Affective Landscapes

Exploring Human-Landscape Relations through Coffee Farming Practices in Hawai'i

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Master's Thesis in Development, Environment and Cultural Change

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ABSTRACT

Based on ethnographic fieldwork on the Island of Hawai'i, this thesis explores human-landscape relations through engagement with coffee farming practices. By exploring relations between the past, present, human and nonhuman, the main argument is that landscapes are affective. This builds on the affective turn in social sciences and humanities. I start by taking an analytical approach to "landscape" as a way of exploring ways of relating and caring for the nonhuman, which speak for alternative perspectives on cultivating land. As an analytical framework, landscape opens up the possibility for a multispecies exploration in farming practices, such as coffee farming practices, which also considers nonhuman agents in the "making" of landscapes. Here, I engage with coffee farming practices as about regulating, shaping and controlling landscapes. I also engage with the farmers' practices as ways of knowing landscapes. Ultimately, I argue that the landscape is affective, capable of affecting human-landscape relations through farming practices and ways of knowing the landscape, which in turn evokes a form of care for the nonhuman.

Keywords: multispecies studies, landscapes, ethnography, affect, Hawai'i

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MAPS OF HAWAI'I

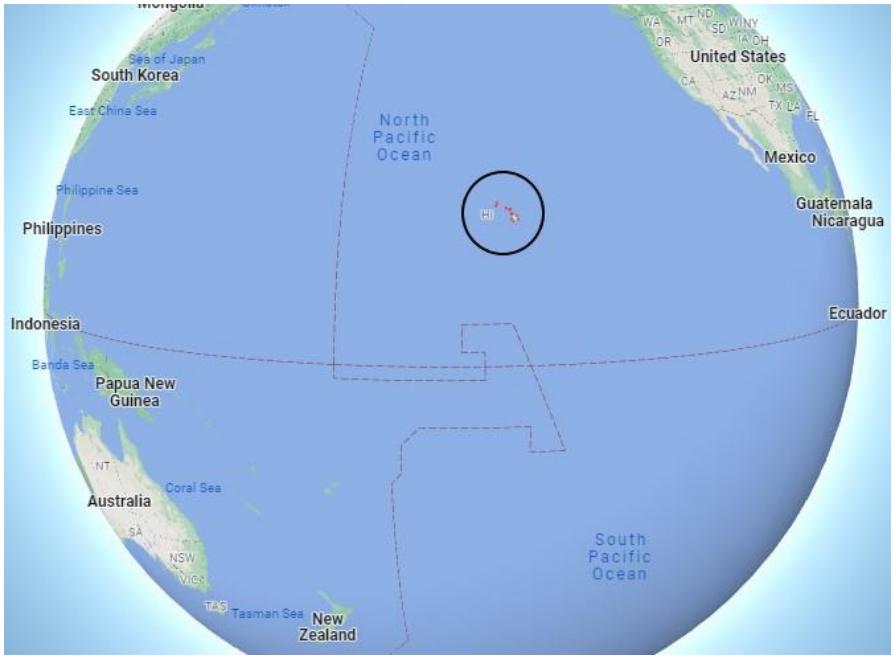


Figure 1 Location of the Hawaiian Islands. Photo: Google Maps, 2023.

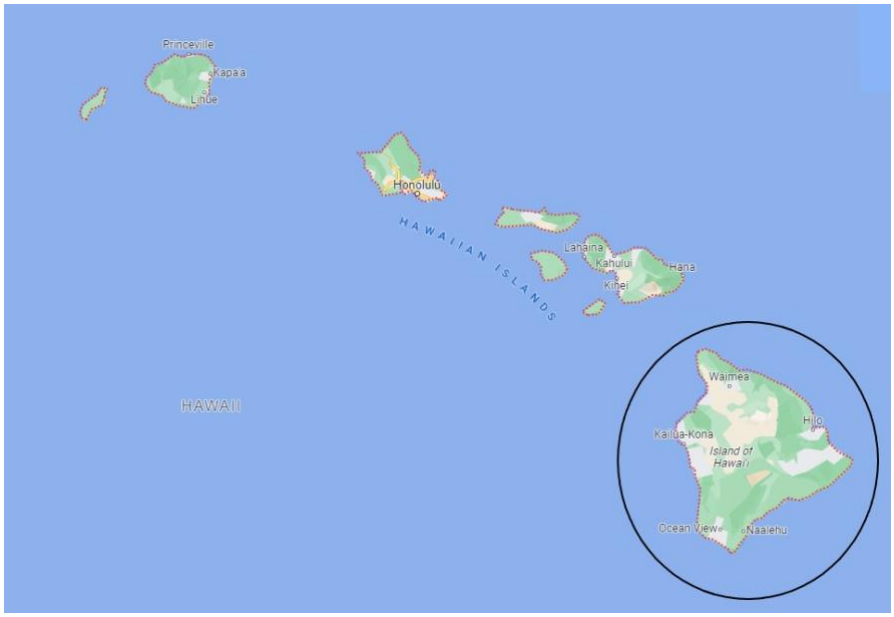


Figure 2 Place of fieldwork, the Island of Hawai'i, circled. Photo: Google Maps, 2023.

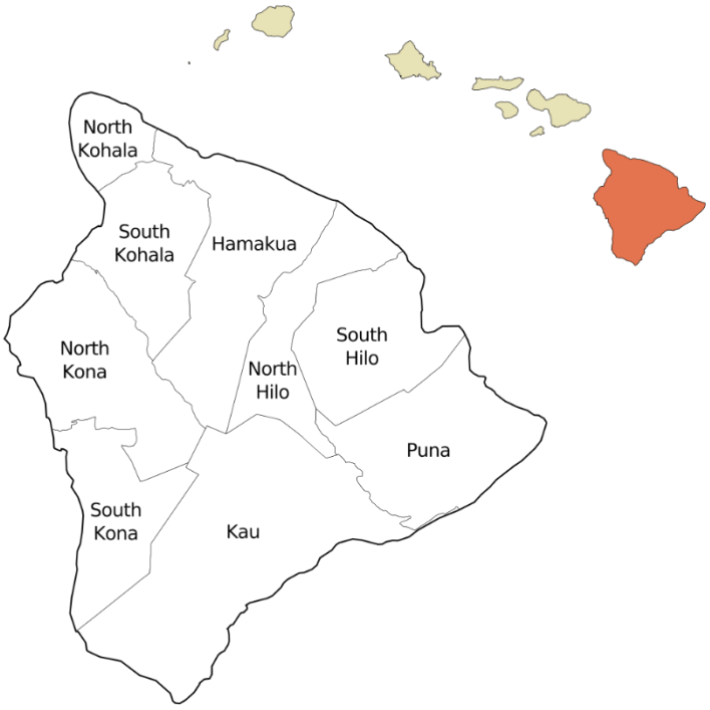
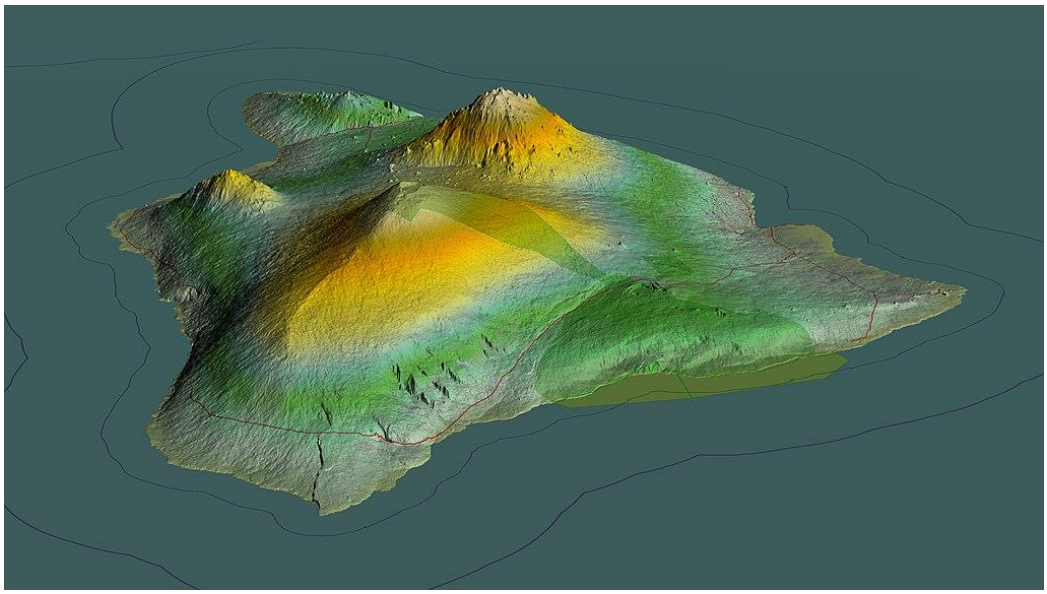


Figure 3 Districts on the Island of Hawai'i. Photo: Public Domain, via Wikimedia Commons.



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CHAPTER 1
- INTRODUCTION

"The current climate crisis and the associated notion of the Anthropocene are sources of the attention to and radical rethinking of the human condition, including its involvement and entanglement with the nonhuman" – (Remme 2017: 54)

About the Thesis

This thesis is about coffee farming practices as a way of knowing and caring for landscapes in a time of ecological degradation. This research is based on the fieldwork I conducted over the course of ten weeks in July-September 2022 on the Island of Hawai'i, commonly referred to as "The Big Island". I build on the term landscape in a broad sense based on forestry scientist and anthropologist Andrew Mathews (2018). Mathews draws on his experience with "landscape ethnography", and argues that landscapes are materialized through relations between humans and nonhumans, and between nonhumans and other nonhumans (ibid.: 391).[1] Because landscape perception is only partial, speculative and empirical, Mathews describes how landscape perception must always be attuned to specific and place-based histories (2018: 391). In these approaches, landscapes are also configurations of multispecies[2] histories. Thus, the concept of landscape provides a way of exploring connections between peoples and places, the human and nonhuman, the past, present and the future, the experiential, relational and objective – all of which can contribute to a rethinking of human-landscape relations – which is a way of building on the initial quote from anthropologist John Henrik Ziegler Remme.

Moreover, this thesis will also engage with the landscape of coffee farms as a way of exploring ways of relating and caring for the nonhuman, which speak for alternative

[1] Similar to Anna Tsing's notions of landscapes as "the configuration of humans and nonhumans across a terrain" (Tsing 2005: 173).

[2] In environmental humanities studies, science and technology studies (STS) and anthropology, there is a variety of terms used to address "multispecies" and its equivalences: nonhuman, other-than-human, more-than-human and more. Throughout this thesis I employ the terms "multispecies" as well as "nonhuman" where multispecies does not fit so easily with the prose of the text.

perspectives on cultivating land. As an analytical framework, I argue that landscape opens up the possibility for a multispecies exploration in farming practices, such as coffee farming practices, which also considers nonhuman agents in the "making" of landscapes. Here, I engage with coffee farming practices as about regulating, shaping and controlling landscapes. I also engage with the farmers' practices as ways of knowing and experiencing landscapes. As a theoretical inertia, I build on "the affective turn" in social sciences and humanities to emphasize how landscapes and the nonhuman also have an impact on the human experience. In turn, I argue that the landscape is affective, capable of shaping human-landscape relations through farming practices, which in turn evokes a form of care for the nonhuman.

This thesis will mainly center around two narratives; large-scale coffee production on plantations, and small -cale coffee cultivation, focusing mainly on the latter. The following pages of the introduction here is threefold. First, I describe the process that led me to this project proposal, and the aims, objectives and research questions which guide this thesis. Second, I will briefly mention key topics from which my inspiration for this thesis originated from. The third section is a brief introduction to each chapter of the thesis.

Thesis Aims, Objectives and Research Question

This thesis is concerned with farming practices as a way of also rethinking humans' relationship with the landscapes and the interlacing trails of humans and nonhumans. As Remme has argued, the current state of the climate crisis and the complexity of the anthropogenic impact on nature and ecologies, requires a new thinking and attention towards the relationship between the human and nonhuman (2017: 54). The main research question of this thesis is: in what ways can coffee farming practices in Hawai'i inform an analysis of the relationship between humans, nonhumans and the landscape in times of ecological degradation?

One of the main objectives is to explore the ways in which farming practices can form new and emergent human-landscape relations. Another objective is to explore how the histories of landscapes shape current coffee farming practices in Hawai'i, and in turn, how this affects the relationships between human and nonhuman. These objectives inform the aim of this thesis, which is to contribute to the bourgeoning field of landscape studies and multispecies ethnography, and to rethink our relationship to landscape, land use, and the future of agricultural practice.

The Process of Project Development – Why Hawai'i?

Islands have gained much attention in climate change research and environmental studies because they are considered to be "microcosms of the world" (Kirch 1997, in Lazrus 2012). Tongan and Fijian writer and anthropologist Epeli Hau'ofa calls this approach to islands as a form of "world-enlargement" (1994) which refers to the processes and practices that extend beyond the physical limits of islands, "including the flows of people, materials, and goods that have always made island living possible" (Lazrus 2012: 289). Like any other place in the world, islands are deeply globally connected. The Hawaiian Islands are some of the most isolated landmasses on the planet (Department of Land and Natural Resources 2022). They are also dependent on global shipping and imports an estimated 90% of their consumed goods (Office of Planning, State of Hawai'i). With my interest in landscapes and agriculture, the Hawaiian islands' history of industrial plantations and vulnerability to ecological degradation made Hawai'i particularly interesting. In the extension of this, I was interested in what ways ecological crisis and degradation can shape human-landscape relations. In Hawai'i, potential crises include volcanic eruptions, earthquakes, tsunamis, accelerated ecological degradations as well as the economic vulnerability of being so dependent on global trade. In terms of agriculture and ecology, Hawai'i's geographic isolation makes the islands particularly vulnerable to the threats posed by invasive species introduction (Gon, Tom, and Woodill 2018). Perhaps 15,000 or more vascular plants have been introduced to Hawai'i since Western contact in 1778 (ibid.: 14). Among these are multiple species that degrade native ecosystems' composition and structure, and thereby their functions as well as impact agricultural production systems (ibid.). I realized that this scope of crises was far too multiple, and I was without a specific case to situate my project ideas. To resolve the practical issues pertaining to my research ideas and ambitions, I began with exploring what methods I would apply and directed my focus to the empirical, and so-called "ethnographies of the particular" (Abu-Lughod 1991).

From the early stages of my project development, I knew I wanted to apply my training in ethnographic methods to this project and engage with peoples' everyday lives through participant observation. Through many conversations in peer review groups with fellow students, I began to explore different ways of foregrounding my research interests and ideas with place-based practices in Hawai'i. It was important that I could find a concrete engagement which spoke to a variety of issues in relation to the current ecological crisis. I began to explore

the variety of agricultural practices, crops and productions on the Hawaiian Islands and narrowed it down to coffee farming. In this way, I could ground my analysis of crisis with a concrete engagement and practice. Therefore, this thesis explores coffee farming practices in Hawai'i. In relation to coffee farming, as this thesis will explore more in-depth, current examples of invasive species and pathogens-related threats in Hawai'i are coffee berry borer and coffee leaf rust. General challenges to Hawaiian agriculture are high cost of land, production inputs, lack of infrastructure, limited legislative support the availability of labor, and farmers' knowledge to manage tropical soils, pests and diseases, and weed pressure. This exemplifies how encounters between history, colonization, and agriculture can transform human-landscape relations, which is where this thesis will intervene.

Limitations of the Research

As with most research, the basis for this research also derives from a localized and particular context, with its own respective histories, relations and connections. The accounts, narratives and perspectives represented in this thesis is also partial and patchy: they do not represent a full overview of different actors, from consumers, coffee roasters, mill-houses, phytosanitary personnel and so on. Therefore, it is difficult to make any wider generalizations based on this thesis. Also, the duration of fieldwork and the number of persons involved in the collaboration limits the scope of claims made throughout this thesis. However, I am hopeful that my thesis will contribute to a growing field within landscape and multispecies studies, or environmental humanities more broadly, and inspire a further exploration of the relations between agricultural practices, landscapes, and the future of environmental care.

