for a more peaceful sharing of space.

5.2 A quantitative approach to human diversity

To examine the diversity in people's attitudes to elephants, I used a questionnaire survey across 250 respondents with seven statements to measure tolerance in the local context, relating to acceptable levels of disruption to daily activities, crop/property damage and even accidental human death. This was then compared against a range of other explanatory variables in the Table 20 below (Thekaekara 2010).

<i>No.</i>	<i>Variable</i>	<i>Coding</i>
1	Gender,	Binary; 0/1
2	Occupation	Nominal; 1-4; 1 – agricultural labourer, 2 – Both agriculturalists and labourer, 3 – self-employed agriculturalists, 4 – non-agriculture
3	Education Level	Ordinal; Ranked 1-4
4	Income	Ordinal; Ranked 1-4
5	Area of land holdings	Ordinal; Ranked 0-4
6	How wildlife-conflict prone the crops were	Ordinal; Ranked 1-4; 1 - no land, 2 – tea/ coffee/ pepper, 3 - tapioca/ginger/tubers, 4 – paddy/bananas
7	Use of forests	Ordinal; Ranked 1-4; 1 for none, 2 for firewood, 3 for forest produce for own consumption, 4 for forest produce for sale
8	Perceived frequency of interaction	Ordinal; Ranked 1-4; Unequally spaced classes with Elephants and Wild Boar
9	Perceived frequency of conflict	Ordinal; Ranked 1-4; Unequally spaced classes with Elephants and Wild Boar
10	Ethnic community	Ordinal; Ordered according to Kruskal Wallis ranks for tolerance

Table 20: Coding of variables for model for individual's tolerance to wildlife

This quantitative approach to understanding tolerance was useful in establishing that (a) the cultural variable of “ethnic community” was the most important predictor of tolerance rather than a range of other social and economic factors and (b) there was a statistically significant variation of tolerance among the different communities (Figure 21 ahead). This was a useful starting point, but from the perspective of sharing space, what was more relevant was how tolerant all the different communities in the region were, and what elements of their cultural or ethnic identity made them tolerant to elephants.

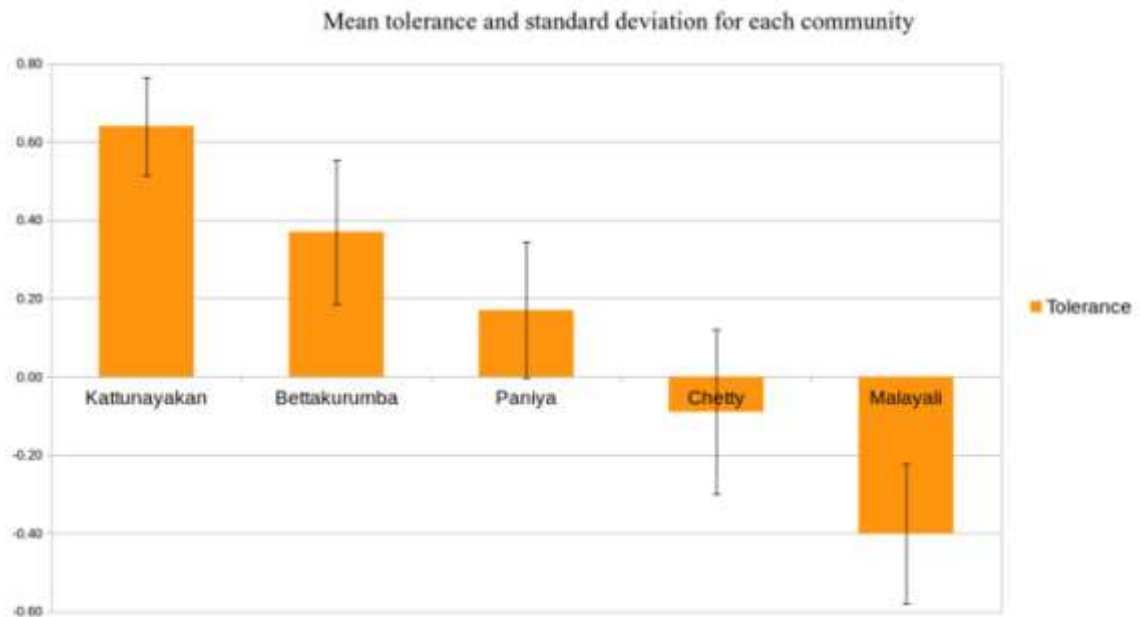


Figure 17: Mean Tolerance scores for different communities

This deeper engagement with the underlying values and beliefs that led to people being more tolerant was beyond the scope of a questionnaire survey, and over the last four years I have used a qualitative approach to explore this diversity further. Probing these underlying questions is a significant challenge; the dominant narrative, that the presence of elephants outside protected areas is itself a problem, is well entrenched. The starting point of all conversations locally, even with “tolerant” individuals is the problem faced on account of elephants, and any superficial engagement with the issue will reinforce this dominant narrative of significant and growing “HEC”. Positionality in all of the discussions I engage in with the local people become particularly relevant. The key question I probe is therefore what are the long-term solutions to reducing the negative impacts elephants have on people, attempting to quickly move beyond describing the problems faced on account of elephants.

In the next Section I discuss the relationship that various communities have with elephants (and more broadly nature) at some depth. I start with the history of the community and their interactions with the landscape, and then move on to their interactions with elephants.

5.3 A qualitative approach to human diversity

A description of the history, and an anthropological description of the cultural and ethnic diversity should arguably be relatively straightforward given that:

"...it would be no exaggeration to assert that the Nilgiris district has been more closely and thoroughly studied by more anthropologists, throughout the entire history of their discipline, than has any other district in Southern Asia, or perhaps anywhere." (Hockings 2008:2)

But despite the large body of work in the region, the cultural diversity has almost been too immense for colonial era anthropologists to meaningfully and systematically organise, where Paul Hockings again satirically highlights the problem:

"... district with an enticing variety of tribal people – hunters, foragers, pastoralists, swidden farmers, sorcerers, peasant farmers, mahouts and so on..."

It is no surprise then that what was done was too often biased, amateurish and generally of poor quality: missionaries, officials, travellers and army officers were the ethnographic authorities of the day.. (Hockings 2008:1-2)

The majority of the early anthropological writing was limited to the study of the more “exotic” four groups in the (elephant free) upper plateau of the Nilgiris - the *Badagas*, *Todas*, *Irulas* and *Kotas* (Nurit Bird-David 1994), with very little written about the people of the Gudalur region (referred to as the Gudalur-Wyanaad plateau in colonial literature). The basic classification of the people living in the Gudalur region is unclear, where even contemporary literature studying ethnobiology in the Nilgiris (Rajan et al. 2002) or claiming to provide an “anthropological perspective” to community-based conservation (P. N. Anderson 2001) confuse the different ethnic groups in the region, making describing the communities somewhat challenging.

Using early anthropological literature also poses the problem of the highly racialised and colonial narrative of the time:

"The Cad Curubaru are a rude tribe, who are exceedingly poor and wretched. In the fields near the villages, they build miserable low huts, have a few rags only for clothing, and the

hair of both sexes stands out matted like a mop, and swarms with vermin.” Buchanan (1807), reproduced as an authoritative source in Thurston and Rangachari (1909).

“These savages live in the forests, but have no fixed abode. After staying for a year or two in one place they move on to another . . . There they sow small seeds, and a great many pumpkins, cucumbers, and other vegetables; and on these they live for two or three months in the year . . . During the rains these savages take shelter in miserable huts. Some find refuge in caves, or holes in the rocks, or in the hollow trunks of old trees. In fine weather they camp out in the open . . . Roots and other natural products of the earth, snakes and animals that they can snare or catch, honey that they find on the rugged rocks or in the tops of trees, which they climb with the agility of monkeys; all these furnish them with the means of satisfying the cravings of hunger. Less intelligent even than the natives of Africa, these savages of India do not possess bows and arrows, which they do not know how to use. (Dubois 1897:76)

But these early writing do also provide some interesting insights into people’s relationship with elephants, and I therefore, cautiously, use descriptions that I think are meaningful. I also rely significantly on my own background of working closely with these groups over the last decade to chart out the history of the each of the communities, and use quotes from my ethnographic fieldwork to understand their interactions with elephants.

Before going into a detailed ethnographic description, a brief overview of the communities is perhaps a useful starting point, provided in the Table 21 below.

<i>Community</i>	<i>Indi- genous</i>	<i>Tribal</i>	<i>Subsistence Mode/ Occupation</i>	<i>Legal Land Owners</i>	<i>Interac- tion with Elephants</i>	<i>Approx. Pop- ulation</i>
Kattunayakan	Yes	Yes	Traditionally Hunter-Gatherer (HG) and now occupied in wage labour, but still most forest dependent of all the tribes.	No	High	Less than 1%
Bettakurumba	Yes	Yes	Traditionally HG, now also occupied in wage labour, with a number of them working for the forest department, particularly as mahouts.	No	High	1%
Paniya	Yes	Yes	Also traditionally HG, but now mostly occupied in wage labour	No	Moderate	6%
Mullukurumba	Yes	Yes	Settled agriculturalists (SA), with a significant number of them currently employed in Government jobs.	Yes	Low	Less than 1%
Chettys	Yes	No	SA, now also involved in small local businesses	Yes	Moderate	10%
Malayalis	No, arrived 1940s onwards	No	Agriculturalists, though mostly growing cash crops, with the educated younger generation moving to urban centres.	No	Low	17%
Srilankan Repatriates	No, 1980s onwards	No	Wage labourers and small-scale cash crop farmers	No	Moderate	35%
Early Planters	No, 1900s onwards	No	Tea/Coffee plantation owners and workers, again with younger generation mostly in other parts of the country/world.	Yes	High	30%
Forest Department	No	No	Government employment and temporary residence in the Nilgiris.	N/a	High	n/a

Table 21: Summary of all the communities living in the region

With this overview, I next engage in a deeper discussion of the history of each of the communities, particularly in terms their shared history with elephants, and also describe their current interactions with elephants, with a focus on the varied beliefs and practices in their interactions with elephant and the varying levels of tolerance.

5.3.1 Kattunayakans

Kattunayakans are the most forest dependent of all the communities, as is described by their name; Kattu (forest) Nayakans (rulers). They have stayed away from most of the ‘development’ schemes run by both government and NGOs in the region, and are largely landless, with most of their villages located at the forest fringe. Working occasionally as

wage labourers for both the forest department and local land owners, they also still routinely collect wild food and forest produce for consumption and sale.

They have been the focus of most of Nurit Bird-David's work (1990, 1992, 1996, 1999, 2006), continued by her student Daniel Naveh (2013, 2014), and some of the current anthropological ideas around indigenous communities' "alternative world views" and epistemologies are arguably based on the Kattunayakans. Given that they have been so extensively written about, I include significant ethnographic description from Bird-David and Naveh's work along with my own field work.

They have remained the most isolated and forest dependent of all the indigenous communities, with other communities wary or even afraid of them. This fear includes some links to their shapeshifting ability described by Thurston and Rangachari (1909:177):

"Some Nayakas are credited with the power of changing themselves at will into a tiger, and of wreaking vengeance on their enemies in that guise."

This fear even persists in to more recent times; traditional Paniyas and Bettakurumbas still believe they would "die of chest pain" if they entered a Kattunayakan house. Arun, a Kattunayakan student in the school I taught at from 2006-2008 and who now works for The Shola Trust, was very slight as a boy, but never got bullied since he "could spit over his left shoulder, utter some chants, and his very powerful grandmother would make whoever was fighting with him immediately fall sick" (as narrated by Ramesh, Arun's classmate and a colleague at The Shola Trust).

Their interactions with other communities was largely around their knowledge of forests; Ursula Münster (Münster 2014) also examines how been co-opted by colonial and post-colonial governments for their expert environmental knowledge, despite being stripped of their rights and access to forests. Buchanan (1807) talks of how farmers hire them to protect their crops, particularly against elephants:

"Their manner of driving away the elephant is by running against him with a burning torch made of bamboos. The animal some-times turns, waits till the Curubaru comes close up; but these poor people, taught by experience, push boldly

on, dash their torches against the elephant's head, who never fails to take to immediate flight."

Though perhaps exaggerated, this snippet does indicate that the Kattunayakans (who Buchanan calls the "*Cad Curubaru*", presumably an older and anglicised version of Kadu Kurumba), were considered more attuned to elephants and wild animals than other settled communities.

More contemporary work, particularly by Bird-David and Naveh, also provides interesting notes on their relationship and interaction with elephants. Their understanding of an elephant as a nonhuman person is well articulated:

"Nayaka described some elephants as 'devaru'. They did not apply this word to all the elephants...because of their assumed, shared, inert 'elephantness'. Rather, Nayaka used the word for specific elephants, in particular situations...characterized by immediacy not just in the physical sense of close distance, but in a social-phenomenological one." (Naveh and Bird-David 2014:60)

This is further elaborated with examples; an elephant that carefully walks between houses without damaging them and being respectful towards people, or one which you can "look straight into his eyes" and "communicate with non-verbally" is "aana-devaru", but an elephant that breaks houses, behaves unpredictably, or where there is no mutual engagement, is just an ordinary "aana" (Naveh and Bird-David 2008).

There is also an understanding of elephants having "idiosyncratic" personalities, and much of their behaviour is attributed to this as described by Bird-David and Naveh (2008:65):

"There are good budi (olle budi) elephants and bad budi elephants. When we walk in the forest, if there is an elephant with good budi the elephant makes noise to make us know he is there. If there is bad budi elephant the elephant is not making any sound, just wait silently. When you get near, this elephant attacks."

There is an understanding of elephant emotions as well, which allows them to be more accepting of elephants killing people. Bird-David and Naveh (2008) describe an incident when an elephant killed a person in the village, but still the others in the village did not agree to help the forest department capture the elephant and take it to Mudumalai, since the reason it killed a person was that it was angry and upset the forest department had previously captured the same elephant's partner/companion elephant.

Kattunayakans often talk to elephants, particular the “devaru” elephants that they relate to, as nonhuman persons, again from Bird David and Naveh (2008:63):

“One October night in 2003, elephants entered KK [[the village]]; they trampled one of the huts, walked through the wetland paddies, and started to eat banana plants. While doing so, they also emitted loud bellows that were heard all over the village. One man went to about eight meters from where the elephants were standing, a distance that, should the need have arisen, would still have enabled him to run away. From there he approached the elephants boldly. In a typical blaming tone he said:

‘Seri [in this sense ‘ok’], if you want to eat, you silently eat and go. We have children here!’

The elephants, then, stopped bellowing, and a few minutes later went away, out of the village.” (2008:63)

“When a Nayaka finds himself in front of an elephant, he prefers to stand still and, as calmly as possible, to address the elephant in a persuasive tone of voice (characterized both by the tone and by the substance):

‘I am not coming to disturb you, or to do any harm to you.’

The most frequently used rhetoric in such cases stresses what is common to both sides of the encounter:

You are living in the forest, I am also living in the forest; you come to eat here, I am coming to take roots (fruits, fire wood, etc.) ...I am not coming to do any harm to you.” (2008:63-64)

Based on these descriptions, some simple generalisable observations about the Kattunayakans and their interactions with elephants are perhaps useful. They have always distanced themselves from some of the other communities in the region and still retain the strongest links with the forests, and consequently have a long shared history of living with elephants. While there are numerous changes at play in the landscape, they still appear to have less trouble with elephants than most of the other communities, partly on account of

their non-agricultural and non-competing mode of subsistence, but also on account of deeper cultural beliefs and values. There is a general belief, both among the Kattunayakans and the other communities that they are closely connected to the animistic or spirit world, and are therefore better equipped to deal with wild animals. The most relevant however, is their understanding of elephants as other-than-human persons. They relate to particular individuals rather than the species as a whole, and believe they are able to communicate with and maintain good relations with these individuals. Some particular elephants are not attributed personhood, and this allows for the accommodation of the occasional breakdown in the Kattunayakan-elephant relationship. Overall, they do not envision any serious challenges in sharing space with elephants either now or in the future, despite all the changes underway.

5.3.2 Bettakurumbas

While the Kattunayakans have been written about extensively, there is almost no contemporary literature on the Bettakurumbas. In much of the early writing all the Kurumbas were grouped together, making description of this group a challenge. Thurston and Rangachari (1909) suggest that the Bettakurumbas originally lived on a mountain range called the Vollagamalai in Karnataka, which is reflected in their name Betta (hill) Kurumba, and that they represented remnant populations from the Pallava Dynasty, after its fall during the 7th and 8th century CE, where their long isolation in the Nilgiri and Malabar forested region made them "*wild and uncivilised*" (Thurston and Rangachari 1909:156).

In their own oral history however, they prefer to think of themselves as always being forest people. While the Kattunayakans have shied away from development, the Bettakurumbas have been more ambivalent; almost all the children are enrolled in schools, they routinely access Government schemes and public distribution system, and are more integrated into "mainstream society", while also retaining their links with the forest. They believe their exposure to the outside world began centuries ago; narratives around capturing and taming wild elephants are vibrant in their stories, where they insist that Maharajas depended on

them for "keddah"⁷⁸ operations, with British and Indian forest departments continuing this tradition. This is also mentioned in some of the early literature:

"The Betta Kurumbas are, I am told, excellent elephant mahouts (drivers), and very useful at keddah (elephant-catching) operations." (Thurston and Rangachari 1909:162)

"I have heard of a clever Kurumba, who caught an elephant by growing pumpkins and vegetable marrow, for which elephants have a partiality, over a pit on the outskirts of his field." (1909:163)

Even today, all the mahouts managing the captive elephants in Mudumalai, the neighbouring wildlife reserve, are Bettakurumbas, and they are also employed as guards and watchers and as guides for tourists and researchers entering wildlife areas.

In their handling of tame elephants, the Bettakurumbas are unique in that they are one of the few groups who do not use the "ankush" or the bull hook (a pointed metal hook) that is widely used to manage and control captive elephants. They sometimes carry a small stick, but communicate with the elephant mostly by moving their toes behind the elephant's ears. Each of the captive elephants is attached to one Mahout and "Cavady" (assistant) for most of their lives. With the mahout and cavady invariably being related, each elephant is in some sense a part of one human extended family, with a strong bond between elephant and mahout family. There is a well-known story of Bhama, one of the elephants in the camp rescuing her mahout Bomman from a leopard attack, and *"after driving the predator away, she carried the unconscious mahout with her trunk through a distance of around three kms to the safety of the camp."*⁷⁹

An excerpt from a discussion with some elderly mahouts in 2009 brings out a version of elephant capture rather different from the keddah operations:

"In the old days there was no fuss like there is now to capture elephants; hundreds of people and shooting the elephants with sleeping medicine and all that."

⁷⁸ A method of capturing elephants where an entire herd is driven into a specially constructed stockade or 'keddah', followed by mahouts entering the keddah on tame elephants and lassoing and separating out the elephants for individual training.

⁷⁹ <http://www.thehindu.com/2000/01/23/stories/13231087.htm>

On the correct day, the elders in the village will do all the required poojas for the spirit. Then some selected men will go into the forests, to a particular area that the spirits tell us where to find the elephants. When they see the herd they go up to them and ask some elephants to come and join us to work for the Kings. Some particular elephants would separate out from the herd and give themselves up to be caught. On their own they would come out and enter the kraal for training."

The idea of them being able to communicate with and get wild elephant to cooperate with them is also not new, and finds mention in the 1908 Gazetteer of the Nilgiris: "*Stories are told of how they can summon wild elephants at will*" (Francis 1908:156). This indicates animistic ideas of elephants as "other than human persons" capable of mutual respect and cooperation.

Some interactions between "modern" and "educated" Bettakurumbas and wild elephants is interesting. First a description from 2009; when a wild tusker visited a hospital, catering to and staffed by indigenous people, at the edge of the Gudalur town. Elephants had never been so close to the town before. It was suddenly more dangerous – for the children in the staff quarters who played outside till late evening, the staff who walked around the campus for the night shifts, patients who came and went at odd hours. Ramesh was a young boy, from the Bettakurumba tribe, who studied in the school where I taught then, and had lived in a semi-urban setting all his life with no exposure to wild life. While the usual semi-urban response would be chase the elephants away, Ramesh's reaction was slightly different. He cut all the sugarcane around his house and left in in the forests for the elephants to eat, arguing that it had got there by mistake and was stuck between the estate and the hospital, and now that it was there it was within its rights to eat all the bananas and sugarcane around, and feeding it to the elephant was arguably a better option. The entire institution adjusted to accommodate the elephant:

Kids were not allowed to be out after 6 in the evening, and were told not to make any loud noises after dark. The nurses changed the timing of the night shift from 8.00 to 6.00 so they could get inside before dark. Patients were all cautioned about going out in the night, and caution spread around to anyone who had to walk that way at night. (Thekaekara 2015:24)

Another interesting vignette is from 2014, when we were doing fieldwork in the Bandipur Tiger Reserve in the neighbouring state of Karnataka. We were mapping the spread of an invasive plant, which involved staying in remote forest department camps and walking through the forests all day in groups of three or four, and encountering wild elephants very frequently, and were charged at a few times. When we set off in groups on the second day, I found many of my colleagues (Paniya, Mullukurumba and Kattunayakan) were all practising phrases in Bettakurumba, and on enquiring about it:

“Here also we found out the mahouts are Bettakurumba. So we are learning how to talk to the elephants to tell them to go away peacefully and not charge us. In case we get attacked what else to do? Better to speak a language known to the elephants.”

In summary, Bettakurumbas are slightly more removed from the forests than the Kattunayakans, and have embraced “modernity” to a larger extent, interacting less with wild elephants on a daily basis. They have limited challenges in living with elephant on account of their non-agricultural mode of subsistence and also their alternative world views. But elephants, particularly the captive ones, are more central to their culture, with them considered the “elephant experts” by most of the other communities and the state forest department, and again ideas of elephants being other than human persons capable of mutual respect and reciprocity remain. They have a clear understanding of elephant personalities, and also relate to and interact with elephants as other-than-human persons.

5.3.3 Paniyas

The Paniyas are numerically the largest tribe in the region, also inhabiting the neighbouring districts of Wayanad in Kerala and Coorg in Karnataka. They refer to themselves as *"Ippimala Makkal"*, meaning the children of the Ippi Mountain from the neighbouring district of Wayanad. The history of the tribe is linked to slavery, with even the name of the tribe translating into ‘worker’ (Paniyan) in Malayalam. Though some refer to a *"pre-historic"* period where the tribe was autonomous, there are records from as early as the 8th century CE suggesting that the Paniyas were an enslaved community (Aiyappan 1992). Their own oral history today begins with being captured by a king and enslaved. This is also documented:

In the fifties of the last century [1850s], when planters first began to settle in the Wynad, they purchased the land with the Paniyans living on it, who were practically slaves of the land-owners.” (Thurston and Rangachari 1909 Vol.6: 58)

Practically the whole of the rice cultivation in the Wynad is carried out by the Paniyans attached to edoms (houses or places) or devasoms (temple property) of the great Nayar landlords; and Chettis and Mappillas also frequently have a few Paniyans, whom they have bought or hired by the year at from four to eight rupees per family from a Janmi. (Thurston and Rangachari 1909 Vol.6:60)

The traditional slavery evolved into a system of indentured labour under the Chettys, in which people worked for daily rations of paddy, (unhusked rice) under a one-year verbal contract, a system that appears to have persisted until 1976 (Kulirani 2003).

Given this long history of subjugation and marginalization, their relationship with nature and interaction with elephants and wild animals has received little or no attention in the literature. There is even some confusion around their basic ‘hunter-gatherer’ versus ‘settled-agriculture’ mode of subsistence.

“The word Paniyan means labourer, and they believe that their original occupation was agriculture as it is, for the most part, at the present day. Those, however, who earn their livelihood on estates, only cultivate rice and ragi (Eleusine coracana) for their own cultivation; and women and children may be seen digging up jungle roots, or gathering pot-herbs for food.” (Thurston and Rangachari 1909 Vol.6:59)

Kulirani (2003) argues that despite their long history of enslavement, the world view of the Paniyas is still that of the hunter-gatherer, where their engagement with the modern cash economy is very similar to the traditional food gathering economy. They see their agricultural labour as a form of “wage gathering” that allows them to purchase food in the immediate term, similar to the “*immediate returns*” system of hunter-gatherer communities (Woodburn 1982).

Given that the majority of the community are employed as wage labourers on other people’s lands, on the whole there is less interaction between Paniyas and elephants compared to some of the other indigenous communities, and elephants therefore do not

feature as prominently in their collective imagination and myths. But even the limited interactions offer some interesting insights.

In 2007, I was interacting with the parents of one of the Paniya children in the school where I taught. I found the grandfather had been killed by an elephant, while on the way back from a tea estate where he worked. I was not studying elephants (or people's perceptions of them) at the time, but was still curious about how the issue had been dealt with and expected significant antagonism towards the elephants. But the reaction from the man's daughter left an impression on me:

“What can be done? Nothing can be done. He has gone. What can we say about the elephant? It was going one way on the road and he was coming the other way. He got killed. It did not come after him to kill him. Such things happen. If they give compensation good, otherwise what can be done? Nothing.”

This attitude – a certain acceptance of death, particularly so in accidental encounters with elephants – was relatively widespread among many of the communities.

In 2016, almost a decade later, when it was known that I worked on conservation and research related to elephants, I was talking to the same person about elephants in the region.

“Then you were asking what is to be done! Now I have to ask what are you doing? Elephants are coming back everywhere! Growing up as a child we used to happily play around the village till late night. Even my grandparents don't remember a time when there were elephants in our village. Now no one steps out after dark, almost every day there are elephants around. Even the dogs have to be kept inside the houses. Everyone is scared, it's not like before...”

Nothing can be done. They said they will put a fence around the village, but it will break and elephants will come. We have to be careful now, that's all.”

In 2012, there was another incident when Kokila, a Paniya woman was killed. My parents have worked most of their lives with the indigenous people in the region, and knew her well. My mother wrote about it in a national newspaper:

“Mercifully, I hope, she died instantly. The elephant kicked her around like a football and smashed her into a pulp...had to collect the bits and put them into a sack...

A passionate conservationist asked me, “Did they get compensation?” The question angered me. Kokila was a lively, feisty, irrepressible woman. Panichis..are independent, proud.. She represented her people, even becoming a Panchayat [local self-government] member... She was bold and theatrical, making everyone laugh, dancing infectiously with abandon, urging everyone to join her. How do you compensate the death of such a woman? Of any woman for that matter? Can you replace the person for her family? Her children? Her people?

*.. why a tiger's life is deemed so much more important than our laughing, dancing, full-of-the-joy-of-life Kokila. A tiger's death mostly makes it to every newspaper in the country; each life is precious, counted, documented by tiger lovers in London and New York...Our Kokila will never make headlines. Perhaps the Coimbatore editions will carry an item: “Tribal woman killed by elephant”.*⁸⁰

All of these arguments are of course very relevant, but what was more striking perhaps was my conversation with Kokila’s cousin, a few days later:

“It was horrible to even see. Everyone is asking why the elephant did that.. Do you know?.. That must be a bad elephant. But what to do? Forest department said they will put a trench around the village when they get funds. But they will never get funds. Elephants are coming back a lot now.. We just have to all be more careful. Nothing else can be done really.”

The overall Paniya perception of elephants is hard to summarise, since their interaction with elephants is limited. From among the few who do interact with elephants, in comparison to the Kattunayakans and Bettakurumbas, they seem to have greater challenges in living alongside elephants, since the majority of them are involved with agriculture in some form or the other. This is also compounded by elephant populations seeming to be on the rise or their range expanding in parts of the Gudalur region, and interacting more with

⁸⁰ <http://www.thehindu.com/features/magazine/who-will-bell-the-big-cat/article3314376.ece> Kokila’s name is not changed in this instance, since it is in the public domain.

some villages in the region. But despite these challenges and the perception of the problem increasing, it is evident that they are reasonably accommodating of elephants, and seem to have accepted the idea of the inevitability of sharing space. While the idea of other-than-human persons, animistic relations and communication with elephants is not clearly evident like in the other tribes, there is still some understanding of individuality in elephants, and that violent attacks may be on account of a particular individual “*bad elephant*”.

5.3.4 Mullukurumbas

The Mullukurumbas have received almost no attention in any of the colonial era literature on the region. While there is a mention of them in the Gazetteer (Francis 1908) as a subdivision of the Kurumbas, there is no description of them at all. This could be because they are very few in numbers, limited to the North-Western part of the Nilgiris district, which was a part of Wayanad/Kerala until the reorganisation of states in 1956. And as per the Government’s Scheduled Tribes list, they are still officially all grouped together as the ‘Kurumbas’. Misra’s (1971) “Mullukurumbas of Kappala” is perhaps the only anthropological description of the tribe.

Unlike the other three groups, the Mullukurumbas are very clearly settled agriculturalists, and are also the only tribal group in the region to have title for their land, granted in colonial times. They also consider themselves superior to some of the other tribal groups; “*Among the natives of the village, the mullukurumbas are next to the Chettys socially and ritually, while the Urali Kurumbas [Bettakurumbas], Kattu Naickens and Paniyans follow in the descending order*” (Misra 1971:31), and are much more integrated into mainstream.

They are the only tribal group considered “big game hunters”, where they use large bows and arrows and even guns on occasion while the other groups at best lay traps for small animals. Much of their identity revolves around hunting, but at the same time there is little or no wildlife or forest left around them. Misra notes that in 1971 it was already three or four decades since the forests around them were changed to plantations, and their hand crafted “nari valai” (tiger net) that was an integral part of their culture was already redundant.

There is almost no overlap between elephant ranges and the current Mullukurumba settlements, and this has perhaps been the case for at least half a century. But I still include them as a stakeholder group for two reasons. First is that elephant range is now expanding, and one Mullukurumba village is beginning to interact with elephants after at least half a century. Second, a number of the forest department field staff who interact with elephants on almost a daily basis are from this tribe, and there are numerous interesting accounts of their interactions with elephants.

“..On the way back we decided to come through Ayankolly road [Cherambadi Range], so that the internship boys can see the place. When we reached Amko factory, there was Makana standing. And two staff were there Subramani ettan and one more Mullukurumba anti-poaching watcher. They were talking to the Ganesan elephant telling him to go into the forests quietly and not to stand in the middle of town, otherwise lots of people will come and it will be a big problem for him. Subramani ettan told me that this animal can understand whatever we speak to him.” A note by Ramesh, 10th May, 2016.

“We got news of elephants near Valakalady bridge [Cherambadi Range], so immediately we went to see which elephant it was. When we reached there we found lot of public were standing there, and the elephant was CMK1. So many people were all trying to see, and MK APW boys were letting the people, including children come from the road in batches and watch the elephant. We thought it was dangerous to let public go so close to the elephants, but staff said this is a very peaceful elephant, and won't attack people.” A note by Prakash and myself, 7th March 2016.

With the very limited exposure to elephants, making significant observations about Mullukurumbas interactions with elephants is a challenge, but even from the limited interactions between Mullukurumba field staff and elephants, animistic ideas of elephants as other-than-human persons emerge, where they believe they are able to communicate with elephants. But from their perspective, elephants numbers and range is expanding, causing significant difficulty in guarding their crops, but there is still limited discussion about the long term consequences of living with elephants.

5.3.5 Chettys

‘Chettys’ (also spelt Chettis) are a well-known merchant community across South India, but the Chettys of the Nilgiris are not connected to this larger group. They are considered native to the region, with colonial documents from the mid-1800s documenting their presence, but are not classified as scheduled tribes and but surprisingly little has been written of them. Thurston and Rangachari do not mention the Chettys of Gudalur at all, and neither does the 1880 Gazetteer of the Nilgiris (Grigg 1880). The 1908 Gazetteer (Francis 1908) does mention the Moundadan and Wayanad ‘Chettis’ as being distinct from the other Chettys in South India, but nothing further about them.

Their language draws from Malayalam and Kannada (from the neighbouring states of Kerala and Karnataka) and they *"probably gradually emigrated from surrounding areas throughout preceding centuries and encroached on land in the Nilgiri-Wynaad"* (Bird-David 1994:341). Adams describes the Wayanadan Chettys as the largest of the indigenous groups in the region, *"who claim to have migrated into the region from the Coimbatore area of Tamilnadu as agricultural cultivators several hundred years ago"* (1989:319). Irrespective of when exactly they moved into the region, most agree that they have been in the region for a few centuries at least, and have always been settled-agriculturalists, traditionally growing a range of millets and grains, but now largely involved in paddy cultivation in low lying areas (Krishnan 2009) and also a range of vegetables as cash crops. Although they have lived and continue to live in close proximity with the forests, they do not have a history of dependence on forest produce.

Their relationship with the other groups is noteworthy; Misra (1971:31) notes that *"The Chettys who are the richest of the whole lot enjoy the highest status locally"*, where they had the Paniyas locked into a *"bonded labour"* system that has been well documented (Aiyappan 1992; Kulirani 2003). In their own narrative however, they describe the Paniyas as respected farm hands, with the indentured system of payment in grain, where *"Even lean periods these tribes are fed by the chetty people without getting works from them"*⁸¹. While

⁸¹ <http://moundadanchetty.blogspot.co.uk/2011/>

such a benevolent take on the relationship is perhaps expected from the more powerful community, from my own observations I would agree that the relationship is perhaps slightly more mutual than other documented instances of slavery. There is no description from either community of violence that is usually associated with slavery in other parts of the world. Francis (1908) also describes certain instances where the Paniyas play important roles in Chetty ceremonies. In contemporary times there is a significant shortage of labour in the region, and the tribal communities are relatively well paid (and usually in advance) for their labour.

Of the 1000 or so Chetty families currently in the region, over 600 families live within what is now the Mudumalai Tiger Reserve, and have been fighting to be relocated out of the forests since the 1980s, even getting the High Court to instruct the Government to relocate them. The majority of them therefore, want no interactions with the forests, and many of them have abandoned agriculture while the long process of relations is under way. From the quote in the opening Section, it is also evident that most of them do not see a future for their children that is linked to agriculture, particularly when it is further strained by wild animals feeding on their crops. With their long shared history of living with elephants they are not particularly antagonistic towards elephants, and believe negative interactions are inevitable, but at the same time do not appear to have significant animistic beliefs or interactions with individual elephants as other-than-human-persons.

5.3.6 Early Planters

The five indigenous groups described above now form less than about 20% of the population, with various waves of migration over the years. The voice and political clout of the newer majority communities are now perhaps dominant, particularly around the issue of elephants and sharing space. I attempt to describe these communities as well, roughly in chronological order of immigration. The first migrations of “early planters” began in the mid-1800s, and carried on till the mid-1900s. Understanding the people in this wave is a challenge, since they do not form a single ethno-linguistic, or social group in any way, with the only common factor being the “first immigrants in to the region”, and are further divided by class – small estate owners or local elites and estate workers.

The “local elites” also do not identify as a distinct cultural, linguistic or ethnic group, and are very small in number, but form a peer group in the Nilgiris and interact regularly through social “clubs”, where English is the common language of communication. In addition, the small estate owners, this group also includes corporate estate managers, and a number of the local business people. The majority of them have established title for their land, and are not considered encroachers like most of the other newer immigrants into the region.

Despite wielding significant power locally, the unstable nature of global commodities like tea and coffee that I have discussed in Chapter 3 has produced for them a fragile and ambiguous financial status. The majority of the younger generation is moving out of the region to urban centres in India and other parts of the world, with their family estates turning largely into holiday homes. Given that elephants do not eat tea or coffee, there is no immediate threat posed by elephants to this group and their livelihood. Their relative affluence rarely puts them into direct and life-threatening contact with elephants, making them more tolerant to the animals on their land, as described in some of the quotes in the opening Section of this Chapter.

While they do not appear to hold animistic beliefs about elephants, there is some idea of individuality and an attempt to rationalise bad behaviour by elephants, and outlined from a quote from an estate owner after elephants completely destroyed a labourer’s house.

“It was horrible Tarsh. They just completely destroyed everything. ... Really rowdy elephants, we have never seen anything like this in the last 30 years. We are convinced they came from Kerala. Just the same as all these young rowdy tourist boys how come on motorcycles you know..”

The second group of migrants in the wave of early planters are the workers on these same estates. These people also migrated in from the plains of Tamilnadu and the neighbouring states of Kerala and Karnataka, with the ‘melting pot’ metaphor being a suitable way of understanding how these communities have assimilated over the years. Adams (1989) has described a strong sense of “communitas” that developed among all these communities from different backgrounds who now live together. Many of these communities moved out

of the estates where they worked (sometimes over generations) and established independent homesteads by encroaching onto unoccupied Government or forest lands.

Our interactions with these groups of people are somewhat limited, since the majority of them live in “labour lines”⁸², situated inside privately owned estates without public access. But from some of the people who have moved out we have had some interesting insights.

...about elephants, I will tell a good story. Elephants came to visit us at my daughter's wedding time. There were so many people everywhere those two days, and we were going here and there trying to look after the guests. Evening around 8 o'clock I came out of my gate and came face to face with a huge tusker. I prayed to god that my family will not have to conduct a funeral with the wedding. But I looked at him straight, and I knew I will be safe. He looked at me for a minute, and then moved back and left...Ganapathi [the Elephant God] had just come to bless the wedding.

...elephants have always been here, but now both the elephants and the people are increasing. Before we used to not see them much, they used to come and go in the night once in a way, but now we see elephants almost every other day. But what to do? We can't chase them anywhere. This is also the elephant's home. Neither us nor them can go back to our native places. This is our home now.”

This second group is clearly much more vulnerable to being in dangerous situations with elephants. Grouping them with the ‘local elites’ may appear problematic, but overall I argue that their attitude and perception of elephants is indeed similar and grouping them together is perhaps acceptable. There is a general sense that elephant numbers and range are increasing and there is likely to be more trouble in the years to come. But there is also a sense of inevitability that is accepted – neither the elephants nor the people can be displaced from the region, and there is no option but to try and live together peacefully. Relating to individual elephants does happen in some cases, where elephant where aggressive or unexpected behaviour from the elephants is blamed on elephant “culture” and linked to narratives around outsiders/ tourists.

⁸² Terraced dwellings constructed for plantations workers

5.3.7 Malayalis

“Malayalis from that [Malabar] area who were forced by population pressures to look outside for land and/or employment found the economic potential of Gudalur enticing. They might have been less inclined to migrate if the political climate were laden with a strong sentiment of linguistic regionalism; but Gudalur was looked upon as a sort of half breed by the Tamil Nadu Government, and there were few restraints to Malayali immigration.” Adams (1989:324).

The Malayali settlers from the neighbouring state of Kerala are perhaps now socially and politically the most vociferous group in the region. They occupy most of the elected positions in the local self-government, which is part of the reason that the Government of Tamilnadu looks on Gudalur as a “half breed” as Adams claims above. The indigenous groups refer to them as “Chettans” (“elder brother” referring to the Syrian Christians who arguably converted in the 1st century CE) and “Kakas” (The Muslim “Mappila” or “Moplah” community from the Malabar region of Kerala, who began conversion to Islam around the 7th century CE, through contact with Arab traders). The Malayalis moved into the region in the 1960s soon after the reorganisation of states, primarily in search of agricultural land. They are generally thought of as being hard working, ambitious, and upwardly mobile, and were quick to accumulate wealth. The Chettans were largely agriculturalists, while the Mappilas were largely traders. The latter remain mostly in urban pockets in the region, with limited interactions with elephants or wildlife, and the majority of the narrative around the Malayali immigrants pertains to the Chettans. The Mappila migration also started much earlier perhaps, from the early 1900s, some as plantation workers and also as a trickle-in of business people as more services were needed in the region.

The Chettans were somewhat unscrupulous in their means of accumulating land, which Misra describes in terms of their relations with the Mullukurumbas of Kappala: *“The Christian immigrants here are keen to possess land in and around the village. Hence they liberally lend money to the native population if the latter mortgages their land.”* (1971:32). An NGO in the region also highlights this: *“ACCORD (Action for Community Organisation, Rehabilitation and Development) was born in November 1985 out of the realisation that the Adivasis of the Gudalur Valley were being cheated and exploited... We*

started with the central belief that Adivasis had to retrieve the ancestral lands taken away from them by force and deceit."⁸³ Most of the indigenous groups lacked the concept of land ownership recognized by the state, and never attempted to get titles for the land they in their possession, and the Chettans were able to take these over with relative ease. They also occupied significant areas of government land, where they claim squatters' rights. The person who immolated himself in reaction to state evicting people (described in Section 3.3), was a Malayali. While there were significant protests about the eviction in the 1970s, Adams notes that the majority of the more long-term residents in the area *"were glad to see the current wave of squatters evicted, since they felt that if the public lands were opened to anyone, they should have the first rights of occupation"* (1989:328). This animosity between this group and the state as well as the other indigenous groups is relevant, and is something that is glossed over in much of the political ecology work in the region that only focuses on a state vs. people problem (Taghioff and Menon 2010; Karthik and Menon 2016).

This community has had no previous interactions with forests or wildlife, or a tradition of sharing space with elephants or other wildlife. Their relationship with the land is very different from most of the indigenous communities, where a Kattunayakan from Manvayal explains:

"When a Chettan takes over some land, the first thing he will do is to remove everything on it. No other life is allowed to remain. All the undergrowth is cleared, not even some grass will be left. Any snakes or small animals that come will be killed. Then he will plant a jackfruit tree. It will grow fast, and in 4-5 years it will fruit and he will be able to say that he has always been there and his father planted the jackfruit..."

Elephants used to roam on all those lands, but now they have nowhere to go or hide, and there are more problems.."

Only a small percentage of the Malayalis; the Mappilas live mostly in smaller urban centres in the region, and the majority of the Chettans do not have elephants around where

⁸³ <http://adivasi.net/history.php>

they live (discussed more in later Sections). However, a few of them do have wild elephants visiting their lands, and are very vocal in their protests about the elephant trouble. A meeting called by the Revenue Divisional Officer (RDO) in 2015 was indicative of this. The participants consisted of all the elected members of the Panchayats (Local Self Government Councils), forest department officials, and a range of local leaders, and the focus was on identifying what each stakeholder groups could do to deal with growing elephant problems.

Cherumulli Village Panchayat Councillor: "In October the entire crops of Mr. Babukutty were destroyed by elephants. He approached the range officer for compensation, but was told he cannot get it since he did not have patta. So we organised a big protest outside the Range Office, demanding compensation be paid to all the people even those without patta, since none of the people in Gudalur have patta."

RDO: "Yes, that's fine, but please talk about what you can actually do yourselves to reduce the problem."

Devarshola Town Panchayat Member: "Elephant are routinely coming into all the areas in our Panchayat, even near the town. We have sent petitions to the Collector, Mudumalai Field Director and all officials. Still no action is taken. So last month we organised a protest outside our panchayat office, with full participation from all the local people..."

RDO: "I don't want to know about protests, please share with everyone what steps you have actually taken on the ground"

Sreemadurai Village Panchayat Councillor: "The Sreemadurai area has the worst elephant problem since it is at the edge of the Mudumalai forests. We have been complaining for a long time that the local poor farmers are all struggling-"

RDO: "Yes, but please tell us about what you can do on the ground to improve the situation"

Sreemadurai Village Panchayat Councillor: "We have organised many protests-"

RDO: "Enough! I keep on saying don't tell me about protests but talk about solutions, and still you people go on saying the same thing! Thank you to all the

Panchayat members for coming for this meeting, but now I will call on the Forest Department...”

All of the above elected representatives were Malayalis, and finding ways in which they can live with elephants is not usually a consideration. Most of their focus is on getting the Government agencies to ensure elephants do not come onto their lands or offer them compensation for loss. Overall, this community has the most trouble living with elephants, and are perhaps the only community who do not see sharing space as a viable option now or in the future. There is no understanding of elephant individuality or relating to them as nonhuman persons. The future of this community’s interactions with elephant and even the long-term stake in the region is somewhat tenuous. While they have a strong attachment to the land, there does not appear to be any move by the Government to grant title. Though most of them don’t consider the possibility of leaving the region, most of the younger generation have been through university, and are moving to urban centres for employment.

5.3.8 Sri Lankan Tamils

The Sri Lankan Tamil repatriates are the final migrant group into the region, and were subjected to the largest organised yet turbulent migrations in the 20th century. The Colonial era companies took a large number of Tamilian labourers from India to Northern Sri Lanka in the late 19th and early 20th centuries to work on tea plantations, but at the time of Sri Lankan independence these communities, then at about 500 thousand people, were denied citizenship. After numerous diplomatic discussions between India and Sri Lanka, India agreed to “take back” as many of the Sri Lankan Tamils who wanted to return⁸⁴, and the rest would be given citizenship. Though labelled a “repatriation” it was closer to an “expatriation” (Bass 2013) where about 250,000 people were moved to India between 1967 and 1987, which peaked around 1980 after the brutal anti Tamil pogroms in Sri Lanka where thousands of Tamils were killed, leading to a war that lasted decades with about 70,000 people killed over the years⁸⁵. In 1992 the militant “Liberation Tigers of Tamil Eelam”, fighting for a separate Tamil state in Sri Lanka assassinated the Prime

⁸⁴ Under the Sirimavo-Shastri Pact (1964) and later the Sirimavo-Indira Pact (1974)

⁸⁵ http://news.bbc.co.uk/1/hi/world/south_asia/7521197.stm

Minister of India for his lack of sympathy for the Tamil cause, and India then sent back 50,000 Tamils who agreed to “voluntarily” move back. The fate of these people has been a significant political issue in India, with the Government of Tamilnadu at loggerheads with the central Government. Given this turbulent history, there is strong political support for the cause of the Sri Lankan Tamils in Tamilnadu. The majority of the repatriates who stayed in India were settled in the Nilgiris, where the Government converted large tracts of forests into tea plantations and set up four tea factories in Gudalur to employ them. Most of the locals saw this as a deliberate move by the Government to shift the demographic of Gudalur, from a range of immigrants (mostly Malayalam speaking) to becoming a majority Tamil population.

The socio-economic status of this community has not improved significantly over the years, and has been a constant political issue, with no support systems in place to help them cope with the trauma of movement and violence they witnessed in Sri Lanka. Over the last few decades, many of the families settled in Tea estates out of these plantations and established their own small agricultural homesteads, squatting of the disputed “Section 17” lands. Some portions of tribal lands were also taken over, largely from the Paniya tribe, but more for habitation than agriculture, and it is not seen as a widespread problem. Though they are much larger in number than the Malayali immigrants, the area of land they occupy is significantly less. While they are also considered encroachers by state bureaucracy and local ethnic groups, there has never been any attempt to evict them from the lands they occupied, with them being seen as a vote bank for both of the major regional political parties.

Given that historically they had little or no interaction with elephants, they find it particularly hard to cope, and also get no support from the state as they are considered illegal encroachers. As described in the opening Section, the majority of the Sri Lankan Tamils find it very challenging to live with elephants. But there are also minority views that are more positive.

“...I have been here for over 30 years – more than most of the other people. Things have changed a lot and the problems have increased. The number of people has increased a lot, and the elephants are not afraid as much now, and boldly walk on roads, drink water from the panchyat tanks etc. In the early days this area was like

a forest, and we used to be scared to come back in the nights. But now it is a town, and people think elephants should not be in a town, and people should be able to come and go whenever they want.

The real issue is land. Everyone is scared they will say it is an elephant corridor and throw people out. But that is also not possible. The Government only brought us to this area and didn't say anything when we started cultivating the lands.

You tell the Government to give us all patta (title deed) for the land. Elephants have always been here, and they will always be here. People will learn to adjust. This chasing them into Mudumalai is foolish, everyone knows it cannot be done.”

The majority of this community is also Hindu, who worship Ganesha, the elephant headed deity, and damage by elephants is understood in terms of divine retribution: *“The people must have done something wrong in their lives and God is punishing them. There is no other explanation”*

While the Sri Lankan Tamils have had the least exposure to elephants compared to the other inhabitants of the region, they still are not the least tolerant. There is an accepted inevitability of living with elephants among most of the people who have been interacting with elephants for a few decades, which is perhaps made easier by the religious and cultural reverence to elephants on account of Ganesha, the elephant-headed deity.

5.3.9 Wildlife People

The last stakeholder group, are perhaps the “wildlife people” who comprise largely of the forest department staff, and supported by a range of NGOs and wildlife activists. This is a very diverse range of people to group together, but I argue that they share a common view of elephants and elephant problems, and have a significant impact of the shared space. Each of the five Ranges in Gudalur has about 50-70 staff posts officially sanctioned, but about half of them are vacant, putting the remaining staff under considerable stress. In total, the forest department field staff consists of about 250 people spread across the region.

There is a distinct division within the staff in terms of temporary staff from one of the groups described above, and permanent staff hired at the state level who move around across the state and do not have a long-term stake in the region. While there is significant diversity within this group of people, they are working as a community of practitioners under a singular bureaucratic authority, and do at some levels represent a single constituency with regard to their interactions with elephants and more importantly in local politics and policy.

The NGOs and wildlife activists are a more nebulous group, with little or no real interaction with elephants on the ground. The distinction between NGO and activist remains blurred and complex. The Nilgiris has over 5000 registered trusts and societies, the majority of them relating to Wildlife and Environmental Conservation. The majority of these however, do not have funding, staff and programmes, but function more as activist groups, with their members all holding full time (usually corporate) jobs. The Nilgiri Wildlife and Environmental Association (NWEA) is an interesting example, being the ‘oldest’ conservation organisation in India. It was established as the ‘Nilgiri Game Association’ in 1877 by elite Colonial hunters who were concerned about the uncontrolled hunting, and used their positions of power to push the then “Government of Madras” to enact the Nilgiris Game and Fish Preservation Act in 1879, arguably the first “conservation” law in the country, aimed at controlled hunting. Today the NWEA consists of about 900 members with the highest-ranking government officials all enrolled as ex-officio members. They are therefore able to exert significant pressure in the policy space. Almost every local or national news article on ‘Human-Elephant Conflict’ quotes one of the local conservation groups as the expert opinion.

There is also the interesting case of “judicial activism”. Case law forms a key part of the Indian forest legislation, where even the fundamental definition of the term ‘forest’ comes from a well-known 2006 judgement from the Supreme Court of India, in the case of “T.N. Godavarman Thirumulpad vs. Union Of India & Ors.” filed in 1996, with its roots in Gudalur. This group has had a significant impact; the judgement on the elephant corridor, described in Chapter 3, banning all night traffic on highways coming through wildlife reserves (which also faced significant backlash from local people), preventing the

establishment of an international scientific observatory, to stopping the construction of a railway line through the forests.

Despite being a very diverse group of people, their overall position with respect to the interactions between elephants and people converge on some broad issues. Their arguments for saving elephants resonate with more global conservation narratives, of elephants playing an important role in the wider ecosystem, as flagship, keystone and umbrella species. While biologists often focus on the survival of the species and are not averse to the culling of individuals, for this group the rights of individual elephants is also important and they invariably oppose the capturing of any elephants.

They consider the majority of the people in the region “encroachers” who have taken over forest lands for agriculture and reduced elephant habitat. They see this conversion of forest land into agriculture as the root cause of the ‘Human-Elephant Conflict’ problem. In regular encounters between people and elephants, even in cases of people getting accidentally killed, they believe it is the people’s behaviour towards elephants that is the problem.

5.4 Categorising the human diversity

The quantitative analysis pointed to the cultural variable of “ethnic” community as the key predictor of tolerance. While generalising about an entire communities’ interactions with elephants is arguably problematic, from a policy or management perspective, some generalisation or grouping is inevitable, and I argue that “ethnic community” is the most meaningful way of doing this. From the qualitative narrative, for each of these communities I have outlined their history in relation the landscape, their current occupations and modes of subsistence, and finally their beliefs and practices relating to elephants. I have attempted gain a deeper understanding of what makes some communities more tolerant than others than the questionnaire survey would allow. I argue that there are three main cultural-ecological threads that allow for tolerance and a more peaceful sharing of space; (1) Elephant ontologies, or what each community thinks an elephant is, (2) their modes of subsistence and the varying agricultural crops types, and (3) the shared history of living with elephants. This diversity is hard to neatly classify or cluster, but I do nevertheless attempt to typify these underlying factors that contribute to “tolerance” or allow people and elephants to share space more peacefully. Any such simplistic grouping of people is fraught with generalisation, essentialisation, and subjectivity, but it is still useful to make some distinctions as a heuristic approach to understanding the diversity of human-elephant interactions in the region (Thekaekara and Thornton 2016).

5.4.1 Elephant ontologies

First, concerning the characterization of elephants, or the varied elephant ontologies. How are they conceived and their interactions with people explained? There appear to be four broad conceptualizations that emerge, where people understand elephants as (1) Other-than-human persons, (2) Gods, (3) Victims, and (4) Wild/unpredictable animals, which I briefly describe below.

First is the indigenous idea of other-than-human persons, where some individual elephants are accorded some form of person-hood, capable of mutual respect, communication and even relationships with humans, that was prevalent among the Kattunayakans,

Bettakurumbas and to a lesser extent the Paniyas. This conceptualisation of elephants allows for accepting varying behaviour in elephants based on individuality, personality and agency. Elephants are expected to behave in accordance with human values and morality, and elephants that have been wronged are expected to be angry or sad and behave unpredictably (where even killing of a person is not seen as unusual), but aberrant individuals who behave badly with no provocation are liable for punishment. This understanding of elephants is perhaps the most conducive for a peaceful sharing of space.

Second is the idea of elephants as Ganesha or Ganapati, one of the best known and most worshipped deities of the Hindu pantheon, which is prevalent among all the communities except the hunter-gatherers, the Christian or Muslim Malayalis, and the Wildlife People. Attributing divine status to elephants almost automatically implies certain reverence and tolerance. Negative encounters between people and elephants are rationalised in terms of divine retribution, and there is a certain acceptance of it. While this appears to be ideal for tolerance and a sharing of space, I rank it below the other-than-human idea of elephants, as this divine reverence does not allow for individuality in elephants. Continuous exposure to violence from elephants leads to a complete breakdown in the human-elephant relationship, since there is no room to blame or attempt to punish the elephants for wrongdoing, and elephants can then quickly become “demons”. While I did not encounter direct references to this in my fieldwork, I did sense deep antagonism towards elephants in some people, particularly the Sri Lankan Tamils, who also worshipped elephants. This duality exists in Hindu mythology; Gajasura is the “elephant demon”, and Gajasurasamhara, an avatar of Shiva, is the “slayer of the elephant demon”, who appears in Pallava and Chola art and iconography from over a thousand years ago, portrayed dancing on an elephant’s head (I. V. Peterson 1991).

The third is the idea of elephants being victims. This is very prevalent in the “Wildlife People” group in particular – that humans are expanding into and destroying elephant habitat, and forcing them into contact with people. The Kattunayakans also share this view to a lesser degree, where they see both themselves and elephants losing out on account of the large migration of people into the region. With this approach there is again limited scope to accommodate individuality, personality or agency in elephants. The underlying assumption is that elephants are passive victims not in control of their circumstances, who

interact with people only because they have been forced to do so. This idea is arguably the basis of the global narrative around conservation, but almost ironically, it is not shared by most of the communities living with elephants. While there has been a significant reduction of natural cover over the last century with immigration and growing human population into the region, elephants are also expanding their range over the last decade.

And finally, is the idea of elephants as wild and unpredictable animals. This stems from a very anthropocentric view of the world, arguably rooted in the Judeo-Christian ideology where man was created in the image of God, to “rule over the fish in the sea and the birds in the sky, over the livestock and all the wild animals, and over all the creatures that move along the ground” (Genesis 1975 1:26). Lynn White (1967) argued (in the journal *Science*) that this ideology is perhaps the root of the current ecological crisis. While this understanding accommodates all the varying elephant behaviour that is experienced by the humans who share space with them, it does not allow for elephants (or any elements of nature) and humans to be ontological equals, and there is no moral obligation to behave well or live well with animals, and killing elephants is acceptable. A version of this also perhaps exists in biology, where animal behaviour is explained more in terms instinct and stimulus from their immediate environment rather than more cognitive processes of thought and culture (Masson and McCarthy 1996).

<i>Community</i>	<i>Other-than-human Persons</i>	<i>Gods</i>	<i>Victims</i>	<i>Wild Animals</i>
Kattunayakans				
Bettakurumbas				
Paniyas				
Mullukurumbas				
Chettys				
Early Planters				
Sri Lankan Tamils				
Malayalis				
Wildlife People				

Table 22: Different communities' varied beliefs about elephants

It is evident that many of the communities ascribe to multiple conceptualisations of the elephant. While all of these different ideas around “what is an elephant” are important, from the point of sharing space the most relevant is perhaps in hunter-gatherer’s other-than-human ontology of elephants, that allows for significant mutual accommodation and variation in the behaviour of both elephants and people. This world view makes them the most tolerant, both from the quantitative regression model and from the qualitative descriptions of interactions with elephants.

5.4.2 Modes of subsistence or agricultural crop types

Another important factor that mediates human elephant interaction is the type of land use and this is very relevant in shared spaces where the people are hunter-gatherers, small scale agriculturalists, agricultural labourers, plantation owners, to traders or small business owners, with the agriculture also varying between food crops like rice, bananas or vegetables which elephants eat, and plantations crops like tea and coffee which elephants do not eat. From the “competition over space and resources” (Adrian Treves and Karanth 2003) understanding of HEC, it would appear that conflict could be grouped into three distinct categories with decreasing intensity – (1) No crops, (2) inedible crops, and (3) edible crops. Not interacting with elephants at all would imply no conflict at all, but all the communities in the region do interact with elephant in some ways.

No crops - the wildlife people, most of the Sri Lankan Tamils, labourers from the early planters, the Paniyas and some of the Kattunayakans and Bettakurumbas, all do not own significant areas of land or grow any crops themselves. This should minimise their negative interactions with elephants and be the most positive from the perspective of sharing space.

Inedible crops - the early planter who grew tea and coffee, which elephants do not consume and should therefore not facilitate significant negative interactions between elephants and people. Some of the Kattunayakans, Bettakurumbas and Mullukurumbas who have land have taken to planting tea and coffee over the last decade, partly as a means of proving their possession over the land they occupied. While the Mullukurumbas have traditionally planted rice and also plant bananas since they do not significantly overlap with elephants, the Kattunayakans and Bettakurumbas almost never planted bananas, even though they are more remunerative than tea or coffee. When queried about why they did not grow bananas, the answer from a Kattunayakan was “*because elephants will eat it of course*”. And as described in the opening Section of this Chapter, a Bettakurumba elder also voices his concern about some of the other groups planting bananas and the increased risk it poses in attracting elephants to the human settlements.

Edible crops - the Mullukurumbas and Chettys have traditionally always planted rice, and the Malayalis often grow bananas – the crops that elephant do eat, and arguably pose a significant challenge from the perspective of sharing space.

While I have been critical of the “competition for space and resources” framework being the sole approach to understanding interactions between elephants and people, it cannot be entirely ignored, and people’s basic mode of subsistence undoubtedly has an impact on the human elephant relationship and the ability to share space. How this pans out across the different communities is shown in Table 23 below.

<i>Community</i>	<i>No Agriculture</i>	<i>Inedible Crops</i>	<i>Edible Crops</i>
Kattunayakans			
Bettakurumbas			
Paniyas			
Mullukurumbas			
Chettys			
Early Planters			
Sri Lankan Tamils			
Malayalis			
Wildlife People			

Table 23: Different communities' varying agricultural practices

Again there is significant diversity, with multiple communities engaged in more than one mode of subsistence. But the most relevant aspect is that on the whole only significant “high conflict” crops are planted by the Malayalis, since the Mullukurumbas do not significantly overlap with elephants and the Chettys and very small in number and also increasingly less disposed towards agriculture for the livelihood.

5.4.3 Shared history

Finally, the shared history between elephants and people is an important factor in understanding tolerance. Living with elephants inevitably poses some challenges, and a shared history is a key element in allowing a culture of mutual accommodation to evolve. Communities like the Chettys for example, who grow paddy and have a long history of guarding their crops from elephants are less antagonistic towards elephants than the Malayali immigrants. Categorising this shared history is challenging, since even among the indigenous communities there is some debate about when they first moved into the region. For this thesis, the most appropriate classification is perhaps (1) “indigenous” communities who have been in the region for at least a few hundred years and are the best adapted to elephants, which are the Kattunayakans, Bettakurumbas, Paniyas, Mullukurumbas and Chettys, (2) communities who have been in the region for close to a century – the early planters who came into the region in the first wave of immigrations in the late 1800s and early 1900s and have now forged a relationship with elephants, and (3) communities who moved in about 50 years ago or less, the Malayalis in the 1960s and the Sri Lankan Tamils in the 1970s and 80s, who have had significantly less time to adapt to elephants.

These different conceptual and explanatory frames vary significantly among the different communities inhabiting the Nilgiris, as summarized in Table 24 below.

<i>Community</i>	<i>Indigenous</i>	<i>c. 100 years</i>	<i>c. 50 years or less</i>
Kattunayakans			
Bettakurumbas			
Paniyas			
Mullukurumbas			
Chettys			
Early Planters			
Sri Lankan Tamils			
Malayalis			
Wildlife People			

Table 24: Different communities' varying history of living with elephants

Being able to share space more peacefully with elephants clearly hinges on the shared history, and how long the people have lived with elephants is important. This varies significantly among the different communities in the region, but what is significant is that even the most recent immigrant communities have been in the region for over 30 years, and some are showing signs of being able to adapt to living with elephants.

In summary, I argue that there are three underlying drivers of people's tolerance to elephants and the ability to share space more peacefully – elephant ontologies and the very conceptualisation of what is an elephant, the mode of subsistence and kind of crops people choose to grow, and the shared history of living together. All of these vary significantly between the different communities, but “tolerance” does not vary linearly with each of them. That is communities who plant conflicting crops are sometimes more tolerant than others who do not engage in agriculture, or communities who have had a longer exposure to elephants are sometimes less tolerant than those with a shorter exposure to elephants. But from a management perspective some generalisations are required, and given the monolithic understanding of the “human” in policy around HEC, these three factors are arguably a reasonable way of heuristically understanding the propensity for people to be able to share space with elephants.

5.5 Conclusions

The overarching conclusion relating to my question “*What are the varied practices of humans that significantly shape the sharing of space with elephants?*”, is that I have shown that the people are very different from each other in their interactions with elephants, and “ethnic community” is the most appropriate way to cluster and understand this diversity. I have then described each communities’ varied history and interactions with elephants, and then identified three underlying factors that play a key role in allowing for a more peaceful sharing of space. In conclusion, I describe the implications of this diversity for policy and management of the shared space to reduce the negative impact elephant and people have on each other.

At the outset, the first problem is that none of the policy relating to human-elephant interactions recognises that there is considerable variation in how people in the landscape understand elephants, and the assumption is that all the people are impacted by elephants in the same way is problematic. Factoring this diversity into policy is a significant challenge; labelling entire groups of people with certain tags of tolerance or intolerance has very serious shortcomings – it does not allow for individual variation that always exists, or account for temporality and how individuals change over time. Nevertheless, there is perhaps room for some broad ideas that could feed meaningfully into policy.

First is that not all interactions between elephants and people are negative. The traditional idea that conflict “occurs wherever these two species coincide” (Sitati et al 2003), is clearly not relevant, and some of the newer literature (e.g. Kansky et al 2016, Inskipp et al 2015) is starting to examine the diversity in the humans, but the nuanced of the human elephant interactions are not captured in the quantified framework of the natural sciences. Positive interactions between elephants and people are ignored; there is a fascination with elephants that draws people to them even in cases of conflict that is not accounted for in the literature. While the situations I describe in this thesis only touch on this issue and focus more on diversity between people, in almost all encounters between people and wild elephants that I have witnessed, people gather in large numbers to watch, and undoubtedly gain something from the experience interacting with elephants. In some cases, there is the entertainment and “fun” in people having a night out chasing the elephants together, but in

other cases they are also just content to watch the elephants for extended periods of time. For tourists seeking wildlife experiences this is of course understandable and expected and there are even attempts to look at how much they will be willing to pay to offset the damage done by elephants (Bandara and Tisdell 2003, 2004). But I find even people who interact with wild elephants on an almost daily basis, often negatively, are still willing to invest their time in watching elephants. Tea estate workers and supervisors stop working for a while and invariably call their managers to come and join them. What to do about the elephants is almost secondary, the first reaction is usually to all stop and watch them. We routinely come across people who complain bitterly about elephants and the damage they cause, who could be classified as being highly “intolerant”. Yet, they are more than willing to spend an hour or two watching elephants with us, constantly discussing the elephants’ activities, the interactions they have had with people and their lives in this human-dominated landscape. These positive experiences people gain from elephants is almost never quantified or even recognised in all the studies on HEC.

Second is that indigenous communities, and hunter-gatherers in particular, have a very different worldview, and their relationship with particular other-than-human elephants is very useful in allowing them to live with elephants more peacefully. And given the “*remarkable consistency of animism across the world*” among hunter-gatherer communities (Praet 2013:341) it is perhaps safe to assume that this world view is common to a majority forest-based people who share space with animals. The Kattunayakans understanding of “idiosyncratic personalities” behaviour that Naveh and Bird-David (2008) describe is very similar to what modern ethologists have discovered through careful elephant behavioural studies (Srinivasaiah et al. 2012). Perhaps linked to this is that people who have been living with elephants for some time also seem to have a nuanced idea of personality and culture in elephants, where they distinguish between “good” and “friendly” elephants and “bad” or “rowdy” elephants. This is not the same as hunter-gatherers’ ontologically equal other than human person, but it still does nevertheless allow people to cope with negative interactions with elephants and allows for a more peaceful sharing of space.

Third, is that the dominant view on “conflict” may not always be the majority one. In Gudalur, most of the “Panchayat” (local self-government) positions are occupied by

Malayalis, who have the most trouble in sharing space with elephants. The dominant narrative in all local policy circles revolves around this, where it is assumed that the high level of conflict and antagonism between people and elephants is common to all the inhabitants of the region, but this is clearly not the case. Any superficial investigation into the question of human-elephant conflict will inevitably pan out like a self-fulfilling prophecy. It is only a deeper and more consistent ethnographic engagement with the issue that draws out the more nuanced picture and the significant differences in how people interact with elephants.

All “conflict mitigation strategies” therefore, must seriously consider this diversity in how humans interact with elephants before they are implemented universally across all the communities. Simplistic barriers aimed at separating out spaces or deterrents may in fact have negative consequences in the long term, making people less willing to share space. Having worked closely with policy makers and forest department managers however, how this unfolds on the ground could be a challenge. My MSc thesis in 2010 showed that indigenous groups who had a long shared history with elephants were much more tolerant than the immigrant communities who moved into the landscape more recently (Thekaekara 2010). This idea resonated well with local policy makers, and we found it being repeated at various government meetings, to the point where statements like “no tribals get killed by elephants” were routine, and every indigenous person was expected to be highly knowledgeable and tolerant of elephants, and all problems of human wildlife conflict were attributed to newer immigrants. This rigid simplification and classification is of course problematic, not allowing for individual and temporal variability; as described above, this does indeed change over time, in both positive and negative ways. And in some cases, like the forest guard at the check-post, the same person can almost simultaneously feel positive towards the species and negative towards a particular individual elephant. But policy on the issues of human wildlife conflict, almost by definition has to be generalisable to be applied at a scale of a region, district, state or even country. The only generalisable approach perhaps, is to redesign the way policy is formulated, moving it away from the top-down, expert driven approach, to being more bottom-up and community-driven. If every village is encouraged and allowed to make their own plans for sharing space with elephants, with access to the range of available technological solutions through some suitable financial instrument (subsidy, loan, rent etc.), it will perhaps create the space for a more autonomous and resilient sharing of space.

6. Understanding and managing the shared space

In the previous Chapters, I have highlighted a range of socio-cultural, political and ecological factors that are important in understanding human-elephant interactions, and then showed that both the humans and elephants are highly varied in their attitudes and behaviour towards each other. I have used an interdisciplinary, place-based approach, which has generated results important to the fields of human-animal relations studies in general, and more particularly, to the practice of conservation, where this complexity is clearly relevant to allowing people and elephants to share space more peacefully. In this penultimate Chapter I attempt to bring all of this together and ask - “*How can the complexity of human-elephant shared spaces be better understood and managed to minimise the tensions between the two species*”? I examine how all this complexity can be meaningfully integrated into policy and the management of the human-elephant shared space to reduce the negative impact these species have on each other.

I argue that one of the key problems lies in the space being conceptualised purely in topographic terms, without due consideration of the linkages within that space, and can be better understood and managed in relational or topological terms. I look at how all of the complexity I have described through this thesis can be understood as elements in a topological space, and finally be used to better manage the space and reduce the negative impact elephants and people have on each other. I map all the factors and the diversity I have outlined in the previous Chapters in the topological space, and show how they are linked to each other. I show that this more expansive, non-linear approach to understanding the human-elephant interface can help in making pragmatic decisions on the ground. I also discuss the various changes under way, and the implications of these for the future of people and elephants sharing space.

6.1 Understanding the shared space beyond “conflict”

At the outset, the first and most evident contribution to the conservation literature is around the very idea of “conflict”. There have been calls to re-frame “human-wildlife conflict”, since it is not a consciously antagonistic interaction between people and animals (Peterson et al. 2010; Peterson et al. 2013) and it is often conflict between different groups of people (Redpath et al. 2013). The need to re-frame the problem is something that I strongly re-

iterate. In addition to both of the above criticisms, the traditional conservation literature assumes all interactions between people and wild animals are a problem, even if not consciously antagonistic. This is clearly not the case as I have shown throughout this thesis; there are numerous interactions that are also positive. Disruption of lives, crop and property damage and accidental human fatalities are all “real” problems, but the more important factor in these interactions are people’s perceptions of them. This is highly varied across the landscape, where a number of people think some loss or damage by animals is inevitable, which I have discussed in detail in Chapter 5. While some communities are clearly more tolerant than others, there are numerous instances of people from across all the different socio-economic classes, ethnicities and cultures who all take time out from their lives to simply watch elephants. Even people who are adversely affected by elephants gain something from the interaction, and there is no normative idea of what kind of negative interaction actually constitutes “conflict”.

Despite the problematic framing, there are nevertheless a number of real negative impacts on the people on account of elephant interactions. These impacts could potentially jeopardise the future of elephants and people sharing space, and possibly even the long-term survival of elephants as a species. It is important to therefore understand these negative interactions within all the social-ecological complexity I have described in earlier Chapters in a way that can be relevant to the literature and practice of nature conservation. I examine how all these factors come together and affect the long-term tenability of people and elephants living together in Gudalur. Further I look at the implications of all of this for other human-elephant shared spaces and for the broader practices of nature conservation - to try and perhaps answer Caitlin O’Connell-Rodwell et al.’s (2000) question around what we are replacing the protected area paradigm with.

In the Indian context, given that 80% of the elephants’ home range is outside protected areas, and all the protected areas have people living inside them. There is a sense among most conservation practitioners, policy makers and some scientists that sharing space is inevitable – an imperative rather than an option (Narain et al. 2005; Rangarajan et al. 2010; Madhusudan et al. 2015). The protected area paradigm needs to be replaced by a more comprehensive approach that includes multiple land use types, with due consideration of

the welfare of local people (and wildlife conservation). The hope is to achieve this through a zonation exercise, and these ideas have already been well articulated and are part of policy and law⁸⁶. This zonation is discussed in some detail in the report of the Karnataka Elephant Task Force (described in Chapter 1), suggesting elephant conservation, coexistence and removal zones (Sukumar et al. 2012). But implementing these zones is challenging at multiple levels; first in the process of deciding the boundaries of these zones on the ground (within a democratic decision-making framework), and second in the management of these zones – particularly the “coexistence zone” – and the fine balance between the needs of people and elephants amidst all the complexity. This is what I hope to discuss in more detail in this Section – to create a “framework” to understand all the complexity in a way that is useful for conservation and the people and elephants that share space, and potentially re-conceptualise the cognitive and cartographic understanding of these zones.

The geographic scale at which this shared space is conceptualised is relevant. It can be done at the level of one individual’s land (hectares), at a village or estate level (tens to 100s of hectares), at a council or Panchayat level (1000s of hectares or 10s of km²) or at the forest division of landscape (100s of km²), or even at broader state or national levels (100s of thousands of km²). All of these entail many similar yet also significantly different aspects and approaches to thinking about the problem. Through this thesis, I discuss this at the scale of the Gudalur “landscape” of about 500 km², since that is usually the scale of management. It is large enough to be generalisable and useful for conservation policy and also small enough to be understandable or manageable in practice.

The next key element in managing the human-elephant interface is the question of peoples beliefs – particularly in terms of indigenous world views and animism, which I discuss in the next Section.

⁸⁶ Chapter Section 38V of the Wildlife Protection Act discusses “core zones” and “buffer zones”, which aims to “at promoting co- existence between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of the local people”. India’s flagship “Project Elephant” in 1972 started with defining “Elephant Reserves” that encompass multiple land use types rather than just protected areas, and one of the three major objective of the project is to “address issues of man-animal conflict”.

6.2 Indigenous worldviews, animism as a factual basis

The “aana devaru pooja” (worship/reverence to certain other-than-human elephant individuals which I describe in Chapter 1) in the Therpakolly village was one of my earliest encounters with a strong animistic belief system. It was used by the Kattunayakans as a very real way of mediating their relationship with elephants. In the conservation framework, it could be thought of as a “traditional HEC mitigation strategy”, much the same as beating drums to chase away the elephants or installing trip wire systems, though it does not find mention in the conservation literature. Despite my appreciation and commendation of these animistic beliefs in allowing them to live more peacefully alongside elephants, the more important question is the relevance of this at wider scales. Would I personally (or through The Shola Trust) endorse this as a meaningful “HEC mitigation strategy”? While it is clearly useful for the Kattunayakans, it remains a challenge for me as an individual or on behalf of an NGO to endorse an activity that has no “rational” basis. This clearly maps onto Nadasdy’s (2007) criticism described in Section 2.3.1, of anthropologists treating these different ontologies as merely being symbolic and metaphorical, which prevent them “*from becoming a factual basis of managing the human-wildlife interface*”.