Engaging with Landscapes in a Time of Ecological Crisis

Anna Tsing and colleagues propose that the "multidimensional crisis of the 21st century" calls for taking landscapes as the starting point for research inquires (Tsing et al. 2019: 186). Moreover, they emphasize the need to be analytically and critically attuned to how interconnections of ecology, political economy, and multispecies histories make and remake landscapes (ibid.). However, I will not give a genealogical review of the landscape concept, but rather engage with landscapes methodologically and analytically. This thesis connects to a

range of the global challenges raised by popularized concepts such as the Anthropocene, Capitalocene or Plantationocene[3], and I do not believe that any of these concepts necessarily surpasses the other. Scholars, activists and (some) politicians argue humankind are faced with a time of multiple ecological crises. These crises include more extreme weather conditions, degradation of nature, decline of species population towards 'the sixth extinction' and massive transformations of land areas. The raising of such concerns and societal challenges has been given different terms or definitions such as the Anthropocene, Capitalocene, Plantationocene, and more. Whilst the terms have their own respective definitions and signifiers of the current epoch and its main drivers for accelerated planetary changes, they all speak to the same issues in one way or the other. Each concept speaks to the consequences of humankinds' domination, transformation, manipulation and exploitation of landscapes, natural resources and peoples. However, there are several factors which distinguishes the aforementioned concepts.

The term Anthropocene is not synonymous with climate change, pollution or global warming. First applied by Paul Crutzen and Eugene Stoermer (2000), the Anthropocene refers to a new geological epoch in which human-kind has come to dominate the Earth as a geological force. With different starting dates of the Anthropocene raging from the Neolithic revolution (Glikson 2013) to the colonization of the Americas (Lewis and Maslin 2015) and the Industrial Revolution in the mid 1700's (Moore 2016), all dates speak to an important shift of environmental and ecological conditions. The term Anthropocene has sparked and inspired many conversations across disciplines in natural sciences, humanities and social sciences. However, the term Anthropocene has been critiqued, especially for its tendency to treat "humanity as one", which raises issues that are beyond the control of any individual or particular communities.

Jason Moore (2016) critiques the basis of the Anthropocene concept and introduces the term "Capitalocene" to better describe the root causes and effects of our historical epoch. According to Moore, the term Capitalocene was first used by Andreas Malm in personal conversation between the two. In later years, the Capitalocene has been theorized more broadly. Moore's formulation of the Capitalocene can be understood as "the era of capitalism as a world-ecology of power, capital, and nature", where capitalism is a way of organizing nature (2016: 5). In many ways, the Capitalocene is a critique to the ways the Anthropocene term assumes a "humanity as one" approach. Whilst the Anthropocene speaks to the ways in which humans

[3] There are more concepts introduced since the term Anthropocene entered scholarly debates. Such terms are Cthulucene, Pyrocene, Technoscene and more (see Chao 2022).

have come to dominate, manipulate and exacerbate natural resources since the industrial revolution, the Capitalocene refers to the *system* which has led to the vast economic growth. Global capitalism was built on excluding most humans from humanity: indigenous people, victims of slavery and almost all women. From the perspective of colonial lords and administrators, plantation owners and merchants, these humans were not considered human at all. According to Moore, "they were regarded as part of Nature, along with trees and soils and rivers – and treated accordingly. […]. Backed by imperial power and capitalist rationality, it mobilized the unpaid work and energy of humans […] in service of transforming landscapes with a singular purpose: the endless accumulation of capital" (Moore 2016: 78-79). In this vein, the Capitalocene delves into deeper structural issues that has driven the planet into its current state of ecological disaster through capitalist organization of nature. This especially true when tracing capitalism's colonial origin, which relied on slavery and cheap or unpaid labor, land-grabbing and the process extracting natural resources and values.

The Plantationocene, is what Donna Haraway refers to as "the devastating transformation of diverse kinds of human-tended farms, pastures, and forests into extractive and enclosed plantations, relying on slave labour and other forms of exploited, alienated, and usually spatially transported labour." (2015: fn5). It builds partially on both the Anthropocene and Capitalocene, and according to Haraway, the Plantationocene is not something of the past, but a force which continues to expand at an accelerated speed through the processes of enclosure of lands and deforestation in favor of monocrop agricultural businesses, industrialized meat production and crops for animal feed (ibid.).[4] In this vein, the concept of the Plantationocene speaks to the rearrangement of nature into capital, and large-scale ecological simplifications of landscapes.

Because of the multifaceted aspects of these topics, this thesis also draws on multiple subjects ranging from political economy and ecology, history, human geography and more. Nevertheless, I rely mostly on emerging perspectives from environmental humanities and anthropology. In their introduction to the digital volume, *Feral Atlas* (2021), Tsing, Deger, Saxena and Zhou call for a "theoretically informed empirical attention to the anthropogenic transformation of land, air, and water" (ibid.). This thesis will seek to address some of these issues by turning my attention to coffee farming practices in landscapes of Hawai'i which humans have transformed and manipulated ecologies through timber deforestation, introduction

[4] I will elaborate on the context of the plantation industry in Hawai'i in chapter four.

of new species and industrial agriculture. However, as I will show, humans are not the only agents in landscapes. A movement towards "multispecies ethnography" are becoming increasingly visible and abundant. Multispecies scholars are especially concerned with questions concerning our "current condition" pertaining to human-nonhuman relations (van Dooren, Kirksey and Münster 2016). Scholars from a wide range of disciplines have demonstrated how humans now need to live more symbiotically with our earthly cohabitants and our environments (see for example Haraway 2016; Haraway 2003). Among other inquiries, multispecies scholars explore how capitalism, colonialism, and the unequal distribution of power affect the broader web of life (van Dooren et al. 2016: 3). Multispecies approaches focus on the myriad of different ways multiple nonhumans bring forth new forms of relations: an emergent set of relations of being and becoming.

I will take human-nonhuman relations seriously and explore the affective dimensions of coffee farming, and how history, nonhuman presences and lives shape human-landscape relations. To explore the issues of our "current condition", this thesis brings to the forefront concrete engagements, everyday lives and experiences of coffee farmers whose lives are directly affected by historical and current transformation of landscapes, and multispecies assemblages. Whilst many scholars are a bit more "doomsday oriented" or apocalyptic, this thesis may perhaps be more optimistic and hopeful. As I will show, knowing the landscape, and to care for the nonhuman, gives rise to new ways of tending to land plagued by ecological degradation and challenges. I do so by drawing on ethnologist Karen Lykke Syse's methodological approach to landscapes (2014: 21): Firstly, landscape is the arena where I engaged with people. Second, the landscape was a trigger for narratives. Thirdly, I approached landscape's physical properties, engaging with the nonhuman – animals, insects and plants - and landscape histories. Fourthly, I understand the landscape as a material manifestation of changes in agriculture and land use practices. Fifthly, and finally, I explore the landscape as an arena of political and environmental changes.

Thesis Outline

Most of the chapters begin with either quotes or ethnographic vignettes as an invitation to start reflecting about the topic in each of the chapters. In the next chapter, I will discuss my methodological approach before and during fieldwork. Here I will do an in-depth discussion on

my approach to participant observation and fieldwork. I will also discuss the main challenges that arose during this project, and how I navigated them. These are challenges related to my own role as a researcher, conducting fieldwork on settler colonial land, anonymity as well as more practical issues. In chapter three I describe the analytical and theoretical foci of this thesis. I build on a variety of sources concerning landscape in research and will describe how human-landscape relations are affective and emergent. In chapter four, I do a condensed historical exploration of landscape changes and ecological degradations in Hawai'i. Although there are many factors that have led to the current state of Hawaiian landscapes and environmental challenges, I emphasize the role of settler colonialism and industrial monocrop plantations, mainly sugarcane, in shaping Hawaiian landscapes. Subsequently, in chapter five, I explore the role of coffee farming in Hawai'i, and a brief introduction to the history of Hawaiian coffee, its ecologies and trajectories. In the remaining chapters of the thesis, I explore the ways in which various forms of encounters, practices and relations speak to human-landscape connections in different ways. In chapter six, I begin with exploring the ground beneath our feet, and role of soils and soil health in the coffee farming landscape. Thereafter, in chapter seven, I move above ground to the land and trees, and flesh out multispecies encounters in coffee farming. In chapter eight, I shift the focus to the coffee trees and explain the impact of the very recent coffee leaf rust disease outbreak in Hawai'i. In chapter nine, the topic will be the experiential mode of being in landscapes. Here, I discuss more broadly the relation between humans and landscapes in terms of exposure as an experience of the landscape. The thesis moves between different forms of encounters from soils to insects, to crop disease and pesticides, to explore how the affective capacity of the such encounters shape human-landscape relations. In the concluding chapter, I summarize main arguments and point to future possible research agendas. Throughout the thesis, I refer back to my analytical and theoretical framework, arguing how landscapes and humans are constantly in relation to one another through practices of coffee farming and the affects of this relation.

CHAPTER 2
- METHODS AND THE PROCESS OF FIELDWORK

"Our selves, our bodies, have been taken for granted and assumed to be simply a tool utilized for observation (if though of at all). […] In my fieldwork, my bodily experiences lent valuable insights […]" – (Holmes 2013: 34)

Introduction

This chapter gives an overview of my main methods. I begin by describing my methodological approach and the reasoning behind my choice of methods, mainly participant observation in fieldwork and "the arts of noticing" (Tsing 2015). I place emphasis on the strengths of doing fieldwork for this research project and describe how the arts of noticing informed the fieldwork process in order to better understand nonhuman affects in the landscape. As described in the previous chapter, I use the term landscape methodologically, analytically and conceptually, and I have employed an "autoethnographic" approach in writing this thesis. Autoethnography uses the researches own personal experiences in order to analyze field encounters more freely (Adams, Holman, and Ellis 2022). Throughout this chapter, I describe the process of selecting a field site, and how I engaged with my main interlocutors and handled my fieldwork material. I will also discuss ethical reflections regarding positionality and other considerations in relation to my fieldwork and thesis writing.

Methods and Methodological Approach

I have background in social anthropology and have been trained in anthropological methods and theory. As mentioned in the introduction chapter, I wanted this project and thesis to be guided by empirical and emic perspectives. I also wanted to apply methods I was comfortable with which also made room for collaboration with people in the field to decrease the distance

between me as a researcher and my interlocutors. In a formal sense, my methods are qualitative and based on an interpretivist approach to research. As I was concerned with farming practices and quite new to farming, I chose participant observation through fieldwork and the arts of noticing as my main research methods.

Fieldwork

Fieldwork as a method can sometimes be a bit vague as it is a general, but also discipline-specific method. Simply using fieldwork does not really uncover what actually happens during the fieldwork process. Fieldwork entails different techniques and objectives varying on the discipline. For example, archeologists, geographers, animal studies scholars and many more conduct fieldwork, but also quite differently. As a method within social sciences, I draw on ethnography, or anthropological fieldwork, which is described as a method of experience (Pandian 2019). Ethnography as we know it today originates from British social anthropology, and the qualitative sociology Chicago School (O'Reilly 2009). Fieldwork encounters "are modes of ethical engagement wherein the ethnographer is arrested in the act of perception" (Borneman and Hammoudi 2009: 19). I conceptualized and practiced fieldwork as a form of situated learning, and a composition of different modes of engagement through participant observation.

Participant Observation

The way I employ participant observation is based on fieldwork as an ethnographic mode of inquiry. In short, participant observation in fieldwork can be summarized by DeWalt and DeWalt as taking part in everyday routines, informally observing and engaging in leisure activities, using casual conversation as an interview technique, taking field notes of observations and conversations (2011). This is relevant for my approach to participant observation as a form of situated learning, and well suited in order to explore and learn about farming practices. "Go-alongs" (O'Reilly 2012) were important elements of my fieldwork "Go-alongs" are similar to what Tim Ingold refers to as "mobile fieldwork" (Ingold and Vergunst Lee 2007). Both "go-alongs" and "mobile fieldwork" are forms of participant observation that places focus on researcher involvement, and "[…] emphasizes context and sensoriality, by placing researchers in the mobile habitats of their informants" (O'Reilly 2012: 99). During my

fieldwork, participant observation entailed many informal conversations and active listening. As Karen O'Reilly writes about participant observation, there is not a tension that needs to be resolved between participation and observation as it already involves a balance of engagement and distance, strangeness and understanding: "[participant observation] is in fact a very creative and distinct way of being in and learning about the world" (2012: 106). Therefore, this thesis is also autoethnographic as I am applying both tacit and explicit observations and experiences in this thesis as a form of embodied research.

Fieldwork and the Senses

Nancy Scheper-Hughes has argued that ethnographic research has historically pretended that there was no researcher in the field, thus erasing the selves and bodies of the researcher (1992: 23). Raymond Madden writes that our senses, "touch, smell, sound and sight come together to form the framework for memories, jottings, and consolidated notes that form the evidentiary basis ethnographic writing" (2017: 19). I argue that emphasizing the sensorial aspects of the researcher in fieldwork gives more validity to the knowledge that is produced in ethnographic research. It should not be ignored that doing fieldwork is highly sensory, and as people, we learn through our bodies as we experience, live and feel the everyday life:

> Embodied knowledge (knowledge that becomes a part of who we are) is built up over time as we learn to do things our research participant can do, as we do things with them, and as we become part of the setting, the culture and the group with whom we spend so much time. [...] we cannot undertake ethnography without acknowledging the role of our own embodied, sensual, thinking, critical and positioned self. (O'Reilly 2012: 99-100).

Building on anthropologist Paul Stoller's call for a "sensous scholarship", physician and anthropologist Seth Holmes has argued that the body of the researcher could be considered as an intimate form of sensous scholarship or embodied research method (Stoller 1997, in Holmes 2013: 34). In this way, Holmes argues for an embodied participation: an attunement into the ways in which the body of the researcher itself produces field data through the senses. In an explorative book on fieldwork methods, political scientist Allaine Cerwonka similarly argues how researchers can benefit from reflecting more about how the body of the researcher is also a space of analytical insights (2007). Cerwonka argues, that rather than striving for complete objectivity, which she claims is an epistemological idea, the researcher's sensorial experiences

should complement and enrich rather than replace 'scientific objectivity' as a mode of analysis (2007: 33, 36). It is impossible to remove the researcher from the field as if they were not present. Such an erasure also ignores the effects the researcher has with their interlocutors in the context of fieldwork. Positionality is an important aspect of research methodology and ethics, and to remove the researcher and their affects from the field, is to overlook an important element of positionality.

Although a turn to a sensory scholarship is a hopeful and important step for remaining reflexive about ethnographic methods and insights, one must also be critical and transparent to its limitations. As Madden argues, it is important to be able to step back from ones bodily and sensory experiences, and analyze and interpret from these experiences (2017). According to Clifford Geertz, ethnographers can never fully comprehend and understand the social worlds of interlocutors: "Whatever sense we have of how things stand with someone else's inner life, we gain it through their expressions, not through some magical intrusion into their consciousness. It's all a matter of scratching surfaces" (Geertz 1986: 373). As researchers, we can never fully "tap into" the world as experienced by the people we engage with, but by "scratching the surface" of peoples' knowledges and perspectives, we can at least try to understand. In the next section, I will describe modes of engagement which are more experiential, and the multispecies aspects of fieldwork.

The Arts of Noticing – Collaboration and Attunement to Multispecies Fragments

There are many other engagements which informs the analysis of the material from the fieldwork. Before fieldwork, I was motivated to include multispecies aspects of farming because, as Anna Tsing writes, world-making is not limited to the human (2015: 22). Therefore, I employed the arts of noticing, which entails close collaboration with peoples and nonhumans, and to pay attention to assemblages. Tsing writes about assemblages as being open-ended gatherings, and how "they allow us to ask about communal effects without assuming them. They show us potential histories in the making" (2015: 23). In this way, assemblages are encounters, and there are emergent ways of being and knowing of such encounters. Because I spent much time picking coffee cherries alone in the field, I needed the knowledge and expertise of the farmer to understand multispecies presences: what were they? What did they do? Where do they come from? In a similar vein, philosopher Thom Van Dooren and environmental humanities scholars Ursula Münster and Eben Kirksey write about the arts of attentiveness in

relation to multispecies worlds. They write that "the arts of attentiveness is a reminder that knowing and living are deeply entangled and that paying attention can and should be the basis for crafting better possibilities for shared life" (2016: 17). This approach is important in order to explore how farming practices evoke a new form of care, and how the landscape is affective.