Negotiating this has been particularly challenging. Despite my diverse and varied background, I remain entrenched in a western mode of thinking, and unable to personally accept anything that falls outside of the rational approach. At the same time, my colleagues are all from the local communities with similar animistic beliefs, and this belief system is easily accepted by other newer immigrants and even the forest department staff. When I first described this pooja to a Range Forest Officer (RFO) in the Forest Department (which to me was very interesting in signifying how different indigenous communities were from the others), I was surprised to find that he thought it was a very good idea, and wanted to use it as an official Government strategy to mitigate HEC. It then struck me that this acceptance of other worldviews is widespread across India, linked to mainstream religious beliefs and superstitions. Chief Ministers of states routinely offer worship in temples praying for a good monsoon, sometimes spending up to 30,000 USD from the state’s exchequer⁸⁷. The media outrage around the Indian Government’s space programme and the

⁸⁷ <https://timesofindia.indiatimes.com/city/bengaluru/karnataka-govt-to-spend-rs-20-lakh-on-pooja-for-rain-gods/articleshow/58951461.cms>

“unscientific” beliefs of the Indian space scientists highlighted this complexity. In 2013 India’s successful mission to Mars was in the news for costing about one-tenth of the United States’ mission to Mars⁸⁸. But soon after that the Indian media was highly critical of the superstitions of the scientists – from skipping the (unlucky) number 13 in the naming of the satellites, to the director praying at a famous temple before the launch⁸⁹. All of these beliefs and superstitions clearly help in some way, for both the astrophysicists and the hunter-gatherer tribes, perhaps in allowing for a better frame of mind when launching rockets or dealing with elephants. This is widely recognised in India, and even though it may be criticised for being unscientific; an individual’s right to undertake any sort of ritual that makes them feel more comfortable or confident remains largely unchallenged. Accepting a more generalised version of the Kattunayakans’ animistic worship of elephant-people will perhaps not be a problem. Animism could very easily become a “factual basis” of managing the human-elephant relationship in India.

Over the years, I have undoubtedly internalised and accepted many of the ideas about other-than-human persons. With elephants, it is almost hard to refrain from “anthropomorphism” and relating to them as people. I have found myself talking to them on multiple occasions, and for the elephants coming around our house, it feels perfectly reasonable to tell them we have no intention of harming them in anyway, and also in turn asking them to behave well. But this animistic approach is not limited to elephants, and our relationship with the (clearly inanimate) equipment at The Shola Trust is an interesting example. Every year, as a part of more general “Aayudha (tool) Pooja” that happens in various forms across India, we have evolved a tradition of paying our respects to all the equipment around us. Our computers, GPS devices, cameras and vehicles all get specially cleaned and thanked for serving us well all through the year and helping us undertake our research work. It started as a more pragmatic form of ensuring the equipment was well looked after – if we all value our equipment at least once a year there is it more likely that we will take better care of it all throughout the year. But over time it has evolved into

⁸⁸ <http://www.bbc.com/news/science-environment-29341850>

⁸⁹ <http://www.deccanherald.com/content/367580/superstitions-beliefs-indian-space-scientists.html>,
<https://timesofindia.indiatimes.com/india/Isro-seeking-Lord-Balajis-blessings-is-superstition-Professor-CNR-Rao/articleshow/26275831.cms>

actually feeling that most of the inanimate objects around us are also other-than-human-persons.

There would seem to be, therefore, in the Indian context, arguably no barrier to animism becoming a factual basis for mitigating the human-elephant relationship. Local communities, forest department staff, policy makers, and even heads of state are all reasonably comfortable with accepting animistic beliefs and other ways of thinking.

Despite this widespread acceptance, I remain uncomfortable about spreading the practice of “elephant poojas”. This is largely on account of the current political climate in India with a right-wing Hindu Nationalist party in power. While there has been extensive scholarship on the inclusiveness and adaptiveness of Hinduism (e.g. Narayan 1989), I am not familiar with that body of work and unable to discuss it with any depth. In the current environment with a rise of Hindu nationalism, there is arguably a systematic discrimination against other religious minorities, while indigenous animistic religions are being absorbed into mainstream Hinduism (Sharma 1978; Bijoy 2003; Xaxa 2005; Baviskar 2007). Negotiating this – the positive elements of animistic beliefs allowing people to live better with elephants on the one side, with Pandora’s Box of the growing “Hindutva”⁹⁰ agenda in India is something that I am and will continue to have to engage with, but is beyond the scope of further discussion in this thesis.

In the context of the global debates about the anthropologists not taking animistic belief systems seriously, it is important to recognise that this is not the case in India. But The Shola Trust (or myself) endorsing poojas remains problematic, as it could have an adverse impact on other religious groups, and hasten the homogenisation and appropriation of the diverse animistic religions, while also feeding into the broader “Hindutva” agenda that I do not ascribe to.

⁹⁰ The proponents of the term claim it has nothing to do with any particular religion, but describes a people with a common nation, race and culture/civilisation, and are generally inclusive of “Indian” religions of Buddhism, Jainism, Sikhism, and of course Hinduism. But it clearly exclusive of “foreign religions” such as Islam, Christianity, Judaism and Zoroastrianism. Some Indian social scientists have described it as a fascist movement, propagating a cultural hegemony by the majority Hindu religious group (Patnaik 1993).

These two key points I have discussed above – that all interactions between elephants and people are not negative, and that a more generalisable version of animism is widespread across India – are clearly very relevant to managing the shared space. In the next Section, I examine and call for a re-conceptualisation around the way the space is understood, moving from a topographic to topological space.

6.3 Re-thinking “space” - relations and topologies

In the conservation sciences and positivist epistemology, the ideal way to better manage the shared space would be to quantitatively “model” all of the complexity and predict future scenarios. Creating quantifiable metrics to measure many of the factors *may* be possible after studying and comparing multiple such landscapes, but it is beyond what can be done with just one landscape, and not in keeping with my commitment to “thinking like a human” (Adams 2007). But despite my reluctance to quantify and categorise, for all this variability to be relevant and meaningful in the policy and management spheres, there needs to be some structured approach by which landscapes can easily be understood and compared. I therefore do attempt to “score” the various factors that are relevant to understanding the shared space in response to a particular question, both for the Gudalur context and for other similar landscapes of coexistence.

There are a number physical factors – the extent of natural cover and agriculture, the type of agriculture, the distribution and density of elephants and humans through the landscape – that are clearly relevant to sharing space. But there are also a number of “cultural” factors – the tolerance of individuals to elephants (which I have linked to indigenous animistic beliefs), the conservation conflict between different groups of people, the behavioural types of elephants and the level of elephants’ habituation to people – that are less studied. A combined holistic understanding of how these factors all intersect with each other and affect the shared space could be very useful for conservation.

Understanding these physical and cultural factors together in a way that can directly translate into maps and zones is an insurmountable challenge. The problem therefore,

perhaps lies in the conceptualisation of the space solely in topographic terms. A more nuanced understanding of “space” is clearly the forte of human geography, where there is a wide range of theories and conceptualisations of space, and I engage with the ideas around space briefly, examining how it can be used in this thesis.

Apart from the more complex conceptualisations of space, the Oxford English Dictionary is a useful starting point, defined as (1) “*a continuous extension viewed with or without reference to the existence of objects within it*” and (2) “*the interval between points or objects viewed as having one, two or three dimensions*”.

Moving on to a slightly more nuanced understanding of space, Thrift (2008) defines it:

“As with terms like ‘society’ and ‘nature’, space is not a common sense external background to human and social action. Rather, it is the outcome of a series of highly problematic temporary settlements that divide and connect things up into different kinds of collectives which are slowly provided with the means which render them durable and sustainable.” (2008:95)

He further outlines four different kinds of space based on processes – empirical (“*whereby the mundane fabric of daily life is constructed*”), block (“*whereby routine pathways of interaction are set up around which boundaries are often drawn*”), image (“*whereby the proliferation of images has produced new apprehensions of space*”), and place (“*whereby spaces are ordered in ways that open up affective and other embodied potentials*”) (Thrift 2008:105). This understanding of space is of course far removed from the Cartesian and topographic understanding of space in the conservation literature and more broadly the natural sciences. But most of the work in geography continues to advance the theoretical understandings of space rather than to attempt to apply the existing ideas of space to particular problems in the world.

An exception is perhaps Hinchliffe et al. (2013), who, while also continuing to further theorise and introduce new vocabulary (“borderlands”), demonstrate how the challenges

around biosecurity can be better addressed if the space is thought of in more relational and topological terms. With globalised food systems and networks, efforts to check or control the spread of viruses, bacteria and diseases at national borders is no longer useful. A virus in a mega pig farm in Mexico can result in serious illness among children in rural England, yet have little or no impact on the children in schools in the geographic vicinity of the farm. The networks and connections in the food network are more important than the physical space. Deadly viruses now more often than not lie dormant everywhere, and the danger is more that they could “break out” rather than “break in” to a country, and the focus should be shifted from the traditional idea of borderlines and breach points to a more relational idea of borderlands and tipping points or moments of intense folding. A topological understanding of biosecurity is therefore clearly very useful, but it is unclear whether there has since been any effort in the policy sphere to operationalise these ideas; to map the relations and networks in a way that actually improves biosecurity and human well-being.

The idea of topology or topological space is varied across different bodies of literature – particularly between mathematics, physical geography and GIS as compared to human geography, so how I intend to use topology is worth briefly discussing. A dictionary definition of topology is “the study of geometrical properties and spatial relations unaffected by the continuous change of shape or size of figures”. This is based on the mathematical understanding of topology which loosely relates to objects or surfaces where the geometric relationship between points on the surface cannot precisely be defined – the mobius strip, which simultaneously appears to have one and two surfaces. Serres and Latour’s (1995) handkerchief analogy is also useful; when neatly folded, each point is at a fixed distance from all the other points, but when crumpled up put into a pocket the distance between all the points cannot be known just by the outer surface of the folded form.

This is broadly the idea I wish to apply to the human-elephant shared space – to think of it as a crumpled rather than folded handkerchief. Each of the elements cannot be defined solely in terms of physical space, the relational connection with all the other elements is also essential, as well as the continuous changes in these elements and the relations

between them. For this conceptualisation of the human-elephant shared space to be useful on the ground, it is important to also map all the relations and connections. To know how the space will respond to changes – or to have some idea of the shape the handkerchief will take in the pocket. If all the elements and their interlinkages can be described, it allows for some insights into how the space is changing and evolving, and this is what I intend to describe in the next Section.

6.4 Mapping the topological human-elephant shared space

Throughout this thesis, I have been critical of the nature-society dualism, but in breaking down this dualism, ignoring some of the actual differences between the continuum of human and natural worlds is also not useful. Simply put, a wild elephant cannot live in a city for extended periods of time, and a modern, “developed” human being cannot live in a forest for extended periods of time. Both can and do exist at these ends of the continuum at times, and seeing any movement across the gradient as a transgression or aberration is not useful. Any conceptualisation of the shared space must recognise this difference between elephant and human habitats as a continuum, and draw on some of the relevant work in the natural sciences and the conservation literature.

I therefore choose to understand the shared space along two axes. First in terms of physical Cartesian space linked to the physical geography and topography of the region, which can vary between “wild”⁹¹ spaces more suited for elephants, and “urban” spaces more suited for people, within the normative understanding of the needs of elephants and developed, modern humans. Second, in terms of a cultural or relational space, that can broadly range from positions of “sharing” or “coexistence” to “separation” or “conflict”.

⁹¹ I recognise that both these terms, particularly “wild” come with significant baggage, but do not attempt to over-think the terms or create a more nuanced definition, and use the terms in a broad sense.

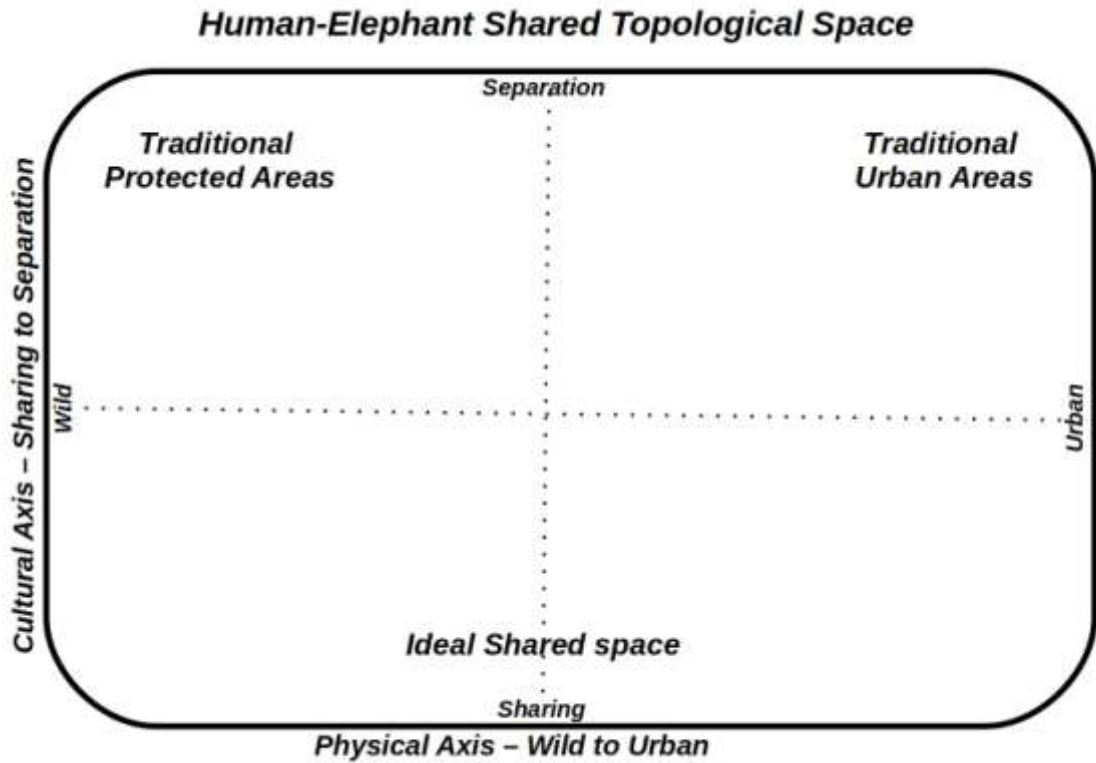


Figure 18: Visualisation of the shared topological space

Visualising the space along these two axes captures the continuum of both the physical and cultural attributes of shared space. The top left quadrant represents traditional protected areas that have no room for people, while the top right quadrant represents traditional urban areas with no space for wildlife. But with the majority of the elephant range that is shared with people, the bottom half of the space becomes relevant, and the ideal shared space is one that is an even balance of “wild” and “urban” on the physical scale, with a strong culture of tolerance or coexistence.

I now summarise all of the factors that affect the shared space that I have described through this thesis, I attempt to describe how they plot on to these two axes, and also how they are changing.

6.4.1 Elements of the shared space:

Laws and policies related to ecological significance: The laws and policies relating to elephants and conservation are perhaps the first and most important aspect of sharing space, and whether they tilt in favour of people or elephants. The process of law making and the level of protection offered to elephants is cultural, but the impact of the laws (landscape level planning, development projects, regulating land use conversion, construction/ urbanisation etc.) is also physical. In Gudalur, as I have discussed in Section 3.2, given the high ecological importance of the region, the laws weigh in heavily in favour of wildlife rather than people, plotting closer to “separation” in the cultural space (focus on protected areas, elephants highly protected etc.) and to “wild” in the physical space (number of laws regulating human activity outside PAs and preventing urbanisation), making this element plot onto the top left corner of the space. Laws are relatively stable, though some case law will emerge through the ruling on the Janmam Act and Elephant corridor, a decision which is currently pending in the Supreme Court, and that will have an impact on the physical space.

Agriculture: The extent of the area under cultivation clearly affects the physical space, while the choice of crops and the level of intensity of management arguably impacts the cultural space. As discussed in Section 3.5, about half of the region is under cultivation, with the majority agricultural land use being tea and coffee, allowing for a reasonably peaceful sharing of space, making this element plot onto the bottom left of the space. Changes in these are linked to global commodity fluctuation, but there is unlikely to be large changes in land use patterns, and future changes will also factor in elephants.

Natural cover: The extent and degree of fragmentation are both relevant to the physical space, where more fragmented and patchy landscape with no clear “hard edges” provides some shade/cover and allows the elephant to use more of the physical space. This is counter to the normative narrative where “fragmentation” is seen as a problem in conservation, though it usually is at much larger scales (1000s of km²), and involves both habitat loss and fragmentation. Gudalur has 30-50% of the area under natural vegetation, and is highly fragmented, with a network of forest patches everywhere, making this element plot on to the bottom right of the space. With all of the disputes over land, the degree of fragmentation may increase, but it is not likely that all the forest cover will be

converted to agriculture at any point in the future, or that the fragments will completely disappear.

Human diversity: Human cultures are clearly often all very different from each other and have a significant impact on the cultural space as I have highlighted in Chapter 5. I have showed that there is significant diversity in human cultures in the regions, where the majority of the people have a shared history with elephants and only a minority have significant negative interactions with elephants, making this factor plot onto the centre bottom of the topological space. Tolerance of elephants appears to increase over time. With continued migration into the region there will always be a section of the people with significant problems in living with elephants, but as immigration levels off, it could be possible that the negative interactions with elephants reduce over time.

Elephant diversity: In parallel, the same is true for elephants as I have demonstrated in Chapter 4. There is significant behavioural variation for the elephants within the region, both at a population and individual level, which affects the cultural space. There are some elephants in the region that are particularly well habituated to living alongside people, and these individuals account for the majority human-elephant interactions with a relatively lower number of negative interactions, making this element plot onto the centre bottom of the topological space. Habituation will possibly increase over time, and the sharing of space may become more peaceful into the future.

Human population and distribution: The density and distribution of humans is relevant yet particularly complicated to tease apart along physical and cultural terms. With a remote village, the physical “threat” of elephant damage is much higher, yet the people who live in such settings are invariably culturally better adapted to living with elephants. Broadly, I therefore map the overall number or density of people at the landscape scale onto the physical space, but the choice of how non-urban people distribute themselves across the landscape onto the cultural space.

The human density in the region is about 500/km², which is higher than the national average, with a significant number of small towns or semi urban⁹² clusters across the landscape, putting it closer to the urban on the physical space. Outside of the densely populated small towns, the rest of the region is still characterised by scattered and spread out houses, putting it closer to sharing on the cultural space.

Immigration into the region has been very high, with a sustained decadal growth of almost 50% for over half a century, but this appears to have flattened out over the last decade as described in Section 3.6, and is perhaps not likely to increase as much into the future.

Elephant Population and distribution: Similar to the human, the elephant density maps onto the physical space, while how spread out they are indicates their level of comfort around human habitation, and plots on the cultural space. About 150 elephants are using the region on a regular basis and some of them are permanently resident, indicating that the region offers reasonable “habitat” for the elephants. In terms of distribution, they are also spread out widely across the region, making this element plot onto the left-bottom of the space.

While there is no information about the changing numbers, it is evident that their range is expanding, but they now occupy most of the region all through the year, and there is limited scope for further expansion.

Human-Human Conflict (or Conservation Conflicts): The conflict between different groups of people is something that I have discussed at some length in Sections 3.3 and 3.4, which impacts the cultural space. I have identified significant conflict between groups of people on various accounts, making this element plot onto the centre-top of the space. The history of conflict over land arguably cannot get any worse, since it has gone all the way up to the Supreme Court and is awaiting final judgement, with some kind of settlement likely to occur in a few years. The forest department has been more proactive in engaging with the public over the last few years. Indigenous rights are in the process of being recognised. In view of all of this, the conservation conflicts appear to be on the decline,

⁹² Various definitions of urban exist, but the most relevant from an elephant perspective is perhaps the built up area, which is what I refer to in this context.

though there does not appear to be scope for full resolution of these conflicts in the foreseeable future.

Interactions and mitigation: Finally, there are the actual interactions between people and elephants, and I have argued in Chapter 5, that what matters more is people's perceptions rather than the actual negative interactions, and this is linked to the level of pro-activeness in the state "mitigating" these, making in impact the cultural space more than the physical space. The negative interactions are largely around human fatality, where the number of people getting killed every year is perhaps the highest in the country for any similar sized region. But I have argued that there is a high tolerance, where the majority of people think it inevitable, and the problem is more around conservation conflicts. Compensation is paid effectively, and the forest department is seen to be highly proactive around the issue, making this issue map onto the centre top of the space.

The number of deaths per year do not appear to be increasing over time, there has been a decline in 2017 (data not presented in this thesis). But any simplistic ideas around this are problematic, given the web of interconnectedness that creates these accidental encounters, which is too complex for linear conclusions. I would cautiously assume that there is not likely to be significant change in context around accidental human deaths.

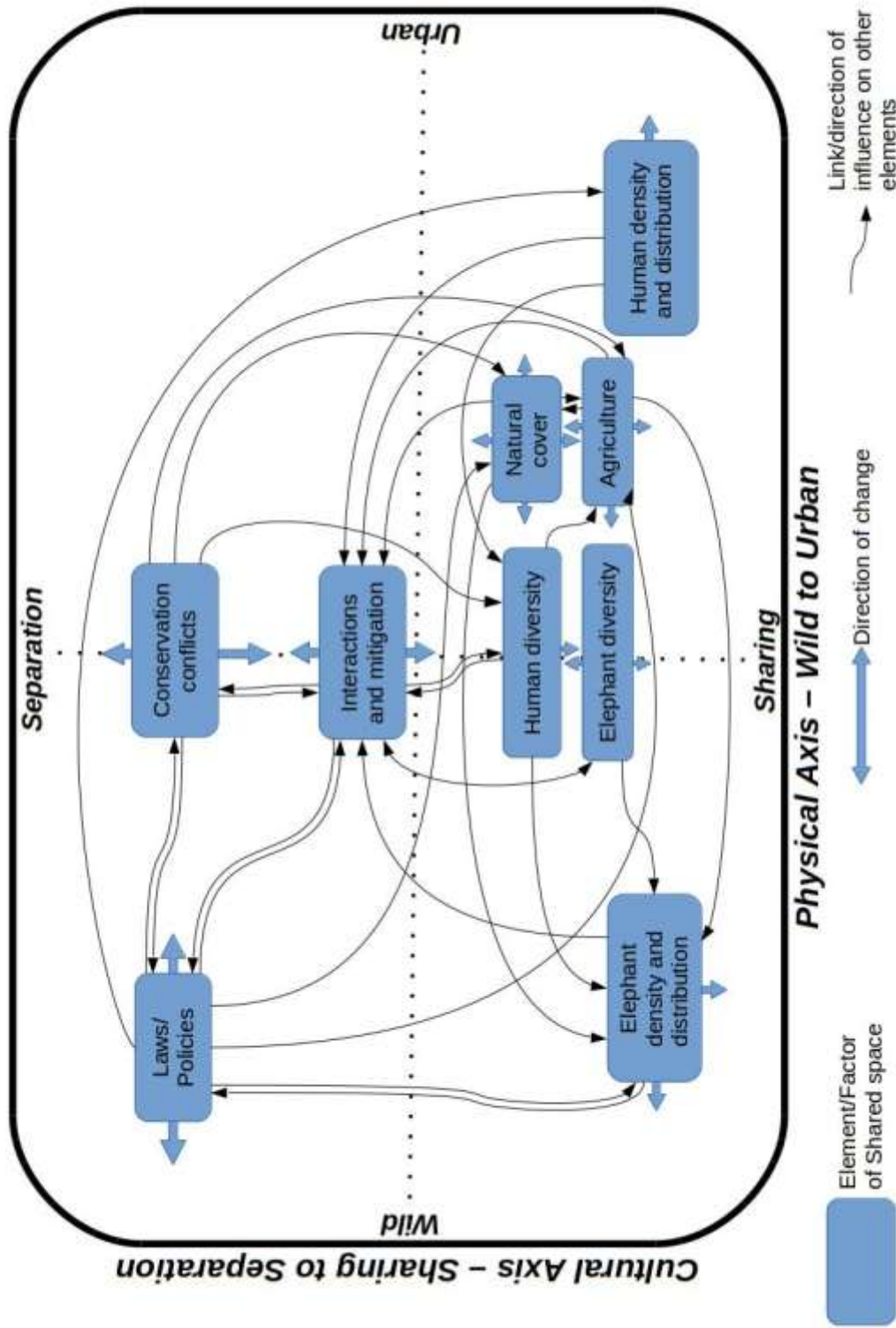
In order to understand all these elements of the shared space together, I summarise all the key processes in Table 25 below. For each of the elements in the shared space, I first frame it as a question that can be asked of other shared spaces, then describe some simple categories into which they can fit, briefly describe them for Gudalur and how they plot onto the physical or cultural space, how these variables are changing over time, and finally, how they are linked to the other elements of the shared space.

<i>Factors influencing the shared space</i>	<i>States/Categories</i>	<i>Gudalur – mapping onto physical (X) and cultural (Y) axes</i>	<i>Changes under way</i>	<i>Linkages/ impacts on other factors</i>
Laws and policies: How stringent are the laws and policies that are in place relating to elephants and conservation outside PAs?	Physical – Land use: High (No Land use change (LUC) possible), Moderate (LUC possible in some areas), Low (No or minimal regulation over LUC). Cultural – Elephant protection: Favouring High (cannot easily be killed/captured), Moderate (can be captured), Low (can easily be killed/ captured).	Land use cannot easily be changed anywhere in the region, and elephants cannot easily be captured or killed in “conflict” situations. X: Low, Y: High.	Some unpredictable changes in law are likely around corridors, but no significant changes around LUC governance.	Linked to all factors except Elephant diversity and Human diversity.
Agriculture: What is the extent of the agriculture and how “conflict prone” are the crops?	Physical – Area/Extent: High/Moderate/ Low, or actual areas/percentages through GIS approaches. Cultural – Conflict proneness of crops: High (food crops – rice, bananas etc.), Moderate (mix of crops), Low (Unpalatable plantation crops – coffee, tea etc.)	More than half the area is under agriculture, but the majority of it is “low conflict” tea and coffee plantations. X: Moderate-High, Y: Low.	No major changes in land areas are likely, but there may be some changes in the type of agriculture on account of the shortage of labour and global commodity prices.	Natural cover, Elephant density and distribution, Interactions and mitigation.
Natural cover: What is the extent of natural cover and how spread out/fragmented is the remnant natural cover?	Physical – Area/Extent: High/Moderate/ Low, or actual areas/percentages through GIS based approaches. Cultural – Extent/ spread of fragmentation: High/Moderate/ Low based on GIS visualisation of the spread of natural fragments through the landscape.	Less than half the area is under natural cover, but there is a very high degree of scatter/fragmentation. X: Moderate-High, Y: Low.	Some small changes are continually under way on account of all the ambiguity over land tenure, but nothing significant is likely on account of the relatively stringent laws.	Agriculture, Elephant population and distribution, Interactions and mitigation.
Human diversity: What are the modes of subsistence, ethnicities and history of the people affecting elephant “conflict”/ “tolerance”?	Cultural – High (new immigrants with no history of living with elephants), Moderate (settled agriculturalists but with long shared history of living with elephants or mix of different peoples), Low (indigenous hunter-gatherer groups with animistic beliefs).	Mixed, but with the minority being new immigrants with low tolerance. X: Neutral (Moderate), Y: Moderate-Low	Overall there is a sense of acceptance across the landscape that elephants will always be here, and most of the conflict is around land. With longer exposure, tolerance is likely to increase.	Interaction and mitigation, Agriculture, Elephant diversity and distribution.
Elephant diversity: Do the elephants in the region show signs of habituation/ comfort around people?	Cultural – High (only crop raid at night, and not seen near habitation during the day, high human fatality), Moderate (elephants are seen often during the day, but move away from people), Low (number of individual that do not exhibit “flight of fight” response in human encounters).	Mixed, but with a few elephants well adapted to people. X: Neutral (Moderate), Y: Moderate-Low.	Elephant seem to become less aggressive/ uncomfortable around people over time with more interaction, but with continued immigration into the area this may change.	Interactions and mitigation.
Human density /distribution: What is the	Physical – Density: High/Moderate/Low (best understood in relative	Density of people is higher than national/international	Immigration into the region seems to be slowing down,	Interactions and mitigation,

<i>Factors influencing the shared space</i>	<i>States/Categories</i>	<i>Gudalur – mapping onto physical (X) and cultural (Y) axes</i>	<i>Changes under way</i>	<i>Linkages/ impacts on other factors</i>
human population density in the region? What is the spread of houses outside the urban/ semi-urban settlements?	terms/compared to other shared landscapes). Cultural – Clustering: High/Moderate/Low (from highly clustered into urban pockets to evenly spread out through the region).	al average (500/km ²), with a large degree of spread across the landscape. X: High, Y: Low.	though process of urbanisation and development may continue.	Human diversity.
Elephant density and distribution: What is the elephant population in region and how widely do they range within the landscape?	Physical – Density: High/Moderate/Low (best understood in relative terms/compared to other shared landscapes). Distribution: High/Moderate/Low (possibly based on presence/absence in a gridded approach).	A relatively high number of elephants use the landscape, many permanently resident, plotting closer to “wild” (Low). The elephants are widely distributed through the region, plotting closer to “sharing” (Low). X: Low, Y: Low.	Changes are not known in terms of continued immigration in to the region, but in terms of distributions the elephants use almost the entire region, and there is not much scope to change.	Interactions and mitigation, Laws and policies.
Conservation conflicts: Is there relative harmony in the region over land, forest rights, conservation policies etc. - or is there high conflict?	Cultural – High/Moderate/Low (based on a qualitative assessment of the region, including the interaction of many of the other factors described above).	There are very high levels of conflict in the region between different groups of people. X: Neutral/Moderate, Y: High.	Very high levels of conflict at present, but potentially likely to improve; settlement of indigenous rights is under way, and land tenure is likely to be settled in the next few years, though the Supreme Court corridor judgement could increase conflict.	Laws and policies, Interaction and mitigation, Human diversity, Natural cover, Agriculture.
Interactions and mitigation: What are the perceived problems around human-elephant interactions, and how effective is the mitigation?	Physical – Spatial patterns: High (all clustered near boundaries), Moderate (some patterns visible), Low (no patterns/trends). Cultural – Perceptions of conflict: around crop/ property damage, accidental death, and disruption of activities, linked to the mitigation-effectiveness in terms of compensation and barriers – High, Moderate, Low.	There are no spatial patterns around the deaths – they are spread out all through the region. The problems are largely around human fatality, perceived to be very high. But compensation is paid effectively. X: Low, Y: High-Moderate.	The forest department has been relatively more proactive in addressing problems over the last few years, with significant outreach and engagement with local people.	Human diversity, Elephant diversity, Laws and policies.

Table 25: Describing the elements of the topological space

Human-Elephant Shared Topological Space



This visualisation of the cultural and physical variables in the shared space is useful at multiple levels. First, it is able to bring together a range of disparate strands of information, and view them together to understand how they affect the human-elephant shared space. And when all are visualised together along with the changes in each of the elements, it is possible to glean some insight into the future tenability of sharing space. For a reasonably peaceful sharing of space, most elements should ideally cluster together at the centre of the physical scale and closer to sharing on the cultural scale, or at the bottom centre in the visualisation. Despite all the problems in Gudalur, while there are some outliers, the majority of the elements do cluster at the centre-bottom region in the visualisation. Future trends/changes also indicate that many of the elements could move towards a more effective sharing of space. This visualisation is also very relevant for the management of the space, which I discuss in more detail in the next Section.

6.5 Managing a topological space

With the mapping and visualisation of this space, it is worth discussing the implications for better understanding and managing the space in the long term.

6.5.1 Decision-making framework

The most pressing problem across elephant-human landscapes, is the “urgent” decision making process soon after people are killed in accidental encounters with elephants. Should the elephant(s) then be captured/trans-located, driven away, or left undisturbed? Currently the capture of elephants involves the head of the state forest department physically signing an order based on a field report by the local manager. This can only happen on the scale of days, when the decision needs to be on a timescale of hours. This is what the Elephant Task Force tries to address through their elephant conservation, coexistence and removal zones – so decisions can be made more efficiently on the ground. But as mentioned, defining the boundaries was too complex a process, which I argue is because the space cannot be thought of in purely topographic terms, and is better understood topologically. That is, the physical boundaries are defined by culture and are fluid over time. What is relevant to managing the space, is that at any given time and place, the topological space can have a topographic projection. That is, all of the above variables can be mapped for a particular incident, to examine the feasibility of continued coexistence

and inform some management decision (most often relating to the capture and translocation of elephants). For example, highly habituated elephant that feed off waste food at the edge of the city of Guwahati (a city of almost one million people in North-east India), there is no effort to capture them⁹³. But when an individual elephant is responsible for a number of human deaths in and around forest areas in Wayanad (adjacent to Gudalur), it is captured⁹⁴. All of these decisions are made in very complex ways, and do not fit into the framework of topographic zonation but can be systematised using a topological conceptualisation of the human-elephant shared space.

6.5.2 Planning conservation interventions

The shared space is clearly highly complex, with the intricate web of inter-linkages and changes almost making it incomprehensible. This is perhaps inevitable for the Gudalur region, with one of the most complex land histories in India. While other landscapes may not be as complicated, elephant and people sharing space is finally a challenging and complex proposition, with no easy solutions for “peaceful coexistence”.

Effective “conservation projects”, aimed at promoting better coexistence, should ideally target all these elements, aiming to move them to the bottom centre of the visualisation. Each element of the shared space is characterised by a number of inward linkages or factors that it is influenced by, and outward linkages, or factors that it in turn influences. Focussing on “outward elements” (which influence the most number of other elements), would be particularly useful, rather than “inward elements” that are affected by multiple other elements.

⁹³ <https://indianexpress.com/article/north-east-india/assam/guwahati-residents-herd-together-to-better-commune-the-wild-elephants-that-pay-them-frequent-visits/>

⁹⁴ <https://www.thehindu.com/news/national/kerala/Rogue-elephant-captured-in-Wayanad/article16676100.ece>

The laws and policies around conservation are clearly the most important outward element, currently tilting heavily towards “separation” and “wild”, which is not ideal for sharing space. Changing laws and policies are beyond the scope of local forest managers and conservationists working in these landscapes, but when laws are likely to change, there is perhaps some scope to influence the outcome. This is likely to happen in the Gudalur region, but the thrust of the “conservation fraternity” is to continuously strive for more stringent laws and uniform solutions that benefit wildlife, which will increase conservation conflicts in the region, and perhaps have an overall negative impact on the shared space.

Conservation conflict is the next key outward element, influencing a number of other elements in the space, but currently limiting the shared space. While this is not actively on the radar of most conservationists/forest managers, there is an intuitional sense that conservation conflict has a negative impact. Most of the efforts of the forest department over the last two years are aimed at building stronger links with local communities and reducing conservation conflict.

The real human-elephant interactions, and people’s perceptions of them, is another important element, but it is largely an inward element, influenced by many others. The state’s actions towards mitigating the negative impacts are important, however, and they improve people’s tolerance of elephants. The mitigation efforts have been improving over the last year as I have described. But in the conservation literature, this is assumed to be the *only* area that requires attention, and that effective “HEC Mitigation” is *the* solution. This is not the case; negative interactions are influenced significantly by a number of other factors, and there is limited scope to drastically reduce or eliminate all negative interactions, such as human fatalities.

For managing the shared space more effectively, efforts need to be more spread out across other elements in the shared space, reducing conservation conflicts as I have described above. Natural cover and agriculture are of course clearly linked, and incentives to maintain natural cover or promote crops that are less prone to conflict are an immediate possibility. Human migration into the region is driven to a large extent by the ambiguity in

the land ownership, while elephants could be moving in on account of changes in the more intact forests like the spread of invasive species – both of these are areas that warrant further research and action. The diversity in the humans and elephants in terms of behaviour, personality and culture is again a key element that could be an area of intervention – to attempt to promote greater tolerance in both the elephants and the people.

Much of this is already a part of the informal activities that forest department field staff engage with on a daily basis. There is an intuitive understanding of the complexity, where the policy framework often impedes rather than facilitate their efforts to more effectively manage the human-elephant interaction. The topological framework I present is aimed largely at people who are not embedded in the reality of the human-elephant shared space – to allow policy makers, wildlife conservationists and researchers to appreciate the nuance and complexity. I do not attempt to even begin to make detailed management prescriptions, rather the endeavour is to present all of the complexity to wider audiences in an understandable form, so as to make a stronger case for a more bottom up approach to managing human-elephant shared spaces.

While many of these small changes on each of the individual elements is underway, there are also drastic changes that occur, affecting many of the elements, which I discuss in the next Section.

6.6 Tipping points and intense folding

A key feature of topological spaces are tipping points and moments of intense folding, and the implications of this on the ground are worth discussing. As described in Section 1.5 and 3.1, two human fatalities in the second week of December 2015 was the start of a significant unrest in the region, which erupted later in March 2016 when three people were killed within two days. The state elections were approaching, which prompted a very significant reaction from the state, resulting in a paradigm shift in the way the forest department and state bureaucracy viewed the problem, where “reducing HEC” became much more central to their agenda. This was a classic tipping point in the topological space.

There were no changes in laws or state level policies, yet there were significant changes on the ground, and the dynamics of how these changes occurred are interesting. The senior most individuals in the forest department were assigned with the task of “stopping all human fatalities” and ordered by the chief minister to physically be present in Gudalur until there was some stability. The DFO and the Range Forest Officers (RFOs) were in turn given unreasonable ultimatums about human fatalities (as described in Section 1.3 of the Introduction). But more importantly, they were all given the autonomy to do whatever it took to stop people from getting killed. The Chief Conservator of Forests at the time was particularly proactive, and held a series of meetings with various stakeholder groups in the region, and more importantly attempted to institutionalise the process of on-going interactions between the forest department and the people. He issued notices to each RFO in the division, where they had to meet with tribal leaders every month to talk about the problems they faced with elephants, and what could be done to better foster coexistence. The DFO and RFOs were instructed to leave their mobile phone numbers with all “local leaders” including the elected representatives of the local Panchayats. The conservator also gave his personal mobile phone number to various tribal leaders and told them to get in touch directly with him if there were problems with elephants, which indirectly implied that they could also complain to him about the RFOs and DFO. Multiple “WhatsApp groups” were started for a quicker dissemination of information – one internal group with all heads of the various arms of the government at the district level, and another with the same officials and also selected “respected members of the public”. “Respected” was not defined, and the group essentially included members of the local elite. The significance of this is important – it was the first time there was a direct line of communication between senior officials and the public, even if only with local elites and tribal leaders.

This was a rupture in the status quo that forged new links and reconfigured the power dynamics between the state and the people, and between different groups of people. Tribals who were at the bottom of the local power structure had access to senior officials. This changed their standing with other communities, and with the lower ranks of the forest department staff with whom there was on going conflict over their rights to use forest resources. Further, the problem of human fatality was taken much more seriously by the state, and there was a real effort and commitment to reduce the frequency of these extreme

negative interactions. The highly bureaucratic forest department was forced to reconfigure itself to be more outward looking and accountable to the local people. None of this happened as a part of a considered master plan; the individuals who were tasked with stopping human fatalities acted spontaneously and intuitively. Not all of their actions (like meeting with all the various stakeholder groups) could be shown to have a direct impact on reducing accidental human deaths, but this has been useful in reducing conservation conflicts, and has had a positive impact on the shared human-elephant space.

The relevant question for my thesis, is how these tipping points can be understood and used productively for conservation and to better share space. First is to recognise that large and significant changes are triggered by these extreme events, and change is not a slow and predictable process. Given the complex set of conditions that produce these tipping points it is not feasible to predict when they will occur or the outcome of these ruptures. From a conservation planning and management perspective, it is possible to try and ensure the conditions and context are conducive to positive changes in the shared space. This was clearly evident with the “crowd-sourced elephant monitoring and early warning system”, where the technology back-end was in place since 2013, but the forest department started actively using it only in 2015, soon after this tipping point. The exact impact this system has had on the shared space is hard to measure, but the collective understanding of the elephants in the region has increased significantly, and this clearly has a positive impact on the space.

The implications are that conservationists and managers should be aware that significant change occurs during these events, and must be prepared or be ready to try and channel them towards implementing more long-term changes that will allow elephants and people to share space more peacefully. This topological understanding of the space therefore allows for a much more flexible and adaptive decision-making process that factors in much of the complexity that I have described through this thesis.

6.7 Conclusions

In this penultimate Chapter, I have asked “*How can the complexity of human-elephant shared spaces be better understood and managed to minimise the tensions between the two species?*” I have looked at how the shared space can be better understood and managed in topological and relational terms rather than in merely topographic terms. I summarise these conclusions below.

I argue the focus on “conflict” and the assumption that all interactions between people and elephants are negative is problematic – there are numerous positive interactions as well. Indigenous world views and animistic ideas around animals are clearly very useful in negotiating the shared space, but it has been argued that they are treated as being largely metaphorical and symbolic and are not taken seriously even by anthropologists. While there is very little understanding of indigenous animistic beliefs in policy around human-wildlife interactions, I argue that in the Indian context, these ideas could perhaps become a part of the policy since there is wide spread acceptance of mainstream Hindu superstitious beliefs, and the challenge is perhaps for these indigenous animistic ideas to retain their unique identity and nuance and not be subsumed by the dominant Hindu belief system.

Finally, I make a call to re-conceptualise the shared space in topological terms, defined by both physical and cultural factors. I then highlight nine factors that I have discussed through this thesis, examining the cultural and physical implications of these, and how they map onto a cultural scale of sharing or coexistence to separation or conflict, and a physical scale of wild to urban. This allows all the complexity to be understood together, and it highlights the fact that despite the problems appearing very significant, the majority of the elements in the shared space cluster together around the position of ideal sharing. I show that this approach to visualising the space can also be useful for management, and allowing for a rationalisation of the intuitive and often *ad hoc* manner in which decisions are taken on the ground. Conservation interventions can also be targeted at particular factors in the space that are outliers in terms of allowing for a more peaceful sharing of space. Change within this system are clearly not linear and “points of intense folding” or “tipping points” are useful ways to understand the changes, where intense events rupture the fabric of the

shared space that could change some elements significantly and forge new relations and power dynamics in the space.

Through this Chapter, I have showed a re-conceptualisation of the space could be relevant to managing and taking practical decision around the human-elephant interface, which I believe is something that will make a significant difference in allowing elephants and people to share space more peacefully.

Finally, in the last Chapter, in conclusion to the entire thesis, I use a reflexive approach to examine my personal journey in undertaking this interdisciplinary research and the methodological implications of this for the various disciplines aiming to work on conservation and more broadly human-animal studies. I also discuss, again using a personal and reflexive approach, the future of elephants and people sharing space in both Gudalur and also other neighbouring shared landscapes.

7. Conclusions

Through this thesis, I have attempted to cover significant ground in better understanding how people and elephants share space in the Nilgiris. Through the four research questions, I have examined the range of factors that underpin human elephant interactions, the diversity in both the humans and elephants that interact with each other, and looked at how all this can be used to better manage the shared space to minimise the negative impact elephants and people have on each other. While each of the Chapters ends with a set of more detailed conclusions, I briefly summarise the findings of this thesis here.

7.1. A summary of conclusions

- Through the grounded introduction in Chapter 1, I have presented a series of ethnographic descriptions that challenge some of the normative ideas around human-elephant interactions. From the friendly elephant Bharathan who does not cause significant conflict in his interactions with people, to a significant event where people are killed and elephants captured, to the complexities of managing the shared space and the debates in the policy sphere, I draw out the key research questions that are relevant to people and elephants sharing space.
- In Chapter 2, I review the literature from various disciplines that are relevant to humans and elephants (or animals more broadly) interacting with each other and sharing space, and describe the interdisciplinary methodological considerations and methods used in this thesis. The conservation literature, with its roots in biology, is committed to the practice of nature conservation, but most human-wildlife interactions are understood through the lens of conflict, and is limited by the quantified positivist epistemology. Elephant biology, while extensive in its study of elephants, has shown very limited interest in the lives of elephants that interact with people. Geography and anthropology are showing a growing interest in animals and offer interesting insights that look beyond conflict, but the focus remains on generating new theoretical approaches to understanding human-animal interactions and also suffer from methodological limitations that hinder significant engagement

with large and dangerous wild animals, particularly in the global south. This thesis has attempted to contribute largely to the conservation literature, while borrowing from ideas in geography and anthropology, moving beyond the positivist epistemology. I have used a range of methods from GIS and map making, to multispecies ethnography involving individual elephant identification, extended elephant observation, along with interviews, discussions and participant observation among humans. All of this was undertaken with due consideration of the underlying epistemological approaches of the different disciplines.

- In Chapter 3, I have identified and discussed a number of factors that are essential in understanding the context of human-elephant interactions. The region is accorded a high conservation value, arguably giving elephants an advantage over the local people. There is significant conservation conflict between the state and the different groups of people inhabiting the region, which amplify and exacerbate the negative inter-species interactions. The land use is particularly relevant – the dominant crops being tea and coffee plantations makes crop damage insignificant, and the spread of forest fragments through the region allows elephants to use majority of the region. The distribution of elephants and people across the landscape shows large overlap, making sharing of space inevitable, since constructing barriers (trenches and fences) at a regional scale is not feasible. In terms of changes in the region; global changes in agricultural commodity prices has an impact on human-elephant interactions and crop patterns, and also intensity of management of the plantations change. Elephants have significantly expanded their range over the last five years, coming into greater contact with people than ever before. Finally, there are some patterns in the human fatalities that can possibly be mitigated to reduce the negative impacts elephants have on people.
- In Chapter 4, I have examined the diversity among the elephants in terms of how they interact with people, while evolving novel methods to do this. I have showed that the elephants living in Gudalur differ significantly from other elephant populations living in more intact forests as described in the literature. The overall population is skewed towards younger individuals, with a very high proportion of

young males. The home range of some of the elephants is smaller than anything reported in the literature. These elephants do not seem unduly affected by human presence and continue with “natural” behaviour like feeding and sleeping even in highly modified environments in the presence of a number of people. There is significant individual variation as well, where I have created behavioural categories along a gradient of interactions and reactions to humans, using both qualitative and quantitative data. The majority of elephants (72%) do not significantly interact with people, either seen very few times in the region or invariably seen away from human habitation. About 18% of the elephants do interact with people regularly, but remain afraid of people and exhibit the “fight of flight” response. These individuals, which are 11 males and one female led herd of 10, are responsible for the majority of negative interactions between elephants and people. A final 9% of the elephants are highly habituated to people and remain unperturbed and almost never attack, even when being chased by people, but it is invariably these habituated elephants that are assumed to be problematic.

- In Chapter 5, I have showed that humans are also highly varied in their attitudes to, and problems of living with, elephants. A number of people, even those who have negative encounters with elephants, gain from interacting with elephants and spend extended periods watching them. With various waves of migration into the region, “ethnic community” is the most appropriate way to cluster and categorise this diversity. Hunter-gatherer tribes with little or no agriculture and strong animistic beliefs about elephants as “other-than-human persons” have room to accept individual variation in elephant behaviour and have very limited conflict with elephants. Some of the newer agricultural migrant communities who have no history of living with elephant and grow crops that elephants eat, have much higher levels of conflict, with a gradient of people between these two extremes. But the local narrative around conflict is driven by the powerful and more vocal minority community, and is not reflective of the overall problem the majority people have of living with elephants. Policy around reducing the negative impact people and elephants have on each other must recognise this diversity, and a bottom up approach will allow for more autonomous and peaceful sharing of space with elephants.

- In Chapter 6, I examined how all of this complexity can be better understood and managed to reduce the negative impact the two species have on each other. The majority of interactions between people and elephants are non-conflicting and positive, and this needs to be recognised in the policy around managing human-elephant shared spaces. Animistic ideas and beliefs, while not even taken seriously by anthropologists (Nadasdy 2007), could potentially be taken seriously and become a part of the policy around managing the human-elephant shared space in the Indian context. Finally, I attempt to re-conceptualise the space and understand it in topological rather than topographic terms. With this, I have showed that the cultural and physical variables relating to human-elephant interactions can be understood and examined together. This topological mapping of the space allows for better decision making on a case to case basis, and for a more targeted planning of conservation interventions aimed at promoting peaceful coexistence.

All of these findings have been discussed in more detail in each of the individual Chapter's conclusions, and I do not attempt to further deliberate on these. In this final Chapter, I instead attempt to examine the implications of this work for further research around people and animals, particularly in terms of methods. I also attempt to dwell on the future of sharing space, and how this could pan out in the years to come. For both of these, I use a personal and reflexive approach, first looking back at my own journey of undertaking interdisciplinary research over the last six years, and then reflecting on my own experience of living with elephants as an inhabitant of the shared space.

7.2 Undertaking interdisciplinary research

The global human population continues to grow and consume more resources, while Asian elephant (and some other wildlife) populations are also growing (Chapron et al. 2014; Project Elephant 2017). People and elephants (and other wild animals) are now coming into contact with each other perhaps more than ever before. Better understanding the people, animals, and their interactions is going to be an area of growing interest, but how this can be meaningfully undertaken remains unclear. Interdisciplinarity appears to be the indisputable way forward, but is a significant challenge as I have described in Section 2.2.1.3, both in the conservation literature and in human geography. A better understanding of different disciplinary and epistemological boundaries is a useful starting point, which I discuss below.

7.2.1 Disciplinary and epistemological boundaries

I have described the methodological approaches and epistemologies of the different literatures in Section 2.4, which I reiterate briefly here. Biology, including elephant biology, ethology and the conservation literature, are rooted firmly in quantified positivism and the scientific method, even when extending to people and studying their attitudes, beliefs and tolerance to wildlife. The critical social sciences, human geography and anthropology, arguably rely more on the qualitative post-positivist or interpretivist approaches, which also extends to newer work examining the lives of animals and their interactions with people. With natural scientists already studying people and social scientists already studying animals, what are the implications for interdisciplinary research? Is much of this cross disciplinary research therefore already interdisciplinary? “Interdisciplinary” journals in conservation regularly publish (only) positivist social science (e.g. *Biological Conservation* – Kansky et al. 2016), while critical social science journals regularly publish post-positivist research on animals (e.g. *Transactions* - Evans and Adams 2018). The choice of journal for publication is driven not by the discipline, subject or object of study (people or animals), but by the methodological approach to studying them. The challenge therefore is around bridging epistemological, rather than disciplinary boundaries. Should the discussion therefore shift from inter-disciplinary research (Fox et al. 2006; Adams 2007; Redford 2011) to inter-epistemological research?

In this thesis I have attempted to examine the lives of elephants and people, through what I hope is an inter-disciplinary *and* inter-epistemological approach. I have described the elephants and people in different Chapters, and situated the work in different literatures with little or no overlap, seemingly reinforcing the nature-society dichotomy. Interactions were examined from either a human or elephant perspective, and at the outset it would appear that even this body of work is presented in a multi- rather than inter-disciplinary format. However, throughout this thesis I have attempted to be “epistemologically neutral”, being aware and committed to different and almost contradictory epistemologies. Starting with a multispecies ethnographic approach, aware of my subjectivity and positionality, the primary data remained qualitative data within the post-positivist or relational framework of the critical social sciences, assuming elephants are thinking, sentient beings, without losing any of the richness of the human-elephant interactions. I have then attempted to draw out some quantifiable data and generalisable patterns that fit into the natural sciences framework, while having direct relevance to policy and managing the shared space, without being overly simplistic or reductionist. In both the Chapters, on elephants (Chapter 4) and people (Chapter 5), I have attempted to satisfy the epistemological requirements of both the natural and critical social sciences, with an ultimate commitment to the reality of the shared space on the ground and the lives of the elephants and people. This of course runs the risk of falling between the gaps, and not being considered legitimate in any of the disciplines, which I hope to find out over the course of time.

In the next Section, I describe my journey in undertaking what I hope to call inter-epistemological research, linking them to the methodological limitations I have described in Section 2.4 – biology’s reductionism, more-than-human geography’s inability to actually engage in (wild) elephant geographies.

7.2.2 Accepting contradictory epistemologies

This is perhaps the first challenge as a researcher, though I was unaware of it when I first started formal research in 2009. I knew different ethnic communities were very different from each other in how they interacted with elephants, and wanted to further

“scientifically” study this diversity. More specifically, having worked with indigenous people for some years, I believed that the Kattunayakans, the most forest-based of all the groups, were highly tolerant of elephants and didn’t have all the “HWC” problems the literature described as general problems between all people and wildlife. The first methodological option was to use a few stories of varied human-elephant interactions and make a strong argument for communities being significantly different in their interactions with elephants. This would have considerable depth, but lack the breadth to convince policy makers and other conservationists; I needed quantifiable data and rigorous statistical analysis. I formulated a questionnaire that I believed aptly captured the nuances of the human-wildlife interaction in this context, and then interviewed 250 people from five different ethnic groups. I subjected this “data” to various analyses, and “proved” that some communities were more tolerant than others. For the thesis, I backed this with more meaningful stories, and got a distinction in the MSc dissertation for my efforts.

For the next few years, I presented this at various conferences, and focussed on convincing conservationists and policy makers that indigenous people were highly tolerant and their lives were not incompatible with wildlife conservation, with a significant degree of success. In 2013 I started my PhD, and engaged with the seemingly vast body of more-than-human geography literature, and started being more and more critical of the quantified, positivist, over simplified conservation research. The same year Chembakolli – my quintessentially tolerant Kattunayakan village – had an elephant damage eight houses in one monsoon, and wanted help in getting the forest department to dig a trench to keep the elephants out. This shattered my “highly tolerant hunter-gatherer” generalisation, and it dawned on me that my “scientific data” was preventing me from accepting the realities on the ground. At a conservation conference soon after that, with numerous presentations filled with quantified data and complex statistical analyses but based on what I thought were overly simplistic assumptions that were invariably ignored, I did a complete methodological switch and decided to abandon quantitative data trying to run complex problems through simple regression models. For the next few years of the part time PhD I focussed mostly on immersing myself in the interactions and ethnographic field work.

The mapping and GIS work all happened during this period, and the qualitative-quantitative or epistemological debate did not seem relevant. I focussed on the problem at hand – I wanted to know where the elephants, people and forests in the region were. I briefly looked at the remote sensing tools available and found them inadequate. The biological sampling and extrapolation for elephant distribution based on signs (dung, foot prints, and direct sightings) was also not convincing or feasible; given the mosaic of multiple land use types it would involve sampling in one land use and extrapolating to another. I instead chose a “grounded” approach that I felt sure would be accurate – mark out all the houses and forests from Google earth, gridded the landscape and asked people (mainly forest department field staff) about elephant presence throughout the year. I did not see any problems with these methods, until a biologist later pointed out that asking people was not entirely reliable or scientific. But he also acknowledged that there was no other way – it was not feasible to visit 500+ grids and look for elephant signs in each of them.

Towards the end of 2015, I began to study the elephants more seriously (along with the TST team), and here another methodological reversal occurred. The more-than-human literature discussed very relevant ideas about how elephants *should* ideally be studied with all the wonderful richness and complexity, but despite all these ideas, it was only the biologists who actually had any real-life experiences of elephants. I had to also be relevant to them. I realised the “animal turn” in the social sciences was two decades old, with no signs of doing what it was calling to do. Biologists spent years or even decades studying the same elephants and knew them intimately, while more-than-human geographers’ interest in the inner lives of the animals studied rarely extended beyond a few months. I didn’t believe I could glean significant insights into the lives of elephants through a few observations or from what local people told me about elephants, I had to watch them for extended periods of time. I thought my research had to be relevant to the existing science and practice of conservation, though the challenge of overcoming “biological reduction” remained, which I describe later in this Chapter.

Around the middle of 2016, I attempted to publish my MSc results in the (supposedly interdisciplinary) journal “Conservation Letters”, and the rejection and comments from the

reviewers highlighted the epistemological tensions. The biologists who reviewed it, while providing some constructive criticism around the statistical analyses, rejected many of the conclusions which were not supported by the “data”, but came from the “vague anecdotes” and “generalisations made from disparate and unconnected [anthropological] literature from other parts of the world”. None of the literature on hunter-gatherers’ alternative worldviews and ontologies were considered relevant bodies of knowledge.

Some biologist colleagues wanted help with better understanding “tolerance” across the Nilgiri Biosphere Reserve. After presentations of my work and long discussions, it was decided the same questionnaire would be rolled out across the three states, and I found myself vehemently objecting. My questionnaire was only relevant to capturing the human-wildlife interaction based on the context of the people and place. Very pragmatically, I knew that most of the questions would be irrelevant to a millet farmer in Karnataka or a paddy farmer in Kerala, since their context was completely different from the tea/coffee farmers and wage labourers of Gudalur.

The contrary epistemological positions became clearer – critical social scientists reject questionnaire surveys since they are inevitably based on a set of assumptions, and ignore much of the complexity that could render the “data” completely irrelevant. Biologists on the other hand, reject the in-depth case studies since they are not representative or generalisable, with patterns that can be relevant to policy. It was only then, when I had finished most of my fieldwork, that the full significance of the “great epistemological gulf” (Brosius 2006) became apparent.

I started with a critical social science approach, where I collected mostly qualitative data from ethnographic field work, aiming to challenge some of the normative ideas around conservation. From there, at various points during the thesis, I attempted to either collect or draw out more quantitative data from the existing qualitative data, and challenge some of these normative ideas with more generalisable descriptive statistics. And finally, in writing the thesis, I have attempted to use both these approaches together to make certain arguments, remaining true to the complexity and nuances on the ground, while also

drawing out some broad generalisable patterns that are useful for policy. Whether these actually satisfy the epistemological requirements of the different approaches I will find out over the course of time when defending this thesis and going through the peer review process. It could of course end up with different elements presented to different audiences through different journals, but the ultimate objective – however challenging – would be to also push on the epistemological boundaries of various journals – to have ethnographic field work published in natural science/conservation journal, and a hypothesis-driven regression model in a critical social science journal.

In retrospect, I think there are a few key factors that allowed me to remain “epistemologically neutral” and work with seemingly contradictory approaches to what constitutes knowledge. The first is perhaps my lack of a formal training in either the social or natural sciences. In most of my early work, I felt the lack of training in biology was a limitation, but it eventually turned out to be an advantage where I was not trained to prioritise one universalist epistemology over another. The second is the unusually long duration of my “field work” over six years (and further informed by my deep engagement with the place by living there for three decades), and remaining committed to all the changes that happened on the ground with both the elephants and the people. This did not happen by design, but more by the reality of living in the region and encountering the people and elephants as an insider (through The Shola Trust) over this period. This is perhaps not feasible for most researchers, and everyone only doing research around their home comes with its own set of limitations. But a commitment to fieldwork over extended periods would clearly be useful for undertaking such work. The third is the people I have interacted with, starting of course with my supervisors. Soon after the interdisciplinary MSc programme, I attempted to start a DPhil at the University of Oxford, co-supervised by an anthropologist, a long-term ecologist and an environmental geographer. I then moved to the part time PhD at the Open University, and gained two more supervisors – a cultural and human geographer. While the long-term ecologist was not able to continue as a formal supervisor, I have remained connected and continued to discuss my work over the years, and have also been associated with an elephant biologist at the Indian Institute of Science (IISc) in India. In addition to this wide range of formal and informal supervisors, my peer group has also been important. The students and post-doctoral researchers I sat and interacted with on a daily basis spanned both the critical social sciences and biology – from

geographers and zoologists at Oxford, to biologists in India. All of these people were clearly doing interesting and relevant research; continued discussions that centred around the practice of nature conservation ensured that both these epistemologies remained relevant. This wide and diverse network of people has been critically important in allowing me to remain committed to the two contradictory approaches to research and knowledge.

While not all of these elements of my research trajectory are replicable for other researchers undertaking interdisciplinary research, a number of them are – particularly supervisors from different disciplines, extended field-work, and a commitment to the changing realities on the ground and continued interactions with people from different epistemological backgrounds.

In the next Section, I discuss in some detail the process of arriving at the particular methods and methodology I have used to understand the lives of the Gudalur elephants.

7.2.3 Inter-epistemological methods

7.2.3.1 Understanding elephants – ethograms versus ethnographies

A major epistemological challenge we encountered, was when we started systematically studying the elephants. My lack of training in the biological or animal behavioural sciences and the absence of a formal supervisor in these fields meant I had no set methodological framework to follow. The motivation to more systemically study the elephants was similar to that of better understanding the people; I knew that the behaviour of the Gudalur elephants was different from the elephants in the adjacent Mudumalai to the North, and also that individuals were very different from each other. The biologist I was associated with has had a long-term elephant monitoring programme in Mudumalai over the last 30 years, and my first effort was to replicate their methods in Gudalur to make quantified comparisons. My probation report, at the beginning of 2015, claimed that I was going to work closely with ecologists and use their “*ethological methods – radio/geographic positioning system (GPS) collaring combined with trace/group sampling and behavioural mapping*”.

Towards the end of 2015 I began formally studying the elephants, and I distinctly remember our first day of “field work”. I was with four colleagues from The Shola Trust and two biologists from Mudumalai. They were going to show us how to conduct elephant behavioural field work. It all boiled down to the ethogram – a structured table of all elephant behaviour, based on preliminary observations, which we were attempting to make. We also wanted to identify individual elephants based on morphology, and had our cameras ready to take photographs. The forest department staff had all been instructed to help us, and we rushed off to an area where elephants were reported. We got there and found the elephants had just been chased up the hill by the local people and one team of forest department field staff. There was considerable excitement in trying to retrace the elephants’ path, and look at photos of the elephants on local peoples’ mobile phones. The RFO got a call about there being elephants in another place, and we all piled into jeeps and headed off in another direction. There was commotion at the second place – the elephants were actually being chased, and we could hear people shouting and banging drums in the valley below, though we could not actually see the elephants from the tea covered hill slopes we were on. We then got called back to the first place, where elephants had been spotted again. We split up into two groups, not wanting to miss any of the action. I stayed with the two biologist colleagues, and we kept moving around trying to see the elephants. A local estate worker had brought five young tourists to see the elephants. The forest department officers shouted at him for endangering people’s lives. He shouted back at them claiming he could do what he wanted on private land and no one was in danger. The tourists however got scared and left. A few hours went like this. Then finally one of the watchers came running up to us and called us to the neighbouring hillock, since the elephants were about to be chased out that way. We ran around the hill and waited eagerly. Finally, the elephants emerged, coming almost directly at us. About six cameras started clicking away furiously. Some staff jumped into the frame and wanted us to photograph them and the elephants with our “good cameras”. The elephants seemed quite calm and composed all considered, but soon sensed us, and moved back into the wooded valley. We had seen them for all of six minutes. A haggard group of forest department staff then followed. They had lost their voices from all the shouting, and not had anything to eat or drink all through the day, and it was almost 4 pm by then. We left all the staff there and started walking back to the main road. We took the first bend around the hill, and came up to another tusker. We retreated quickly, then remembered our task was to photograph and observe the elephants, and tentatively began photographing him from a safe distance.

When we sat down later in the evening to take stock of the day, the reaction from the biologist was interesting:

“This place and the elephants are not proper. You can’t do any rigorous behavioural studies with suitable sampling methodology. This is really no place for elephants. No ethogram can be made for this type of situation, where people are chasing them all the time and it’s a completely unnatural environment. At best you can try ad libitum sampling, no rigorous sampling will work.”

Altmann (1974:235) describes ad libitum sampling as *“Such records are the result of unconscious sampling decisions, often with the observer recording “as much as he can” or whatever is most readily observed of the social behaviour of a group in which behaviours, individuals and often the times for behaviour sessions are chosen on an ad libitum basis”*. This to me seemed similar to the ethnographic approach we had been using with the people, and I decided to abandon the ethological framework altogether. Even if we were able to construct an ethogram, “feeding” would be recorded as one activity, with no distinction made between the elephant was feeding on a remote hill, raiding someone's crops, or feeding in a swamp surrounded by people etc., clearly very different contexts, even if the final behaviour was the same. Our first task was to identify individual elephants, for which we took photos and videos, but we also collected some information around the context of the human-elephant interaction, and made detailed notes about what the elephants were doing – what we called “elephant ethnographies”, which later became multispecies ethnography as we also significantly engaged with the people.

Despite my disillusionment with the ethogram, the need to connect with the existing biological literature on elephants remained. We had no “hypothesis” when we started, or structured/quantified data we were collecting – only detailed notes from each of our elephant observations. But in a few months patterns began to emerge; the Mudumalai elephants only came out at night, raided crops and went back, the Cherambadi elephants were almost “urban” - they never went into contiguous forests at all, and were seen even around houses through the day, while the O’Valley elephants would be seen for a few

days, and then disappear into contiguous forests for a few weeks. I spoke to my biologist colleagues about this clear pattern we were noticing, but they were unimpressed - “*Do you have any data to support this or are you saying this based on your perceptions?*” The need for quantified “data” was evident, and it was possible to extract this from the qualitative data. At each of the interactions, from our notes we began to “score” the various parameters as I have described in Section 2.5.2, and we generated some “data” to show the elephants were indeed significantly different from each other. In this thesis I have limited it to descriptive statistics, but in future research more “robust” analyses could be carried out (multi-dimensional scaling, for example), which we aim to do after three years of collecting such data.

What I have found particularly interesting, is that the “biological reduction” is more a problem with the discipline rather than the individual biologists who often possess a more expansive view of science. Around my home, I routinely encounter four different tuskers - OVT3/Silver Monstera, OVT6/Kokkal Moopan, OVT7/Alibaba Basheer and OVT8/Arumugam Kuppaiswamy. From these, I “feel” the least threatened by Moopan, followed by Monstera; I will not attempt to move away, but will try to be quiet and observe them. With Kuppaiswamy I am scared; and will invariably move further away or even run. With Basheer I am curious – I don’t feel like I know much about him so will try and watch him more, but always ready to flee. When I encounter the elephants, or if I have to advise family or friends on what to do if they come across them, I will not attempt to use any of my “data” but will rely on my feelings. Discussing this with biologists, I find they all agree – how you behave around elephants has to be based on feelings, and not science or data. They all talk of a sixth sense. Some of the more thinking biologists are very aware of the limits of the natural science framework – there may be some other interaction between elephants and people (“*possibly based on some electromagnetic waves coming off brain activity*”) that we do not yet understand. Many of the well-known biologists have written extensively; and there is almost a contradiction in their scientific and “popular” writing. In their science they are objective and detached from the elephants as mere objects of study, while their popular writing highlights their subjective positions and meaningful (anthropomorphic) interactions they have with the elephants they study. Saba Douglas-Hamilton’s (whose father, Ian Douglas-Hamilton was one of the pioneering African elephant researchers) first interaction with an elephant is one example of this:

““On Saba’s first meeting with Virgo, her mother, Oria, approached the elephant on foot holding her new born baby in her arms. Virgo let them come close then stretched out her trunk and took a good long sniff of the baby. She then coaxed her own calf forward as if to introduce it to the humans.”⁹⁵

Almost all of the early elephant biologists have written books for popular consumption (e.g. Douglas-Hamilton and Douglas-Hamilton 1979; Poole 1996; Sukumar 1996; Payne 1998; Moss 2000). These describe their meaningful interactions with elephants in great detail, and are not limited by questions of objectivity and distancing themselves from the animals. From these popular writings and from interacting with some of the early elephant biologists (who significantly engaged with elephants in their field work unlike much of the newer work as I have described in Chapter 2), I would argue that all of them have actually engaged in elephant ethnography, and their ethological data is merely a subset of all the information they gather about the lives of elephants. The “biological reduction” is only to satisfy the epistemological requirements of the disciplines – the people themselves have never actually allowed the tick boxes in the ethogram to get in the way of their attempts to experience the inner lives of elephants. The biologists, as people, are arguably doing what the more-than-human geographers are calling for, disciplinary boundaries notwithstanding.

Overcoming this “biological reduction” therefore, may not be as significant a task as it seems; it is merely the disciplinary boundaries that need to be reconfigured. This is perhaps under way, with the journals like “*Ethnoprimateology*” taking the lead in bridging the ethnography-ethology gap.

With the limitations of the ethogram for observing elephants clearly evident from the discussion above, engaging with and understanding the limitations of other methods becomes particularly important. More-than-human geography methods in particular, and the call for geographers to engage more significantly with the methods in biology (Hodgetts and Lorimer 2014), is worth examining further, which I do in the next Section.

⁹⁵ From <https://sabadouglashamilton.com/about/>

7.2.3.2 Sensing elephants

A few months into our elephant fieldwork, I noticed the notes by my colleagues would often include “*the elephants then saw us...*”. In my attempt to be “scientific” and technically correct, I kept reminding them that elephants had very poor vision, and in all likelihood were not actually seeing them, but either hearing or smelling them. I kept pushing them to be more accurate in their notes. After this happened a few times, one of them retorted:

“Why are you so worried about the word? What I mean is the elephant knew we were there. Sometimes they smell, sometimes they hear, sometimes they may also see a bit of movement. It depends on the wind, whether there is rain or how dry the leaves are when we walk. How they know we are there we cannot be sure. When we write “saw”, we mean they knew we were there.”

It was decided we should then use the term “sense” instead of “see”, and this is perhaps one of the most important aspects of watching and interacting with elephants. Compared to humans, elephant’s vision is poorer in the day, but sharper at night. Their olfactory and auditory senses however, are much more advanced, and they also use their feet to pick up vibrations. Sight (in the day) is our most prominent and almost only sense, and with powerful zoom cameras we further enhance this one sense and are able to “see” elephants from distances much beyond the range of our eyesight or of any of the other senses. But at closer quarters, being able to “sense” elephants on their terms becomes important. In undertaking field work with elephants, being able re-tune our senses to be more in sync with the elephants is a key skill⁹⁶ that needs to be developed.

Sensing elephants, I argue, happens at two levels. First is related to finding elephants or having a sense of when elephants are around. My partner first pointed this out – that most

⁹⁶ The term skill has more complex definitions, but I use the simpler dictionary meaning to imply “the ability to do something well; expertise.”

of us who grew up in the region, are almost able to sense the presence of elephants before we actually could see them. While this was possibly expected for most of us at The Shola Trust who spent the majority of our time looking for elephants, she was surprised to find even my brother (who now lived in the city of Bangalore) had a similar sense for finding elephants. This prompted some discussion about how we actually “sense” elephants. Breaking it down, we agreed that this was not entirely a “sixth sense”, but more of a cognitive process that relies on thought, experiences and a combination of the senses – a subconscious deduction. Based on our experiences, we have some ideas about the kind of areas that elephants are likely to be seen – like around bamboo clumps, in grassy open patches, close to streams or water bodies - what biologists would term elephants’ preferred micro-habitat. The next is smell – fresh elephant dung has a powerful odour that can be smelt even by humans from a considerable distance. Every elephant defecates almost once an hour, so a herd of 12 elephants implies a new pile of dung every five minutes, and this “elephant smell” can easily be picked up once the observer becomes attuned to it. Then there is sound – elephants spend most of their day feeding and constantly breaking branches of trees, which can also quite easily be heard. In regions shared by elephants, people arguably create a subconscious register of these various sensory cues. A cracking of a branch may sometimes be followed by a waft of elephant smell while driving by. If you then approach a grassy patch you are subconsciously already expecting elephants. All of these sensory cues and of course much more pronounced when walking, with a number of visual cues also helping - broken branches and grasses bent in the direction of the elephant’s movement.

Detecting elephants is therefore a reasonably straightforward process of deduction, with the only complication being that the cues all register at a more subconscious level, making them hard to tease apart. If you make a check-list and try to focus on any one sense, you may miss another. The senses have to all come together. This skill is not limited to elephants, but is developed when interacting with a number of other wild animals, and comes naturally to anyone in an environment with dangerous wild animals, since not sensing a dangerous animal in time could result in death. Biologists (and hunters before them) also learn this skill relatively quickly, primarily through their indigenous “trackers” or “guides”. While it is not discussed in the methods Section of scientific publications, it is vibrant in all of the popular literature – particularly the hunters. It is honed through

continuous practice, but perhaps also never forgotten – possibly like cycling or swimming. It is also hard to suspend this skill after it is acquired; I remember walking through the New Forest in southern England and feeling slightly disconcerted – I was automatically processing various cues, while at the same time very aware of the fact that there were no elephants or other dangerous mammals in those forests. A tribal colleague who visited Germany also had a similar experience – he thought the forests felt strange, since *“there was nothing that could make you run, only things that would run from you”*.

In addition to the more straightforward skill of detecting elephants, there is a more nuanced and subtle skill related to being in the presence of elephants and predicting how they will behave. There are of course a number of visual cues to tell if an elephant is wary or agitated and close to charging at you – the raised trunk to smell the air, the ears stop flapping and are held straight out to pick up sounds, the stopping of all movement in the body, the pawing of the ground in extreme cases. All of this has been written about extensively by hunters and biologists. But there remains an embodied interaction between a person and an elephant, which is the key to a certain “feeling” about how the elephants will react. I have touched on this above with the tuskers around my home, but am only just beginning to be aware of this bodily experience of being in the presence of elephants, and do not feel qualified to discuss it in depth.

Mahouts who deal with elephants on a daily basis are clearly much more aware of this, and a story from a colleague who trained under a senior mahout with temple elephants is a good example of what she called a “sixth sense”.