Through the "art of tracking", anthropologist Pierre du Plessis argues how the arts of tracking and gathering Mahupu, or Kalahari truffle, can be used as methods for noticing multispecies landscapes. Du Plessis states that tracking "represents a way of noticing the assemblages of more-than-human relations that make up landscapes" (du Plessis 2022: 49). Drawing on Tim Ingold's notion of tracking, du Plessis argues that the practice of tracking itself is a way of noticing a complexity of interconnected trails (Ingold in du Plessis 2022). This also entails the shifting temporalities of landscapes. What du Plessis describes for us, is a way of understanding landscapes through a multiple set of relations *through* the art of tracking. This tracking involves looking for signs of changes in the landscape, other forms of plants, changes in the sand, smell and the weather conditions. Thus, finding or tracking the Mahupu, Kalahari truffle, involves paying attention to the many details that are *not* the truffle. Because the Kalahari truffle "materializes through its entanglement with a variety of other landscape doers, it helps exemplify the ways in which tracking can be a practice of noticing the gatherings of movement that enact landscapes, rather than drawing attention to individual actors moving across a static background landscape" (du Plessis 2022: 66). Enacting landscapes in this way, through specific practices and arts of noticing, can help us understand the relationships from which landscapes emerge in a form of togetherness rather than separation, and move towards a multispecies ethnography. In the case of this thesis, coffee farming practices are the central practices which enacts landscapes which in turn can say something about human-landscape relations.

As mentioned, the sensorial aspects of doing fieldwork were especially important, as it was impossible to exclude them from the experience of place. Throughout my fieldwork, I spent a lot of time being in nature, hiking, trekking and trying to get a sense of the feeling of the places I moved through: what is making sounds? What does the landscape look like, and why? What is that smell? Especially sight and hearing were important tools for me. By drawing on these two senses, I noticed smaller details in the places I visited, such as the proliferation of weedy grasses instead of diverse vegetation, the absence or presence of birds singing and buzzing insects. Through these sensorial aspects I became attuned to the presences and absences of life in the landscapes I moved through. To explore multispecies relations is a multilayered experience, and as part of the process of situated learning, and in relation to my research

question, it was important to be attuned to the presence and absence of the nonhuman. Anthropologist Heather Swanson writes that to include multispecies experiences during fieldwork, also helps to broaden the perspectives and epistemological traditions in anthropology which tends to favor human exceptionalism (Swanson 2017). As ethnographers, one should not reject the methods in social sciences in order to understand multispecies worlds, but rather expand and amplify our attention to them through collaboration (ibid.). In this regard, a great deal of gratitude is owed to the coffee farm workers who generously shared their knowledges about the multitude of beings in their farming landscapes, and landscapes in general. As multispecies histories are an important element in answering my research question, the arts of noticing and attentiveness have been important tools, methods and approaches.

Conducting Fieldwork

Selection of Field Sites and Collaborators

To do fieldwork can be a messy process, and sometimes it is very much about coincidences and improvising as everyday life unfolds. When I arrived in Hilo on the Big Island, I connected with my contact person at the University of Hawai'i (UHH) to find a suitable starting point for my fieldwork. Despite having done extensive outreach via e-mail beforehand, I had trouble with lack of responses, and it was difficult navigating what to look for, who to reach out to and how to connect with potential interlocutors without knowing the place. My contact person at UHH and I discussed many options, and I was encouraged to continue to reach out to multiple coffee plantations although I had already done so before leaving Norway. As I browsed the internet for coffee plantations, I realized that larger coffee plantations were mainly located on the Leeward side of the Big Island, along the Kona Coast. As I lived on the Windward side of the island, the commute to Kona was about 2-2.5 hours by car, not considering traffic. This brought on some logistical challenges as I would need a car to get to coffee plantations. I narrowed my focus to plantations who had open days for visitors to tour the property where I could learn more about coffee cultivation in Hawai'i.

A few plantations replied, and I was invited to come and get a tour, spend a day with them, observe and engage with plantation workers, although mainly administrative staff. I decided to follow-up on two separate plantations, one in Kona and one in Ka'ū. Later during my fieldwork, I came in contact with a smaller-scale coffee farmer in the Puna district who was

looking for someone to help out with picking coffee cherries. This was during my last four weeks on the island, and I grabbed the opportunity to gain hands-on experience with coffee farming practices. My main collaborators during fieldwork were from the coffee plantation in Kona, the coffee plantation in Kaʻū, and the smaller coffee farm in Puna. On the Kona plantation I talked with the owner, a communications manager and a seasonal worker. On the Kaʻū plantation I talked with a seasonal worker and a tour guide. On the smaller coffee farm, I helped out with daily, seasonal activities, mainly picking coffee cherries. Here I only engaged with the owner. I am immensely grateful for the opportunity I had with the smaller coffee farm, as much of the material for this thesis is based on my experiences there.

Admittedly, much of my fieldwork was coincidental, but it also an example of the ordinariness of fieldwork, and how fieldwork is a spontaneous unfolding of events that is beyond the researchers control. Other than the two plantations and the smaller coffee farm, I also "walked about" in landscapes on hiking trails or in national parks. Although they are on the periphery to the aims of this thesis, the experiences in the different landscapes have informed and supplemented my observations on the plantations and farms, as well as conversations and questions to farmers.

Engaging with People in the Field

I followed the people[5] I talked with through the places I visited, letting them guide and navigate the situation. I entered a field of research which I had little knowledge of but was eager to learn more about. Throughout my fieldwork, the people I engaged with were both my mentors and collaborators as I gained more knowledge of coffee farming practices and the landscape itself. To follow these people in their own respective milieus, allowed me to listen, observe, smell and generate a 'feel' of their everyday lives, knowledge and practices. As I will elaborate more on in the next chapter, I have tried to work inductively in order to let my fieldwork experiences shape the analytical and theoretical framework of this thesis from the ground-up. This would not have been possible were it not for my choice of methods and how I engaged with people during fieldwork.

During my fieldwork, I rarely conducted any form of structured interviews. During my visits to the larger plantations, I was always given a tour of the property after which we would

[5] I refer to my informants/interlocutors interchangeably as people or collaborators.

sit down. In these sit-downs I conducted unstructured or semi-structured interviews. This allowed me to custom question to observations I made during the tour, but also to ask more general questions regarding their perspectives of farming practices. As most of my days on the coffee farm in Puna mainly consisted of harvesting cherries, I attuned myself to the landscape and took notes of observations. The attunement to landscapes involved listening, observing and smelling different places I visited. During breaks and lunch, I would ask the farmer about what I had seen, heard, or other questions that had come to mind in the field of trees.

I relied heavily on hand-written fieldnotes and using my memory to keep track of experiences, observations and conversations with people. Therefore, most of the quotes from people in this thesis are not direct citations but reconstructed formulations. Taking fieldnotes was an essential practice for me during fieldwork and consisted of two separate strategies. First, during the days I was in a participatory context, I took "rougher" fieldnotes. Second, either at the end of the day or when I had the opportunity, I transcribed my fieldnotes digitally with more details. In this second stage I combined fieldnotes with my own reflections in which I reflected more broadly about my experiences with detailed descriptions of places and direct documentation of observations and conversations. Fieldnotes became my internal dialogue with myself, fieldwork experiences as well as discoveries and new questions.

Ethical Reflections

Anonymity and Informed Consent

This research project is approved by the Norwegian Center for Data Research (Sikt). It was formally approved without any remarks. All of my engagements involved informed consent, and interlocutors were provided with information about the project and that their consent could be withdrawn at any time. During my fieldwork, I never collected any personal information through questionaries or surveys, and I aimed to ensure no harm to interlocutors. All names in this thesis are anonymized, and I have used pseudonyms. Furthermore, places and locations are sometimes not named in order to respect interlocutors' wishes to keep places from being identified.

Positionality

As explained, my academic background in anthropology and environmental humanities have shaped the research design, choice of methods as well as analytical and theoretical perspectives applied to my fieldwork material. Another important ethical consideration of positionality is the self. I am a white, cisgender man from Northern Europe who conducted fieldwork in a place still plagued by settler colonialism. Especially considering that my fieldwork was closely related to land and land use, it was important to me to stay sensitive to histories and different perspectives on land and landownership. Furthermore, although I engaged and conversed with Hawaiians during my fieldwork, none of them were key collaborators throughout my fieldwork. However, I have tried to be as sensitive and respectful as I can to the context of my research. I do not claim to represent Hawaiian worldviews although some of the terms used are Hawaiian. The terms are mentioned as they were applied and expressed by my interlocutors, and/or through literature reviews. I do not wish to present such perspectives here as my own, but as emerging perspectives that were built in collaboration with key interlocutors and the fieldwork experience. As I had almost no experience with farming before this fieldwork, it is important to me that my interlocutors are recognized as my teachers and mentors just as much they are my interlocutors in this project.

As I moved through different situations in my fieldwork, I also assumed different roles. On the coffee farm I moved from being a master student to a volunteer worker whilst on the plantations I was master student interested to observe and asked questions about their practices. When I was volunteering as a helper in community-based reforestation events, I was a visitor on Hawaiian ancestral land. Overall, my fieldwork took place within settler colonial land relations which holds contentious sentiments. I have tried my best to navigate this tension. It has been challenging, but also rewarding. I have leaned on different sources of environmental history and Indigenous and decolonial scholarship to inform the historical context of this thesis, and to remain critical and reflexive to the context of my research.

Summary

In this chapter I have explained my methodological approach and the process of doing fieldwork. In short, I relied on participant observation as my main method through active engagement in farming practices and using informal conversations as an interview technique.

My fieldwork was a form of situated learning, in which my interlocutors' knowledges, and experiences with particular places and landscapes, were invaluable. Through the arts of noticing, I give more-than-human agents a more prominent role in this thesis through my experience with the plantations, farm and the landscape in general. I gained a greater understanding of the entanglements of socio-ecological relations on Hawai'i through active participation in coffee cherry harvesting, observing the surroundings and walking the landscape. The methods I have chosen and the multi-layered experience of doing fieldwork, has helped me to familiarize myself with farming practices, multispecies presences and their impact on human-landscape relations. My approach to an embodied, sensory scholarship also informs the analytical and theoretical framework.

CHAPTER 3
- ANALYTICAL AND THEORETICAL FRAMEWORK

> "[T]rough living in it, landscape becomes a part of us, just as we are a part of it. […] in a landscape, each component enfolds within its essence the totality of its relations with each and every other." - (Ingold 2000: 154)

Introduction

Landscapes are central to my analysis and thus the basis for my analytical framework. I employ the landscape concept in a way that connects the terms "land" and "landscape".[6] Furthermore, I will include the importance of multispecies presences, as well as experiences and practices in landscapes as foundation for the thesis' theoretical approach. My theoretical approach is based on my fieldwork experiences, which emphasize the importance of processes – ecology, history, political economy – in shaping human-landscape relations. Whilst the analytical framework is based on landscape studies, the theoretical framework will help understand what happens in the landscape and the relations that emerge.[7] I begin by exploring landscape and landscape studies as inertia in which I argue for the landscape as a site of analysis in this thesis. Thereafter, I discuss my theoretical approaches to "encounters", "affect" and "emergence" as ways of understanding responses and effects of human-landscape relations. The essence of this theoretical exploration is to broaden the analyses of human-landscape relations, how they come to be, what these relations manifest, what stories they tell, and what they evoke.

[6] As mentioned, my aim is not to give a comprehensive genealogy of the landscape concept, but to apply it critically and representatively to my fieldwork.

[7] Anna Tsing also refers to the use of the word "landscape", as many humanist scholars may be concerned because "one of its genealogies leads to landscape painting, with its distance between viewer and scene" (Tsing 2015: 304).

Analytical Framework

Landscape

Some scholars describe the terms "land" and "landscape" as separate analytical categories (Syse 2022). For example, ethnologist Karen Lykke Syse argues that "'land' is used to describe the solid part of the earth, or a portion of the earth's surface distinguished by boundaries or ownership. It is also a word used by the people who labour the land to describe it. […] 'Land' encapsulates the terrain understood by all the senses. […] 'Land' is concrete; hands on" (ibid.: 102). In this way, "land" represents an emic[8] perspective of place, experienced and expressed through experience, senses and belonging. Landscape is in turn described as representing an etic perspective (ibid.: 103).[9] Landscape "became a perspective many scholars choose to use to analyze and interpret the land, implicitly requiring a certain disconnection from that which is described (ibid.). Accordingly, there are analytical overlaps between land and landscape. I will draw on landscape as my main analytical framework which combines the analytical distinctions between land and landscape. Whilst the analysis builds on the people I talked and walked with during fieldwork and their perspectives on *land*, the concrete and tactile, I bring these narratives and perspectives to a broader discussion about *landscapes*, which is both imagined or symbolic, *and* concrete and tactile.

Landscape is an object of study for a variety of disciplines. As an analytical framework, landscapes offer valuable insights to my fieldwork material, which also includes the experience,

[8] The separation of "emic" and "etic" perspectives speaks to the difference between knowledge that is socio-cultural, local, conceptual, or codas (emic), and that which is "scientific" (etic). See Ingold 2000; Rosa and Orey 2012.

[9] Pertaining to etic and emic perspectives, geographer and anticolonial researcher Max Liboiron makes a similar distinction when they (singular) elaborate on the distinction between "land" (lowercase) and "Land" (capitalized). Following Styres and Zinga, Liboiron write: "land refers to landscapes as a fixed geographical and physical space that include earth, rocks, and waterways; whereas 'Land' extends beyond a material fixed space" (2021: 6fn19). This is similar to the analytical distinction between "land" and "landscape" described above. Liboiron engages with Land as "the unique entity that is combined living spirits of plants, animals, air, water, humans, histories and events recognized by many Indigenous communities" (ibid.: 7fn19). On the other hand, Liboiron's use of land refers "to the concept from a colonial worldview whereby landscapes are common, universal, and everywhere, even with great variation" (ibid.).

materiality, and descriptions of land as well as history. Built on a strong tradition of landscape studies in geography, anthropology and political ecology, landscapes give the opportunity to explore both human and nonhuman histories and interconnections, thus inviting scholars to think more broadly about human-nonhuman relationships in times of ecological crisis. Human geographer Carl Ortwin Sauer has been named as a prominent scholar in the field of cultural landscape studies (Robbins 2020). Sauer's work *The Morphology of Landscape* (1996, [1925]) is argued to have inspired the "cultural turn" in the field of geography (Atha et al. 2019: xxi). The cultural turn in geography highlighted the roles of representation, meaning and language. Sauer's influence is considered important as it centered the role of history, political and economic processes in landscape studies (Antrop 2013: 6). Sauer was especially concerned with human-environment research, and the human use of nature and how landscapes came to look the way they did (Robbins 2020: 33). He also offered early critique of commercial economy as unsustainable (ibid.). Moreover, Sauer pointed to "objects" in the landscape as existing in interrelation, and that they are subject to change, development and completion (Sauer 1996 [1925]: 299). Sauer defined the objective of geography as "the establishment of a critical system which embraces the phenomenology of landscape, in order to grasp in all its meaning and color the varied terrestrial scene" (ibid.). Building on Sauer's contributions, landscape continued to be approached with a philosophical-phenomenological perspective, which opened the possibility of looking at landscapes beyond their physical and spatial values (Antrop 2013: 7). One of the most prominent scholars driving this shift in geography turn was Yi-Fu Tuan. Like Sauer, one of Tuan's central contributions was the emphasis of landscapes as an experiential arena; a social construct with symbolic meanings and narratives (see Tuan 1974). These shifts have inspired studies of landscapes beyond the discipline of geography, into political ecology, environmental humanities, anthropology and more. Later, with contributions from scholars such as Denis Cosgrove (1998), David Lowenthal (1998) and Kenneth Olwig (2002), the landscape is more than a symbolic space or an experiential arena: landscapes are contested spaces of the interplay between identity, power and authority. By building on the tradition of landscapes as phenomenological, an experiential arena, symbolic, and as spaces of meaning and representation, this research will expand into recent interests in approaches to landscapes.

Landscapes have multiple histories and political dimensions which are important for understanding human-landscape relations. This builds on anthropologist Tim Ingold (2000), and his description of landscapes, and the relationships between humans and land. In some ways, Ingold has been a leading figure in contemporary anthropological studies of landscapes and the environment, and phenomological approaches to "being-in-the-world". He writes: "[the

land is] an immense tangle of interlaced trails – an all-encompassing rhizome – which is continually ravelling here, and unravelling there, as the beings of which it is composed grow, or 'issue forth', along the lines of their relationships. […] Thus, there is no opposition here between history and land." (2000: 149-150). In the extension of this, Ingold writes that landscapes emphasize form which is "generated and sustained in and through the processual unfolding of a total field of relations that cuts across the emergent interface between organisms and the environment" (Ingold 1993: 156). Similarly, and perhaps simplified, Anna Tsing describes landscapes as "the configuration of humans and nonhumans across a terrain" (2005: 173). These perspectives warrant a new way of understanding landscapes as a form of different relations that are not bounded by any specific entity. As Karen Lykke Syse writes, landscapes are also "animalscapes" (Syse 2014: 21). She argues for how the presences of animals "saturate the landscape with their agency" (ibid.). As such, the combination of human and nonhuman histories opens the possibilities for a critical investigation of conviviality, and the landscape becomes the analytical site of exploring such human-nonhuman relations and histories. Therefore, the potential of landscape as an analytical category holds great promise because landscapes are not only human or anthropogenic, but also includes nonhuman histories in the analysis. To understand landscapes, and the historical and ecological assemblages that make up landscapes, is central to understanding life and environmental change in times of ecological crisis. By being attuned to nonhuman landscapes we can begin to be more involved with the nuances of change and what sort of care we need to have for our environments. This does not mean to ignore the fact that landscapes are anthropogenic, such as large agricultural sites or cities. Rather, to pay attention to the multiplicities of such anthropogenic changes, opens up for understanding what *has* been and the potential of what *can* be: landscapes emerge from the encounters of practices, transformations and histories – which broadens the analyses of human-nonhuman relations.

It is important to acknowledge the aforementioned development of contemporary landscape studies. As mentioned in the introduction chapter and to concretize, I conceptualize landscape in a broad sense building on the formulations of landscapes by Andrew Mathews (2018). Mathews draws on his experience with "landscape ethnography", and how landscapes are materialized through relations between humans and nonhumans, and between nonhumans and other nonhumans (ibid.: 391), much like the arguments made by Tsing (2005; 2015), Ingold (2000) and Syse (2014). At the same time, Mathews evokes geographer Kenneth Olwig (1996), and emphasizes the need to account for the concrete and recognizable, linked to historical, political and economic formations (Mathews 2018: 407). In his study of terracing system

landscapes in Italy, Mathews argues for the importance of attention to the structural connections, ruptures and flows in landscape histories. Because landscape perception is only partial, speculative and empirical, Mathews also describes how landscape perception must always be attuned to specific and place-based histories (ibid.: 391).

By engaging with landscape as a combination of both emic and etic perspectives, I argue that the potential of landscapes as an analytical framework is far-reaching and diverse, allowing multiple and nuanced forms of knowledges and perspectives to emerge. Furthermore, in echoing Syse, "[e]ven with a reflexive use of emic and ethic perspectives, attempts to include more dimensions, senses and agents will always just be subjective and suggestive" (Syse 2022: 103). Even so, I explore the ways in which landscapes not only are arenas for human and nonhuman lives, or materializations of political and economic histories, but also how being in and knowing the landscape affect[10] and impact human-landscape relations. This brings me to the thesis' theoretical framework.

Theoretical Framework

Affects and Emergences: Transformative Encounters

In landscapes, there are multiple encounters in time and space of different scales and agents. I argue that these encounters are affective, which in turn can be productive. In the case of my fieldwork, and working with a farmer and plantations, whose livelihoods depend on their lands, emotions are very much involved. Here it is necessary to distinguish between emotions and affects. Massumi writes that "an emotion is a very partial expression of affect. […] [N]o one emotional state can encompass all the depth and breadth of our experiencing of experiencing – all the ways our experience redoubles itself" (2015: 5). This is what I mean by affective landscapes, and how landscapes are important in order to understand the emergence of ecological imaginaries and ways of relating to the landscape. In order to take landscapes seriously, as well as the other nonhuman entities, requires theoretical innovation concerning human-landscape relations. This theoretical framework opens for an exploration of how

[10] My use of "affect" may be confusing throughout this thesis as it means both affect (impact) and *affect* (the theoretical concept I employ). I hope that this chapter can give some clarity for the reader in terms of my approach to affect as a theoretical concept, to make it easier to distinguish *affect* from affect/impact throughout the chapters of this thesis.

experiences of landscapes' materiality influence human-landscape relations, and how new knowledges can emerge from these relations.

When I write "encounters" I draw on Anna Tsing's concept of "friction" (2005). Tsing describes friction as zones of "awkward engagement", and that friction is "the awkward, unequal, unstable and creative qualities of interconnection across difference" (2005: 4). Central to the concept of friction, is that friction can be "productive" (ibid.: 5). As Tsing vividly describes: "a wheel turns because of its encounter with the surface of the road; spinning in the air it goes nowhere. Rubbing two sticks together produces heat and light; one stick alone is just a stick. […] [F]riction reminds us that heterogeneous and unequal encounters can lead to new arrangements of culture and power" (ibid.). Essentially, friction is about encounters, and by taking encounters into consideration highlights the importance of interaction of historical trajectories, politics, culture and power (ibid.: 5-6). This entails that different narratives, emotions, knowledges and discourses do not live separate lives, but that they are connected through encounters. As Tsing suggests, in order to understand how encounters are productive, one needs to turn one's attention to place which in the case of this thesis, is the Island of Hawai'i. In a particular place, past and present encounters of political, economic and cultural processes can materialize the potential for new forms of understandings and relations to emerge, and the landscape is the site of this process. To further understand how encounters relate to human-landscape relations, I employ the concept of affect.

Political philosopher and social theorist Brian Massumi is one of the most influential "affect theorists" in the humanities and social sciences. In his book *Politics of Affect* (2015), Massumi builds on Spinoza's and Gilles Deleuze's concept of "l'affect". Massumi explores affect as "capacity to affect and to be affected" (Massumi 2015: ix), and as a "heightened sense of belonging" (ibid.: 6). Affect encompasses what Massumi refers to as "bodily capacities", as well as emotions, responses, reflections, and events: "in affect, we are never alone" (ibid.). However, "the affective turn" in philosophy, social sciences and the humanities have been critiqued. Historian Ruth Leys calls it a "shameless form of borrowing" by the humanities and social sciences, and "anti-intentionalist" (2011: 443). Leys also criticizes the affective turn in cultural studies being "hopelessly misguided" (2021: 128) and for creating "difficulties for more positivistic kinds of material analysis" (2011: 467).[11] She argues that affect is independent

[11] One could question why an analysis *need* to be positivistic. This is a question of scientific methods and what falls between positivism, empiricism and realism, which in turn is about epistemology and ontology (O'Leary

of signification and meaning (ibid.: 443). Nonetheless, I argue that Leys' reading of Massumi's concept of affect also might be misguided. Massumi writes that affect is "an invitation for an indefinitely constructive thinking of embodied, relational becoming" (2015: 51), meaning that affect is always relational. In some ways, affect favors the bodily experience of encounters and the impact of these encounters. To follow anthropologist Kathleen Stewart (2007) affect can be a way of exploring power. Steward writes: "power is a thing of the senses" (2007: 84), and affect is a way of understanding power with emphasis on the nonlinguistic, senses and experience. For Massumi, affect is about being open to the potential of relations: "we participate jointly in life" (Massumi 2015: 201). To paraphrase Stewart, affects are the sentience of an encounter, a way of being-in-relation (2011: 449). Thus, relations have impact beyond their connections as they are also transformative (Strathern 2020), To think affectively, evokes a form of care which emerges from encounters, the capacity to affect and be affected (Massumi 2015: 122, 202), which brings me to the concept of emergence.

I build on literary scholar Raymond Williams' concept of "emergence", which refers to change as being novel yet transformative, where "new meanings and values, new practices, new relationships and kinds of relationships are continually being created" (Williams 1977: 123). Similar to affect, Williams argues that there is a need to pay attention to the structures of feelings, and what feelings do (ibid.: 127). As this thesis will explore, what emerge out of the affective encounters between humans and the landscape? Multispecies ethnographer Eben Kirksey also builds on the concept of emergence and writes: "Emergent ecologies can destroy the existing order. Microbes that become existing diseases […] can quickly transform dominant political strategies, economic systems, or agricultural practices. Emergences can also figure into collective hopes" (Kirksey 2015: 1). This opening paragraph from Kirksey's book *Emergent Ecologies* is invitation for thinking about the relations between the human and nonhuman and landscapes.[12] An important aspect of emergence is that it takes place independent of human thought (Knudsen 2023: 139), is always relational (Svensson 2021: 6), and that emergence "characterizes the human world as it does the natural world, so that society is more than the

2017). Concerning the latter, anthropologist Ståle Knudsen (2023) explores the limits of "flat ontology" in new materialist research and political ecology and argues for the potential of critical realism in these scholarly debates.

[12] In writing "multispecies" and "human" separate, does not mean that multispecies worlds and human worlds are not mutually exclusive. Rather, I employ them in a way so that they are relational through the landscape rather than binary opposites.

sum of individuals, and the study objects of social sciences are emergent totalities" (Knudsen 2023: 15).

Affective Landscapes and Emergent Human-Landscape Relations

I employ the term "affective landscape" as a way of understanding human-landscape relations shaped by coffee farming practices and experiences. Literary scholars and historians Christine Berberich, Neil Cambell and Robert Hudson elaborate on *affective* landscapes as a way of considering landscapes beyond their material properties (2013: 314, my italics).[13] In this way, I understand affective landscapes as a relational interaction between humans and landscapes, the material, sensorial, and bodily, as a way of uncovering relations between the human and nonhuman world (ibid.).[14] Thus the landscape is the continuous emergence of human-nonhuman relations, an affective landscape which shapes the ways in which peoples see and know landscapes. The core argument is that what the landscape *is* influences people engaging with the landscapes, and our ways of knowing. As Kathleen Stewart also explores with her concept of "worlding" (2010), that the world is not constructed in the human consciousness before they are lived. Rather, our understanding of the world comes through ways of knowing and engaging with it, being attuned to its differences and similarities: an uncovering of relations. Throughout this thesis, I explore coffee farming practices through encounters between humans, landscapes and nonhumans, and how these encounters are affective. As Massumi writes, "one always affects and is affected in encounters; which is to say, through events" (2015: ix). In this tension, I suggest, lie possibilities for new ways of viewing and working agrarian landscapes, through relational practices of the human and nonhuman, and new knowledge-making.

Ultimately, I propose an approach to affective landscapes which takes landscapes and the nonhuman seriously. An affective landscape is oriented towards the future, evoked by affects, nostalgia, sentiments and hopes of the peoples who live in the landscape. It is a human-landscape relation which emerges from the encounters between nonhumans and landscapes that are shaped through political, economic, anthropogenic and historic events. Throughout this

[13] In their article, Berberich et al. draw on many scholars in affect theory, ranging from philosophy, anthropology, to political science.

[14] This also speaks to the separation Karen Lykke Syse (2022) does with "land" and "landscape" and offers a potential analytical and theoretical bridging between the two.

thesis, I argue that landscapes are affective, because human-landscape relations become joint together through encounters. Through encounters in landscapes, new human-landscape relations emerge, and ways of understanding the human condition in a time of ecological crisis. My intervention is that it is through relations with landscapes, and relations between human and nonhuman *within* the landscape, that humans can come to form ideas of care for the nonhuman.

As I have argued, it is important to consider the historical events that have shaped the Hawaiian landscapes in the present. In the next chapter, I begin by describing how the landscapes in Hawai'i are shaped by different waves of change and encounters. This includes an exploration of how the land has been transformed through agriculture, domestication, ecological imperialism, the political economy of trade, and global capitalism.

CHAPTER 4
- A BRIEF HISTORY OF ECOLOGICAL CHANGES, LAND RELATIONS AND LANDSCAPES IN HAWAI'I

Vignette

In August, I was attending a community organized reforestation event in the northern part of the island. The community organization was composed by different peoples; Native Hawaiians, other local residents, activists as well as researchers in ecology. The sun was scorching and there was barely a light breeze, which had no cooling effect. In the southwest, the land crescents into a panoramic view of the Pacific Ocean. Towards the east, there were steep hills covered with a few eucalyptus trees and wild shrubs. From the hills in the east, and towards the ocean in the southwest, laid remnants of what used to be a creek. The creek was dried out, and probably been dried out for a long time. Being in August, the weather was warm, sunny and like myself, most of the volunteers were wearing long-sleeved shirts and full-length pants to stay protected from the glaring sun. Once home to endemic and native trees, the landscape was now mostly dry land with weedy grass and a few surrounding eucalyptus trees on the east and north-facing hills. Originally, this had been the home of sandalwood trees, the '*iliahi* tree. Stories were told about how this land was a lively place for all kinds of creatures: birds, insects and worms. Now there were no flowers, fruits, berries or healthy soil for them to feed from any longer. There were no birds singing, no buzzing bugs; there was only a loud silence, occasionally interrupted by the light breeze rattling the leaves of the eucalyptus tree and the ringing of

distant goat bells. The settlers quickly expanded their imprint on the Big Island into the Kohala district, and the land was later privatized and the ‘*iliahi* was cut down, sold and exported to (mainly) China. After clearing the land of trees, the land was eventually turned into ranching with cattle, and more recently, goats. The land became further depleted for ecological diversity. The absence of liveliness was haunting.

The trees we planted from a local nursery were referred to as *keikis*, meaning “child”. During the event, we planted *koa* and the *‘a’ali’i* trees, two endemic trees to Hawai’i. Especially the *koa* is well suited for the climate and the current state of this dry landscape. The *koa* tree is a “warrior of trees”, which also lies in its name with *koa* meaning ‘strong’ or ‘bold’. The *koa* has leaves which are not really leaves, and work almost the same as roots. *Koa* leaves have the ability to absorb even the smallest portions of humidity and moisture from the air and guide it down towards its roots. In other words, a good tree that can withstand the dry conditions of the land and simultaneously provide moisture to the soil. To plant the *keikis,* we cleared a small section of the land from weeds and exposed the topsoil. Then we jammed a big stake into the ground and stirred the stake in circles to deepen the hole in order to place the *keikis*. When the *keikis* were put in the soil we gave them words of encouragement in so that their growth would be more successful. After planting them, we needed to water the *keikis.* We poured water from a bucket onto the area around the *keiki.* To my surprise, the soil quickly repelled the water. Because of the long period of drought, the lack of tree shading and the generally dry climate, the soils had turned hydrophobic. The soil was also very fine, like powdered sugar, and we had to dig deeper to reach some level of moisture in the soil. Identifying a good soil for the *keikis* was not essential, but it would most likely increase the chance of them growing successfully. My planting partner had much more experience than I had and said we

should look for aggregates in the soil, which is a good indicator for better soil health. Aggregates are compounds of small soil particles which hold each other together through the binding of organic matter between soil particles. My partner suggested we move a bit closer to the rim of eucalyptus trees. However, we could not plant *keikis* too close to the eucalyptus trees as they absorb most of the nutrients and moisture in the ground, and the leaves can be toxic to other plants and trees. We were both very excited when we found smaller patches of aggregate rich soils at a safe distance from the eucalyptus trees.

To pay our respects to the place and the landscape, we did a *kilo* at the end of the event, a practice in which we observed and payed attention to the landscape surrounding us. Through *kilo*, one becomes attuned to a particular place and nature through our senses; sight, smell, hearing, touch and taste: one lets the effects of nature guide one's attention, and try to tune in to what sort of relationships we experience in and with that place. I sat down by the edge of the dried up creek, which was now just a few rocks surrounded by slightly greener grass. I noticed how quiet it was, with just the wind rattling the eucalyptus trees, the dry soil and its sweet, earthy smell. I picked up a dry eucalyptus leaf which had fallen from its tree and smelled its distinct and powerful fragrance. I began to wonder what this place might be like in a twenty-year's time, when the *keikis* had grown up. Will the birds return to this once lush and lively place? Will the trees provide shade for the grass to regrow? Will the soils be less hydrophobic and regain its microbial diversity? Will the creek return to its continuous flow? Will more dragonflies be able to lay their eggs in the water? Restoration of the landscape is not a guarantee of the return of other living beings, but it can possibly bring about the potential for the more thriving landscape that was in the past.