“Something went wrong and the tusker gored its mahout. He was killed almost immediately. There were no signs of aggression before that. Hundreds of people around all panicked and started screaming and running away. The elephant was then getting more agitated. The senior mahout walked up to the elephant and put his hand on its left tusk and calmed it down. Just imagine – standing over its dead mahout, with his blood still wet on its right tusk.

Everyone was shocked by him going up to the elephant. I asked him how he knew it would not kill him also. And he said he can't explain, he just knew. How can we possibly explain this through the scientific framework? If I tell you all these stories we can go on.. But I never mention all this to the biologists – they will never understand.”

There is very clearly some interaction between the two beings that allowed the mahout to confidently approach a potentially very dangerous elephant, or the sense people with vast experience of dealing with elephants have about how an elephant will react. This is an area that needs significantly more attention, which is clearly beyond the scope of biology, but well within the mandate of human geography or anthropology.

Finally, an important point of discussion around methods for studying elephants and people, is the questions of ethics and consent when taking a more-than-human approach to understanding nonhumans, which I discuss in the next Section.

7.2.3.3 More-than-human ethics

Through this thesis, I have argued that more-than-human geography has been largely unable to significantly engage with the lives of large and dangerous animals in “beastly places”. Hodgetts and Lorimer (2014) have attributed this in part to methodological shortcomings, and call of geographers to use the advances in the natural sciences; technologies of tracking, inter and intra species communication, and the geographic information that can be gleaned from genetic analysis.

In critical social scientists using these methods however, some questions around ethics emerge, as animals become subjects rather than objects, negotiating the world as thinking sentient being rather than a mechanistic species responding to instinct and evolutionary triggers. Animal ethics is of course a vast area of research, and significantly engaging with or contributing to this body of literature is beyond the scope of this thesis. Instead, I focus

on two pragmatic and grounded problems of applying these methods to elephants that I encountered during fieldwork, when I claim to treat them as ontological equals.

Much of our fieldwork at the human-elephant interface involved elephants being chased by people, often violently with specially designed fire crackers, blaring sirens and large groups of people shouting and beating drums. Amidst these chaotic and busy encounters that involved some form of violence against elephants, while we discussed this and made sure we did not directly engage in any violence ourselves and abided by the “do no harm” approach that has been a part of the medical research ethics for over a century, I could not claim to be an entirely non-partisan observer. I had research permits from (and access to) the head of the state forest department. I discussed our research with DFO on a weekly basis. I conducted trainings for the forest department field staff. Changing these practices was a definite possibility, though it would of course open up a significant discussion of my role as a “participant” and an “observer”. This is arguably similar to the ethical challenges faced by social scientists in conflict zones, which has also received insufficient attention (Goodhand 2000; Avruch 2001; Wood 2006). Barua (2014) is one of the only other social scientists to engage in direct elephant observations with a more-than-human perspective, where his method relating to “tracking elephants” involved working with biologists to track elephant movements through signs left behind, and reconstructing their activities through local human informants. The objective of his paper is not to discuss the lives of the elephants as an end in itself, and he does not furnish details of how often he interacted with elephants and whether there was any violence he witnessed against the elephants, since elephants enjoyed state protection and it was the dis-empowered locals who faced more significant levels of violence from the elephants. But this is an area that warrants some analysis and discussion in all such work by critical social scientists, and is something I intend to examine in further research. In overcoming my dilemma on the ground, I used our data (primarily videos) as a mirror for the forest department field staff. In watching the videos in a space more removed from the lively and charged atmosphere of the human-elephant encounter, it was decided by the staff themselves to limit the use of firecrackers and elephant chases except in unavoidable situations.

The other ethical complication is around the use of radio collars. While we did not finally use these, it came up for discussion when elephants were captured, and is a topic that warrants more discussion given the significant violence the process involves. The elephant is darted with an immobilising drug from a vehicle or helicopter using a tranquilliser gun, a collar is fitted, and then the sedation is reversed with another drug. While this sounds straightforward, it comes with significant risk associated with elephant physiology. All mammals except the elephant have an empty pleural space around their lungs to make it easier to breathe. The lungs of the elephant are attached to the walls of the thoracic cavity with the space around filled with connective tissue. This makes it easier for elephant to use their trunks to “snorkel” or breath under water at higher pressures, but also makes it difficult for them to breathe or tolerate “sternal recumbancy” (lie on their chests) for extended periods without suffocating. How the elephant falls after being tranquillised therefore becomes critically important. It could also fall trapping its trunk under its own body, again suffocating itself. The terrain is also very relevant, after the darting, the elephant often starts running away, and in undulating terrain sometimes with water bodies, there is the very real risk of the elephant fatally injuring itself or drowning during the fall, and a number of captive elephants (India) or a helicopter (Africa) is always around to minimise this risk. The drugs used are also very relevant; Etorphine and Fentanyl derivatives used in combination, with Diprenorphine to reverse the effect, have been popular in the past (Jones 1975; Stegmann 1999), but run the risk of an overdose that can easily kill the elephant, or an under-dose where the elephant never falls. Xylazine and ketamine combinations are growing in popularity, where the elephant does not actually fall, and is partly immobilised while standing (Sarma and Pathak 2001; Cheeran 2008). There is some risk to the humans, as the elephant can still flap its ears, move its trunk/tail etc. While this standing sedative seems ideal with minimal risk to the elephants, it could have some psychological effect on the elephant, as it may be aware and remember how it was handled (or man-handled) by humans. All of these discussions are very vibrant in India, where the death of any elephants on account of these risks is unacceptable in the public sphere, but much less so in Africa where cultural and religious links to elephants are not as strong, a small percentage of mortality being expected and tolerated. The psychological impact of research on elephants is perhaps not yet considered.

Beyond the risk of mortality in these operations, there is the traumatic impact these interventions have on elephants even beyond the drug administration. In the much publicised paper on elephant sleep for example (Gravett et al. 2017), the methodology (which is relegated to almost footnote at the end of the paper) involves coming in with helicopters and tranquillising the matriarchs from the sky, using sirens to chase away all the other elephants, then making a sizeable cut in the trunk - 5 cm long, 15 cm deep - into the most sensitive (and constantly used) part of the elephant, to put in the implant. That this traumatic experience may negatively impact the elephants sleep is not considered or even mentioned.

While the natural sciences and animal ethics boards have discussed and come to terms with these methods, is there a need for social scientists to re-examine the ethics of these methods given the differing ontological positions on elephants? Evans and Adams (2018), use GPS-Satellite collars as a part of their method, and while the actual collaring process was likely to be undertaken by biologists as a part of a different project, they unfortunately do not engage with any discussion around the ethics, or even furnish any details of the tranquillising process – the drugs used, and the actual process of darting the elephant.

The impact of the collar on the individual within elephant society also warrants some discussion. After the decision to collar an elephant was taken (as described in Section 3.1), the District Collector pointed out that this would be an identifier for people to recognise the elephant as being problematic, and cause protests wherever it was released. But the Bettakurumba mahouts also discussed the impact the collar would have as an identifier for the elephant within elephant society. Here was a young male recently ejected from its natal herd, trying to form bonds with other male elephants, and arguably a bit of a social outcast within elephant society. Putting a collar on him, they argued, would only further impede his efforts to “settle in” or find his place in elephant society, and would possibly increase his potentially dangerous interactions with people. Ingold (2000), has also described indigenous communities’ displeasure in other parts of the world around biologists’ “ethical” treatment of animals during the process of capture, tagging, collecting samples etc.

None of this is a call to abandon these methods entirely; when an elephant kills people, getting off with the trauma of having a collar around the neck is arguably trivial compared to being captured and placed in a forest department camp, or even “humanely” put down as a means of preventing further human death. But these are all issues that social scientists must engage with and discuss more pro-actively in order to be able to undertake more meaningful research with elephants and people.

In summary, through this Section (7.2) on undertaking interdisciplinary research, which has been discussed in the literature for some time now with limited success, I argue that the challenge is to overcome epistemological rather than disciplinary boundaries. Social scientists are already studying animals, and natural scientists are studying people, but both remain rooted to their respective disciplinary epistemologies. I have therefore attempted to undertake “inter-epistemological” research, and using a reflective approach, I have argued that this was possible on account of various factors – my lack of formal training in either of the epistemologies, having supervisors and colleagues from ecology, anthropology and geography, and a firm commitment to empirical field work over an extended period of time while answering a range of grounded questions that emerged from the human-elephant interface.

I have then examined some of the methodological implications of undertaking research that spans both the qualitative-relational and quantitative-positivist approaches. For observing elephants, I show that it is possible to start with qualitative ethnographic data and extract some quantitative data by scoring variables. Further, I argue that for most biologists who study animals for decades, the quantitative “science” is only a subset of the real “data” they have accumulated. As people they tend to agree that a species like the elephant can never fully be understood through a quantified approach, and their qualitative work is published as “popular writing” and available in the public domain. In finding and observing elephants for extended periods, cultivating the skill of sensing elephants is important. This can be done by harmonising the various sensory cues with the rational and cognitive information about elephants gleaned over time, and is something that most people can learn through spending extended periods with elephants. There remains a more complex and nuanced

idea of a “sixth sense” relating to predicting how an elephant would behave in the presence of people, but this is not something I have been able to acquire during fieldwork. And finally, in critical social scientists rushing to use technological tools from the natural sciences, I raise some concerns about the ethics of these methods, when elephants are no longer objects but subjects of study, and the framework of ethical clearances for research with human subject should arguably be applied.

In the next Section, I use the same reflexive approach to examine my own interactions and living with elephants, more as an inhabitant of the shared space rather than a researcher, and discuss the future of personally living with elephants.

7.3 Personally living with elephants

Through much of this thesis, I have been critical of the conservation biology approach of viewing all human-wildlife interactions as “conflict”, and have focussed on many of the non-conflicting and positive interactions between people and elephants in the Nilgiris. I have been critical of relying solely on the human-nature separation (protected area) model of conservation, and called for more focus and better management of shared landscapes. While all of this is clearly useful and important from an academic and conservation perspective, my position as an inhabitant in the region, sharing space and living with elephants, is also worthy of some introspection and discussion. While I advocate living with elephants, can I also personally live with elephants? In this final Section of the thesis, I reflect on my own interactions with elephants over the years, and discuss the feasibility of my sharing space with elephants in the years to come.

7.3.1 Perceptions and interactions with elephants over the years

My early interactions with elephants was largely in the Mudumalai Tiger Reserve (then Wildlife Sanctuary), driving through with my parents as a child. The roads were largely free of cars in the late 1980s, with the odd jeep going up and down every half an hour or so. Vehicles that got too close to the elephants were invariably charged at, and my earliest memories of wild elephants is that of fear and a sense of danger – stopping a few 100 metres away from a herd or tusker, waiting for them to cross the road, and hoping they did not charge and the jeep did not stall or break down. Every few months we would hear of a jeep that had been attacked. Elephant behaviour in the reserve has changed significantly over the years; there is now one vehicle travelling on the road every minute, and elephants have become indifferent to cars. There is virtually no sense of fear or danger when people in cars encounter elephants now – locals who remember the charging elephants warn people not to stop, but elephants have not charged at or damaged a car for over a decade now.

Through my undergraduate degree and early work up to about 2010, I went up and down the forest roads on my motorbike relatively often and always hoped to encounter elephants. The interactions then were a mix of fear and excitement – even if the elephants did charge,

there were a lot more vehicles around and much less danger. My interactions with elephants were still limited largely to the reserve. I interacted with indigenous people often, and heard lots of stories about elephants, but they remained these “wild” animals, reasonably disconnected from people.

In 2010, I saw elephants for the first time around my parents’ home, and still remember the excitement. They were on the grassy hill slopes behind my parents’ house, so we could safely watch them from a distance. Most of the village was out watching the elephants. By then I was a full time qualified conservationist promoting conservation outside protected areas, and felt it was my duty to “educate” people about the need to conserve elephants outside protected areas. There was no longer any fear of elephants (though the excitement remained), and elephants were a species we were aiming to conserve.

Between 2013 and 2015 another shift occurred, as a colleague’s house was damaged and we began to study elephants more intensively. The elephants’ position as “victims” in need of conservation interventions was becoming less tenable as their own agency and role as actors in the landscape became obvious. While they may have been forced out of the more intact forests on account of ecological stresses, they were now choosing to live alongside people, and with the support of the state it was the local people who were more often the victims. While in local circles I was increasingly identified as a biologist studying elephants, I was much more careful about my position and advocating conserving elephants in Gudalur at the cost of local people, even though I remained positive about elephants and the prospects of coexistence. Towards the end of 2016, OVT6/Kokkal Moopan came around our house (which we had by then built on my parents’ land, close to their house) often. He never damaged anything, and for two weeks he seemed to very carefully explore all the surroundings of our house every night, but only when we were fast asleep – he made sure he didn’t disturb us at all. He got a bit bolder, and we all got to see him a few times in the evenings both around our house and my parents’ house, leaving us all feeling very positive and excited at the prospect of having friendly elephants around us more often.

There has been an evolution of my interaction with and position on elephants over the years - starting from being afraid of elephants as dangerous wild animals as a child, to being excited and wanting to see them (almost like a tourist) in my early 20s, to strongly advocating their conservation in the early years at The Shola Trust, to remaining cautiously optimistic about conserving elephants outside PAs. I knew the elephants and all the complex issues around their conservation, and believed I had solidified my position about elephants in the region. Living with elephants in Gudalur was perhaps going to be inevitable, but local people had to be at the forefront of negotiating the shape and form of coexistence. The conservation policy still assumed most interactions between people and elephants were problematic, and while many people did indeed have very significant problems on account of elephants, the majority of the interactions were non-conflicting and relatively peaceful.

We had a child early in 2018, and moved to Cochin for a few months, to my wife's parent's house. On the 17th of August 2018, while I was busy trying to finish this thesis, the O'Valley herd attacked and ransacked our home, completely shaking up my carefully considered position on elephants in the region.

7.3.2 The limits of sharing – elephants in our house

Our neighbour called me at about 8 pm to say there were lots of elephants in the area. He was a Malayali, and usually scared of elephants and wanting to chase them away. In the past I had always told him not to bother the elephants – they would move along peacefully if we didn't bother them. It was raining heavily and there was no electricity, so he did not have the option of trying to gather people and going out to chase them away. It then occurred to me, that the OV herd had been seen by colleagues the previous day on the neighbouring hill. The herd had a history of house-breaking, and my parents and us were away, leaving both houses empty. Slightly worried, I called two of my colleagues for their opinions, to ask what they thought. They thought it best someone went and checked on the house, so all gathered together collected flashlights and firecrackers, and drove up to the house. It was close to 10 pm by the time they got there, to find two elephants had already entered the house and 9 more surrounding it. . There were two young elephants inside the

house, and another 9 all around. It took a lot of hard work to get the elephants to move away, before my colleagues could even assess the damage.

A few young ones had got in and crushed almost everything – fridge, washing machine, kitchen cupboards. The adults seemed to have walked all around and broken every single door and window. They reached in and pulled the bedding off the bed and chewed on the quilts and pillows. They pulled down book shelves and even ate some of our rare and precious books. There were trunk marks all over the walls. The damage was extensive, and my colleagues were all too upset to even send me photos. Ramesh, who also had his house damaged by elephants commented: *“I was so upset when just one door was broken. But your house was turned upside down. We can’t imagine how you must be feeling”*.



Image 44: Our house damaged by elephants.

My first reaction was to buffer and down play the news, particularly to my wife (we were scheduled to move back in a week with our few-month-old son), but also to our respective

families. They would all get upset and worry about our future there. I tried to remain rational about it – the damage was significant, but what made it look worse was the mess the elephants had made; large quantities of mud and dirt were mixed up with our crushed possession and strewn all over the house. It was decided with the team that photos were not to be sent around, or other people informed, until things were cleaned up.

The news spread though, and the next few days were intense – phone calls from reporters, the senior officers in the forest department, conservation colleagues – all wanting to know why this had happened. I was the elephant researcher, and had to explain to everyone why elephants had ransacked my own house. And this was not a poor, tribal's house with very little in it, this was a middle-class house that all these people related to. “White goods” like the washing machine and fridge, aspirational appliances for middle-class Indians, had been destroyed. There was no food beyond a few kilograms of grains and pulses, very little salt, and no alcohol – the usual reasons for elephants breaking into houses. A researcher colleague was very excited and insisted I keep detailed notes of all the emotions I was feeling to use as future material. A senior colleague from WWF-India was very keen to use the incident to push policy makers and the forest department to ensure elephants were kept inside the forests (and indirectly rebuke me for my position on sharing space with elephants). The Chief Conservator of Forests (who I had worked with on conceptualising and implementing our elephant monitoring programme) was very empathetic and insisted he would process the compensation claims quickly. But how could I explain it? There was no biological explanation, the OV herd did just this – broke houses for no apparent reason. All the break-ins followed a similar pattern – no one was at home, and there was no significant food or similar elephant attraction. Was it just curiosity? The young ones usually got in first, and the mothers would sometimes follow leaving a trail of destruction.

This was the explanation I repeated to all those who asked the young ones were curious, and the mothers broke everything around trying to get the young ones out. But we (my wife and I) still discuss the “why” every now and then. Why did the elephants actually ransack our house? It was not as though they came in and in and broke a few things, it was literally like vandals had got in and made a systematic effort to destroy or upturn everything in the house. We try to rationalise it by “thinking like the elephants”. They were

curious, and one young one broke in – probably OVT2, who was still in the house when my colleagues arrived. Once in the house, he could not see much, and had to explore the house using his other senses. There was no sound from all the inanimate alien objects, and mostly unnatural smells, so the only way to explore the house was to pull on things with his trunk. When he encountered a new material, he was unfamiliar with he tested it by applying some force - stepping on it. So the fridge, washing machine, kitchen chimney all went this way. Furniture was wood, and while it was turned around and tossed about to get a sense of the shape, it was not stepped on or crushed. The cupboards were also wood, but not quite in the form he was used to, and some familiar smells, so he opened them up and pulled everything out. Old musty books seemed edible and were eaten. The newer plastic covered ones were alien and were left. The mud walls (rammed earth, an environment friendly building technique we used) were familiar, and nothing happened to them. The glass in all the doors and windows were a strange new material, and were all tested and broken. The damage, from the perspective of an elephant entering an alien space, was not significant. We lost a lot more than the average less privileged person in the region who suffered elephant damage because of our more consumerist lifestyles and that we had more material goods; when tribal houses were broken into, a few pots and pans was usually the only damage. We slowly came to terms with what had happened, and it felt less like mindless vandalism.

Over the next few weeks I focussed on trying to get the house fixed and move back in. Family and friends wanted to know if it was safe – what would happen if the elephants came again when we were inside. They wouldn't, I assured them – they only attacked houses that were empty, and they didn't seem to go to the same house twice.

7.3.3 Our relationship with elephants and the implications beyond

So the questions remains; how am I (or we, the three of us including my wife and child) going to negotiate living with elephants in the years to come? Is my position on sharing of space going to change now that the negative impact elephants have on people is no longer abstract and detached? Perhaps not; elephants can never be completely removed from the landscape, and we are not inclined to move out of the region and live in a city. So the

pragmatic, “coexistence is inevitable” remains; it is only the details that need to be worked out, and this process is under way.

How I feel about the elephants is relevant. If the OV herd come around our house in the near future, I will perhaps hurl stones and abuses at them for the damage they caused. At the same time, I don't feel any deep antagonism towards them, and would still be happy to have elephants come around our house, even the OV herd – provided they don't break into the house again. And we now have to impose some boundaries on the sharing of space. I don't believe my relationship with them has changed considerably. Much like the guard at the Thorapally check-post I describe in Section 1.1, for most people living with elephants, it invariably ends in a stable love-hate relationship. Initial interactions with elephants (which are increasing across India as elephants expand their ranges) start with either love (as in our case, where we overly positive about elephants) or hate (for agricultural immigrants who suffer significant losses). But over time, those overly positive mellow with negative interactions, and those overly negative mellow with positive interactions, and a middle ground is reached.

But we cannot run the risk of a repeat while we are in the house – I don't ever want to test my assertion about the elephants not attacking a house with people inside or coming to the same house twice. I shudder at the thought of the three of us being surrounded by elephants as they break the doors and windows and enter. So an electric fence of some form is being envisioned to more carefully negotiate the extent of sharing – we are all sure we can't share our house with elephants. The question is where we create the boundaries in sharing space - do we want to exclude elephants from some area immediately around the house as well? My parents own about 10 acres of land around both our houses, but a fence around the whole land is not feasible – it's too expensive, more complicated to maintain, and we don't like the idea of keeping all animals entirely off our land. But now that we are putting a fence up, we would also perhaps like to include a little vegetable patch by the side of the house. The aesthetics and feel of a fence are key considerations as well – we don't like the feel of a very visible electrified barrier all around us. It almost traps us in as much as it keeps elephants out. So a new design is being experimented with – thin, almost invisible hanging strands at regular intervals, suspended from one thicker cable running through the

canopies of the trees surrounding the house. It is this careful and considered negotiation about how we share space that is the key to the future. Sharing of space will mean different things for different people in different contexts. For it to be effective and long lasting, local people must have the autonomy to decide the shape and form of how they share space with elephants. Some people will inevitably fence off their entire land, but the cost of this in the long term may exceed the cost of having elephants on some part of their land, and these boundaries will keep changing as they are moulded by all the processes of change I have described in Chapter 3. So long as there is no top-down imposition of a forced sharing of space by the state that compromises the personal safety and wellbeing of the local people, it will be relatively peaceful and stable at a landscape scale, allowing for the elephants to continue surviving outside of the protected area network.

How is this relevant to the broader practice of nature conservation? Humanity is increasingly committed to the ideal of conservation and saving species, but how do we reconcile the “sharing” and “sparing” approaches that I refer to in the preface to the thesis? The sparing approach, of relegating all the other species on earth to some areas, while we humans maximise production and resource-extraction from the rest, is clearly problematic. Above all, it fails to address the root cause of the ecological crisis; capitalist driven over-consumption, exacerbated by growing developing country human populations and their per-capita consumption. A number of people now agree that we need to better integrate the needs of humans with the needs of all the other life-forms on the planet. But how do we then deal with the elephant in the room – of conflict with species when they have the same needs as humans – the “wicked” problem of HWC? How does sharing address the fundamental question of consumption?

Living with animals forces (often inadvertent or unintended) introspection. Elephants as conservation actors, influence all decisions, at personal, local, regional and national scales. Do we need to rethink the globally accepted norm of “developed” societies, where all human needs are met, with comfortable dwellings and wider living environments we call cities. When elephants enter these spaces we have created for ourselves, they demonstrate that what we think is “comfortable” and “modern” is in fact increasingly more alien, artificial and removed from the rest of the earth and all the other living beings on it. It may

be worth contemplating how ideal human “habitat” is often uninhabitable for all other life-forms. Living with elephants poses a challenge for capitalism induced excesses in any form; in our case they remind us to keep our home simple. Large farms with cash crops are targeted, while small holdings growing enough food for the family are spared. People forced to work long hours in corporate plantations are under greater threat from the elephants compared to those who better balance their time between home and work. Living with elephants has forced us personally to be more careful and considered about our choices – to balance our needs with theirs. Elephants are expanding their ranges in multiple regions across India, from the coal and mineral rich regions of central India, to the periphery of Bangalore – India’s Information Technology capital. And they raise questions about the large-scale mining operations’ impact on wildlife at landscape scales, and the rampant unplanned urbanisation around our cities. Can elephants help to push India towards a more sustainable development trajectory?

Living with elephants may not be relevant to all humans across the world, but almost all the large mammal species expanding their ranges at global scales and coming into greater contact with people force some form of inter-species reconciliation that goes against the grain of capitalist consumption. Through this thesis, I have looked at how wide and diverse strands come together to shape the human elephant shared space, and how this can be better understood and managed for the benefit of both elephants and people. Could this approach be used in other parts of the world to help people and animals share space more peacefully, and potentially lead happier, healthier lives?

Human-wildlife conflict, through this lens, is in part a solution to the world’s ecological crisis, and not a problem that conservation needs to “solve”. Can conservation embrace HWC mitigation as the solution to the problem?

8. References

- Abend, Gabriel. 2008. "The Meaning of 'Theory.'" *Sociological Theory* 26 (2): 173–99.
- Acamпора, Ralph. 2004. "Oikos and Domus: On Constructive Co-Habitation with Other Creatures." *Philosophy & Geography* 7 (2): 219–35. <https://doi.org/10.1080/1090377042000285426>.
- Adams, T. 1989. "Gudalur: A Community at the Cross Roads." In *Blue Mountains: The Ethnography and Biogeography of a South Indian Region*, edited by Paul Hockings. Oxford University Press, Oxford.
- Adams, Tempe SF, Michael J Chase, Anna Attard, and Keith EA Leggett. 2017. "A Preliminary Study of Stakeholders' Opinions and Perceptions of Elephants and Elephant Management in Botswana." *Pachyderm*, no. 58: 67–76.
- Adams, WM. 2007. "Thinking like a Human: Social Science and the Two Cultures Problem." *Oryx* 41: 275–76.
- Agrawal, Arun, and Elinor Ostrom. 2006. "Political Science and Conservation Biology: A Dialog of the Deaf." *Conservation Biology* 20 (3): 681–82. <https://doi.org/10.1111/j.1523-1739.2006.00468.x>.
- Aiyappan, Ayinipalli. 1992. *The Paniyas, an Ex-Slave Tribe of South India*. Institute of Social Research and Applied Anthropology Calcutta.
- Alfred, Raymond, Abd Hamid Ahmad, Junaidi Payne, Christy Williams, Laurentius Nayan Ambu, Phua Mui How, and Benoit Goossens. 2012. "Home Range and Ranging Behaviour of Bornean Elephant (*Elephas Maximus Borneensis*) Females." *PLoS One* 7 (2): e31400.
- Ali, I.M. 1999. "Using Education to Safeguard Parks: The Case of Nairobi National Park, Kenya." *Environmental Education and Information* 18 (2): 117–24.
- Allee, Warder Clyde, and Karl P Schmidt. 1951. "Ecological Animal Geography." *Soil Science* 72 (6): 479.
- Altman, Jon C, and Melinda Hinkson. 2007. *Coercive Reconciliation: Stabilise, Normalise, Exit Aboriginal Australia*. Arena Publications Melbourne.
- Altmann, Jeanne. 1974. "Observational Study of Behavior: Sampling Methods." *Behaviour* 49 (3): 227–66.
- Anderson, Kay. 2000. "'The Beast within': Race, Humanity, and Animality." *Environment and Planning D: Society and Space* 18 (3): 301–20. <https://doi.org/10.1068/d229>.
- Anderson, Paul Nicholas. 2001. "Community-Based Conservation and Social Change amongst South Indian Honey-Hunters: An Anthropological Perspective." *Oryx* 35 (01): 81–83.
- Arivazhagan, Chelliya, and Raman Sukumar. 2008. "Constructing Age Structures of Asian Elephant Populations: A Comparison of Two Field Methods of Age Estimation." *Gajah* 29: 11–16.
- Armitage, Derek R, Ryan Plummer, Fikret Berkes, Robert I Arthur, Anthony T Charles, Iain J Davidson-Hunt, Alan P Diduck, Nancy C Doubleday, Derek S Johnson, and Melissa Marschke. 2009. "Adaptive Co- management for Social–Ecological Complexity." *Frontiers in Ecology and the Environment* 7 (2): 95–102.
- Avruch, Kevin. 2001. "Notes toward Ethnographies of Conflict and Violence." *Journal of Contemporary Ethnography* 30 (5): 637–48.
- Badola, Ruchi. 1998. "Attitudes of Local People towards Conservation and Alternatives to Forest Resources: A Case Study from the Lower Himalayas." *Biodiversity & Conservation* 7 (10): 1245–59.
- Baldwin, James A. 1987. "Research Themes in the Cultural Geography of Domesticated Animals, 1974–1987." *Journal of Cultural Geography* 7 (2): 3–18.
- Balmford, Andrew, Joslin L. Moore, Thomas Brooks, Neil Burgess, Louis A. Hansen, Paul Williams, and Carsten Rahbek. 2001. "Conservation Conflicts across Africa." *Science* 291 (5513): 2616–19.
- Bandara, Ranjith, and Clem Tisdell. 2003. "Comparison of Rural and Urban Attitudes to the Conservation of Asian Elephants in Sri Lanka: Empirical Evidence." *Biological Conservation* 110 (3): 327–342.
- . 2004. "The Net Benefit of Saving the Asian Elephant: A Policy and Contingent Valuation Study." *Ecological Economics* 48 (1): 93–107.
- Barnes, R.F.W. 1996. "The Conflict between Humans and Elephants in the Central African Forests." *Mammal Review* 26 (2–3): 67–80.

- Barry, Dwight, and Max Oelschlaeger. 1996. "A Science for Survival: Values and Conservation Biology." *Conservation Biology* 10 (3): 905–11.
- Bartholomew, John George, William Eagle Clarke, and Percy Hall Grimshaw. 1911. *Atlas of Zoogeography: A Series of Maps Illustrating the Distribution of Over Seven Hundred Families, Genera and Species of Existing Animals, Prepared by JG Bartholomew, W. Eagle Clarke and Percy H. Grimshaw; Under the Patronage of the Royal Geographical Society*. Pub. at the Royal geographical institute by J. Bartholomew and Company.
- Barua, Maan. 2013. "The Political Ecology of Human Elephant Relationships in India." DPhil Thesis, Oxford: University Of Oxford.
- . 2014a. "Bio-Geo-Graphy: Landscape, Dwelling, and the Political Ecology of Human–Elephant Relations." *Environment and Planning D: Society and Space* 32: 915–34.
- . 2014b. "Circulating Elephants: Unpacking the Geographies of a Cosmopolitan Animal." *Transactions of the Institute of British Geographers* 39 (4): 559–73.
- . 2016. "Lively Commodities and Encounter Value." *Environment and Planning D: Society and Space*, 0263775815626420.
- Barua, Maan, Shonil A. Bhagwat, and Sushrut Jadhav. 2013. "The Hidden Dimensions of Human–Wildlife Conflict: Health Impacts, Opportunity and Transaction Costs." *Biological Conservation* 157 (January): 309–16. <https://doi.org/10.1016/j.biocon.2012.07.014>.
- Baskaran, N., M. Balasubramanian, S. Swamiathan, and A. Desai. 1995. "Home Range of Elephants in the Nilgiri Biosphere Reserve, South India." In *A Week with Elephant: Proceedings of the International Seminar on Asian Elephants*, edited by J. S. Daniel and H. Datye. Bombay: Natural History Society, Oxford University Press.
- Baskaran, N, and Ajay A Desai. 1996. "Ranging Behaviour of the Asian Elephant (*Elephas Maximus*) in the Nilgiri Biosphere Reserve, South India." *Gajah. Journal of the Asian Elephant Specialist Group* 15 (January): 41–57.
- Baskaran, Nagarajan, Uthirapathi Anbarasan, and Govindasamy Agoramoorthy. 2012. "India's Biodiversity Hotspot under Anthropogenic Pressure: A Case Study of Nilgiri Biosphere Reserve." *Journal for Nature Conservation* 20 (1): 56–61.
- Bass, D. 2013. *Everyday Ethnicity in Sri Lanka: Up-Country Tamil Identity Politics*. Routledge Contemporary South Asia Series. Routledge.
- Bates, Lucy A, Katito N Sayialel, Norah W Njiraini, Cynthia J Moss, Joyce H Poole, and Richard W Byrne. 2007. "Elephants Classify Human Ethnic Groups by Odor and Garment Color." *Current Biology* 17 (22): 1938–42.
- Bates, Lucy A, Katito N Sayialel, Norah W Njiraini, Joyce H Poole, Cynthia J Moss, and Richard W Byrne. 2008. "African Elephants Have Expectations about the Locations of Out-of-Sight Family Members." *Biology Letters* 4 (1): 34–36.
- Bauer, Hans. 2003. "Local Perceptions of Waza National Park, Northern Cameroon." *Environmental Conservation* 30 (2): 175–81. <https://doi.org/10.1017/S037689290300016X>.
- Baviskar, Amita. 2007. "Indian Indigeneities: Adivasi Engagements with Hindu Nationalism in India." *Indigenous Experience Today*, 275–303.
- Baynes-Rock, Marcus. 2013a. "Life and Death in the Multispecies Commons." *Social Science Information* 52 (2): 210–27.
- . 2013b. "Local Tolerance of Hyena Attacks in East Hararge Region, Ethiopia." *Anthrozoös* 26 (3): 421–33.
- Bekoff, Marc. 2000. "Animal Emotions: Exploring Passionate Natures Current Interdisciplinary Research Provides Compelling Evidence That Many Animals Experience Such Emotions as Joy, Fear, Love, Despair, and Grief—We Are Not Alone." *BioScience* 50 (10): 861–70.
- Bennett Jr, Charles F. 1960. "Cultural Animal Geography: An Inviting Field of Research." *The Professional Geographer* 12 (5): 12–14.
- Bhargav, Praveen, and Shekar Dattatri. 2011. "Betraying India's Wildlife." *Governance Now*, 1–15.
- Bijoy, CR. 2003. "The Adivasis of India - A History of Discrimination, Conflict, and Resistance." *People's Union of Civil Liberties Bulletin*, 2003.
- Bingham, Nick. 2006. "Bees, Butterflies, and Bacteria: Biotechnology and the Politics of Nonhuman Friendship." *Environment and Planning A* 38 (3): 483–98. <https://doi.org/10.1068/a38436>.
- Bird-David, N. 1990. "The Giving Environment: Another Perspective on the Economic System of Gatherer-Hunters." *Current Anthropology* 31 (2): 189.
- . 1992. "Beyond 'The Hunting and Gathering Mode of Subsistence': Culture-Sensitive Observations on the Nayaka and Other Modern Hunter-Gatherers." *Man* 27 (1): 19.

- Bird-David, Nurit. 1994. "The Nilgiri Tribal Systems: A View from Below." *Modern Asian Studies* 28 (02): 339–55.
- . 1996. "Puja or Sharing with the Gods?: On Ritualized Possession among Nayaka of South India." *The Eastern Anthropologist* 49 (3–4): 259–76.
- . 1999. "'Animism' Revisited: Personhood, Environment, and Relational Epistemology 1." *Current Anthropology* 40 (S1): S67–91.
- . 2006. "Animistic Epistemology: Why Do Some Hunter-Gatherers Not Depict Animals?" *Ethnos* 71 (1): 33–50.
- Bird-David, Nurit, and Danny Naveh. 2008. "Relational Epistemology, Immediacy, and Conservation: Or, What Do the Nayaka Try to Conserve?" *Journal for the Study of Religion, Nature & Culture* 2 (1).
- Björntorp, Per. 2001. "Do Stress Reactions Cause Abdominal Obesity and Comorbidities?" *Obesity Reviews* 2 (2): 73–86.
- Blecha, J., and H. Leitner. 2014. "Reimagining the Food System, the Economy, and Urban Life: New Urban Chicken-Keeper in US Cities." *Urban Geography* 35 (1): 86–108.
- Blockstein, David E. 2002. "How to Lose Your Political Virginity While Keeping Your Scientific Credibility." *BioScience* 52 (1): 91–96. [https://doi.org/10.1641/0006-3568\(2002\)052\[0091:HTLYPV\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2002)052[0091:HTLYPV]2.0.CO;2).
- Boitani, L. 2003. "Wolf Conservation and Recovery." In *Wolves: Behavior, Ecology, and Conservation*, edited by L.D. Mech and L. Boitani, 317–40. University of Chicago Press, IL, USA.
- Bradbury-Huang, Hilary. 2010. "What Is Good Action Research? Why the Resurgent Interest?" *Action Research* 8 (1): 93–109.
- Braun, Bruce. 2005. "Environmental Issues: Writing a More-than-Human Urban Geography." *Progress in Human Geography* 29 (5): 635–50.
- Brosius, J Peter. 2006. "Common Ground between Anthropology and Conservation Biology." *Conservation Biology* 20 (3): 683–85.
- Browne-Núñez, Christine, and Sandra A. Jonker. 2008. "Attitudes Toward Wildlife and Conservation Across Africa: A Review of Survey Research." *Human Dimensions of Wildlife* 13 (1): 47–70. <https://doi.org/10.1080/10871200701812936>.
- Bruskotter, Jeremy T, and Robyn S Wilson. 2014. "Determining Where the Wild Things Will Be: Using Psychological Theory to Find Tolerance for Large Carnivores." *Conservation Letters* 7 (3): 158–65.
- Bryant, Raymond L. 1991. "Putting Politics First: The Political Ecology of Sustainable Development." *Global Ecology and Biogeography Letters* 1 (6): 164–66. <https://doi.org/10.2307/2997621>.
- Bryman, Alan. 2012. *Social Research Methods*. Oxford University Press.
- Buchanan, Francis. 1807. *A Journey from Madras Through the Countries of Mysore, Canara and Malabar...* T. Cadell and W. Davies.
- Buller, Henry. 2008. "Safe from the Wolf: Biosecurity, Biodiversity, and Competing Philosophies of Nature." *Environment and Planning A* 40 (7): 1583–97. <https://doi.org/10.1068/a4055>.
- . 2013. "Animal Geographies I." *Progress in Human Geography*, 0309132513479295.
- Buller, Henry, and Carol Morris. 2003. "Farm Animal Welfare: A New Repertoire of Nature- Society Relations or Modernism Re- embedded?" *Sociologia Ruralis* 43 (3): 216–37.
- Bulte, E. H., and D Rondeau. 2005. "Why Compensating Wildlife Damages May Be Bad for Conservation." *Journal of Wildlife Management* 69 (1): 14–19.
- Bulte, Erwin, and Daniel Rondeau. 2007. "Compensation for Wildlife Damages: Habitat Conversion, Species Preservation and Local Welfare." *Journal of Environmental Economics and Management* 54 (3): 311–22. <https://doi.org/10.1016/j.jeem.2007.02.003>.
- Burghardt, Gordon M. 1991. "Cognitive Ethology and Critical Anthropomorphism: A Snake with Two Heads and Hognose Snakes That Play Dead." In *Cognitive Ethology: The Minds of Other Animals: Essays in Honor of Donald R. Griffin*, edited by Donald Redfield Griffin. Psychology Press.
- Byrne, Richard W., Lucy A. Bates, and Cynthia J. Moss. 2009. "Elephant Cognition in Primate Perspective." *Comparative Cognition & Behavior Reviews* 4. <https://doi.org/10.3819/ccbr.2009.40009>.
- Callaway, Ewen. 2008. "Elephants Master Basic Mathematics - Life - 20 August 2008 - New Scientist." 2008. http://www.newscientist.com/article/dn14569-elephants-master-basic-mathematics.html#.U_fL9tbALFY.