Introduction

It is perhaps tempting and easy to imagine Hawai'i as a tropical paradise, with white sand beaches, lush, green forests, luxury resorts – a place to go to relieve oneself of stress and to relax. Whilst the commonplace postcard illusion of Hawai'i may hold a dominant hold on the imaginaries of Hawai'i, the islands' histories and developments are contentious and manifold. This vignette describes fragments of a reforestation event I attended during my fieldwork in the Kohala district of the Big Island. What the vignette illustrates is the condition of a specific landscape, where ecological degradation, settler colonialism and extractivism is still very visible. The vignette is an example of anthropogenic transformation of the ecologies, ranging from soil health to the absence of birds, insects and the growing of weeds. It highlights a transformation of a previously lively area in which birds thrived in the mix of '*iliahi* trees, *pili* grass, shrubs and blossoms alongside dragonflies and other insects, to a landscape which is marked by drought, weeds and silence. The vignette also shows that it is impossible to understand the current context and condition of Hawaiian landscapes without considering the histories of privatization of land, industrial agriculture, ranching, the timber industry or other factors which has shaped the landscape. The empirical example describes an encounter between past and present, and between humans and the landscape which evokes an imaginary of the future of the landscape. This further exemplifies how the landscape is affective in the way that the condition of the landscape encourages a practice of restoration and care. The history of ecological changes and landscape transformations is important in order to understand the affective landscape.

Whilst the vignette speaks to contemporary challenges as a result of the timber industry and ranching, the most prominent force of Hawaiian landscape transformation has been industrial sugarcane plantations. This chapter will elaborate on the main trajectories of environmental history and ecological changes in Hawai'i. According to historian Carol A. MacLennan (2014) there were three main waves of ecological change on the Hawaiian Islands. Firstly, Polynesian explorers who settled on the islands sometime between year 1000 and 1400 had significant effects on the islands' ecologies. The Polynesians brought with them a set of crops, so-called "canoe plants" which they cultivated on a large scale. The second wave began with the arrival of Captain James Cook and the British in 1778 which led to the introduction of foreign species. The third wave was the emergence of industrial monocrop agriculture, especially sugarcane. I continue this chapter by briefly exploring the changes in land relations – from land stewardship

to privatization of land – and the three main waves of ecological change. For the purposes of this thesis, I will condense these histories.

Land Relations: From Land Stewardship to Privatization of Property

The Polynesians explorers who first settled in the islands developed societies with hierarchical governance structures and custodies of land. Kāne (1997) argues that the *ali'i nui* (high chiefs/kings) distributed custody of land to loyal supporters. The *mokupuni* (smaller island kingdoms) were divided into *moku'āina,* which was composed by *ahupua'a* (small chiefdoms) (Kauanui 2018). An ideal *moku* was where the different *ahupua'a* were split into "triangles" which typically started wider *mauka* (inland towards the mountains), and narrowing in *makai* (towards the ocean). The land thus spreads across different environments with various natural resources. The *ahupua'a,* the "triangular" shaped part of land, was managed by extended families through *'ili* (larger areas within the *ahupua'a*). The *'ili* was divided into smaller land plots which was worked by smaller family units. The land management system did not allow for humans to formally "own land" in the sense of private ownership in Western economic terms. Because the land was considered to be immortal, and humans to be mortal, land ownership was beyond imagination (Kāne 1997: 31). It was rather an attitude of land stewardship that guided Hawaiians' relationship to the land. The *maka'āinana*, the people who worked the land and produced food did not have the overall custody of the land. The custody and main stewardship of land was in the hands of the *ali'i nui* (Sahlins 1985). All Hawaiians had general rights and access to lands and resources in order to support their communities. This included access to wetland forest areas to get wood or birds, to dryland agricultural lands to get taro, sweet potatoes and more, as well as to coastal areas for fishing. There was an interdependence and reliance between communities which sustained the hierarchical stewardship of land, but nevertheless also nurtured and cared for the land and the people. The land and natural resource management system was based largely on relations of reciprocity (MacLennan 2014: 46). The basis for the reciprocity was not only between persons or communities, but also between humans and the land. The term *malama'āina*, proper care for the land, is still often used in everyday conversation amongst farmers and others.

Settler Colonialism

When settlers[15] arrived, there was a rising interests in the economic opportunities in Hawaiian agriculture. This led to the privatization of land which was sold, cultivated and transformed into industrial agricultural land. The process of privatization did not only change the management system of lands, but also doomed the Hawaiian subsistence agriculture and food systems. The development of land relations and ownership in Hawai'i is a complex history with many details. For a richer account of these developments, I refer to the aforementioned authors. An important aspect of these processes and the present in Hawai'i, is the structure of settler colonialism. Lorenzo Veracini writes that settler colonial phenomena occurs when colonizers come to a place with the intention of staying and establish a new political order: "settler colonialism is about turning a place and a specific human material into something else, and, paradoxically and simultaneously, about a specific human material that remains true to itself in a place that is 'other'" (Veracini 2013: 313). What this means is that colonizers transform peoples and places into something they are not, the subjection of Indigenous peoples, to fit into the colonizers logic and understanding of the world (Veracini 2016: 40). In response to a settler colonial historical narrative, Hawaiian perspectives and political processes are included in newer research to multiply the historical perspectives of Hawaiian societal transformations (MacLennan 2014 and Kauanui 2018).

J. Kehaulani Kauanui argues that there is a paradox concerning Hawaiian sovereignty in the meeting with settlers, as many of the political transformations which occurred after the arrival of the Europeans and Americans, were strategic decisions made by the Hawaiian government to keep Hawaiian sovereignty intact (Kauanui 2018: 18-19). Kauanui refers to political scientist Noenoe Silva who writes:

> It was in response to foreign aggression, and also to missionary claims that the [Native Hawaiians] were savage and uncivilized that the *moi'i* and the *ali'i nui* changed their ways of government by adopting a constitution on which European and American types of laws could be based and by adhering to international norms of nation-statehood. These moves were made with the goal of preserving sovereignty – that is, to avoid being taken over by one imperial power or another. (Silva 2004: 37. Cited in Kauanui 2018: 18-19).

[15] By "settlers" I refer to Non-Native Hawaiian persons. Settlers in the Hawaiian context are a diverse group of people; early settlers were from Japan, Germany, England and the mainland U.S, many of which were missionaries (see Kauanui 2018 and MacLennan 2014).

One of the most notable changes made by Hawaiian government was the rearrangement of lands through King Kamehameha III's1848 Mahele land division and the subsequent Kuleana Act in 1850 (Kauanui 2018). In the Kuleana act, Hawaiian lands were divided mainly between three parts: the Hawaiian government (government land), including the King's land (crown lands). The crown lands amounted to about 1 million acres, and government lands about 1.5 million acres. Second, the *ali'i* land were large estates held by the chiefs which totaled more than 1.5 million acres. Lastly, about 30 000 acres were held for the *maka'āinana*. The latter were small land parcels, *kuleana*, which required a survey and testimony in order to formally claim residency (MacLennan 2014: 47, Kauanui 2018: 87-88). Later, unclaimed *kuleana* and government lands were sold or leased to settlers through a series of new legislation which allowed for land to be owned and sold by settlers (Kauanui 2018: 91). In turn, the enclosure of the *ahupua'a* lead to a severing of ties between people and the land, in which privatized lands were turned into sites of industrial agriculture rather lands of abundant natural resources supporting the interdependence and subsistence of Hawaiian communities. In 1898, Hawai'i was annexed as a part of the U.S., and became the 50th state of the U.S. in 1959.[16]

The arrival of Western people and settler colonialism significantly changed land relations and agriculture with privatization of land and industrial agriculture. Now I turn to the three waves of ecological change to describe further the changes of landscapes and ecologies.

Three Waves of Ecological Change: A Condensed History of Hawaiian Landscape Transformations

1 - Domestication and Agriculture by Polynesians

It would be reductive to say that advanced forms of agriculture did not exist in Hawai'i before the arrival of settlers. As mentioned, all of the Hawaiian islands have a generally wetter, windward side, and drier, leeward side. This sets the conditions for different plant and animal lives and possibilities for cultivation (Noa Lincoln et al. 2018). The Big Island is the biggest and easternmost island in the archipelago. In the center of the island, there are two volcanoes, Mauna Kea in the north, and Mauna Loa in the south. Both mountains reach over 4000 meters

[16] Questions concerning Hawaiian statehood is very much contested. I highly recommend J. Kauanui (2018) for an extensive elaboration about the Hawaiian sovereignty movement.

above sea level and create very distinct weather conditions. Archeological research show how Hawaiians cultivated crops and plants in large, advanced forms of agricultural systems in drylands on the leeward side of the Big Island, and smaller garden plots on the windward side (Lincoln et al. 2018: 3986-3987). When Polynesian peoples first arrived to Hawai'i from Marquesas and Tahiti approximately in the year 1000-1200 AD (Kirch 2011), they were likely met with green, lush and mountainous landscapes. With them, the Polynesians brought so-called "canoe plants" such as taro, breadfruit, yams, bananas and more. They are also believed to have brought with them domesticated pigs and chickens (Perroy, Melrose and Cares 2016: 155). In the years 1400 to 1778 the Hawaiian population increased significantly, and following the population growth, agriculture was further intensified and expanding too leeward sides of the islands, including the Big Island (MacLennan 2014: 17). With the rapid population growth, the intensification of agriculture caused the first wave of ecological change in Hawai'i (ibid.). On the leeward side, which was arid and rain-dependent, Hawaiians developed dryland agriculture in today's Kohala and Kahikinui areas (ibid.: 17-18). Archeological investigation into these areas suggest that the dryland production was formed in terms of cropping cycles in fixed fields (ibid., Lincoln et al. 2018: 3988). Here the Hawaiians cultivated taro, sweet potato, and to a lesser extent yams and sugarcane (*kō*) (Lincoln et al. 2018: 3989). Regions with rich marine resources also had larger-scale fishpond aquaculture (MacLennan 2014: 18).

In an extensive research article on restoration of '*āina malo'o* (non-flooded, dry lands) and '*āina wai* (inundated, wet lands), researchers explore the high levels of place-based adaptions in Native Hawaiian agriculture (Lincoln et al. 2018: 3985). Scholar have given little attention to the significance and scale of Indigenous Hawaiian alterations of the environment through agriculture and settlements. In this research, the scholars demonstrate the complexity and intensity of pre-settler Hawaiian agriculture. They also argue that the simplification of the history of traditional Hawaiian agriculture, especially in the field of archeology and anthropology, has impeded the in-depth understanding of Hawaiian agricultural systems (Lincoln et al. 2018: 4002). Hawaiians had developed highly unique resource management practices in relation to the environments which maximized agricultural production (ibid.: 3986). There were many different forms of agriculture such as smaller gardens close to settlements, irrigated terraces, agroforestry, monocrop arboriculture and more (ibid.: 3988). Early Hawaiian agricultural systems were the foundation for specific place-based traditional ecological knowledges which powered the political developments of the Hawaiian Islands, and the Kingdom of Hawaii (ibid.: 3986).

However, pre-settler Hawaiian agriculture altered landscapes with significant ecological impact through deforestation of lowland forests, building dams and canals for intermittent water manipulation, built soils and more (Lincoln et al. 2018: 3990). In Puna, the region in which I did most of my fieldwork, the Hawaiians had large agroforestry fields, smaller gardens such as planting pits and built soils (ibid.) Pre-settler Hawaiians had developed a socioecological understanding and knowledge of the lands they engaged with. Their agriculture and land use practices were adapted in detail to the lands they cultivated. This was necessary as climates and landscapes varied greatly from region to region, and within regions themselves. Nevertheless, Hawaiian society, land relations, and the advanced agricultural systems underwent larger transformations following the first arrival of European settlers starting in 1778, followed by American and Japanese settlers. The arrival of settlers had large impact on the islands' ecologies.

2 - The Introduction of Foreign Species by Settlers

Captain James Cook and his crew arrived on the Big Island in 1778. Environmental historian Alfred W. Crosby writes how the Europeans' "portmanteau biota", new microorganisms and mammals, led to the most significant ecological changes (Crosby 1986: 270). Portmanteau biota is a term used to describe the organisms European settlers brought with them to colonized land (ibid.). This biota included everything from animals and plants, to seeds and microbes. Crosby also explains that the spread of disease amongst native populations was one of the central happenings which allowed for the colonization of land. The spread of disease and death amongst the Hawaiians opened up lands and resources for more settlers to inhabit the islands. This is also true for many other indigenous nations in the world. The Hawaiian's exposure to diseases first brought by settlers from Europe, and later from the U.S, China and Japan, lead to a mass death of the Hawaiian population. An estimate claims that 57 percent of the Hawaiian population died as a result of diseases brought by settlers from various places, in a so-called "microbiological mayhem" (Bushnell 1993, cited in MacLennan 2014: 25). Another important aspect of early settler presence in Hawai'i was the evolvement of commercial trade. With the increasing interest in Hawai'i as a commercial trade center, an increasing demand of vegetable foods, firewood, fruits and nuts led to the cultivation of other high-demand crops which replaced much of the pre-settler Hawaiian agricultural fields (MacLennan 2014: 27). But with

the increasing interest in Hawaiian land, came a large influx of settlers, and introduction of new species.

As mentioned, the introduction of industrial agriculture in the late 1800's marked the beginning of a series of changes with waves of new species, land adaptions and transformations as well as human settlements. Not only were new species introduced, but the processes of new species introduction were on a massive scale. However, not all foreign species were introduced knowingly. Many smaller animals, birds, insects and microbes were "passengers" on ships. Seeds and spores were carried in furs and feathers, or were otherwise transported with their travelling companions (MacLennan 2014: 26-27). European and American settlers also brought domestic goats, sheep and cattle. These ungulates have had massive impact on the landscape, and contributed to soil erosion and massive deforestation in favor of ranch land (ibid.). Together with the spread of non-native grasses, ungulates are argued to have had one of the largest impacts on Hawaiian landscapes (ibid.). Native forests and grasses could not regenerate quickly enough from the invasion of cattle, sheep and goats, and in turn, the soils were deprived, and naked soils became washed away during heavy rainfall (ibid.). Without soil and vegetation to capture rain water, the water was washed to the sea, evading the rivers, streams and aquifers thus leaving them dry (ibid.).

The landscapes in Hawai'i were not only transformed through portmanteau biota, the introduction of new species by settlers, or new, intensive forms of agriculture. Large-scale ecological change and landscape transformations were also accelerated by changes wrought by industrial agriculture, commercial trade and new socio-political organizations of land use and privatization of land. Perhaps most notably was the growth of commercial sugarcane industry.

3 - The Sugarcane Plantation and Changing Landscapes

The geographic location and climates of the Hawaiian Islands also made them ideal for large-scale trade and production of high-demand crops such as sugarcane, macadamia nuts, papaya, pineapple and more. A form of political ecology of sugarcane can demonstrate how the global sugar industry shaped and reshaped Hawaiian landscapes[17]. With the rapidly expanding sugar economy on the world market, Hawaiian sugar plantations had to adapt or fail (MacLennan 2014: 36). Large areas of land had been privatized, and especially water resources were

[17] Anthropologist Sidney Mintz has written extensively about the sugarcane plantation industry in the Caribbean (1985).

enclosed for the sake of agricultural production. The acceleration of the sugar industry in Hawai'i came in 1875 when the Treaty of Reciprocity was signed. The treaty was basically a preferential trade agreement, which allowed for duty free trade between Hawai'i and the U.S (ibid.: 37). Smaller sugarcane plantation owners, mostly Chinese or Hawaiian, were forced to sell out to foreign buyers from the U.S mainland which saw the opportunity to turn sugarcane plantations into capitalist ventures (ibid.).

Sugarcane required nutritious soils and plenty of rainfall, and the windward sides of the Hawaiian Islands presented near like perfect conditions (MacLennan 2014: 40). Especially the northern and windward areas of the Big Island were perfect to produce sugarcane. Industrial cane agriculture created significant environmental challenges such as crop disease, insect pests and rapid soil depletion. Subsequently, the loss of soil nutrients led to an early dependence on fertilizers, both natural and artificial (ibid: 42). As the demand for sugar and sugar production increased, so did Hawai'i's dependency on the sugar economy. Progressing at an accelerating speed, almost all resources of Hawai'i were geared towards the monocrop business, and the production and export of sugar between the 1880's and World War II (ibid.: 29). According to MacLennan, two main points are to be made about sugarcane production's effect on Hawaiian landscapes: First, it was the "sugar capitalists'", mostly missionary descendants, capacity to organize their interests and assets in the competition with the Hawaiian monarchy (ibid.: 45). Second, the managing of the particular environmental needs for sugarcane production through political and scientific strategies has had major influence on the present day landscapes in Hawai'i (ibid.: 46).

Almost all agricultural lands on the Hāmākua coastline on the Big Island were devoted to sugarcane along with Puna and northern parts of Kohala. Apart from large areas of sugarcane plantations, the lands on the Big Island consisted mainly by ranch and grazing lands, pineapple production and smaller farms in Kona (MacLennan 2014: 206). Large areas were deforested to make room for the industrial cultivation of sugarcane. Freshwater sources disappeared with the trees that worked as watershed vegetation and the soils were depleted. In sugarcane production, like with other monocrop industries, soils were exhausted and drained for microbial diversity (ibid.: 50). Soil health became of big concern with the following the Great Depression in which many scientists guided their attention to soil and soil health in agriculture and experimentation with fertilizers and insects and pest eradicators (MacLennan 2014: 213; Maher 2000). In the end, fertilizers did all the work of soils in the sugarcane plantations (MacLennan 2014: 216).

Furthermore, the application of pesticides have also led to high levels of arsenic in the soils of former sugarcane plantations.[18]

Most notably, the industrial sugarcane plantations were driven by economic interests and escalated with the surge of capitalist interest and entry to the global market. Following World War II, the plantation industry declined rapidly due to rising labor costs, and increasing competition from producers overseas (Perroy et al. 2016: 155). Labor in the plantations in Hawai'i was never directly slavery, but was dependent on long-term contracts with immigrants from Asia, and displaced Hawaiians (Haraway and Tsing 2019: 7-8). Labor in the plantations were differentiated by racial groups which produced and reproduced racial categories that impacts life on the islands to this day (ibid.; Altemus-Williams and Hobro 2021). Plantation owners segregated workers by ethnic group, and payed the workers varying wages and tended to favor workers with "closer proximity to whiteness" with higher wages and positions (Altemus-Williams and Hobro 2021).

By 1995 most of the sugarcane plantations had been closed due to a range of issues such as overseas competition, mismanagement, labor rights conflicts, and conflict over land and water resources (MacLennan 2014: 278). Although the sugarcane plantations may not be active to this day, their consequences and marks on the natural and social landscapes are still prevalent. The shutdowns of sugar plantations in Hawai'i had disruptive effects on the communities that the industry had supported, leading to far-ranging economic and unemployment crisis (Perroy et al. 2016: 155). The plantation industry's rearrangement of nature into capital have undoubtedly changed Hawaiian landscapes, and shows how the political economy of the sugar industry impacted social, cultural, political, ecological and economic life in Hawai'i. Many of the contemporary issues of land rights, water resources, agriculture and other ecological challenges in Hawai'i s can be traced back to the sugarcane industry. The historical trajectories of Hawaiian landscape transformations are also similar to other sugarcane plantation landscapes such as in the Caribbean. In this respect, anthropologist Sidney Mintz should be mentioned as a pioneering scholar in demonstrating how agricultural production and food systems transformed lives and ecologies. Perhaps more notably, Mintz (1985) shows how such systems are entrenched in relations of power, exploitation, slavery, consumption and

[18] High levels of arsenic can be harmful for humans, but mostly through ingestion. Special health concerns are damages to the heart and blood vessels, liver inflammation, skin pigmentations, and long-term exposure show increased risk of cancer. https://health.hawaii.gov/heer/files/2019/10/Arsenic-in-Hawaiian-Soils-Questions-and-Answers-on-Health-Concerns-2018.pdf (Accessed 14 November 2022).

colonialism, and how commodities can have rippling social, economic, political and ecological impacts. Mintz' work was groundbreaking and also shows similarities to the history of Hawai'i as well and should not go unmentioned.

Agricultural Transformations and Production Today

Today, agricultural production in Hawai'i is mainly concentrated on an increasing number of smaller farms (Rehkamp, Roberts and MacDonald 2021: 1). This is a trend that departs from the rest of the U.S (ibid.). One of the reasons for this trend, may be the USDA's definition of a farm, as "any place that produced and sold – or normally would have produced and sold – at least $1,000 of agricultural products during a given year" (Hoppe and MacDonald 2005, cited in Rehkamp et al. 2021: 2). Since 1970, this definition has been fixed alongside the diminishing value of the dollar currency (Rehkamp et al. 2021: 2). Sugar and pineapple production saw a dramatic reduction with the concluding of the industrial plantation agriculture (Perroy et al. 2016: 154). There has also been a decrease in crop and pasture land acres. From 1980 to 2015, crop acres have been reduced from ~350,800 to ~151,800, and pasture lands from ~1.1 million acres to ~761,400 (ibid.). Much of the acres were most likely lost to military training areas, resort developments, or wildlife and nature conservation by the Federal Government, and conservation or reforestation by private landowners (ibid.). Commercial agriculture in Hawai'i today is dominated by the production of commercial seed crops, macadamia nuts and coffee (ibid.), and the production of coffee saw a 250% increase between the years of 1980 and 2015 (ibid.). Nonetheless, the economic farm value of cattle and calves is dominating the current agricultural sector in Hawai'i (HDOA 2022).

Whilst missionaries, and big corporations were the owners of plantations and main actors in Hawaiian agricultural industry during the plantation era, the agricultural sector today in Hawai'i is driven by smaller farms run by a diverse group of peoples. Demographic trends from 2014 show that farmers in Hawai'i are respectively 9% Native Hawaiian or Pacific Islander, 45% Asian and 43% White (Hollyer and Loke 2014, cited in Hutchins and Feldman 2021: 4).

An Ecological Crisis

The three waves of ecological change in Hawai'i have indisputably transformed the landscapes beyond the control of humans and nature. Humanity and nature are nevertheless interconnected in this process through the landscape. The State of Hawai'i is actively engaged in trying to contain the negative and invasive impact on landscapes. In most entries to nature trails or national parks, small stations are placed where one should disinfect one's shoes and brush off any potential seeds, bugs or any other potentially harmful species. The reforestation events I attended are some of these projects along with other political actions, such as banning sun protective lotions containing oxybenzone, octinoxate, avobenzone and octocrylene.[19] Furthermore, agricultural inspections at airports and ports, so-called "ag-inspections", are required when leaving the mainland for Hawai'i, and vice versa. This is to prevent any further ecological damage through the introduction of new invasive species of plants and animals, microbes and potential crop-diseases. The challenge is, that most of the damage has already been done. Following the closing of sugarcane plantations, land areas were signed off to build housing as a result of rapid urbanization, or resort developments (MacLennan 2014: 278).[20]

[19] This ban has been in place since 2018. However, it is not until 2023 that the ban will lawfully enforced, which includes the both sale and use of sunscreens containing harmful chemicals. https://www.capitol.hawaii.gov/Archives/measure_indiv_Archives.aspx?billtype=SB&billnumber=2571&year=2018 (Accessed 14 Nov 2022).

[20] The infrastructures of the sugarcane industry proved valuable opportunities for new housing projects and resorts as land holders saw new economic opportunities with increased urbanization and tourism. Also, military activity poses increased stress on natural resources. A current example is the contested issue of water, and the Red Hill fuel tank facility in O'ahu. Thousands of liters remain in an underground storage which poisons water systems. https://sierraclubhawaii.org/redhill (Accessed November 14, 2022).

As described by MacLennan, “the faith in human power to manipulate nature and re-create new landscapes of production continues environmental change and, when not checked, degradation” (2014: 281). The forced simplifications of landscapes in monocrop agriculture also have other unintended consequences. The spread of monocrop agriculture dramatically reduces soils microbial diversity and in turn soil health. The forced simplification of landscapes in agriculture also makes crops less resilient to pests and the production less sustainable. Whether through natural mechanisms of dispersal such as winds, or through human

Figure 1: A common sight. A trail sign asking for people to clean shoes (and clothes) before entering forests, trails, beaches and more. Photo by author.

involvement, new pests emerge in these simplified plantation landscapes. It is in these landscapes that my research is taking place, which also shows how landscapes become affected by the simplified plantation ecologies; past and present. The landscapes are almost mnemonic, and carries these histories with them, continuously being shaped by, but also responsive to, human activities. Moreover, these histories and processes also impact the ways in which humans know and relate to landscapes; the landscape is affective.

Summary

In this chapter, I have described how three major events transformed the landscapes in Hawai’i. The most radical transformation happened in the wake of the establishment of sugarcane plantations. The land areas, settlements and ecological struggles on the islands cannot be seen as separate from the industrial plantation agriculture. The first large effect of ecological change

in Hawai'i was by the Polynesian explorers which settled down in Hawai'i. They cleared large lowland forest areas for the purpose of agriculture. The Polynesians also introduced pigs, chickens and goats to the island, and their agricultural systems included manipulation of water ways. However, their agricultural production and consumption in Hawai'i was largely based on social relationships, organization and a reciprocal relationship with the land. Second, settler presence in Hawai'i introduced foreign species and a Western sociopolitical organization of labor and property. Relations between people and the landscape were dramatically transformed as land became privatized, sold and turned to site of economic opportunities and interests. Although these processes were manifold and much more complex than described in this chapter, Hawaiian agricultural products were propelled into the global trade market, which in turn lead to the third wave of ecological change: the introduction of industrial plantations, mostly sugarcane, which further accelerated rural transformations and changing landscapes on a massive scale. The landscape changes in Hawai'i have led to many ecological challenges such as lasting soil depletion, lack of watershed vegetation, drought, emerging crop pests and invasive species. As I will argue later, these consequences impact human-landscape relations, and ways of caring for the landscape. Alongside the sugarcane industry, other specialized crop cultivations emerged, and coffee amongst them. In the next chapter, I will explore the role of coffee farming and how coffee became one of Hawai'i's "brand commodity".

CHAPTER 5
- COFFEE IN HAWAI'I: COMMODITY, CULTIVATION AND CHALLENGES

Figure 5 View overlooking the parts of the Kona Planation property. Coffee trees treated with fungicides creating a white cover. Photo by author.

Vignette

As I drove up the steep hills behind the Kailua-Kona coastline, green leafed trees made a powerful contrast with the clear blue seas of the Pacific Ocean. The road up was paved, narrow and winding. The landscape gradually shifted from gated driveways with groomed lawns to trees leaning in over the road. The paved road turned into a single-lane gravel road as I made a sharp turn and continued uphill for a few minutes. On the sides of the road, I could see people wearing something like hazmat suits, and I assumed they were

beekeepers as Kona is also known for production of honey in addition to coffee. Finally, I reached the Kona Plantation. The parking lot was so full that I struggled to find parking. The plantation was placed on a steep hillside overlooking a vast area of the Kona Coast. As I looked towards the ocean, I realized that I must have been driving through parts of the Plantation on the way up. It was quiet and the air smelled fresh. I could only hear a few people chatting in a group which looked like they were on a guided tour. In total, the Plantation makes up about thirty-seven acres with around 19 000 coffee trees. The hillside was shaped with slopes, which gave the landscape an almost wave-like look. There was also fencing around the whole property (which is not uncommon regardless) and the areas on either side of the fence was cleared for both grass, shrubs and trees: it was a boundary that seeks to separate the Plantation from its immediate surroundings. There were no other trees growing near the coffee trees, which in turn exposed the coffee cherries to more sun and winds. I walked further uphill towards the main house where I had agreed to meet Annie, who oversaw communications and branding of the plantation's coffee production. The road uphill was paved with asphalt, and I passed the guided tour group. Their guide was gesticulating with his arms and talked enthusiastically about the coffee produced on the plantation, and the quality of Hawaiian coffee.

As I approached the main house, I received a warm welcome by three of the plantation workers. They were all seasonal staff from the mainland. I was told that the workers were either permanent staff who lived on the property, or seasonal workers who stay for a period ranging from three to six months, especially during harvest season. All of them were very knowledgeable and forthcoming, and more than willing to share their experiences and perspectives on working with coffee farming. However, not all of them worked in the coffee fields, but were there as either guides for the property, shop assistants

for the Plantation's little store and coffee bar, or maintenance staff. I was taken to the *lanai*[21] in front of the main house where Annie greeted me with a hug and offered me a cup of their specialty coffee before we started to walk around the Plantation. Annie had been working on the farm for many years, beginning as a seasonal worker. The Plantation was enormous, and to walk through the fields of coffee trees was illuminating. As I had noticed when I arrived, there were no distinct smells on the Plantation and the property itself was well-kept. There was very little grass between the rows of coffee trees, and the ground around the trunk of the trees was completely bare. There were no flying insects around, just the sound of people chatting, and the occasional breeze rustling the leaves. The absence of other forms of life was telling. I also noticed plastic collars around a few trees, and I asked Annie what the collars were for. She explained that they sometimes put plastic collars around the stems of the trees to keep weeds from growing too close to the trees. The ground around the trees was cleared to almost only the bare soil at least half a meter to both sides, and along the entire row. The trees were uniform, looking very similar in shape and size. It was a model plantation landscape.

I was stunned by the scale of the Plantation, yet also surprised by the lack of machines. I had expected such a large plantation to have some sort of machinery to help out. Curious to know more, I asked Annie why there were few machines. The thing Annie was adamant about was that farming was a lot of work: "It takes a village," she said. She smiled and looked over the field of coffee trees. Except from cutting weeds, basically all labor was done by hand. It was still early in the harvest season, but a few workers were in the field picking cherries. "The trees don't like to be shaken," Annie told me, as she explained that the workers handpick the cherries to make sure the trees stay healthy. She continued, and

[21] *Lanai* is the Hawaiian word for "front porch". Widely used by people on the Hawaiian Islands.

explained that some coffee farmers use machines to shake the trees until they drop their cherries, which the trees don't really like. If done continuously, the trees would eventually stop producing cherries altogether. Therefore, Annie stated, the Plantation wanted to make sure that the trees continue to produce and thrive in the environment, and that every cherry is handpicked. This made sure that the pickers only pick the perfectly ripe cherries that are actually ready to be picked, also resulting in the best coffee. She guided me back from the field, and we sat down by a table on the *lanai* overlooking the green hills made up of coffee trees and the clear blue ocean further away.

I asked Annie if she knew what used to be on the land before the coffee plantation. Apparently, it used to be a macadamia nut farm. As Annie replied, the owner of the Plantation walked by, and Annie introduced us. The owner explained further that as the macadamia nut prices dropped in the 1980's, macadamia nut production was no longer as profitable, so they had uprooted all the macadamia nut trees and planted coffee instead. The owner was clearly in a rush, and wiped sweat of his forehead before shaking my hand and rushed inside the main house. After some time, Annie had to leave, but she encouraged me to take one of the guided tours with Michael as a new group was starting shortly. She went in to the main house, and I was welcomed into the tour group.

Introduction

The introductory vignette is from my first visit to the Kona Plantation. The Kona Plantation does not only produce coffee beans, but they also welcome tourists and other visitors to tour the property – which was also how I was introduced to the farm. The Kona Plantation is also the home for the majority of its workers, some of which are permanent staff working with the visitor center, communication, website management and more, whilst others are seasonal workers from the mainland. Hawaiian coffee is a well-known specialty coffee, most often referred to as "Kona Coffee". Coffee farming is not without challenges and is especially faced with increasing pressure of invasive species and pests which is one of the consequences of simplified ecologies in agricultural production. In this chapter I explore the growth of coffee production in Hawai'i where I focus mainly two aspects of coffee in Hawai'i. First, I briefly introduce coffee as a crop in Hawai'i; a commodity which entered a vast trade network from the island. Second, I focus on the cultivation of coffee and challenges. I will focus mainly on the latter aspect. Throughout this chapter, I will highlight a few of the differences between the larger scale coffee plantations in Kona and Ka'ū, and the smaller coffee farm in Puna.