- Campbell, Lisa M. 2005. "Overcoming Obstacles to Interdisciplinary Research." *Conservation Biology* 19 (2): 574–77.
- Candea, Matei. 2013. "Habituating Meerkats and Redescribing Animal Behaviour Science." *Theory, Culture & Society*, 0263276413501204.
- Cannon, Walter Bradford. 1932. *The Wisdom of the Body*. New York: Norton.
- Carpenter, Len H., Daniel J. Decker, and James F. Lipscomb. 2000. "Stakeholder Acceptance Capacity in Wildlife Management." *Human Dimensions of Wildlife* 5 (3): 5–19. <https://doi.org/10.1080/10871200009359184>.
- Chanchani, Aditi, Swathi Seshadri, and Rosemary Viswanath. 2018. "Tourism in Sigur Plateau in the Western Ghats of India: An Impact Assessment Report." In *Environmental Impacts of Tourism in Developing Nations*, 158–80. IGI Global.
- Chapron, Guillaume, Petra Kaczensky, John D. C. Linnell, Manuela von Arx, Djuro Huber, Henrik Andrén, José Vicente López-Bao, et al. 2014. "Recovery of Large Carnivores in Europe's Modern Human-Dominated Landscapes." *Science* 346 (6216): 1517–19.
- Cheeran, Jacob V. 2008. "Drug Immobilisation—Yesterday, Today and Tomorrow." *GAJAH*, 35.
- Chelliah, Karpagam, and Raman Sukumar. 2013. "The Role of Tusks, Musth and Body Size in Male–Male Competition among Asian Elephants, *Elephas Maximus*." *Animal Behaviour* 86 (6): 1207–14.
- Choudhary et al. 2008. "Elephas Maximus: Choudhury, A., Lahiri Choudhury, D.K., Desai, A., Duckworth, J.W., Easa, P.S., Johnsingh, A.J.T., Fernando, P., Hedges, S., Gunawardena, M., Kurt, F., Karanth, U., Lister, A., Menon, V., Riddle, H., Rübel, A. & Wikramanayake, E. (IUCN SSC Asian Elephant Specialist Group): The IUCN Red List of Threatened Species 2008: E.T7140A12828813." International Union for Conservation of Nature. <https://doi.org/10.2305/IUCN.UK.2008.RLTS.T7140A12828813.en>.
- Choudhury, Anwaruddin. 1987. "Railway Threat to Kaziranga." *Oryx* 21 (03): 160–63.
- Clayton, Nicola. 2012. "Corvid Cognition: Feathered Apes." *Nature* 484 (7395): 453–54.
- Cochrane, Glynn, Dan R Aronson, Mark Borthwick, María E Bozzoli De Wille, FE Bredahl-Petersen, Erve Chambers, SR Charsley, John Clammer, Shelton H Davis, and Robert O Mathews. 1980. "Policy Studies and Anthropology [and Comments and Reply]." *Current Anthropology* 21 (4): 445–58.
- Conover, Michael R, and Daniel J Decker. 1991. "Wildlife Damage to Crops: Perceptions of Agricultural and Wildlife Professionals in 1957 and 1987." *Wildlife Society Bulletin* 19 (1): 46–52.
- Costanza, Robert, Ralph d'Arge, Rudolf De Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V O'neill, and Jose Paruelo. 1997. "The Value of the World's Ecosystem Services and Natural Capital." *Nature* 387 (6630): 253.
- Crampton, Jeremy. 1994. "Cartography's Defining Moment: The Peters Projection Controversy, 1974–1990." *Cartographica: The International Journal for Geographic Information and Geovisualization* 31 (4): 16–32. <https://doi.org/10.3138/1821-6811-L372-345P>.
- Craven, Scott, Thomas Barnes, and Gary Kania. 1998. "Toward a Professional Position on the Translocation of Problem Wildlife." *Wildlife Society Bulletin* 26 (1): 171–177.
- Daniels, R.J.R. 1996. *The Nilgiri Biosphere Reserve: A Review of Conservation Status with Recommendations for a Holistic Approach to Management : India*. South-South Cooperation Programme on Environmentally Sound Socio-Economic Development in the Humid Tropic. South-South Cooperation Programme on Environmentally Sound Socio-Economic Development in the Humid Tropics. <https://books.google.co.in/books?id=SdYsAQAAMAAJ>.
- Darwin, Charles. 1859. *On the Origin of Species by Means of Natural Selection or the Preservation of Favored Races in the Struggle for Life*. London: John Murray.
- . 1871. *The Descent of Man, and Selection in Relation to Sex*. London: John Murray.
- Datye, HS, and AM Bhagwat. 1995. "Home Range of Elephants in Fragmented Habitats of Central India." *Journal of the Bombay Natural History Society* 92 (1): 1–10.
- Davidar, Priya. 2018. "The Term Human-Wildlife Conflict Creates More Problems than It Resolves: Better Labels Should Be Considered." *Journal of Threatened Taxa* 10 (8): 12082–85.
- Denzin, N. K., & Lincoln, Y. S. (Eds.). (1999). *The SAGE handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage Publications.

- Desai, AA. 1991. "The Home Range of Elephants and Its Implications for Management of the Mudumalai Wildlife Sanctuary, Tamil Nadu." *Journal of the Bombay Natural History Society* 88 (2): 145–56.
- Desai, Ajay, Priya Davidar, Jean-Philippe Puyravaud, Geetha Srinivasan, N Mohanraj, and Tarsh Thekaekara. 2008. "Environmental Concerns around the Proposed Site for the 'India-Based Neutrino Observatory.'" Nilgiri Biosphere Alliance. www.nbralliance.org.
- Dickman, A. J. 2010a. "Complexities of Conflict: The Importance of Considering Social Factors for Effectively Resolving Human–Wildlife Conflict." *Animal Conservation* 13 (5): 458–66. <https://doi.org/10.1111/j.1469-1795.2010.00368.x>.
- Dickman, A.J. 2010b. "Complexities of Conflict: The Importance of Considering Social Factors for Effectively Resolving Human-Wildlife Conflict." *Animal Conservation* 13 (5): 458–66.
- Ditmer, Mark A, Thomas E Burk, and David L Garshelis. 2015. "Do Innate Food Preferences and Learning Affect Crop Raiding by American Black Bears?" *Ursus* 26 (1): 40–52.
- Donlan, Josh. 2005. "Re-Wilding North America." *Nature* 436 (7053): 913–14.
- Dooren, Thom van, Eben Kirksey, and Ursula Münster. 2016. "Multispecies Studies: Cultivating Arts of Attentiveness." *Environmental Humanities* 8 (1): 1–23. <https://doi.org/10.1215/22011919-3527695>.
- Dorling, Danny, and Mary Shaw. 2002. "Geographies of the Agenda: Public Policy, the Discipline and Its (Re)‘Turns.’" *Progress in Human Geography* 26 (5): 629–41.
- Douglas-Hamilton, I. 1972. "On the Ecology and Behaviour of the African Elephant." In .
- Douglas-Hamilton, Iain, and Oria Douglas-Hamilton. 1979. *Among the Elephants*. London: Fontana.
- Dowie, Mark. 2011. *Conservation Refugees: The Hundred-Year Conflict between Global Conservation and Native Peoples*. MIT press.
- Drummond, Hugh. 1985. "Towards a Standard Ethogram: Do Ethologists Really Want One." *Z. Tierpsychol* 68 (4): 338–39.
- Drury, R., K. Homewood, and S. Randall. 2011. "Less Is More: The Potential of Qualitative Approaches in Conservation Research." *Animal Conservation* 14 (1): 18–24. <https://doi.org/10.1111/j.1469-1795.2010.00375.x>.
- Dubois, JA. 1897. "Hindu Manners, Customs and Ceremonies, Trans." *Henry K. Beau-Champs (1818)*, 604.
- Dubois, Sara, Nicole Fenwick, Erin A Ryan, Liv Baker, Sandra E Baker, Ngaio J Beausoleil, Scott Carter, Barbara Cartwright, Federico Costa, and Chris Draper. 2017. "International Consensus Principles for Ethical Wildlife Control." *Conservation Biology* 31 (4): 753–60.
- Easa, PS. 1988. "Movement Pattern of Asiatic Elephant, *Elephas Maximus* in Parambikulam Wildlife Sanctuary, Kerala." *Kerala Forest Research Institute Research Report* 54.
- Emel, Jody, Chris Wilbert, and Jennifer Wolch. 2002. "Animal Geographies." *Society and Animals* 10 (4): 407–12.
- Endicott, K.M. 1979. *Batek Negrito Religion: The World-View and Rituals of a Hunting and Gathering People of Peninsular Malaysia*. Clarendon Press. <https://books.google.co.in/books?id=Jp3XAAAAMAAJ>.
- Evans, Lauren A, and William M Adams. 2016. "Fencing Elephants: The Hidden Politics of Wildlife Fencing in Laikipia, Kenya." *Land Use Policy* 51: 215–28.
- . 2018. "Elephants as Actors in the Political Ecology of Human–Elephant Conflict." *Transactions of the Institute of British Geographers*.
- Evans-Pritchard, E. E. 1946. "Applied Anthropology." *Africa: Journal of the International African Institute* 16 (2): 92–98. <https://doi.org/10.2307/1157018>.
- Farmer, James R, Charles Chancellor, and Burnell C Fischer. 2011. "Motivations for Using Conservation Easements as a Land Protection Mechanism: A Mixed Methods Analysis." *Natural Areas Journal* 31 (1): 80–87.
- Fernando, Prithiviraj, Eric D Wikramanayake, HK Janaka, LKA Jayasinghe, Manori Gunawardena, Sarath W Kotagama, Devaka Weerakoon, and Jennifer Pastorini. 2008. "Ranging Behavior of the Asian Elephant in Sri Lanka." *Mammalian Biology-Zeitschrift Für Säugetierkunde* 73 (1): 2–13.
- Fienup-Riordan, Ann. 1995. *Boundaries and Passages: Rule and Ritual in Yup'ik Eskimo Oral Tradition*. Vol. 212. University of Oklahoma Press.
- Folke, Steen. 1966. "Evolution of Plantations, Migration, and Population Growth in Nilgiris and Coorg (South India)." *The Royal Danish Geographical Society* 65 (2): 198–239.

- Fox, Helen E, Caroline Christian, J Cully Nordby, Oliver RW Pergams, Garry D Peterson, and Christopher R Pyke. 2006. "Perceived Barriers to Integrating Social Science and Conservation." *Conservation Biology* 20 (6): 1817–20.
- Fox, Rebekah. 2006. "Animal Behaviours, Post-Human Lives: Everyday Negotiations of the Animal–Human Divide in Pet-Keeping." *Social & Cultural Geography* 7 (4): 525–37.
- Francis, Walter. 1908. *Madras District Gazetteers: The Nilgiris*. Superintendent, Government Press.
- Funston, P.J., R.J. Groom, and P.A. Lindsey. 2013. "Insights into the Management of Large Carnivores for Profitable Wildlife-Based Land Uses in African Savannas." *PLoS ONE* 8 (3). <http://www.scopus.com/inward/record.url?eid=2-s2.0-84875171726&partnerID=40&md5=25a2d8457f284000c1b4ab7920db0379>.
- Gade, Daniel W. 1967. "The Guinea Pig in Andean Folk Culture." *Geographical Review* 57 (2): 213–24. <https://doi.org/10.2307/213160>.
- Game, Edward T, Erik Meijaard, Douglas Sheil, and Eve McDonald- Madden. 2014. "Conservation in a Wicked Complex World; Challenges and Solutions." *Conservation Letters* 7 (3): 271–77.
- Gangaas, Kristin E, Bjørn P Kaltenborn, and Harry P Andreassen. 2015. "Environmental Attitudes Associated with Large-Scale Cultural Differences, Not Local Environmental Conflicts." *Environmental Conservation* 42 (01): 41–50.
- Geertz, Clifford. 2001. *Available Light: Anthropological Reflections on Philosophical Topics*. Princeton University Press.
- Gehring, T.M., K.C. Vercauteren, and A.C. Cellar. 2011. "Good Fences Make Good Neighbors: Implementation of Electric Fencing for Establishing Effective Livestock-Protection Dogs." *Human-Wildlife Interactions* 5 (1): 106–11.
- Genesis. 1975. *The Bible*. New King James Version. Thomas Nelson Publishers.
- Ghosal, Sunetro, Ketil Skogen, and Siddhartha Krishnan. 2015. "Locating Human-Wildlife Interactions: Landscape Constructions and Responses to Large Carnivore Conservation in India and Norway." *Conservation and Society* 13 (3): 265.
- Ghosh, Soumitra, Nabu Dutta, Hadida Yasmin, Tarun Roy, and Oliver Springate-Baginski. 2009. "(School of International Development Working Paper: Norwich)." In .
- Gichuki, F.N. 1999. "Threats and Opportunities for Mountain Area Development in Kenya." *Ambio* 28 (5): 430–35.
- Gillespie, K. 2013. "Sexualized Violence and the Gendered Commodification of the Animal Body in Pacific Northwest US Dairy Production." Scopus. <http://www.scopus.com/inward/record.url?eid=2-s2.0-84885165275&partnerID=40&md5=bd6cd3c541168e59b8bc66dc3f4dc82c>.
- Glaser, Barney G., and Anselm L. Strauss. 1980. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. 11. printing. New York: Aldine.
- Goodhand, Jonathan. 2000. "Research in Conflict Zones: Ethics and Accountability." *Forced Migration Review* 8 (4): 12–16.
- Gordon, Deborah M. 1985. "Do We Need More Ethograms?" *Z. Tierpsychol* 68: 340–42.
- Gosling, Samuel D. 2001. "From Mice to Men: What Can We Learn about Personality from Animal Research?" *Psychological Bulletin* 127 (1): 45.
- Goswami, Varun R, MD Madhusudan, and K Ullas Karanth. 2007. "Application of Photographic Capture–Recapture Modelling to Estimate Demographic Parameters for Male Asian Elephants." *Animal Conservation* 10 (3): 391–99.
- Graham, M. D., I. Douglas-Hamilton, W. M. Adams, and P. C. Lee. 2009. "The Movement of African Elephants in a Human-Dominated Land-Use Mosaic." *Animal Conservation* 12 (5): 445–55. <https://doi.org/10.1111/j.1469-1795.2009.00272.x>.
- Gravett, Nadine, Adhil Bhagwandin, Robert Sutcliffe, Kelly Landen, Michael J Chase, Oleg I Lyamin, Jerome M Siegel, and Paul R Manger. 2017. "Inactivity/Sleep in Two Wild Free-Roaming African Elephant Matriarchs–Does Large Body Size Make Elephants the Shortest Mammalian Sleepers?" *PloS One* 12 (3): e0171903.
- Greenberg, Julia R, and Kay E Holekamp. 2017. "Human Disturbance Affects Personality Development in a Wild Carnivore." *Animal Behaviour* 132: 303–12.
- Griffin, Donald Redfield. 1976. *The Question of Animal Awareness: Evolutionary Continuity of Mental Experience*. Rockefeller Univ. Press.
- Grigg, Henry Bidewell. 1880. *A Manual of the Nilagiri District in the Madras Presidency*. E. Keys at the Government Press.
- Guha, R. 2001. "The Prehistory of Community Forestry in India." *Environmental History* 6 (2): 213.

- Guha, Ramachandra. 1997. "The Authoritarian Biologist and the Arrogance of Anti-Humanism." *The Ecologist* 27 (1): 14–20.
- Hallowell, A. 1960. "Ojibwa Ontology, Behavior, and World View." *Culture in History: Essays in Honor of Paul Radin*, 19–52.
- Hammersley, Martyn, and Paul Atkinson. 2007. *Ethnography: Principles in Practice*. Routledge.
- Hans Erukwa, Etagbor. 2017. "Human-Elephant Conflict Mitigation Methods: A Review of Effectiveness and Sustainability." *Journal of Wildlife and Biodiversity* 1 (2): 69–78.
- Haraway, Donna Jeanne. 2003. *The Companion Species Manifesto: Dogs, People, and Significant Otherness*. Vol. 1. Prickly Paradigm Press Chicago.
- . 2008. *When Species Meet*. Vol. 224. U of Minnesota Press.
- Harcourt, A. H., S. A. Parks, and R. Woodroffe. 2001. "Human Density as an Influence on Species/Area Relationships: Double Jeopardy for Small African Reserves?" *Biodiversity & Conservation* 10 (6): 1011–1026.
- Harley, J. B. 1989. "Deconstructing the Map." *Cartographica: The International Journal for Geographic Information and Geovisualization* 26 (2): 1–20. <https://doi.org/10.3138/E635-7827-1757-9T53>.
- Hart, Lynette, and Piers Locke. 2007. "Nepali and Indian Mahouts and Their Unique Relationships with Elephants." In *Encyclopedia of Human-Animal Relationships: A Global Exploration of Our Connections with Animals*, edited by Marc Bekoff, 510–15. London: Greenwood.
- Hart, Lynette, and Sundar. 2000. "Family Traditions for Mahouts of Asian Elephants." *Anthrozoös* 13 (1): 34–42.
- Hayward, Matt W., and Graham I.H. Kerley. 2009. "Fencing for Conservation: Restriction of Evolutionary Potential or a Riposte to Threatening Processes?" *Biological Conservation* 142 (1): 1–13. <https://doi.org/10.1016/j.biocon.2008.09.022>.
- Hazzah, Leela, Monique Borgerhoff Mulder, and Laurence Frank. 2009. "Lions and Warriors: Social Factors Underlying Declining African Lion Populations and the Effect of Incentive-Based Management in Kenya." *Biological Conservation* 142 (11): 2428–37. <https://doi.org/10.1016/j.biocon.2009.06.006>.
- Hedges, Simon, and Donny Gunaryadi. 2010. "Reducing Human–Elephant Conflict: Do Chillies Help Deter Elephants from Entering Crop Fields?" *Oryx* 44 (01): 139–46.
- Hess, George R, and Richard A Fischer. 2001. "Communicating Clearly about Conservation Corridors." *Landscape and Urban Planning* 55 (3): 195–208.
- Hesse, Richard, Warder Clyde Allee, and Karl Patterson Schmidt. 1937. "Ecological Animal Geography."
- Hill, Catherine M. 2004. "Farmers' Perspectives of Conflict at the Wildlife–Agriculture Boundary: Some Lessons Learned from African Subsistence Farmers." *Human Dimensions of Wildlife* 9 (4): 279–86. <https://doi.org/10.1080/10871200490505710>.
- Hinchliffe, Steve. 2007. *Geographies of Nature: Societies, Environments, Ecologies*. Sage.
- Hinchliffe, Steve, John Allen, Stephanie Lavau, Nick Bingham, and Simon Carter. 2013. "Biosecurity and the Topologies of Infected Life: From Borderlines to Borderlands." *Transactions of the Institute of British Geographers* 38 (4): 531–43.
- Hoare, R. 2012. "Lessons from 15 Years of Human Elephant Conflict Mitigation: Management Considerations Involving Biological, Physical and Governance Issues in Africa." *Pachyderm* 51 (1): 60–74.
- Hoare, R.E. 1999. "Determinants of Human-Elephant Conflict in a Land-Use Mosaic." *Journal of Applied Ecology* 36 (5): 689–700. <https://doi.org/10.1046/j.1365-2664.1999.00437.x>.
- Hoare, Richard E. 1992. "Present and Future Use of Fencing in the Management of Larger African Mammals." *Environmental Conservation* 19 (2): 160–64.
- Hobson, Kersty. 2007. "Political Animals? On Animals as Subjects in an Enlarged Political Geography." *Political Geography* 26 (3): 250–67.
- Hockings, Paul. 1989. *Blue Mountains, the Ethnography and Biogeography of a South Indian Region*. Oxford University Press Oxford.
- . 1996. *A Comprehensive Bibliography for the Nilgiri Hills of Southern India: 1603-1996*. DYMSET, Université Michel de Montaigne-Bordeaux 3.
- . 2008. "All Aboard the Nilgiri Express!—Sustained Links between Anthropology and a Single Indian District." *History and Anthropology* 19 (1): 1–16.
- Hodgetts, Timothy, and Jamie Lorimer. 2014. "Methodologies for Animals' Geographies: Cultures, Communication and Genomics." *Cultural Geographies*, 1474474014525114.

- Hoggart, Keith. 1996. "All Washed up and Nowhere to Go? Public Policy and Geographical Research." *Progress in Human Geography* 20 (1): 110–22.
- Holdrege, Craig. 2011. "Elephantine Intelligence." 2011. <http://www.natureinstitute.org/pub/ic/ic5/elephant.htm>.
- Holloway, Lewis. 2007. "Subjecting Cows to Robots: Farming Technologies and the Making of Animal Subjects." *Environment and Planning D: Society and Space* 25 (6): 1041–60. <https://doi.org/10.1068/d77j>.
- Honda, T., H. Iijima, J. Tsuboi, and K. Uchida. 2018. "A Review of Urban Wildlife Management from the Animal Personality Perspective: The Case of Urban Deer." *Science of The Total Environment* 644 (December): 576–82. <https://doi.org/10.1016/j.scitotenv.2018.06.335>.
- Hovorka, A. 2008. "Transspecies Urban Theory: Chickens in an African City." *Cultural Geographies* 15 (1): 95–117.
- Howard, Brian Clark. 2015. "Text Messages Prevent Deaths by Elephants in India." National Geographic News. December 29, 2015. <http://news.nationalgeographic.com/2015/12/151229-elephant-early-warning-text-system-india-tamil-nadu-conservation/>.
- Ingold, T. 2000. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. Routledge. <https://books.google.co.in/books?id=5LpTBInNGkEC>.
- Ingold, Tim. 2000. *The Perception of the Environment : Essays on Livelihood, Dwelling & Skill*. London ; New York: Routledge.
- Inskip, Chloe, Neil Carter, Shawn Riley, Thomas Roberts, and Douglas MacMillan. 2016. "Toward Human-Carnivore Coexistence: Understanding Tolerance for Tigers in Bangladesh." *PloS One* 11 (1): e0145913.
- Inskip, Chloe, and Alexandra Zimmermann. 2009. "Human-Felid Conflict: A Review of Patterns and Priorities Worldwide." *Oryx* 43 (01): 18. <https://doi.org/10.1017/S003060530899030X>.
- J Nast, Heidi. 2006. "Critical Pet Studies?" *Antipode* 38 (5): 894–906.
- Jeffrey Moussaieff Masson, and Susan McCarthy. 1996. *When Elephants Weep: The Emotional Lives of Animals*. Delta. <https://books.google.co.in/books?id=V2uWmA4FryoC>.
- Jochum, Kim A, Andrew A Kliskey, Kris J Hundertmark, and Lilian Alessa. 2014. "Integrating Complexity in the Management of Human-Wildlife Encounters." *Global Environmental Change* 26: 73–86.
- Johnsingh, AJT, R Raghunath, and MD Madhusudhan. 2008. "Suggested Extension for the Mudumalai Tiger Reserve, a Unique Tiger Landscape in India." Nature Conservation Foundation, Mysore.
- Jones, David M. 1975. "Elephant Rescue in Sri Lanka." *Oryx* 13 (2): 185–90.
- Jostad, Patricia M, Leo H McAvoy, and Daniel McDonald. 1996. "Native American Land Ethics: Implications for Natural Resource Management." *Society & Natural Resources* 9 (6): 565–81.
- Kansky, Ruth, Martin Kidd, and Andrew T. Knight. 2016. "A Wildlife Tolerance Model and Case Study for Understanding Human Wildlife Conflicts." *Biological Conservation* 201 (September): 137–45. <https://doi.org/10.1016/j.biocon.2016.07.002>.
- Kansky, Ruth, and Andrew T. Knight. 2014. "Key Factors Driving Attitudes towards Large Mammals in Conflict with Humans." *Biological Conservation* 179 (November): 93–105. <https://doi.org/10.1016/j.biocon.2014.09.008>.
- Karanth, K Ullas, James D Nichols, John Seidenstricker, Eric Dinerstein, James L David Smith, Charles McDougal, AJT Johnsingh, Raghunandan S Chundawat, and Valmik Thapar. 2003. "Science Deficiency in Conservation Practice: The Monitoring of Tiger Populations in India." In , 6:141–46. Cambridge University Press.
- Karthik, M, and A Menon. 2016. "Blurred Boundaries: Identity and Rights in the Forested Landscapes of Gudalur, Tamil Nadu." *Economic and Political Weekly, LI* 10: 43–50.
- Katugaha, H. I. E., M. de Silva, and C. Santiapillai. 1999. "A Long-Term Study on the Dynamics of the Elephant (*Elephas Maximus*) Population in Ruhuna National Park, Sri Lanka." *Biol Conserv* 89. [https://doi.org/10.1016/S0006-3207\(98\)00122-0](https://doi.org/10.1016/S0006-3207(98)00122-0).
- Khorozyan, Igor, Siavash Ghoddousi, Mobin Soufi, Mahmood Soofi, and Matthias Waltert. 2018. "Cattle Selectivity by Leopards Suggests Ways to Mitigate Human–Leopard Conflict." *Ecology and Evolution*.
- Khumalo, Kathryn Elizabeth, and Laurie Ann Yung. 2015. "Women, Human-Wildlife Conflict, and CBNRM: Hidden Impacts and Vulnerabilities in Kwandu Conservancy, Namibia." *Conservation and Society* 13 (3): 232.

- Kincheloe, J. L. (2001). Describing the bricolage: Conceptualizing a new rigor in qualitative research. *Qualitative Inquiry*, 7(6), 679-672.
- King, Lucy E., Iain Douglas-Hamilton, and Fritz Vollrath. 2011. "Beehive Fences as Effective Deterrents for Crop-Raiding Elephants: Field Trials in Northern Kenya." *African Journal of Ecology* 49 (4): 431-439.
- Kirksey, S, and Stefan Helmreich. 2010. "The Emergence of Multispecies Ethnography." *Cultural Anthropology* 25 (4): 545-76.
- Knight, J. 2000. *Natural Enemies: People-Wildlife Conflicts in Anthropological Perspective*. European Association of Social Anthropologists. Taylor & Francis. <https://books.google.co.in/books?id=jHh7-dWyxu0C>.
- Kohn, Eduardo. 2007. "How Dogs Dream: Amazonian Natures and the Politics of Transspecies Engagement." *American Ethnologist* 34 (1): 3-24. <https://doi.org/10.1525/ae.2007.34.1.3>.
- Korzybski, Alfred. 1958. *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics*. Institute of GS.
- Krishnan, Siddhartha. 2009. "Of Land, Legislation and Litigation: Forest Leases, Agrarian Reform, Legal Ambiguity and Landscape Anomaly in the Nilgiris, 1969-2007." *Conservation and Society* 7 (4): 283.
- Kulirani, Francis. 2003. "Contextual Analysis of Local Livelihood Strategies." In . Mysore: Swedish South Asian Studies Network. <http://www.sasnet.lu.se/tribalfrancis.pdf>.
- Kumar, Kundan, N Singh, and Y Giri Rao. 2017. "Promise and Performance of the Forest Rights Act: A Ten Year Review." *Economic and Political Weekly* 52 (25-26): 40-43.
- Kumar, M ANANDA. 2006. "Effect of Habitat Fragmentation on Asian Elephant (*Elephas Maximus*) Ecology and Behaviour Patterns in a Conflict-Prone Plantation Landscape of the Anamalai Hills, Western Ghats, India." *Rufford Maurice Laing Foundation, UK* 29.
- Kumar, M. Ananda, Divya Mudappa, and TR Shankar Raman. 2010. "Asian Elephant *Elephas Maximus* Habitat Use and Ranging in Fragmented Rainforest and Plantations in the Anamalai Hills, India." *Tropical Conservation Science* 3: 143-158.
- Kumar, MA, and M Singh. 2010. "Behavior of Asian Elephant (*Elephas Maximus*) in a Land-Use Mosaic: Implications for Human-Elephant Coexistence in the Anamalai Hills, India." *Wildl. Biol. Pract* 6: 69-80.
- Kumara, H. N., M. Ananda Kumar, A. K. Sharma, H. S. Sushma, Mridula Singh, and Mewa Singh. 2004. "Diversity and Management of Wild Mammals in Tea Gardens in the Rainforest Regions of the Western Ghats, India: A Case Study from a Tea Estate in the Anaimalai Hills." *Current Science* 87 (9): 1282-1287.
- Latour, Bruno. 1999. *Pandora's Hope: Essays on the Reality of Science Studies*. Harvard university press.
- Lee, Phyllis C, and Cynthia J Moss. 2012. "Wild Female African Elephants (*Loxodonta Africana*) Exhibit Personality Traits of Leadership and Social Integration." *Journal of Comparative Psychology* 126 (3): 224.
- Lévi-Strauss, C. (1966). *The savage mind*. Chicago, IL: University of Chicago Press.
- Lewis, Michael L. 2003. *Inventing Global Ecology: Tracking the Biodiversity Ideal in India, 1945-1997*. Vol. 5. Orient Blackswan.
- Linnell, John DC, Jon E. Swenson, and Reidar Anderson. 2001. "Predators and People: Conservation of Large Carnivores Is Possible at High Human Densities If Management Policy Is Favourable." *Animal Conservation* 4 (4): 345-349.
- Locke, Piers. 2011. "The Ethnography of Captive Elephant Management in Nepal: A Synopsis." *Gajah* 34 (1): 32-40.
- Locke, Piers, and Ursula Munster. 2015. *Multispecies Ethnography*. Oxford University Press Oxford.
- Lorimer, Hayden. 2006. "Herding Memories of Humans and Animals." *Environment and Planning D* 24 (4): 497.
- Lorimer, J., and S. Whatmore. 2009. "After the 'King of Beasts': Samuel Baker and the Embodied Historical Geographies of Elephant Hunting in Mid-Nineteenth-Century Ceylon." *Journal of Historical Geography* 35 (4): 668-89.
- Lorimer, Jamie. 2010a. "Elephants as Companion Species: The Lively Biogeographies of Asian Elephant Conservation in Sri Lanka." *Transactions of the Institute of British Geographers* 35 (4): 491-506.

- . 2010b. “Moving Image Methodologies for More-than-Human Geographies.” *Cultural Geographies* 17 (2): 237–58.
- Lulka, D. 2008. “Non-Linear Diffusion: Bison on the Hoof and on the Rail in the United States.” *Geoforum* 39 (2): 1007–20.
- Lulka, David. 2004. “Stabilizing the Herd: Fixing the Identity of Nonhumans.” *Environment and Planning D: Society and Space* 22 (3): 439–63.
- . 2009. “Form and Formlessness: The Spatiocorporeal Politics of the American Kennel Club.” *Environment and Planning D: Society and Space* 27 (3): 531–53.
- Lute, Michelle L., Neil H. Carter, José V. López-Bao, and John D.C. Linnell. 2018. “Conservation Professionals Agree on Challenges to Coexisting with Large Carnivores but Not on Solutions.” *Biological Conservation* 218 (February): 223–32. <https://doi.org/10.1016/j.biocon.2017.12.035>.
- Lute, Michelle L., Carlos David Navarrete, Michael Paul Nelson, and Meredith L. Gore. 2016. “Moral Dimensions of Human–Wildlife Conflict.” *Conservation Biology* 30 (6): 1200–1211.
- MacNulty, Daniel R., L. David Mech, and Douglas W. Smith. 2007. “A Proposed Ethogram of Large-Carnivore Predatory Behavior, Exemplified by the Wolf.” *Journal of Mammalogy* 88 (3): 595–605.
- Madden, Francine. 2004. “Creating Coexistence between Humans and Wildlife: Global Perspectives on Local Efforts to Address Human–Wildlife Conflict.” *Human Dimensions of Wildlife* 9 (4): 247–57. <https://doi.org/10.1080/10871200490505675>.
- Madden, Francine M. 2008. “The Growing Conflict Between Humans and Wildlife: Law and Policy as Contributing and Mitigating Factors.” *Journal of International Wildlife Law & Policy* 11 (2–3): 189–206. <https://doi.org/10.1080/13880290802470281>.
- Madhusudan, M. D. 2003. “Living Amidst Large Wildlife: Livestock and Crop Depredation by Large Mammals in the Interior Villages of Bhadra Tiger Reserve, South India.” *Environmental Management* 31 (4): 466–75. <https://doi.org/10.1007/s00267-002-2790-8>.
- . 2005. “Of Rights and Wrongs: Wildlife Conservation and the Tribal Bill.” *Economic and Political Weekly* 40 (47): 4893–95.
- Madhusudan, MD, Narayan Sharma, R. Raghunath, N. Baskaran, CM. Bipin, Sanjay Gubbi, AJT. Johnsingh, Jayant Kulkarni, Honnavalli N. Kumara, and Prachi Mehta. 2015. “Distribution, Relative Abundance, and Conservation Status of Asian Elephants in Karnataka, Southern India.” *Biological Conservation* 187: 34–40.
- Manning, A., and M.S. Dawkins. 2012. *An Introduction to Animal Behaviour*. An Introduction to Animal Behaviour. Cambridge University Press.
- Marino, A., C. Braschi, S. Ricci, V. Salvatori, and P. Ciucci. 2016. “Ex Post and Insurance-Based Compensation Fail to Increase Tolerance for Wolves in Semi-Agricultural Landscapes of Central Italy.” Article in Press. Scopus. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84959338788&partnerID=40&md5=09293d39aaf1dc9ee082ee6d3bcc62e6>.
- Marker, Laurie L., and Lorraine K. Boast. 2015. “Human–Wildlife Conflict 10 Years Later: Lessons Learned and Their Application to Cheetah Conservation.” *Human Dimensions of Wildlife* 20 (4): 302–9.
- Martin, Ron. 2001. “Geography and Public Policy: The Case of the Missing Agenda.” *Progress in Human Geography* 25 (2): 189–210.
- Mascia, Michael B., J. Peter Brosius, Tracy A. Dobson, Bruce C. Forbes, Leah Horowitz, Margaret A. McKean, and Nancy J. Turner. 2003. “Conservation and the Social Sciences.” *Conservation Biology* 17 (3): 649–50.
- Mason, Tom HE, Chris RJ Pollard, Deepthi Chimalakonda, Angela M. Guerrero, Catherine Kerr-Smith, Sergio AG Milheiras, Michaela Roberts, Paul R. Ngafack, and Nils Bunnefeld. 2018. “Wicked Conflict: Using Wicked Problem Thinking for Holistic Management of Conservation Conflict.” *Conservation Letters*, e12460.
- Massei, Giovanna, and Dave Cowan. 2014. “Fertility Control to Mitigate Human–Wildlife Conflicts: A Review.” *Wildlife Research* 41 (1): 1–21.
- Massei, Giovanna, Roger J. Quoy, Joanne Gurney, and Dave P. Cowan. 2010. “Can Translocations Be Used to Mitigate Human–Wildlife Conflicts?” *Wildlife Research* 37 (5): 428. <https://doi.org/10.1071/WR08179>.
- Massey, Doreen. 2001. “Geography on the Agenda1.” *Progress in Human Geography* 25 (1): 5–17.
- Matema, Steven, and Jens A. Andersson. 2015. “Why Are Lions Killing Us? Human–Wildlife Conflict and Social Discontent in Mbire District, Northern Zimbabwe.” *The Journal of Modern African Studies* 53 (01): 93–120.

- Max-Neef, Manfred A. 2005. "Foundations of Transdisciplinarity." *Ecological Economics* 53 (1): 5–16.
- Mayr, Ernst. 1982. *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*. Harvard University Press.
- Mc Guinness, SK. 2016. "Perceptions of Crop Raiding: Effects of Land Tenure and Agro- industry on Human–Wildlife Conflict." *Animal Conservation* 19 (6): 578–87.
- McManus, JS, AJ Dickman, D Gaynor, BH Smuts, and DW Macdonald. 2015. "Dead or Alive? Comparing Costs and Benefits of Lethal and Non-Lethal Human–Wildlife Conflict Mitigation on Livestock Farms." *Oryx* 49 (04): 687–95.
- Mech, L David. 2010. "Considerations for Developing Wolf Harvesting Regulations in the Contiguous United States." *The Journal of Wildlife Management* 74 (7): 1421–24.
- Menon, Ajit, Christelle Hinnewinkel, and Sylvie Guillerme. 2013. "Denuded Forests, Wooded Estates: Statemaking in a Janmam Area of Gudalur, Tamil Nadu." *The Indian Economic & Social History Review* 50 (4): 449–71.
- Menon, Ajit, and Manasi Karthik. 2017. "Beyond Human Exceptionalism: Political Ecology and the Non-Human World." *Geoforum* 79: 90–92.
- Menon, Vivek, Sandeep Kumar Tiwari, Ramkumar K, Sunil Kyarong, Upasana Ganguly, and Raman Sukumar. 2017. *Right of Passage: Elephant Corridors of India*. 2nd ed. Vol. 3. Wildlife Trust of India.
- Messmer, Terry A. 2000. "The Emergence of Human–Wildlife Conflict Management: Turning Challenges into Opportunities." *International Biodeterioration & Biodegradation* 45 (3): 97–102.
- Mishra, Charudutt. 1997. "Livestock Depredation by Large Carnivores in the Indian Trans-Himalaya: Conflict Perceptions and Conservation Prospects." *Environmental Conservation* 24 (04): 338–343.
- Misra, Rajalakshmi. 1971. *Mullukurumbas of Kappala*. Anthropological Survey of India, Government of India.
- Moore, Lorraine. 2009. "Beware the Elephant in the Bush: Myths, Memory and Indigenous Traditional Knowledge in North-Eastern Namibia." *Cultural Geographies* 16 (3): 329–49.
- . 2011. "The Neoliberal Elephant: Exploring the Impacts of the Trade Ban in Ivory on the Commodification and Neoliberalisation of Elephants." *Geoforum* 42 (1): 51–60. <https://doi.org/10.1016/j.geoforum.2010.09.002>.
- Moss, Cynthia. 2000. *Elephant Memories : Thirteen Years in the Life of an Elephant Family : With a New Afterword*. Univ. of Chicago Press ed. Chicago: University of Chicago Press.
- Mumby, Hannah S, and Joshua M Plotnik. 2018. "Taking the Elephants' Perspective: Remembering Elephant Behaviour, Cognition and Ecology in Human-Elephant Conflict Mitigation." *Frontiers in Ecology and Evolution* 6: 122.
- Munck, Allan, Paul M Guyre, and Nikki J Holbrook. 1984. "Physiological Functions of Glucocorticoids in Stress and Their Relation to Pharmacological Actions." *Endocrine Reviews* 5 (1): 25–44.
- Münster, Ursula. 2014. "Working for the Forest: The Ambivalent Intimacies of Human–Elephant Collaboration in South Indian Wildlife Conservation." *Ethnos*, no. ahead-of-print: 1–23.
- Murphree, Marshall W. 1990. "Decentralising the Proprietorship of Wildlife Resources in Zimbabwe's Communal Lands."
- Murray, M, A Cembrowski, ADM Latham, VM Lukasik, S Pruss, and CC St Clair. 2015. "Greater Consumption of Protein- poor Anthropogenic Food by Urban Relative to Rural Coyotes Increases Diet Breadth and Potential for Human–Wildlife Conflict." *Ecography* 38 (12): 1235–42.
- Myers, Norman. 2003. "Biodiversity Hotspots Revisited." *BioScience* 53 (10): 916–17.
- Myers, Norman, Russell A Mittermeier, Cristina G Mittermeier, Gustavo AB Da Fonseca, and Jennifer Kent. 2000. "Biodiversity Hotspots for Conservation Priorities." *Nature* 403 (6772): 853–58.
- Nadasdy, Paul. 2007. "The Gift in the Animal: The Ontology of Hunting and Human–Animal Sociality." *American Ethnologist* 34 (1): 25–43.
- Narain, S, M Gadgil, HS Panwar, and S Samar. 2005. "Joining the Dots - Report of the Tiger Task Force." Government of India.
- Narayan, Kirin. 1989. *Storytellers, Saints, and Scoundrels: Folk Narrative in Hindu Religious Teaching*. University of Pennsylvania Press.
- Naughton-Treves, Lisa. 1997. "Farming the Forest Edge: Vulnerable Places and People around Kibale National Park, Uganda." *Geographical Review* 87 (1): 27–46.

- Naveh, Daniel, and Nurit Bird-David. 2013. "On Animisms, Conservation, and Immediacy." A *Handbook on Contemporary Animism*. Acumen Publishing, Durham, 27–37.
- Naveh, Danny, and Nurit Bird-David. 2014. "How Persons Become Things: Economic and Epistemological Changes among Nayaka Hunter-gatherers." *Journal of the Royal Anthropological Institute* 20 (1): 74–92.
- Nelson, Richard. 1993. "Searching for the Lost Arrow: Physical and Spiritual Ecology in the Hunter's World." In *The Biophilia Hypothesis*, edited by Stephen Kellert and Edward O Wilson, 201–29. Island Press.
- Neo, H. 2012. "'They Hate Pigs, Chinese Farmers... Everything!' Bestly Racialization in Multiethnic Malaysia." *Antipode* 44 (3): 950–70.
- Neupane, Dinesh, Ronald L Johnson, and Thomas S Risch. 2017. "How Do Land-Use Practices Affect Human—Elephant Conflict in Nepal?" *Wildlife Biology*, wlb-00313.
- Newbigin, Marion Isabel. 1913. *Animal Geography: The Faunas of the Natural Regions of the Globe*. Clarendon press.
- Newing, Helen. 2010. *Conducting Research in Conservation: Social Science Methods and Practice*. Routledge.
- Newsome, Thomas M, Justin A Dellinger, Chris R Pavey, William J Ripple, Carolyn R Shores, Aaron J Wirsing, and Christopher R Dickman. 2015. "The Ecological Effects of Providing Resource Subsidies to Predators." *Global Ecology and Biogeography* 24 (1): 1–11.
- Newsome, Thomas M, and Lily M van Eeden. 2017. "The Effects of Food Waste on Wildlife and Humans." *Sustainability* 9 (7): 1269.
- Niimura, Yoshihito, Atsushi Matsui, and Kazushige Touhara. 2014. "Extreme Expansion of the Olfactory Receptor Gene Repertoire in African Elephants and Evolutionary Dynamics of Orthologous Gene Groups in 13 Placental Mammals." *Genome Research* 24 (9): 1485–96.
- Norris, Michael, and Charles Oppenheim. 2007. "Comparing Alternatives to the Web of Science for Coverage of the Social Sciences' Literature." *Journal of Informetrics* 1 (2): 161–69. <https://doi.org/10.1016/j.joi.2006.12.001>.
- Noss, Reed F. 1996. "Conservation Biology, Values, and Advocacy." *Conservation Biology* 10 (3): 904–904.
- Nowotny, Helga, Peter B Scott, and Michael T Gibbons. 2013. *Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty*. John Wiley & Sons.
- Nowotny, Helga, Peter Scott, and Michael Gibbons. 2003. "Introduction: Mode 2' Revisited: The New Production of Knowledge." *Minerva* 41 (3): 179–94.
- Nyhus, Philip J., and Ronald Tilson Sumianto. 2000. "Crop-Raiding Elephants and Conservation Implications at Way Kambas National Park, Sumatra, Indonesia." *Oryx* 34 (4): 262–274.
- O'Connell, Caitlin. 2008. *The Elephant's Secret Sense: The Hidden Life of the Wild Herds of Africa*. University of Chicago Press.
- O'Connell-Rodwell, Caitlin E, Timothy Rodwell, Matthew Rice, and Lynette A Hart. 2000. "Living with the Modern Conservation Paradigm: Can Agricultural Communities Co-Exist with Elephants? A Five-Year Case Study in East Caprivi, Namibia." *Biological Conservation* 93 (3): 381–91.
- OED. 2018. "Home : Oxford English Dictionary." 2018. <http://www.oed.com/>.
- Ogden, Laura A., Billy Hall, and Kimiko Tanita. 2013. "Animals, Plants, People, and Things: A Review of Multispecies Ethnography." *Environment and Society: Advances in Research* 4 (1): 5–24. <https://doi.org/10.3167/ares.2013.040102>.
- Ogra, Monica V. 2008. "Human-Wildlife Conflict and Gender in Protected Area Borderlands: A Case Study of Costs, Perceptions, and Vulnerabilities from Uttarakhand (Uttaranchal), India." *Geoforum* 39 (3): 1408–22. <https://doi.org/doi: DOI: 10.1016/j.geoforum.2007.12.004>.
- Okello, M.M., and D.E. D'Amour. 2008. "Agricultural Expansion within Kimana Electric Fences and Implications for Natural Resource Conservation around Amboseli National Park, Kenya." *Journal of Arid Environments* 72 (12): 2179–92. <https://doi.org/10.1016/j.jaridenv.2008.07.008>.
- Okongwu, Anne Francis, and Joan P Mencher. 2000. "The Anthropology of Public Policy: Shifting Terrains." *Annual Review of Anthropology* 29 (1): 107–24.
- Oli, Madan K, Iain R Taylor, and M Elizabeth Rogers. 1994. "Snow Leopard Panthera Uncia Predation of Livestock: An Assessment of Local Perceptions in the Annapurna Conservation Area, Nepal." *Biological Conservation* 68 (1): 63–68.
- Olivier, Robert. 1978. "Distribution and Status of the Asian Elephant." *Oryx* 14 (04): 379–424.

- Osborn, Ferrel V. 2002. "Capsicum Oleoresin as an Elephant Repellent: Field Trials in the Communal Lands of Zimbabwe." *The Journal of Wildlife Management*, 674–677.
- Papworth, SK, J Rist, L Coad, and EJ Milner- Gulland. 2009. "Evidence for Shifting Baseline Syndrome in Conservation." *Conservation Letters* 2 (2): 93–100.
- Pathak Broome, Neema, Nitin D Rai, and Meenal Tatpati. 2017. "Biodiversity Conservation and Forest Rights Act." *Economic and Political Weekly* 52 (25–26): 51–54.
- Pauly, Daniel. 1995. "Anecdotes and the Shifting Baseline Syndrome of Fisheries." *Trends in Ecology & Evolution* 10 (10): 430.
- Payne, Katharine. 1998. *Silent Thunder: In the Presence of Elephants*. New York: Simon & Schuster.
- Perera, BMAO. 2009. "The Human-Elephant Conflict: A Review of Current Status and Mitigation Methods." *Gajah* 30: 41–52.
- Peterson, Indira Viswanathan. 1991. *Poems to Śiva: The Hymns of the Tamil Saints*. Motilal Banarsidass Publisher.
- Peterson, M. N., J. L. Birckhead, K. Leong, M. J. Peterson, and T. R. Peterson. 2010. "Rearticulating the Myth of Human–Wildlife Conflict." *Conservation Letters* 3 (2): 74–82.
- Peterson, M. Nils, Jessie L. Birckhead, Kirsten Leong, Markus J. Peterson, and Tarla Rai Peterson. 2010. "Rearticulating the Myth of Human-Wildlife Conflict." *Conservation Letters* 3 (2): 74–82. <https://doi.org/10.1111/j.1755-263X.2010.00099.x>.
- Peterson, M.N., M.J. Peterson, T.R. Peterson, and K. Leong. 2013. "Why Transforming Biodiversity Conservation Conflict Is Essential and How to Begin." *Pacific Conservation Biology* 19 (2): 94–103.
- Philo, Chris. 1995. "Animals, Geography, and the City: Notes on Inclusions and Exclusions." *Environment and Planning D: Society and Space* 13: 655–81.
- Philo, Chris, and Chris Wilbert. 2000. *Animal Spaces, Beastly Places: New Geographies of Human-Animal Relations*. Vol. 10. Psychology Press.
- Pirta, Raghubir Singh, Madhav Gadgil, and AV Kharshikar. 1997. "Management of the Rhesus Monkey *Macaca Mulatta* and Hanuman Langur *Presbytis Entellus* in Himachal Pradesh, India." *Biological Conservation* 79 (1): 97–106.
- Pitt, Hannah. 2015. "On Showing and Being Shown Plants- a Guide to Methods for More- than-human Geography." *Area* 47 (1): 48–55.
- Plotnik, Joshua M., Frans BM De Waal, and Diana Reiss. 2006. "Self-Recognition in an Asian Elephant." *Proceedings of the National Academy of Sciences* 103 (45): 17053–57.
- Plotnik, Joshua M., Richard Lair, Wirot Suphachoksahakun, and Frans B. M. de Waal. 2011. "Elephants Know When They Need a Helping Trunk in a Cooperative Task." *Proceedings of the National Academy of Sciences*, March. <http://www.pnas.org/content/early/2011/03/02/1101765108.abstract>.
- Pokharel, Sanjeeta Sharma, Polani B Seshagiri, and Raman Sukumar. 2017. "Assessment of Season-Dependent Body Condition Scores in Relation to Faecal Glucocorticoid Metabolites in Free-Ranging Asian Elephants." *Conservation Physiology* 5 (1).
- Poole, Joyce. 1996. *Coming of Age with Elephants: A Memoir*. 1st ed. New York: Hyperion.
- Prabhakar, R, and JP Pascal. 1996. *Nilgiri Biosphere Reserve Area, Vegetation and Land Use*. Centre for Ecological Sciences, Indian Institute of Science, Bangalore.
- Praet, Istvan. 2013. "The Positional Quality of Life and Death: A Theory of Human–Animal Relations in Animism." *Anthrozoös* 26 (3): 341–55.
- Prasad, Anshuman, and Pushkala Prasad. 2002. "The Coming of Age of Interpretive Organizational Research." *Organizational Research Methods* 5 (1): 4–11.
- Project Elephant. 2017. "Synchronised Elephant Population Estimating 2017." <http://envfor.nic.in/division/introduction-4>.
- Puyravaud, J.-P., and P. Davidar. 2013. "The Nilgiris Biosphere Reserve: An Unrealized Vision for Conservation." *Tropical Conservation Science* 6 (4): 468–76.
- Rajan, S, M Sethuraman, and Pulok K Mukherjee. 2002. "Ethnobiology of the Nilgiri Hills, India." *Phytotherapy Research* 16 (2): 98–116.
- Rangarajan, Mahesh. 2005. "Fire in the Forest." *Economic and Political Weekly* 40 (47): 4888–90.
- Rangarajan, Mahesh, Ajay Desai, Raman Sukumar, PS Easa, Vivek Menon, S Vincent, Suparna Ganguly, et al. 2010. "Gajah: Securing the Future for Elephants in India." Ministry of Environment and Forests, Government of India.

- Reddy, C Sudhakar, Prachi Ugle, MSR Murthy, and S Sudhakar. 2008. "Quantitative Structure and Composition of Tropical Forests of Mudumalai Wildlife Sanctuary, Western Ghats, India." *Taiwania* 53 (2): 150–56.
- Redford, Kent H. 2011. "Misreading the Conservation Landscape." *Oryx* 45 (03): 324–30.
- Redpath, SM, BE Arroyo, FM Leckie, P Bacon, N Bayfield, RJ Gutierrez, and SJ Thirgood. 2004. "Using Decision Modeling with Stakeholders to Reduce Human–Wildlife Conflict: A Raptor–Grouse Case Study." *Conservation Biology* 18 (2): 350–59.
- Redpath, Stephen Mark, Saloni Bhatia, and Juliette Young. 2015. "Tilting at Wildlife: Reconsidering Human–Wildlife Conflict." *Oryx* 49 (02): 222–25.
- Redpath, Steve M., Juliette Young, Anna Evely, William M. Adams, William J. Sutherland, Andrew Whitehouse, Arjun Amar, et al. 2013. "Understanding and Managing Conservation Conflicts." *Trends in Ecology & Evolution* 28 (2): 100–109. <https://doi.org/10.1016/j.tree.2012.08.021>.
- Robbins, P. 2004. *Political Ecology: A Critical Introduction*. Critical Introductions to Geography. Wiley.
- Rogers, M. (2012). Contextualizing Theories and Practices of Bricolage Research. The Qualitative Report, 17(48), 1-17. Retrieved from <https://nsuworks.nova.edu/tqr/vol17/iss48/3>
- Roth, Gerhard. 2012. "Is the Human Brain Unique?" In *The Theory of Evolution and Its Impact*, 175–87. Springer.
- Rust, Niki A, Joseph Tzanopoulos, Tatyana Humle, and Douglas C MacMillan. 2016. "Why Has Human–Carnivore Conflict Not Been Resolved in Namibia?" *Society & Natural Resources* 29 (9): 1079–94.
- Rutberg, Allen T. 1997. "Lessons from the Urban Deer Battlefront: A Plea for Tolerance." *Wildlife Society Bulletin* 25 (2): 520–23.
- Saberwal, V. K., J.P. Gibbs, R. Chellam, and A.J.T Johnsingh. 1994. "Lion-Human Conflict in the Gir Forest, India." *Conservation Biology* 8 (2): 501–7.
- Saito, Masayuki U, Hiroshi Momose, Satoshi Inoue, Osamu Kurashima, and Hiroyuki Matsuda. 2016. "Range-Expanding Wildlife: Modelling the Distribution of Large Mammals in Japan, with Management Implications." *International Journal of Geographical Information Science* 30 (1): 20–35.
- Samuels, A., and J. Altmann. 1991. "Baboons of the Amboseli Basin: Demographic Stability and Change." *International Journal of Primatology* 12 (1): 1–19. <https://doi.org/10.1007/BF02547555>.
- Sandbrook, Chris, William M Adams, Bram Büscher, and Bhaskar Vira. 2013. "Social Research and Biodiversity Conservation." *Conservation Biology* 27 (6): 1487–90.
- Santiapillai, Charles, MR Chambers, and N Ishwaran. 1984. "Aspects of the Ecology of the Asian Elephant *Elephas Maximus* L. in the Ruhuna National Park, Sri Lanka." *Biological Conservation* 29 (1): 47–61.
- Sarma, KK, and SC Pathak. 2001. "Cardio Vascular Response to Xylazine and Hellabrunn Mixture with Yohimbine as Reversal Agent in Asian Elephants." *Indian Veterinary Journal (India)*.
- Sauer, Carl Ortwin. 1969. *Seeds, Spades, Hearths, and Herds: The Domestication of Animals and Foodstuffs*. MIT Press Cambridge, Massachusetts.
- Saunders, Denis A., and Richard J. Hobbs. 1991. "The Role of Corridors in Conservation: What Do We Know and Where Do We Go?"
- Schleidt, W. M., G. Yakalis, M. Donnelly, and J. McGarry. 1984. "A Proposal for a Standard Ethogram, Exemplified by an Ethogram of the Bluebreasted Quail (*Coturnix Chinensis*)1." *Zeitschrift Für Tierpsychologie* 64 (3–4): 193–220. <https://doi.org/10.1111/j.1439-0310.1984.tb00360.x>.
- Schmidt, R H, and R Beach. 1994. "What Is 'Wildlife Damage Management'?" *Wildlife Control Technology* 1 (1): 4–5.
- Scott, J Michael, Janet L Rachlow, Robert T Lackey, Anna B Pidgorna, Jocelyn L Aycrigg, Gabrielle R Feldman, Leona K Svancara, David A Rupp, David I Stanish, and R Kirk Steinhorst. 2007. "Policy Advocacy in Science: Prevalence, Perspectives, and Implications for Conservation Biologists." *Conservation Biology* 21 (1): 29–35.
- Sekhar, Nagothu Udaya. 1998. "Crop and Livestock Depredation Caused by Wild Animals in Protected Areas: The Case of Sariska Tiger Reserve, Rajasthan, India." *Environmental Conservation* 25 (02): 160–171.
- Serres, Michel, and Bruno Latour. 1995. *Conversations on Science, Culture, and Time*. University of Michigan Press.

- Sharma, Prayag Raj. 1978. "Nepal: Hindu-Tribal Interface." *Contributions to Nepalese Studies* 6 (1): 1–14.
- Shastri, Sandeep. 2009. *Electoral Politics in Indian States : Lok Sabha Elections in 2004 and Beyond*. New Delhi: Oxford University Press.
- Shettleworth, Sara J. 2001. "Animal Cognition and Animal Behaviour." *Animal Behaviour* 61 (2): 277–86.
- Shore, Cris. 2012. "Anthropology and Public Policy." *The Sage Handbook of Social Anthropology*, 89–104.
- Siex, K. S., and T. T. Struhsaker. 1999. "Colobus Monkeys and Coconuts: A Study of Perceived Human–Wildlife Conflicts." *Journal of Applied Ecology* 36 (6): 1009–20.
- Sijtsma, M.T.J., J.J. Vaske, and M.H. Jacobs. 2012. "Acceptability of Lethal Control of Wildlife That Damage Agriculture in the Netherlands." *Society and Natural Resources* 25 (12): 1308–23.
- Silva, Julie A, and Alfons W Mosimane. 2013. "Conservation-Based Rural Development in Namibia: A Mixed-Methods Assessment of Economic Benefits." *The Journal of Environment & Development* 22 (1): 25–50.
- Silva, Shermin de, Ashoka DG Ranjeewa, and Sergey Kryazhimskiy. 2011. "The Dynamics of Social Networks among Female Asian Elephants." *BMC Ecology* 11 (1): 17. <https://doi.org/10.1186/1472-6785-11-17>.
- Simoons, Frederick J, and Elizabeth S Simoons. 1967. "The Ceremonial Ox of India; the Mithan in Nature, Culture, and History, with Notes on the Domestication of Common Cattle." DTIC Document.
- Sitati, N. W., M. J. Walpole, R. J. Smith, and N. Leader-Williams. 2003. "Predicting Spatial Aspects of Human–Elephant Conflict." *Journal of Applied Ecology* 40 (4): 667–677.
- Sitati, Noah W., and Matthew J. Walpole. 2006. "Assessing Farm-Based Measures for Mitigating Human-Elephant Conflict in Transmara District, Kenya." *Oryx* 40 (03): 279. <https://doi.org/10.1017/S0030605306000834>.
- Songhurst, Anna. 2017. "Measuring Human–Wildlife Conflicts: Comparing Insights from Different Monitoring Approaches." *Wildlife Society Bulletin* 41 (2): 351–61.
- Springate-Baginski, Oliver, and Piers Blaikie. 2013. *Forests People and Power: The Political Ecology of Reform in South Asia*. Routledge.
- Srinivasaiyah, Nishant M., Vijay D. Anand, Srinivas Vaidyanathan, and Anindya Sinha. 2012. "Usual Populations, Unusual Individuals: Insights into the Behavior and Management of Asian Elephants in Fragmented Landscapes." Edited by Wayne M. Getz. *PLoS ONE* 7 (8): e42571. <https://doi.org/10.1371/journal.pone.0042571>.
- Srinivasan, Krithika, and Rajesh Kasturirangan. 2016. "Political Ecology, Development, and Human Exceptionalism." *Geoforum* 75: 125–28.
- . 2017. "In Search of Common Ground: Political Ecology and Conservation in the Development Age." *Geoforum* 82: 87–88.
- Stamps, Judy, and Ton G. G. Groothuis. 2010. "The Development of Animal Personality: Relevance, Concepts and Perspectives." *Biological Reviews* 85 (2): 301–25. <https://doi.org/10.1111/j.1469-185X.2009.00103.x>.
- Stanton, Lauren Ashley, Matthew Stephen Sullivan, and Jilian Marie Fazio. 2015. "A Standardized Ethogram for the Felidae: A Tool for Behavioral Researchers." *Applied Animal Behaviour Science* 173: 3–16.
- Stegmann, G. F. 1999. "Etorphine-Halothane Anaesthesia in Two Five-Year-Old African Elephants (*Loxodonta africana*): Clinical Communication." *Journal of the South African Veterinary Association* 70 (4): 164–66.
- Stracey, P D. 1963. *Elephant Gold*. London UK: Weidenfeld and Nicolson.
- Strauss, Anselm, and Juliet M Corbin. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Sage Publications, Inc.
- Stüwe, Michael, Jasmi B Abdul, Burhanuddin Mohd Nor, and Christen M Wemmer. 1998. "Tracking the Movements of Translocated Elephants in Malaysia Using Satellite Telemetry." *Oryx* 32 (1): 68–74.
- Sukumar, R. 1989. "Ecology of the Asian Elephant in Southern India. I. Movement and Habitat Utilization Patterns." *Journal of Tropical Ecology*, 1–18.
- . 2003. *The Living Elephants : Evolutionary Ecology, Behavior, and Conservation*. New York: Oxford University Press.

- . 2006. “A Brief Review of the Status, Distribution and Biology of Wild Asian Elephants *Elephas Maximus*.” *International Zoo Yearbook* 40 (1): 1–8.
- Sukumar, R, NV Joshi, and V Krishnamurthy. 1988. “Growth in the Asian Elephant.” *Proceedings: Animal Sciences* 97 (6): 561–71.
- Sukumar, R1. 1991. “The Management of Large Mammals in Relation to Male Strategies and Conflict with People.” *Biological Conservation* 55 (1): 93–102.
- Sukumar, Raman. 1992. *The Asian Elephant: Ecology and Management*. Cambridge University Press.
- . 1994. “Wildlife-Human Conflict in India: An Ecological and Social Perspective.” *Social Ecology, Oxford University Press, New Delhi*.
- . 1996. *Elephant Days and Nights: Ten Years with the Indian Elephant*. 3. impr. Oxford India Paperbacks. New Delhi: Oxford Univ. Press.
- Sukumar, Raman, Ajay Desai, Sharachandra Lele, CH Basappanavar, SS Bist, N Ravindranath Kamath, BR Deepak, et al. 2012. “Report of the Karnataka Elephant Task Force- Submitted to the High Court of Karnataka.” Government of Karnataka.
- Taghioff, D, and A Menon. 2010. “Can a Tiger Change Its Stripes? The Politics of Conservation as Translated in Mudumalai.” *Economic and Political Weekly* 45: 28.
- Tchamba, M.N., and P. Elkan. 1995. “Status and Trends of Some Large Mammals and Ostriches in Waza National Park, Cameroon.” *African Journal of Ecology* 33 (4): 366–76. <https://doi.org/10.1111/j.1365-2028.1995.tb01046.x>.
- Tehamba, M.N. 1996. “History and Present Status of the Human/Elephant Conflict in the Waza-Logone Region, Cameroon, West Africa.” *Biological Conservation* 75 (1). <https://www.scopus.com/inward/record.uri?eid=2-s2.0-0029668885&partnerID=40&md5=ee8c4035e12e56ff7afa6a8ff4196c01>.
- Thekaekara, Tarsh. 2010. “Dissecting the ‘human’ in Human-Wildlife Conflict.” MSc Thesis, Oxford: University Of Oxford.
- . 2015. “Human-Elephant Tolerance.” In *Giant Hearts: Travels in the World of Elephants*, edited by J.-Ph Puyravaud and Priya Davidar, 23–26.
- Thekaekara, Tarsh, and Thomas F. Thornton. 2016. “Ethnic Diversity and Human-Elephant Conflict in South India.” In *Conflict, Negotiation, and Coexistence: Rethinking Human-Elephant Relations in South Asia*, edited by Piers Locke and Jane Buckingham. Oxford University Press.
- Thouless, C.R., and J. Sakwa. 1995. “Shocking Elephants: Fences and Crop Raiders in Laikipia District, Kenya.” *Biological Conservation* 72 (1): 99–107. [https://doi.org/10.1016/0006-3207\(94\)00071-W](https://doi.org/10.1016/0006-3207(94)00071-W).
- Thrift, Nigel. 2008. *Non-Representational Theory: Space, Politics, Affect*. Routledge.
- Thurston, Edgar, and K Rangachari. 1909. “Castes and Tribes of South India.” *Madras Government Press* 5.
- Tinbergen, Niko. 1951. *The Study of Instinct*. Oxford, England: Oxford University Press.
- . 1963. “On Aims and Methods of Ethology.” *Zeitschrift Für Tierpsychologie* 20 (4): 410–33.
- Touma, Chadi, and Rupert Palme. 2005. “Measuring Fecal Glucocorticoid Metabolites in Mammals and Birds: The Importance of Validation.” *Annals of the New York Academy of Sciences* 1046 (1): 54–74.
- Treves, Adrian, and Jeremy Bruskotter. 2014a. “Tolerance for Predatory Wildlife.” *Science* 344 (6183): 476–77.
- . 2014b. “Tolerance for Predatory Wildlife.” *Science* 344 (6183): 476–77.
- Treves, Adrian, and K. Ullas Karanth. 2003. “Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide.” *Conservation Biology* 17 (6): 1491–1499.
- Treves, ADRIAN, and LISA Naughton-Treves. 2005. “Evaluating Lethal Control in the Management of Human-Wildlife Conflict.” *CONSERVATION BIOLOGY SERIES-CAMBRIDGE-* 9: 86.
- Turnbull, C.M. 1965. *The Mbuti Pygmies: An Ethnographic Survey*. Anthropological Papers of the American Museum of Natural History, v. 50, Pt. 3. American Museum of Natural History. <https://books.google.co.in/books?id=ki60AAAAIAAJ>.
- UNEP- WCMC. 2005. “World Database on Protected Areas (WDPA).” 2005. <http://www.wdpa.org/>.
- Vaccaro, Ismael, and Oriol Beltran. 2009. “Livestock versus ‘Wild Beasts’: Contradictions in the Natural Patrimonialization of the Pyrenees.” *Geographical Review* 99 (4): 499–516.
- Van Eeden, Lily M, Mathew S Crowther, Chris R Dickman, David W Macdonald, William J Ripple, Euan G Ritchie, and Thomas M Newsome. 2018. “Managing Conflict between Large Carnivores and Livestock.” *Conservation Biology* 32 (1): 26–34.

- Varma, Surendra. 2000. "Possible Impacts of the Proposed Hydroelectric and HPCL Pipeline Projects, on Asian Elephant Populations." Bangalore: Asian Elephant Research & Conservation Centre, Asian Nature Conservation Foundation.
- Varma, Surendra, André Pittet, and HS Jamadagni. 2006. "Experimenting Usage of Camera-Traps for Population Dynamics Study of the Asian Elephant *Elephas Maximus* in Southern India." *Current Science*. 91 (3): 324–31.
- Varma, Surendra, TS Rajeev, MC Radhakrishnan, and KR Rajesh. 2010. "Mortality of Mahouts by Captive Asian Elephants in Kerala, Southern India; Investigations into the Incidents of Elephant Killing/Injuring Mahouts, Running Amok and Perceptions of Mahouts towards Their Profession." Bangalore: Compassion Unlimited Plus Action & Asian Nature Conservation Foundation.
- Vayda, Andrew P, and Bradley B Walters. 1999. "Against Political Ecology." *Human Ecology* 27 (1): 167–79.
- Venkataraman, Arun. 2000. "Incorporating Traditional Coexistence Propensities into Management of Wildlife Habitats in India." *Current Science* 79 (11): 1531–35.
- Venkataraman, Arun, Sandeep Kumar Tiwari, and Ramkumar K. 2017. "What Is an Asian Elephant Corridor." In *Right of Passage: Elephant Corridors of India*, 2nd ed. Vol. 3. Wildlife Trust of India.
- Vera, Frans WM. 2009. "Large-Scale Nature Development--The Oostvaardersplassen." *British Wildlife* 20 (5): 28.
- Vidya, T. N. C., and R. Sukumar. 2005. "Social Organization of the Asian Elephant (*Elephas Maximus*) in Southern India Inferred from Microsatellite DNA." *J Ethol* 23. <https://doi.org/10.1007/s10164-005-0144-8>.
- Vidya, TNC, Deepika Prasad, and Arjun Ghosh. 2014. "Individual Identification in Asian Elephants." *Gajah* 40: 3–17.
- Vijayakrishnan, Sreedhar, Mavatur Ananda Kumar, G Umaphy, Vinod Kumar, and Anindya Sinha. 2018. "Physiological Stress Responses in Wild Asian Elephants *Elephas Maximus* in a Human-Dominated Landscape in the Western Ghats, Southern India." *General and Comparative Endocrinology*.
- Vollrath, Fritz, and Iain Douglas-Hamilton. 2002. "African Bees to Control African Elephants." *Naturwissenschaften* 89 (11): 508–11.
- Walker, Peter A. 2005. "Political Ecology: Where Is the Ecology?" *Progress in Human Geography* 29 (1): 73–82.
- Walters, Bradley B. 2012. "An Event-Based Methodology for Climate Change and Human–Environment Research." *Geografisk Tidsskrift-Danish Journal of Geography* 112 (2): 135–43.
- Walters, Bradley B, and Andrew P Vayda. 2009. "Event Ecology, Causal Historical Analysis, and Human–Environment Research." *Annals of the Association of American Geographers* 99 (3): 534–53.
- Wang, Yiwei, Justine A Smith, and Christopher C Wilmers. 2017. "Residential Development Alters Behavior, Movement, and Energetics in an Apex Predator, the Puma." *PloS One* 12 (10): e0184687.
- Water, Antoinette van de, and Kevin Matteson. 2018. "Human-Elephant Conflict in Western Thailand: Socio-Economic Drivers and Potential Mitigation Strategies." *PLOS ONE* 13 (6): e0194736. <https://doi.org/10.1371/journal.pone.0194736>.
- Watve, Milind, Kajol Patel, Abhijeet Bayani, and Pramod Patil. 2016. "A Theoretical Model of Community Operated Compensation Scheme for Crop Damage by Wild Herbivores." *Global Ecology and Conservation* 5: 58–70.
- Way, J.G., and J.T. Bruskotter. 2012. "Additional Considerations for Gray Wolf Management after Their Removal from Endangered Species Act Protections." *Journal of Wildlife Management* 76 (3): 457–61.
- Wedel, Janine R, Cris Shore, Gregory Feldman, and Stacy Lathrop. 2005. "Toward an Anthropology of Public Policy." *The ANNALS of the American Academy of Political and Social Science* 600 (1): 30–51.
- Weladji, Robert B., and Martin N. Tchamba. 2003. "Conflict between People and Protected Areas within the Bénoué Wildlife Conservation Area, North Cameroon." *Oryx* 37 (01). <https://doi.org/10.1017/S0030605303000140>.
- Whatmore, Sarah. 2002. *Hybrid Geographies: Natures Cultures Spaces*. SAGE Publications.

- Whatmore, Sarah, and Lorraine Thorne. 2000. "Elephants on the Move: Spatial Formations of Wildlife Exchange." *Environment and Planning D: Society and Space* 18 (2): 185–203.
- White, L. 1967. "The Historical Roots of Our Environmental Crisis." *Science* 155 (10.3): 1967.
- Wilbur, Ryan C, Stacy A Lischka, Jessica R Young, and Heather E Johnson. 2018. "Experience, Attitudes, and Demographic Factors Influence the Probability of Reporting Human–Black Bear Interactions." *Wildlife Society Bulletin* 42 (1): 22–31.
- Williams, A C, AJT Johnsingh, and PR Krausman. 2001. "Elephant-Human Conflicts in Rajaji National Park, Northwestern India." *Wildlife Society Bulletin* 29 (4): 1097.
- Williams, AMIRTHARAJ CHRISTY, ASIR JT Johnsingh, PAUL R Krausman, and QAMAR Qureshi. 2008. "Ranging and Habitat Selection by Asian Elephants (*Elephas Maximus*) in Rajaji National Park, North-West India." *Journal of the Bombay Natural History Society* 105: 1.
- Williams, S.C., A.J. De Nicola, T. Almendinger, and J. Maddock. 2013. "Evaluation of Organized Hunting as a Management Technique for Overabundant White-Tailed Deer in Suburban Landscapes." *Wildlife Society Bulletin* 37 (1): 137–45.
- Willner, Dorothy. 1980. "For Whom the Bell Tolls: Anthropologists Advising on Public Policy." *American Anthropologist* 82 (1): 79–94.
- Wolch, Jennifer. 2002. "Anima Urbis." *Progress in Human Geography* 26 (6): 721–42.
- Wolch, Jennifer, and Jacque Emel. 1995. "Bringing the Animals Back In." *Environment and Planning D Abstract* 13 (6): 632–36.
- Wolch, Jennifer R, and Jody Emel. 1998. *Animal Geographies: Place, Politics, and Identity in the Nature-Culture Borderlands*. Verso.
- Wood, Elisabeth Jean. 2006. "The Ethical Challenges of Field Research in Conflict Zones." *Qualitative Sociology* 29 (3): 373–86.
- Woodburn, James. 1982. "Egalitarian Societies." *Man*, 431–51.
- Woodroffe, R. 2000. "Predators and People: Using Human Densities to Interpret Declines of Large Carnivores." *Animal Conservation* 3 (2): 165–73.
- Woodroffe, Rosie, Simon Thirgood, and Alan Rabinowitz. 2005. *People and Wildlife, Conflict or Co-Existence?* 9. Cambridge University Press.
- World Bank. 2014. "Africa's Urban Population Growth: Trends and Projections | Open Data." 2014. <http://blogs.worldbank.org/opendata/africa-s-urban-population-growth-trends-and-projections>.
- WPC. 2005. "World Parks Congress Recommendation V.20: Preventing and Mitigating Human-Wildlife Conflicts." IUCN.
- Wynne, Clive DL. 2004. "The Perils of Anthropomorphism." *Nature* 428 (6983): 606.
- . 2007. "What Are Animals? Why Anthropomorphism Is Still Not a Scientific Approach to Behavior." *Comparative Cognition & Behavior Reviews* 2.
- Xaxa, Virginius. 2005. "Politics of Language, Religion and Identity: Tribes in India." *Economic and Political Weekly*, 1363–70.