Trajectories of Coffee in Hawai'i

First Introduction

The first coffee trees in Hawai'i were first brought by merchants from Brazil in 1813 (Bittenbender and Nakamoto 2021). In 1825, coffee trees of the Ethiopian *Bourbon* variety was planted in Mānoa Valley on the island of O'ahu (Bittenbender and Nakamoto 2021). Although this first planting was failed, new trees and varieties were later planted on Kaua'i and on the Big Island (ibid.).[22] On the Big Island, a variety of the Guatemalan *Typica* was planted in Honoka'a on the northern windward side which was later embraced by Kona coffee farmers (ibid). Larger plantations were established in the Kona district on the Big Island by 1841, and Kona is still recognized the largest coffee producing region on Hawai'i. However, Puna and Ka'ū are also large coffee producing districts. Along with Kona, Puna was also one of the

[22] Failed coffee tree plantings is not synonymous with the vanishing of coffee trees. There are indeed "feral" coffee trees on the Hawaiian Islands. https://wildlifeofhawaii.com/flowers/1363/coffea-arabica-coffee/ (Accessed December 9, 2022)

original coffee producing districts although it is seldom mentioned. The farmer I collaborated with in Puna also mentioned this, and said that Kona "gets all the credit", and that people have forgotten that Puna was also a major coffee grower district in the past. This is also argued by MacLennan, who describes how sugarcane production "swept over" the coffee fields, and eventually took over as the leading crop in Puna (2014: 164). Nevertheless, in the 1900's, getting a leasehold on lands for coffee farming was considered to be a way of finding independence away from the sugar plantation (MacLennan 2014: 164). This partially also explains one of the reasons for the boom of Hawaiian coffee production, along with increasing global demand for specialty blends. This is also why there are many small coffee farmers compared to large plantations, with over 800 registered individual coffee farms in the State of Hawai'i (Woodill et al. 2014).

As mentioned in the previous chapter, most coffee farms in Hawai'i were driven by Japanese immigrant families. The Hawaiian Islands experienced a wave of Japanese migration when crops started to fail in Japan in the late 1800's. Nowadays, coffee farming operations is run by a diverse group of people, but still mostly small family-run non-commercial farms (Woodill et al. 2014). An emerging challenge for Hawaiian coffee production is the increasing age of coffee farmers, the lack of generational farming leading to a great loss of coffee farming knowledges, and new invasive species and diseases. Also, available lands for coffee farming are purchased or leased by U.S. mainlanders moving to the islands with the dream of a "farming lifestyle" (Longoria de Garcia 2022). As described by Madeleine Longoria de Garcia from the Pacific Coffee Association Inc., new coffee farmers coming to the Hawai'i have little to no experience with farming, which can often result in mismanagement of coffee farms (ibid.).

Trade and Production – The Commodity of Hawaiian Coffee

Coffee farms in Hawai'i are usually divided into three categories.[23] First, about 60% of coffee farms are considered to be non-commercial farms with annual sales less than $10,000 (Woodill et al. 2014). Second, there are smaller commercial farms with annual sales ranging from $10,000 to $250,000 (ibid.). These make up 38% of Hawaiian coffee farms. The remaining 3% are large commercial farms with annual sales exceeding $250,000 (ibid.). Much of Hawaiian coffee is consumed and sold "in-state" and makes up less than 1% of the coffee distributed worldwide (Dyer 2020). The sale of Hawaiian coffee is often divided between unroasted and

[23] These categories are not my own, but based on data from Woordill et al. 2014.

roasted beans. Unroasted beans are so-called "greens", the dried seeds of the coffee cherry, usually sold to importers or local coffee roasters for further sales. Roasted beans are the well-known dark brown beans most commonly sold in stores to consumers. Although Hawaiian coffee makes up little of the total amount on the global market, Hawaiian coffee sales and export make up around 50 million dollars yearly (Cyer 2020), and thus remain an important livelihood and way of life for its cultivators. An exception was the season 2019-2020 where unroasted coffee production was valued at $102.91 million and $148.48 million for roasted value (Kostenko 2021). Coffee production makes up a small portion of Hawaiian gross domestic product (GDP). In the years between 2001 and 2018, general agriculture, forestry, fishing and hunting only made up an average of 0.3% of Hawaiian GDP (Department of Business, Economic Development and Tourism [DBEDT] 2020: vii). In 2019, the agricultural sector in Hawai'i contributed to a GDP of 727 million dollars (ibid: 8). With coffee making about fifty (50) million dollars yearly, the importance of coffee for the Hawaiian economy is relatively low. However, Hawai'i County, the Big Island, is responsible for 54% of the total agricultural production in the state, of which 20% is from coffee (ibid.: 11).

The Rise of Specialty Coffee

Hawaiian coffee is a so-called "specialty coffee". The term specialty coffee was first coined by Erna Knutsen[24] (Pendergrast 1999: 311), and referred to coffees that is not part of the mass-market. Specialty coffee experienced huge growth in the following decades, and became a sort of "gourmet market" for avid coffee drinkers and connoisseurs (ibid.: 337-338). Now, the specialty coffee market is embraced by the mass-consumer market. Hawaiian coffee was also included in a scandal in 1996, the "Kona Kai scandal" (ibid.: 391). The scandal involved Michael Norton, owner of Kona Kai Farms, who bought large quantities of cheap Costa Rican and Panamanian coffee beans, rebagging them as Kona, and selling the coffee with huge profit (ibid.). Consequently, Hawaiian coffee was considered poor quality as coffee experts commented: "[the coffee] tasted dull and uninteresting like Kona coffee, so I assumed it *was* Kona coffee" (ibid.: 392, italics in original). However, Hawaiian coffee reputation survived the scandal, and the price of Hawaiian coffee reached historical heights ever since (Bittenbender and Nakamoto 2021). The price on roasted Hawaiian coffee beans averages on roughly $29 per

[24] Erna Knutsen was an immigrant from Norway to the United States. She settled in San Francisco and took a job at a long established spice and coffee importer. (See Pendergast 1999: 310-311)

pound (Kostenko 2021). Since the 1950's, production yields have been fluctuating but in steady decline most likely due to different pruning methods resulting in shorter trees, and root knot nematodes (Bittendbender and Nakamoto 2021: 4). In 2010, the coffee berry borer beetle caused a dramatic decline in coffee production in Hawai'i (ibid.: 12). Although there was less production yield per acre, mail order services and the internet made Hawaiian coffee more available and the prices were almost tripled from 2010 to 2020 (ibid.: 4).

The word-of-mouth and branding of Hawaiian coffee as a specialty coffee, or specialty blend, remains one of the reasons for hesitance for change in farming methods and practices on Hawaiian coffee farms, because they fear it will change the profile of the taste, as well as insecurities connected to production yields (Longoria de Garcia 2022).

Conditions for Coffee Cultivation

Coffee is a very delicate commodity and fruit. The quality of the coffee is first and foremost determined by essential factors such as the type of coffee tree, soil conditions, water irrigation and growing altitude (Pendergrast 1999: XVI). Like many agricultural products, coffee becomes with the landscapes it is in, which makes it unique. Coffee is vulnerable is almost all its phases of production, from cultivation to harvesting, from drying and roasting to shipment and storage, and on the consumer or retail end with the actual grinding and brewing of coffee beverages (ibid.). Nevertheless, there are a few preconditions that make coffee cultivation especially suitable for Hawai'i.

Kona and Ka'ū

There are many geological advantages for coffee farming in Kona. With the relatively high elevation 400-600 meters above sea level, coffee farms in Kona and Ka'ū get about 1500mm-2000mm of annual rainfall on average (Giambelluca et al. 2013). In comparison, lowland Kona gets about 400mm to 500mm of rainfall annually on average (ibid.). This makes coffee farming in higher elevation landscapes more suitable. Coffee trees are also a partial shade tree. This means that the trees do like sun exposure, but also require shade to be able to thrive the best. Kona and partially Ka'ū gets very predictable weather, mostly because of the Mauna Loa Mountain. Behind Kona, cold and wet air from the East meets warm and dry air from the West.

This creates an inversion layer where clouds are formed which cause shade to cover the higher elevation regions of the Kona Coast in the afternoon, whilst pushing rainfall clouds over Mauna Loa to the East, Hilo-side (Cao et al. 2007). Another key factor for the success of coffee production in Kona and Kaʻū relates is the nature's own irrigation system. Much thanks to the volcanic bedrock of Hawai'i, which leaves most of the rock porous, the island pretty much has its natural irrigation system. Volcanic rocks allow for better drainage which prevents unwanted fungi growth, slows down evaporation from the soil while allowing nutrients to seep through. With the combination of the trees' root systems, the amount of rainfall and the volcanic rocks, soil erosion is kept at bay. Although the Kona Coast and Kaʻū climate and landscapes offer near-optimal conditions for coffee production, coffee farming is not without challenges. And managing the threats to the coffee trees requires experience, knowledge and manual labor.

Puna

Puna is a minor site for coffee production. As mentioned earlier, although Puna was popular amongst early coffee farmers, sugarcane took over as the dominant crop. Furthermore, because Kona is considered to have a favorable climate and considerably more commercial coffee farms and plantations, there is also more expertise related to cultivation of coffee in Kona versus Puna. As H.C Bittenbender and Virginia Smith writes, knowledge and experience with coffee farming outside Kona is either lacking or forgotten, and that "the prospective grower outside Kona should proceed with care and caution" (2008: 3). Located on the windward side of the Big Island, Puna has a wetter climate, and gets about 2000mm-2500mm of rainfall annually (U.S. Climate Data 2022). Also, as a site of previous sugarcane plantation several places in Puna have large traces of industrial agriculture. Large, deforested spots, often square in shape, lay open. These places are now composed of several smaller farms, such as the coffee farm I collaborated with, housing properties or similar. Many of the sites of previous sugarcane production have been vacant for years as traces of arsenic[25] in the soil are still prevalent (Cutler et al. 2012).

[25] Arsenic was often used in chemical sprays applied to the sugarcane fields.

(Non-)Organic Production

Coffee is one of the most heavily sprayed crops in the world (Pendergrast 1999), and "organic production" of coffee in Hawai'i is not widespread. An organic production "prohibits the use of synthetic fertilizers and pesticides, products produced by gene-modification techniques, irradiation as preserving process, sewage sludge as fertilizer, and synthetic processing aids and feed additives" (Blair 2011: 3). Regulations of organic production and farming are mostly guided by national standards, as there are no universal standards for organic production and farming (Blair 2011: 4). There are several reasons for the lack of organic coffee production in Hawai'i. First, the certification is expensive. For the small commercial and non-commercial coffee farms in Hawai'i, the processing of the organic certification level becomes costly. For example, for the California Certified Organic Farmers (CCOF) organic certification, there is an application fee of $325, the cost of annual certification fee and annual inspections, which is billed hourly and the farmers also need to cover travel expenses for the inspection agent (CCOF 2020). For an international certification, there are additional fees. Second, the brand of Hawaiian coffee is already well-established, and Hawaiian coffee does well in the specialty market even without the organic certification. Third, new invasive species, such as insects and crop diseases are making it challenging to manage coffee farms without pesticides and fungicides.

According to human geographer Julie Guthman, the global trend of organic production is not necessarily a movement against industrialized agriculture (2003). In a discussion about organic production regarding organic seafood labelling, Alfnes, Chen, and Rickertsen argue that the organic labelling for seafood can only be applied to farmed aquaculture, and not "wild" seafood (2018: 8). The ocean is "too wild" for humans to control and regulate in terms of pollution and not knowing what the fish, shellfish and more are being exposed to, thus wild seafood does not meet the organic production label standards (ibid.). Thus organic production and labelling remains a commercialization of products, which applies to farmed products that can be controlled and regulated by humans.

Coffee Ecologies

Varieties of Coffee Trees

There is a vast variety of coffees, but the coffee trees are divided into four main groups: *Coffea Canephora* (Robusta), *Coffea Arabica* (Arabica), *Coffea Liberica* (Liberica) and *Coffea Excelsa* (Excelsa) (Meressa and Navrud 2020). Robusta and Arabica varieties are most commercially grown coffee tree (Meressa and Navrud 2020). As mentioned, the most common coffee tree in Hawai'i is the Arabica tree producing Typica beans, the Kona Typica. Arabica coffee makes up more than half of the coffee produced worldwide (ibid.). The Arabica is considered to be the most sensitive of the coffee trees, and can be twice as expensive as Robusta because they are harder to grow successfully. As with many other commercially grown crops, Arabica is one of the varieties with less genetic diversity (Krishnan 2021: 59). This is partially because of the lack of national systems which provides new varieties for farmers (Krishnan 2021: 59). According to Madeleine Longoria Garcia from Pacific Coffee Research Inc., this is further enforced in the case of Hawai'i through strict regulations on agricultural imports (Longoria de Garcia 2022). Also, there is a reluctance to change because of the reputation of Hawaiian coffee, and that new varieties would affect the taste. Another coffee tree variety is the Gesha, another Arabica variety. According to my interlocutors in the field, Annie and Michael in Kona, and Sebastian, a small-scale coffee farmer in Puna, the Gesha variety is increasingly in demand. This is because the Gesha is argued to produce cherries which give a sweeter and rounder flavor of the coffee. It is also said to be more resistant to diseases and pests. On the other hand, Sebastian argues that the Geshas are a hype, because they are more profitable due to the high demand for Gesha coffee in the specialty market. On the Kona and Ka'ū Plantation, large areas were being cleared of existing Typica trees in order to plant the Geshas. In Puna, Sebastian was still contemplating whether to plant a few Geshas or not. However, there are emergent cases of hybridization of coffee tree varieties with the help of biotechnology[26] (Meressa and Navrud 2020).

The different coffee trees are important because they pertain certain qualities. Also, it creates a "taste" for what trees are good for what. It is a form of "technification" of coffee trees and the manipulation of trees in order to get the desired qualities or taste to meet consumer demands. This is also a general issue with simplified agriculture, monocultures, because it

[26] Also see Bittenbender and Nakamoto (2021) for more examples of technologies and testing in regards to coffee diseases and pests.

creates less genetic diversity with coffee trees, making them more vulnerable in case of disease outbreaks.

The Monoculture of Coffee

Coffee trees take a long time to mature and bear good fruits for coffee bean production, also in volume to meet the demand. Thus coffee farming is mostly a monoculture system, in contrast with crop rotation. Crop rotation means to change the type of crops planted on field or group of fields (Ouda, Zohry and Noreldin 2018: 7). Crop rotation can be a challenge with trees such as coffee, because they take longer time to bear fruit, along with limited land use area which makes it hard to farm different crops simultaneously that potentially could cover the economic loss of having to cut down the trees, harrow the soils and grow new ones. In his detailed and wonderful work on soybean production in Paraguay, Kregg Hetherington explains that monocrops are "fragile things" (2020: 28). The effort to create and cultivate monocrops, which are often genetically identical, "inevitably invites intruders that prey on these varieties and thrive in their midst" (ibid.: 28). This can be the beginning of a vicious circle, where challenges with pests requires the use of chemical pesticides, which in turn can make pests resistant to the chemical agents. This is one of the big risks in selecting, manipulating and modifying the coffee trees instead of looking at the complexity of relations in agricultural landscapes.

Dealing with Pests and Invasive Species

Like with many other monoculture farming systems, coffee is also prone to invasive species and pests.[27] Mark Pendergrast argues that in relation to devastating disease and pest outbreaks in agriculture, the real villain is monoculture (1999: 43). Similar to Hetherington, Pendergrast writes: "Whenever man intervenes and creates an artificial wealth of a particular plant, nature eventually finds a way to take advantage of this abundant food supply" (ibid.). However, coffee trees have a natural defense in their caffeine content, which has probably evolved as a natural pesticide against potential predators (ibid.). Nevertheless, just like coffee farmers have

[27] According to the Plant Industry Division of Hawai'i, the introduction of any foreign coffee plants to Hawai'i was prohibited as early as in 1888. Plants can only be imported form the continental U.S. and must be quarantined for one year. See https://hdoa.hawaii.gov/pi/pq/ (Accessed February 21, 2023)

specialized and optimized their production landscapes, bugs and fungi have gained a resource-abundant home in the monocrop coffee landscapes.