9. Appendices

9.1 Appendix 1 – Mapping methods

In Chapter 3, working with field assistant, I have mapped the distribution of elephants, people, and natural vegetation to understand how these interact with each other. For all of this mapping, the work was split between myself and four colleagues at The Shola Trust (TST) – Ramesh, Prakash, Manikandan and Vishnu. The Gudalur Division is sub divided into five ranges, and each of us handled one range, based largely on where we lived and our familiarity with the region and fine local scales. All of the mapping exercises involved drawing on the knowledge of local stakeholders and forest department field staff, and we drew on ideas and techniques of mapping that draws on traditional ecological knowledge and indigenous knowledge (Mackenzie et al. 2017). Large satellite images were printed (1:7000, or 6 km² per A3 sheet), and were carried around on field work. The distribution of elephants, forest and land use were all discussed with field staff and local stakeholders using these printed satellite images as focal points of discussion.

Elephant distribution: I created a 1 square grid to match with the Survey of India topographic sheet for the region – 58A0. This was then cropped, including any grids that intersected with the Gudalur Forest Division Boundary (the shape file layer from TST), resulting in 586 grids. In each grid, we interviewed local people or the forest department field staff about the presence of elephants, and assigned a score on the scale of (1) – never come, (2) come rarely/a few times in a year and (3) present all through the year. This was first done in 2013, and then again repeated in 2017. Maps were created to visualise the distribution of elephants in the region, and further analysis carried out, which I describe later.

Human distribution: To understand the spread of people through the landscape, we mapped each house. This was also done in QGIS with the open layers plugin to bring up a Google earth satellite base layer (dated 2010). A point layer was created, and then each house added to this layer based on the satellite image. In total about 35,000 houses were marked in this way. The quality of images is very high, to the extent that each of us were

able to recognise our own house, so we didn't believe any ground truthing was required. Assuming an average household of 6, this accounts for a population of about 210,000, which is slightly less than the total population of the region of 250,000 as per the 2011 census. We have therefore missed some houses, and looking at the satellite images, we think these would have been in the highly populated urban areas.

Natural cover and land use: For natural vegetation we used the same open layers plugin to bring up a Google satellite base layer, and digitised the patches of natural cover from this. In each range, for ground-truthing we each visited at least five forest patches spread across each range to verify the boundaries. Here we found in some areas coffee planted at low densities with a thick natural canopy cover made it hard to distinguish from forests in the satellite images. This was largely in the south of the division, in the O'Valley range, where there are large areas of forests, though a small percentage of this may in fact be abandoned coffee plantations. From an elephants' habitat preference perspective, this is not very different from a forest, so we do not think this is a serious problem.

Human death: For mapping and understanding patterns around human death we chose a number of variables that we thought may be relevant in looking for trends and patterns that could be mitigated. These included: geographic location, date and time, age/sex/occupation/community of the person, land use around accident and a detailed description of how it happened. This information was not collected formally by any department of the Government. We started collecting this data in 2015, and for all the deaths since then we went to the place and collected this information directly. For deaths before that we got field staff to recall the list of people killed in the last five years, and then traced their families and collected in this information about the death, with all the information maintained in a spread sheet.

9.2 Appendix 2 – Working of the Crowd-sourced Elephant Monitoring and Early Warning System

Background

Elephants are long ranging animals, that move well beyond 'protected area' (wildlife sanctuaries, national parks and tiger reserves) boundaries. The average size of a protected area in India is about 400 km², but the home range of a single elephant herd can be up to 1000 km². So clearly, elephants will always be outside of these as well, alongside people. The problem with this is 'Human-Elephant Conflict', where wild elephant damage crops, destroy houses and property and even kill people in accidental encounters. Dealing this is one of the biggest problems for conservation in India, partly because all the biologists studying elephants have mostly focused on the elephant living inside forests, not the ones living alongside people. Videos of elephants in Gudalur are the best way to get a sense of how different they are from the elephants in forests, with some links – [Ganesan in Kolapalli](#), [KKH herd through the town](#), [Ganesan walking through tea](#).

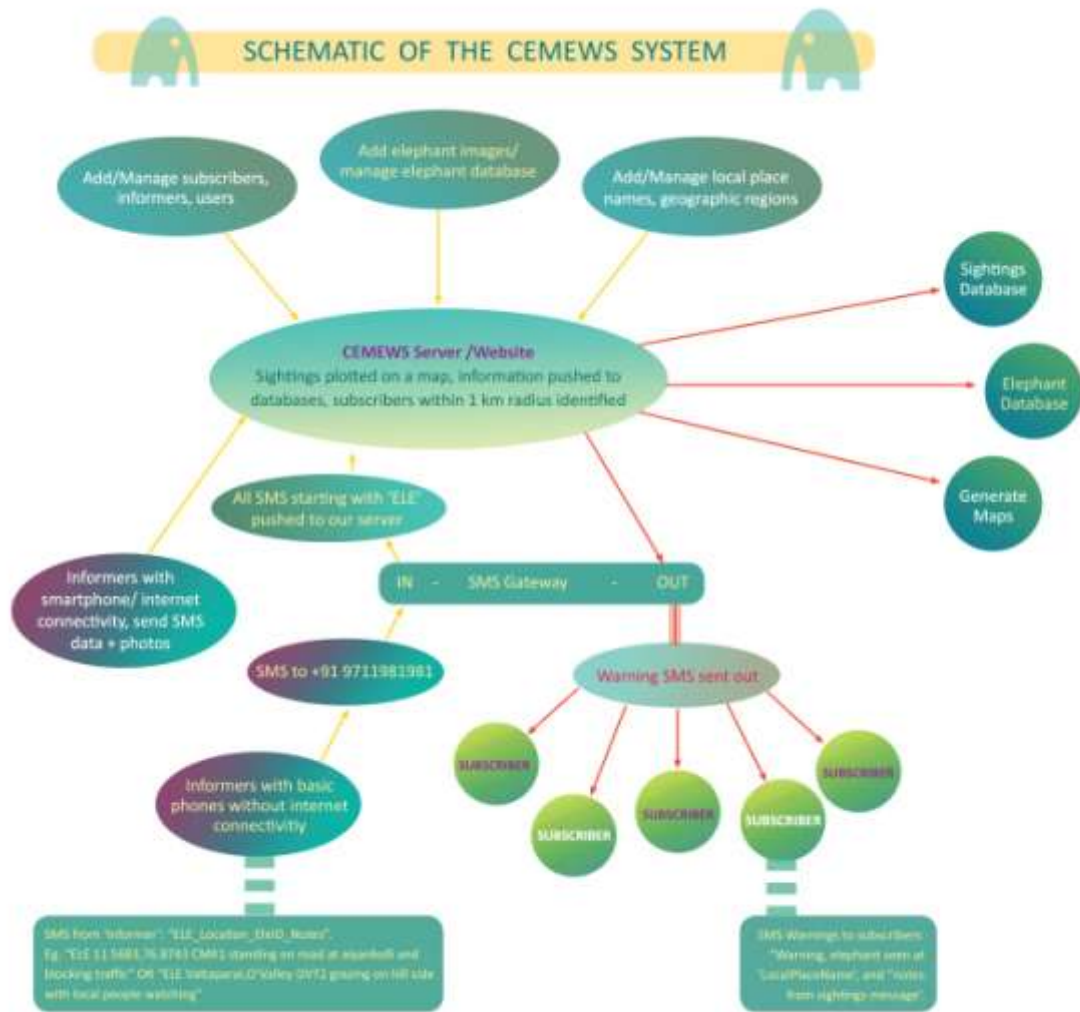
Some researchers at the Nature Conservation Foundation, found that in Valparai, most accidental deaths happened when people were not aware of the elephant's presence. And informing people of elephant movement and getting them to be alert was a key way to reduce this. They had trackers following the elephants, and if they came close to a settlement they would send out warning SMSs to local people, and also turned on warning lights in key areas. This has worked really well.

The CEMEWS

Based on this idea, The Shola Trust in collaboration with Swathanthra Malayalam Computing, set up a 'crowd-sourced elephant monitoring and early warning system' (CEMEWS). The idea was to get all local people to send in messages when they saw elephants, and also automatically send out warning messages subscribers within 1 km of the sighting.

The other objective was to use this platform to better study the elephants themselves. Elephants are complex and intelligent animals, with varying personalities, just like people.

Some are very comfortable and peaceful next to people, but others are much more nervous and potentially dangerous. We thought it would be useful to get local people to identify individual elephants in the landscape, and get to know them better. Or that is people were able to relate to individuals differently rather than the species as a whole, it may be easier for them to tolerate elephants on their lands. For this, we created some training material on how to identify individual elephants based on the ears, tusks, shape of the back etc. When elephants are reported, we visit the area with the forest department field staff, photograph the elephants. When we have seen the same elephant multiple times and got enough photos, we create 'Individual Elephant Profiles', and give the elephant a name (like Bheeman, Rani and Kika) and also an ID (like CMK1, CT2, KKH1, OVH1 etc.) that is based mostly on the forest department range where the elephant is sighted the most. People are then encouraged to send in both SMS and photos (if possible) of any elephants they see, and all of this is stored in an 'Elephant database'.



The system was launched at the end of 2015, with very good support from the Tamilnadu forest department through the Gudalur DFO, where field-staff are the key informers of elephant movement and sightings. And though it's been a very short time there are lot of interesting things we are learning about the elephants.

The System Backend

Information about elephant sightings is by SMS to a specified number which is connected to a SMS gateway, which we rent from a commercial provider. The gateway will identify messages with the keyword 'ELE', and it will be forwarded to the CEMEWS API.

The required SMS format is: ELE latitude, longitude Herd-ID Other-Notes

We are also working on adding a list of local place names to the system, so that latitude and longitude can be replaced by an easily recognisable name.

The CEMEWS system will parse the details from the SMS and will mark the elephant presence on the map. It will also send out messages to the people who are subscribed to the updates within a 1-kilometre circle of the sighting. System moderator can check the collected details through an administrative interface. There are options to manually report and/or change the existing sightings through the administrative interface.

The CEMEWS system is built in python programming language. It is powered by the Django framework and we use an SQL database for storing the data. The source code is available for the public under a GPLv3 license.

There is now significant interest to develop and use this system in other parts of India and possibly the world, and we're hoping to see this grow!

Tarsh Thekaekara and Hrishikesh Bhaskaran, August 2016.

9.3 Appendix 3 – Elephant database

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
1	Bitherkadu	BK01	Unnamed	No	MAF	Squarish Ears, folds both sides, photos taken by prakash and ammakavu on 160819 and Vishnu and Dhanesh on 161209. Both times alone.
2	Cherambadi	CBT01	Shankar Mahadevan	Yes	OM	Large, old male (50+ yrs old). Very short, thick tusk on right, left tusk is broken, so called othakomban. Squarish ears, with large top fold and veins visible. Huge tear in middle of left ear. Full hair on tail.
3	Cherambadi	CMK0 1	Ganesan Nadodi	Yes	OM	Very large, old male. Quite fat and ribs not visible. Back relatively smooth curve, head slightly higher than back. Ears have squarish shape, with slight pointed lower tip. Significant top fold all the way to rear (3 inch). Drooping at rear, with approx. 5 inch tear that is not easily visible. Veins visible. Diffused de-pigmentation towards rear.
4	Cherambadi	CMK0 2	Bheeman Babu	Yes	YAM	Medium size, quite fat, around 30 yrs old. Slight curve in back. Head and back same height. Ears are squarish shape, with rounded top. No top fold, slight backward curve. Floppy folds towards rear. Small V cut on left ear. Some veins visible. Roll of fat under base of tail.
5	Cherambadi	CMK0 3	Selvan Samiarmalai	No	MAM	Middle aged Makhna, with slight stud of tusk visible on right side, but none of left. Not seen often or clearly enough to make profile.
6	Cherambadi	CT01	Raja ACF	Yes	YAM	Medium size, around 30 yrs old, slightly curved back, prominent ridge, with head lower than body. Ears are rounded on top with uneven V at bottom. No top fold, some droopiness/back fold, and veins visible. Short, thick, slightly divergent tusks. Right tusk has slight damage at tip. Left tusk slightly higher than right tusk. Tail has hair.
7	Cherambadi	CT02	Chelakunnu Velukkan	No	SAM	Young tusker - medium to small. Pointed, curved, convergent tusks around 18in long, with right tusk higher and more curved than left. Ears quite small and rounded on top with U shape at bottom, no top fold, but back rear fold. Veins visible.
8	Cherambadi	CT03	Oosikomban Nayak	Yes	SAM	Young tusker - medium to small. Smooth curve in back. Thin long (about 2 ft), pointed almost parallel tusks, going downwards. No fold in ears, rounded on top with uneven V shape at bottom, drooping towards rear.
9	Cherambadi	CT04	Chembaka Oliyan	No	SAM	Young, small to medium tusker, smooth curve in back. Smallish ears, almost pentagon shaped, no top fold, but some back fold, veins not visible. Thin, pointed, almost parallel tusks around 18 inches long. Left tusked, with left tusk slightly higher than right.
10	Cherambadi	CT05	Chinkona Chemban	Yes	JM	Small, sub-adult tusker. Back quite flat, with some bumps. Ears rectangular shape with rounded top, no top fold and significant back fold. Veins visible. Thin tusks around 1 ft long, very divergent.

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
11	Cherambadi	CT06	Sasi Kumar Kaapikad	Yes	SAM	Sub-adult male, around 8-10 yrs old. Ears pointed downwards, with no folds, veins run front to rear and clearly visible. Small hole in left ear. Three warts/bumps on the left side stomach. Small tusks, Slightly divergent/almost parallel, going downwards. Found most around the Kapikadu area, with KK1, KK2, KK3, Messi and Kutty KK.
12	Cherambadi	CT06	na	No	YAM	Captured
13	Cherambadi	CT07	Kotamalai Kalan	Yes	MAM	Middle aged tusker (40-50 yrs), with short pointed (approx 2 ft), thick, curved, almost horizontal tusks. Right tusk more worn out. Large ears, right side almost broken, 3 inch top fold on left side. Drooping at back, with jagged edge. Veins visible. No hair on tail. Smooth curve on back, with body looking quite bumpy.
14	Cherambadi	CT08	Kullan Bolt	Yes	YAM	Young, short tusker. Back flat till middle, then curves downwards. Short thick tusks, left side slightly higher. Squarish ears, with slight pointed lower tip. To top fold, almost curving backwards. Rear folded backwards. Veins visible. Tail is rounded with hair.
15	Cherambadi	CT09	Kumki Bomman	No	YAM	New tusker seen at kotamalai during ct6 capture in april, attacked kumkis
16	Cherambadi	CT10	Velayudhan Gowder	Yes	YAM	Young medium sized tusker. Prominent bump at shoulder. Thin, long (2.3ft) tusks, almost parallel downwards. Rhombus shaped ears with slight curve on top, with no top fold on both sides, except small depression. Veins visible. Full hair on tail.
17	Cherambadi	CT11	Choriyan PRF	No	MAM	Middle aged tusker (around 35 yrs), very slight curve in back. Curved divergent tusks, right side higher. Top fold in both ears (1 inch), with flat top and very pointed bottom. Folded backward, with veins and de-pigmentation visible.
18	Cherambadi	CT12	Unnamed	No	YAM	Which died - got electrocuted
19	Cherambadi	CT13	Unnamed	No	YAM	First seen in June with 21 herd to be double checked
20	Cherambadi	CT14	Messi Kumar Kaapikad	Yes	JM	Juvenile (3-5 yrs old) with small very divergent tusks. Veins visible on ears. Son of KK1. Found most around the Kapikadu area, with KK1, KK2, KK3, CJT6 and Kutty KK
21	O'Valley	GDK1	Kuppamma Devamalai	Yes	MAF	Middle aged female, matriarch of garbage dump herd. Has small top fold and back fold in both ears. Edge of right ear is a bit torn behind the back fold. Squarish shape, with uneven V at bottom. Some de-pigmentation et edges. Back slightly curved, with bump at shoulder and middle of back. Tail almost till ankle, with long hair on one side. Seen around kokal hill and garbage dump, quite regularly. Has juvenile calf.
22	O'Valley	GDK2	Allala Devamalai	Yes		Young adult female, quite small size, always seen with GDK1. Squarish shaped ears, with top fold just starting, but some back fold. Some warts on the right side body. End of the tails seems to have some disease and white in colour, with sparse hair only at tip.

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
23	O'Valley	GDK3	Kaveri Devamalai	Yes		Middle aged female, with small calf. Ears slightly rounded on top with uneven V at bottom. Top fold only starting, but has back fold. Left ear torn behind back fold. Edges of ears thin and wavy, with some depigmentation. Network of small veins visible. Tush visible on right.
24	O'Valley	GDK4	Belliamma Devamalai	Yes		Middle aged female. Squarish ears with uneven V shape at bottom. Top folds only starting, only one small notch in right ear, but 2 notches in left side. Back ridge is very prominent. Bald tail, with end bent to right. Few warts visible on both sides.
25	O'Valley	GDK5	Mary Leena	Yes	MAF	Middle Aged Female. Head is a bit lower than body, back has a distinct peak in the middle. Ears are rhombus shaped, but left side bottom is much more pointed than right. Has only small depressions on top - starting of folds. Small 2 in tear at back of left ear. Significant de-pigmentation at rear parts of ears, and also at temporal glands. Has a juvenile calf of about 3-5 yrs. No hair on tail.
26	Cherambady	KK1	Rani Kaapikad	Yes	MAF	Middle aged female. Clear triangular cut in right ear, called 'kilinja kaadhu' by staff. Ears are rectangular, with uneven V shape at the bottom. About 2 inch fold on top, and veins are visible. Top of back is smooth, with small bump towards the end. Found most around the Kapikadu area. Her son is Messi, who is approx 3-5 yr old male. Matriarch of the KK Herd - KK2, KK3, CJT6, Messi and Kutty KK.
27	Cherambady	KK2	Radha Kaapikad	Yes	MAF	Middle aged female. Left side ear has about 2 inch fold, but right side only starting to fold. Has a wart/bump on the left back leg. Had baby on 19 April 2016, (Kutty KK) and is seen mostly around the Kapikadu area, with KK1, KK3, CJT1 and Messi.
28	Cherambady	KK3	Madhi Kapikaad	Yes	SAF	Young female, smaller than KK1 and KK2. Ears have no fold, and veins are clearly visible on both sides, going outwards/backwards from centre. Ears pointed downwards. Right ear starting to fold, but left ear flat, almost folding backwards. Found most around the Kapikadu area with KK1, KK2, Kutty KK, Messi and CJT6.
29	Cherambady	KM1	Badichi Kotamalai	Yes	MAF	Middle aged, medium sized female, with quite flat back, head slightly higher. Squarish ears, with tops flat and small (1.5 inch) fold on both sides. Big U shaped cut in left ear. Veins visible both sides. Tail has hair. Has calf about 1-3 yrs old. Found mostly in Kotamalai area, sometimes seen with the KK herd also.
30	Cherambady	KM2	Velachi Kotamalai	No	YAF	Have a distinct peak back, and a mole on left side face.
31	Cherambady	KM3	Saroja Kotamalai	No	YAF	Flat back , seen with KM4+1
32	Cherambady	KM4	Geetha Kotamalai	Yes	YAF	Looks like KM4,

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
33	Cherambady	KM5	Malaka Kotamalai	No	MAF	Many warts on the side body,
34	Cherambady	KM6	Muniamma Kotamalai	No	MAF	Looks like makhna, big body, looks old but no ear folds
35	Gudalur	MGMK1	Bharathan	Yes	MAM	Famous elephant, well known before Identification project!
36	Gudalur	MGT1	Unnamed	No	YAM	Smaller tusker, with left tusk curved upwards more.
37	Gudalur	MGT2	Unnamed	No	YAM	Larger tusker, long divergent downward tusks
38	Gudalur	MGT3	Unnamed	No	YAM	Big like MGt2, but seen only once 1/8/15
39	Gudalur	MTR1	Unnamed	No	MAF	Part of Mudumalai herd (MTRH), not seen often and not possible to photograph in the day
40	Gudalur	MTR2	Unnamed	No	YAF	Part of Mudumalai herd (MTRH), not seen often and not possible to photograph in the day
41	Gudalur	MTR3	Unnamed	No	YAF	Part of Mudumalai herd (MTRH), not seen often and not possible to photograph in the day
42	O'Valley	OV1	Bommi Amma	Yes	MAF	Middle aged female. Quite big in size, with round body. Back quite flat. Squarish ears, with uneven V shaped bottom, veins visible in both ears, with depigmentation at edges. Right ear has roll like top fold of about 3 inches all along the ear, with two small V cuts. Left ear is starting to fold, with rear part of ear folded backwards. No hair on tail. Has a small calf, born around June 2016. Matriarch of the O'Valley herd.
43	O'Valley	OV2	Manjushree Brila	Yes	MAF	Middle aged female, a bit fat. Back almost flat, slight curve. Rhombus shaped ears, with distinct point at bottom. Left side has top fold all the way back, but right side only has a depression/start of fold. Two veins clearly visible, and de-pigmentation at edges. Right side edge torn a bit near rear fold. Has two calf about 2 yrs old. Tail has hair, more in the front.
44	O'Valley	OV3	Jayashree Brila	Yes	YAF	Young female, with slight curve in back, almost flat. Has lump of skin/growth above right foreleg, and similar on the bottom of left jaw. Ear slightly rounded top, with V shape at bottom. No top folds yet, right side has little more depression than left side. Rear part slightly floppy, veins slightly visible. Tushes slightly visible. Tail has a clear S shape, more hair on one side.
45	O'Valley	OV4	Pachakadu Ovalley	Yes	YAF	Medium sized female. Bump in back soon after forelegs. Rhombus shaped ears. Tops are flat, with right side folded about one inch and left side only starting to fold. Tail has even hair on both sides. She also has a small calf, about one year old.
46	O'Valley	OV6	Padmavati Ovalley	Yes	AF	Young female elephant, medium sized, with flat back. Ears curved on top with V shaped bottom, no top fold. Left ear has big tear towards the top of back. 2 veins going parallel to edge are clearly visible on right side, left side also has two veins, but one is branching out clearly. Has two calf.

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
47	O'Valley	OV7	Choondi Sundari Ovalley	Yes	MAF	Middle aged female. Noticeably wrinkled skin, with smooth curve in back and prominent ridge. Triangular shaped ears, with slight rounded/flat top, U shape bottom. No top fold, rear of ear folded inwards. Left side ear has two cuts at the edge, and right side long C shaped near where the rear fold starts.
48	O'Valley	OV8	Ayesha Banu	Yes	MAF	Middle aged female. Large pregnant looking, very round body and slightly curved back. Rectangular shaped ears, with uneven V shape at bottom. Flat topped ears, with right side folded over around 1-2 inches, but left side has not yet folded downwards. De-pigmentation visible at edges. No particular cut, except a small tear in right ear. Tail has some distinct bends.
49	O'Valley	OVCH 1	Unnamed	No	YAF	Sighted only once in Chandana Malai on 26/05/2016
50	O'Valley	OVCH 2	Unnamed	No	YAF	Sighted only once in Chandana Malai on 26/05/2016
51	O'Valley	OVCT1	Unnamed	No	JM	Sighted only once in Chandana Malai on 26/05/2016
52	O'Valley	OVCT2	Unnamed	No	JM	Sighted only once in Chandana Malai on 26/05/2016
53	O'Valley	OVCT3	Unnamed	No	JM	Sighted only once in Chandana Malai on 26/05/2016
54	O'Valley	OVMK 1	Lal Bahadur Singh	Yes	YAM	Young Makhna, a bit fat, curved back, head lower than back. Small squarish ears, rounded bottom, with small top folds just starting. De-pigmentation and small veins visible at edges. Long hair on tail, equal on both sides. Prominent bulge in frontal lobe.
55	O'Valley	OVMK 2	Unnamed	No	MAM	Only one video on 01/09/16
56	O'Valley	OVMK 3	James Lauriston	Yes	OM	Old Makhna with large top fold in ear. both the ear edges are jagged with tears. left ear is torn more than the right, with a big tear in the top that almost divides the ear into two. Height of the shoulder and head is almost same. No hair in the tail with almost 3 like bend. Body quit fat. It is well known by the local people around Kamarj, Gaviparai, Rocklands, Heathfield
57	O'Valley	OVT1	Dr. Radhakrishnan	Yes	YAM	Young, medium sized tusker, slight curve in back. Bottom of stomach is flat. Medium tusks, around 2 ft, slightly curved inwards. Right tusked, end chipped a little. Rhombus shaped ears, with clear V shape at bottom. No folds, only starting in left ear. Left ear bottom slightly rounded. Veins visible only at edge of ear. Full hair in tail, more in front.
58	O'Valley	OVT2	Sasiappa Chiki	Yes	JM	Small, sub-adult tusker. Tusks about one foot long. Round shaped ears, left ear is starting to fold and rear part of the left ear is folded backwards, Head a bit lower than body. Right tusk curving upwards at end.

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
59	O'Valley	OVT3	Silver Monstera	Yes	YAM	Middle aged, medium sized tusker, peak in the middle of back with prominent ridge. Almost rectangular ears, with top fold only starting. Rear part of quite floppy, veins and de-pigmentations visible. Long (2.5-3 ft), slightly convergent tusks, with left side longer, sharper, and curving upwards.
60	O'Valley	OVT5	Chinna Kuppuraman	Yes	SAM	Sub-adult tusker, with curved, slightly convergent tusks, right side coming up a bit more than left side. Head lower than body. Round shaped ears, with uneven V at bottom. Veins not visible, but de-pigmentation at bottom. Tail appears to have more hair on one side.
61	O'Valley	OVT6	Kethan Kokkal Moopan	Yes	YAM	Middle age tusker, with tusks around 18 inches, almost parallel, slightly curved inwards and upwards. Warts all over the body, bump in middle of back. Squarish shaped ears, with V shape at bottom. Around 1 in fold on right side, but left side only starting to fold. Left side rear part of ear folds backwards around 4 inches. Tail has hair.
62	O'Valley	OVT7	Alibaba Basheer	Yes	YAM	Young tusker, with peak in the middle of the back, and clear ridge visible. Head lower than body. Thin, long (2.5ft) tusks. Slightly curved and convergent, going downwards. Ears have rounded top with V shaped bottom, and rear fold. No top fold. Seen only around garbage dump. Uses tusks to break electric fence.
63	O'Valley	OVT8	Arumugam Peryakuppai	Yes	YAM	Middle aged, largest of the tuskers at Garbage dump. Medium, thick tusks, around 1.5-2 ft long, slightly curved and convergent, with left side a little higher. Ears are rounded on top with V at the bottom. Slight droopiness and veins visible mostly at edge. No top fold. Long tail, with full rounded hair.
64	Pandalur	P1	Mundakunnu Meenatchi	No	MAF	Both ears folded, veins visible, Both ears torn at the edge. Bottom long V shape
65	Pandalur	P10	Kethi Koomamool a	No	YAF	Young adult female, with big ears, seen by prakash on 160812 and Mani and Ramesh on 161201. This is the oldest female in that group, others are listed below.
66	Pandalur	P11	Ambika	No	YAF	Second female in same group as P10
67	Pandalur	P12	Parvathi	No	SAF	Same as above
68	Pandalur	P13	Sarojini	No	SAF	Sighted in December 12, 2016
69	Pandalur	P14	Maanbi	No	SAF	Sighted in December 12, 2016
70	Pandalur	P2	Harshini Mundakunnu	No	MAF	Big elephant in Pandalur, left tusk a littl higher than right. Medium thick tusks.squarish ears, folds just starting right side, not showing on left side.
71	Pandalur	P3	Durga Devi	Yes	MAF	Middle aged female, medium sized. Ears almost rectangular shape, with uneven V at bottom. Left side has about 2 inch fold/roll, but no fold on right side. Veins are visible. Smooth curve of back, with slight bump in the middle. Some bumps on left flank, near stomach. Tail has hair at the bottom.

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
72	Pandalur	P4	Sandhana Kumari	Yes	YAF	Young adult female, small in size, with juvenile calf. No ear folds on either side, rounded tops of ears with uneven V at bottom. Veins visible, particularly on left side with two veins very clearly going from front to back. Back quite flat/slight curve, with ridge quite prominent.
73	Pandalur	P5	Kalai Vani	Yes	YAF	Young adult female, medium sized. No top fold in ears - almost curving backwards. Network of veins at edge of ear. Flat top, with V shape at bottom. One wart in the middle of the right flank, close to the underside. Stomach very large - looks pregnant.
74	Pandalur	P6	Kannagi	No	SAF	Sighted in December 12, 2016
75	Pandalur	P7	Kamala Rani	No	YAF	Young adult female, medium size. Ear folds only starting. Flat top, with uneven V shape bottom. Right ear has a small hole at the bottom. Veins slightly visible at edges. Back almost flat, with some bumps. Ridge visible and hip bones visible. Tail till ankle, with hair on both sides. Has a juvenile calf.
76	Pandalur	P8	Ammuni Amaikulam	No	MAF	Only top Fold
77	Pandalur	P9	Katherithodu Kali	No	YAF	Young Adult Female. Curved back with prominent ridge and bump in the middle. Flat topped ears, with pointed bottom. Top folds only starting. Had calf early 2018.
78	Pandalur	PMK1	Madhuvana Maanikkan	Yes	MAM	One of the large Makhnas in Pandalur Range. Not very fat, quite agile. Middle aged. It is seen frequently in Madhuvana estate. Significant top fold in ear, with large tear in on left side, but not right.
79	Pandalur	PT1	Mottavaal Murugan	Yes	AM	Middle Aged Tusker. Quite big in size, with round body. Medium slightly convergent tusks, around 2 ft long. Right tusk is broken at the end. Both ears have dipigmentation. Top fold only starting, and some back fold in rear part. Comes to settlements regularly in the night, but not seen often in the day, except in the morning crossing the road between Devala to Kaidhakolli. The tail is bald, so it is known as Mottavaal.
80	Pandalur	PT10	Boju Mon	No	JM	Short tusk half feet
81	Pandalur	PT11	Chinnathambi	No	JM	Tusks Visible
82	Pandalur	PT12	Mesa Velukan	Yes	SAM	Sub Adult Tusker. Downward pointing tusks, medium length, blunt ends. Left longer than right. Ears curved on top, with V shaped bottom. No top folds. Warts on left side of the body. Full hair on tail, almost till ankle length.
83	Pandalur	PT2	Vel Komban	No	YAM	Middle Aged Tusker. Small in size. Long convergent tusks around 3 feet long. Tusk is very thin at the end and joint together. No ear fold, both the ears are triangular in shape. Comparing to other elephants, it look different because it is one of the shortest elephant with long tusks. Look very beautiful..

Sr. No.	Range	ID	Name	IEP?	Age Class	Main features
84	Pandalur	PT3	Kothan Babu	No	MAM	Middle Aged Tusker. Quite big in size. Huge tusks with two feet long. Right tusk is higher than the left tusk. Both the ears are folded. Right ear is fully folded and the left has only slight top fold. It is too aggressive. It was sighted only once in Amaikulm beat, but local people seen it many times during the night.
85	Pandalur	PT4	Aruva Komban	Yes	SAM	Sub Adult Tusker. Long (2-3ft), highly divergent tusks about 2.5t. Left tusk slightly shorter. Smallish ears, no top folds, rounded top, with forward slanting V shape bottom. Back ridge has a clear peak in the middle. Tail between knee and ankle, hair on both sides.
86	Pandalur	PT5	Periyathambi	No	YAM	Short and thick tusks, Body is round in shape. Quite big in size. Head and shoulder in same height. Both the ears have top fold. Nerves visible in the years.
87	Pandalur	PT6	Velukan Baskar	No	YAM	Parallel tusks about 2.5 feet.
88	Pandalur	PT7	Kutty Kurumban	No	SAM	Juvenile Male, seen with P1 and P2 most of the time. Round body. Short tusks, pointed, curved and slightly divergent. Ears folding backwards, with veins slightly visible, uneven V shape bottom. Slight curve in back. Tail above ankle, with hair on both sides.
89	Pandalur	PT8	Chakka Chemban	Yes	MAM	Big elephant in Pandalur, left tusk a little higher than right. Medium thick tusks. Squarish ears, folds just starting right side, not showing on left side.
90	Pandalur	PT9	Kuliyas Das	No	MAM	Right Tusk is higher than the left, no clear photos

9.4 Appendix 4 – Ethical research documentation

Given my unusual research trajectory, much of this thesis draws on my experiences of working in the region before I formally began working on the PhD. For all field research conducted while registered at the Open University and undertaking formal field work through 2016, the standard research ethics protocols were followed.

A participant information sheet was created (pasted below), with all the details of the research being undertaken clearly noted. This was orally communicated to participants orally (in Malayalam or Tamil), and they were also given the opportunity to request the information in written form.

None of the discussions were recorded, and since the majority of fieldwork was participant observation with unstructured or semi structured interviews, no questionnaire was formulated, but some of the key questions used to stimulate discussion were:

1. Tell me about yourself and your family: what kind of work do you do and how long have you been in this area?
2. What are the main problems you face with elephants?
3. How do you think these problems can be solved?
4. What was it like in the past with elephants?
5. What are the major changes happening in this area, and what do you think is going to happen in the future in the way people and elephants share space?

**Title: Living with Elephants; *Understanding the complexities of human-
elephant interactions in the Nilgiris, South India***

Main Contact:

Name: Tarshish Thekaekara

Email: tarsh@thesholatrust.org

Tel: 0091 (0)4262 261752

Address: The Shola Trust, Accord Road, Thotamoola, Gudalur, Nilgiris District,
Tamilnadu, 643212. India

Additional Contact

Name: Shonil Bhagwat

Email: shonil.bhagwat@open.ac.uk

Tel: 0044 (0)1908 654488

Address: Geography Department, Faculty of Social Sciences, The Open University,
Walton Hall, Milton Keynes, United Kingdom, MK7 6AA.

About the Research Project

In this research project we hope to understand the complexities people having in living alongside wild elephants, how different people perceive elephants, and also the difference among different elephants in the way they interact with humans. We also want to understand all the changes that are happening in the region, and how they will affect this region and the way people and elephants are sharing space.

One group of scientists have been following elephants as they move through these areas, and I am interested in talking to people about their interactions with the elephants. We want to know your views about the problems you face due to elephants are, and how you think these problems can be solved. We also want to know about what you think are the major changes in this region, and how think that will affect either elephants or the people in the way the share space. I will be making notes about all that we have talked about, which will be used later for my PhD.

All the information we collect will be used to better understand the complexities of living with elephants, and we also hope to with local government bodies like the panchayats to see if your ideas can be implemented in some local policies.

Your name and identity will not ever be directly used and quoted; it will be made anonymous before it is written up. If at any point you decide you don't want your views to be a part of this study just let me know and I will not use anything from what you have told us. I will also be around here, and give you my contact numbers, in case you want any clarifications at a later stage.

9.5 Appendix 5 – Selected relevant popular articles

The following popular articles highlight some of the issues around elephants, and people sharing space with nature. The Guardian article in particular, on people and elephant living together, was a challenging effort to summarise my thesis. The hyperlinks point to the web sources in the digital version of this thesis, and in the print version a google search of the titles will lead to the articles.

The Ficus in the Tea: The fight for the lonely atti maram (fig tree) – [The Indian Express](#), 2018

Can Elephants and People Live Together? – [The Guardian](#), 2017

Killing a tiger; human-human conflict – [The Hindu Sunday Magazine](#), 2015

Elephants – More brain than brawn - [The Hindu Blink](#), 2015

The Elephant in my Garden - [The Indian Express](#), 2012

Red marks in India's green report card – [The Hindu Editorial](#), 2012

The great urban juggernaut – [The New Internationalist](#), 2010

Apologising to the Aboriginals – [Infochange](#), 2008

Tigers or Neutrinos – [The New Internationalist](#), 2008