As with other coffee production regions in the world, Hawaiian coffee farming is faced with a few main challenges: the coffee borer beetle (CBB), the twig borer beetle (TBB), root-knot nematodes, and coffee leaf rust, or "rust". There are also other challenges such as green coffee scales. What separates the case of Hawai'i from other places, is that Hawai'i is the *last* coffee producing regions affected by these challenges. The CBB is very small and hard to find. One of the main ways of seeing if a tree has been affected by the CBB is to look closely at the cherries. If a cherry has a little hole in it, it is most likely been affected by the beetle. The CBB eats its way into the cherry and lay their eggs inside. Because the coffee cherries contain caffeine, their natural defense-mechanism, the CBB is relatively protected against other predators. The TBB is also very small. However, it is a bit easier to spot which trees have been affected by the twig borer. If a tree has been affected by the twig borer, the twigs of the trees will turn dark and leafless. In order to limit the damages that the beetles do, both the CBB and TBB beetle are combated by inoculating a fungus, *Beauveria bassiana*, (Posada et al. 2007).

The root-knot nematode was first documented in Hawai'i in the 1990's (Bittenbender and Nakamoto 2021).[28] On the Kona and Ka'ū plantations, they hybridize coffee trees in order to deal with invasive species and diseases whilst keeping the tasting qualities intact. One example I came across during my fieldwork was the grafting of coffee. Grafting of trees means to combine parts of two or more plants, usually the scion of one tree, with the rootstock of another (Bilderback 2014). On the Kona and Ka'ū plantations, they grafted Liberica roots with Arabica scions to battle the invasive root-knot nematodes. The Liberica roots are more bitter, thus less attractive for nematodes.

[28] Symptoms of root-knot nematodes have been described since the early 1900's, but without knowing the main cause.

Figure 6 Small holes/traces after the coffee borer beetle (circled). Photo by author.

Figure 7 A small circular spot of the "rust" at the Kona Plantation. Photo by author.

The rust is a fungus called *Hemileia Vastatrix* which grows on the coffee leaves which weakens and sometimes kills the tree (Perfecto et al. 2019). Hawai'i is the last coffee producing region in the world to be affected by the rust, and was officially documented and recognized by the Hawaiian Department of Agriculture (HDOA) in 2020 (HDOA 2020). The recent discovery of rust in Hawai'i causes widespread concern among the farmers, and according to Hawaii Coffee Association (HCA), the potential devastation of Hawaiian coffee could have severe economic impact on the state. The HCA argues that the coffee industry attracts tourists to local coffee festivals as well as Hawaiian coffee draws tourists to shops, cafes and agritourism (ibid.). I will return to the case of coffee rust later in this thesis. Because of the strict regulations on the import of crops, seeds, plants and more to Hawai'i, rust-resistant coffee tree varieties are yet to be introduced to farmers. Also, according to the HCA, "the best fungicides" are not approved for use in the state (ibid.).

Summary

In this chapter I have explored the emergent role of coffee, trade, coffee cultivation and its ecologies. An important aspect of the role of coffee in Hawai'i was that in the late 1800's, the cultivation of coffee in Hawai'i was an opportunity to get away from working on the sugarcane plantations and to gain a form of independence. Later, coffee farming became especially lucrative as the demand for Hawaiian coffee as a specialty blend rose. Now, Hawaiian coffee

is a well-known specialty coffee, whose low yield and high demand fuel the prices. However, the market has also created a higher demand for Hawaiian coffee which in turn has shaped the agricultural landscapes of coffee farming along with its practices. As with many other monocrops, the selection of genetically similar trees and farming practices has turned coffee farming to a simplified landscape which has rendered coffee trees vulnerable to pests and invasive species. Also, there is a paradox within the policies of the HDOA where there are restrictive and strict regulation on bringing new organic materials and chemical sprays to combat pests to protect agricultural production, as well as protecting Hawaiian nature in general. The same policies also make it more challenging to bring in possible solutions, or more resistant variants of plants, to combat pests once a disease outbreak has happened. These aspects of Hawaiian coffee production have impacts on the cultivation practices. The history of accelerated ecological simplification and plantation agriculture, along with an increasing crop vulnerability to diseases and pests as a result, I argue that the human-landscape relations is affected.

In the subsequent chapters of this thesis, I will delve into the practices of coffee farming, and how the farmers respond and relate to the landscape they cultivate in, and the challenges of invasive species and crop diseases. Throughout these chapters, I show how the landscape becomes a site of encounters between farming practices and the presence of nonhumans. I begin from the ground and up by taking soils in the farming landscape as the next starting point.

CHAPTER 6
- SOILS AND COFFEE FARMING

Introducing the Puna Farm

The Puna farm borders a native rainforest and the Kīlaeua and Mauna Loa volcanoes in the West, the seaside of Puna in the East and South, and the district of Hilo in the North. The area of the Puna farm was a previous sugarcane plantation field. The Puna farm was owned by Sebastian, one of my main collaborators during fieldwork. He was originally from the mainland, and does not have a background in farming. Sebastian was from "big corp" business[29], and moved to Hawai'i to be more "in touch with nature" and to get away from the career chase and pressure of a work-life balance in the city: the coffee farm was both his work and life now. There were two smaller house-structures on the property: the main house with an outdoor kitchen on the lanai, and a guest cabin where volunteers stay during periods when extra help is needed. The farm was "off-grid", meaning that there was no electricity nor plumbing system on the property. Water for laundry, doing dishes and similar came from rainwater which was collected from the roof of the main house. Drinkable water was bought on big dispenser, similar to those common in a waiting room at the doctor's office.

An important aspect of the farm was the history of the property. Before Sebastian had bought it, the lot had been vacant for years. As the farm was a previous site for industrial sugarcane production, most of the land had been considered barren due to industrial sugarcane plantations' excessive chemical input. This had depleted the soils, thus making it hard for both arable and pastoral farming. Soil conditions were one of the things that was recurrent throughout my fieldwork, and an essential component for Sebastian. In this chapter, I will elaborate on the importance of soil in the landscape and Sebastian's practices aimed at improving soil health.

[29] Sebastian used to the term "Big-Corp" as a reference for a highly regarded corporate job.

Hawaiian Soils

While soil was a recurrent topic during my fieldwork, it is important to separate the technical and vernacular perspectives of soil in relation to this thesis. In general, volcanic soils, or Andisols, are formed from volcanic ash and cinder deposits and is the most extensive soil order on the Big Island (Deenik and McClellan 2007). Volcanic deposits are enriched in elements such as magnesium and potassium and when volcanic rock and ash weathers, these elements are released, producing typically highly fertile soils (ibid.: 2). Andisols are also easy to cultivate. The combination of good physical properties, low bulk density, stable soil aggregates, good water holding capacity, and good drainage, and their naturally high organic matter content makes Andisols generally highly productive soils (ibid.). However, the aluminum and iron clay minerals in Andisols have a very strong capacity to adsorb phosphorus, one of the essential plant nutrients, and make it unavailable for plant uptake; this process is especially pronounced in the Andisols that occur in wet environments (ibid.). Additionally, the amorphous minerals that dominate volcanic soil can generate an anion exchange capacity when under acidic conditions and depleted in organic matter. Fertility problems may be corrected with additions of organic matter, lime or other fertilizers.

Histosols is another important soil order on the Big Island. Histosols develop from organic matters and consist of more than 50% organic material on the surface (Deenik and McClellan 2007: 3). Similar to Andisols, Histosols also have low bulk-density and good water-holding capacity (ibid.) However, in agriculture, the rapid drainage in Histosols can lead to leaching of added nutrients such as Nitrogen and Calcium (ibid.). Therefore, frequent and small dosages of fertilizer is considered a good practice.

Situated between two volcanoes, Kilauea and Mauna Loa, most of the Puna farm has a bit older soils than further southeast of Kilauea, but still very nutritious soils. This soil is rich in a number of key nutrients, allowing for an abundance of green growth in the Hawaiian Islands. Nevertheless, there is a distinction to be made between lava soils and ash soils. Specifically because of the lava flow history and volcanic eruptions on the Hawaiian Islands, in combination with rainfall and high temperatures, the combination of soils in Hawai'i are some of the world's most fertile, leaving the land lush and green. However, soil degradation is an increasing challenge in Hawai'i.

Soil Health and Degradation

The world is dependent on healthy soils as 95% of all agricultural products grow from soils (Food and Agricultural Organization [FAO] 2017). With one third of the world's soils classified as degraded (FAO 2015), the world's food production systems are put at risk and soil health have been given much more scholarly and policy attention. Soil scientist John Doran refers to soil health "as the capacity of a living soil to function, within natural or managed ecosystem boundaries, to sustain plant health and animal productivity, maintain or enhance water and air quality, and promote plant and animal health" (2002: 119). Moreover, soil health is also crucial for food production systems (Lehman et al. 2020: 544). In turn, soil health is linked the "One Health" concept in which environmental health, animal and human health are connected (ibid.). As mentioned, soil health in Hawai'i is closely linked to processes of deforestation[30] and the industrial planation systems. Plantation agriculture has affected the soils in Hawai'i in several ways, including soil erosion, fertilizer-related acidification, chemical pollution through application of pesticides, and topsoil loss (MacLannan 2014: 213-216). Nevertheless, there has been a lesson taught concerning agriculture in the post-plantation landscapes of Hawai'i: agricultural systems should consider the landscapes' features, such as topography and climate as well as the landscape histories. For example, during the sugarcane plantation period, land along the Hāmākua coastline, Hilo and Puna were cleared for the sugarcane production. Sugarcane was not particularly well-suited for the sloping volcanic, wind-facing and therefore wet climate. Top soils were exposed, and with high inputs of chemicals and the use of mechanical equipment combined with heavy rainfall, soils were depleted, washed out and/or left with high levels of toxins. With soil degradation also comes other forms of ecological degradations which was explained by one of my gatekeepers during fieldwork, Eva.

Eva had been working with soil, soil health and agriculture in Hawai'i for decades. She explained that one example of ecological degradation is the weed pressure from invasive species which presents a constant challenge for farmers, especially organic producers, but also

[30] Echoing the vignette in chapter four from the reforestation event in Kohala. Soils were severely degraded due to rapid deforestation of Hawaiian sandalwood trees. The lack of shade has dried out the soil, leaving the topsoil exposed and vulnerable to washouts. The planting of eucalyptus trees has also depleted the soil of nutrients, as well as leaving the ground around the trees partly toxic because of the chemicals in eucalyptus leaves.

ranchers statewide. Further, lack of on-farm biosafety measures[31] as well as environmental and anthropogenic factors can lead to a fast spread of agricultural pests that quickly change landscapes from healthy to infected or degraded. Eva's work involved the analysis of soil samples for producers and found that nutrient mismanagement is the most common problem affecting soil health and the productivity of crops. Climate-smart agriculture practices that focus on building soil health can provide ecological and economic resilience for agricultural communities throughout the islands and increase food system resilience. Some efforts are underway to promote such systems as a means to provide agriculture-based livelihoods and to regenerate soil health. For example, Eva explained how former plantation landscapes that are now used as pasture for cattle could benefit from improved grazing management and/or deforestation[32] in order to improve soil health. Eva also proposed targeted animal grazing as a method to improve soil health and microbial diversity, as the animals both graze on weeds as well as fertilizing the soil through their feces.

There is an encounter in the landscape in which the plantation histories and legacy meets the present and current farming practices. The condition of the soil impacts the ways in which people respond to soil health, and what practices they implement. Improvements in soil health takes time. For instance, on Sebastian's farm the heritage of a cane plantation is no longer visible to the blind eye, but the soil "remembers". The history of soil degradation, however unintentional it might have been, is affective as it has uncovered how past farming practices as pro-longed consequences. On the farm and plantations I did my fieldwork, there were several efforts in trying to improve soil health, and ways of talking about the relationship between soil and its wider impact of both cultivation, and the future possibilities for farming on the land and nonhuman life.

[31] Biosafety measures speak to the Cartagena Protocol from 2003, an international agreement to ensure safe handling (cultivation, farming), trade, use and transport of living organisms. See more: https://www.cbd.int/doc/press/presskits/bs/cpbs-unep-cbd-en.pdf

[32] Deforestation here was specifically targeted towards the large field of eucalyptus trees along the Hāmākua and Kohala coastline and region. Eucalyptus trees shed leaves which can be considered toxic for microbial life in the soil as well as for other plants.

Affective Soils

When talking about the relationship between soils, humans and the landscape, I refer to soils as affective. By this, I build on my theoretical framework, and mean that the soil have an ability to both affect, and to be affected. More specifically, in Hawai'i, soils have been impacted by human and multispecies activities such as intensive plantation agriculture, deforestation, and animal grazing. In some places, depleted and dry soils as a result of deforestation and conversion of land for pasture, over-grazing and weed pressure have created a landscape in which wild fires thrive. In turn, these soil condition have affected the ways in which people do agriculture and where. Degraded soils and declining soil health, along with the history of monocrop agriculture and industrial plantations have led to a resurgence of practices that are looking towards agro-ecological practices and Indigenous food production systems (see for example Lincoln et al. 2018; Lakhani 2022). But in what ways are soils affecting conditions for coffee farming practices in both the Plantations and the Puna farm?

To make sure that the soils do not become depleted, both the Kona and Kaʻū Plantations and the Puna farm have planted perennial peanut grass (*Arachis glabrata*). This perennial grass forms a solid groundcover and dense rhizomatic networks underground, and increases nitrogen levels in the soil (Sainju et al. 2003: 154). Even though the volcanic soils are rich with nutrients, people I talked with on the farms told me that it was also important to replenish it with nutrients. To implement perennials like peanut grass, also increases the microbial activity and diversity in soils (ibid.). Healthier soils and microbial diversity also lead to less erosion and soil runoff during heavy rainfall.

In Puna, the farmer, Sebastian, worked 24/7 in order to make the farm thrive. The size of the farm makes it a challenge for one-man job. He has occasional volunteers to help out, especially during mulching and harvest season from March to December. In mulching season, typically March-April, Sebastian has volunteers coming for a work-stay on the farm, and sleep in the annex across from the main house. Although the farm is relatively small, mulching requires heavy manual labor to move and distribute the mulch evenly. Apart from his own compost pile, which is made up by nearby soils, vegetation waste, unusable coffee cherries, cherry pulp, and food waste, Sebastian bought local mulch made of compost from the Puna district. In addition to perennial peanut grass and heavy mulching, he has introduced a "no-till" practice. On the Kona and Kaʻū Plantations, they typically used larger machines that drives through the field to distribute mulch and fertilizers.

One day on the Puna farm, Sebastian pointed to a line of seemingly dry, cut weeds that lay between the rows of trees. He kneeled onto the ground and lifted up a big piece of the dried weeds. Under the pile of weeds, there was a much moister and darker matter: a sign of organic decomposition. He told me that when he was "weed-whacking", he would cut the weeds and pile them so they would be easy to shuffle in between the row of trees. The weeds decomposed and entered the larger cycles of the farm ecology, contributing to the nutrient cycle, working towards better soil health and microbial diversity. I argue that this demonstrates a different practice of caring for the trees, because the goal is that soil recuperation eventually takes care of itself. In comparison, as I have described previously, the ground around the trees the Plantations had been completely cleared and was laid bare. As the Puna farm is a previous sugarcane plantation, I was curious as to if there were any benefits to farm there. Sebastian replied both yes and no. One of the benefits is that the land had already been cleared for farming, but that was pretty much it. Sebastian also said that during the plantation period, not much attention was paid to the use of chemicals in farming practices, and that the sugarcane plantations fertilized with harmful substances, leaving the soils full of arsenic. Because of this, he said, areas such as the Hāmākua Coast, Puna and Hilo, which were main sites for sugarcane production, had to be left fallowed for roughly twenty years before anyone could start farming safely again. Soil health and regeneration is key elements of coffee farming, but what are the relational aspects of soil and the landscape?

Figur 9 Perennial peanut grass (Arachis glabrata) on the Puna farm. Photo by author.

Figur 8 New coffee tree plantlings on the Puna farm. Notice how the ground around is barely cleared. Photo by author.

Social science research about soil has been increasing steadily as a response to pressing environmental issues, especially relating to agriculture and politics. Anthropologist Kristina

Lyons (2020; 2016) has explored Colombian farmers' relationship with soils. In the Putumayo region in Colombia, Lyons describes the potential in farmers' attunement to soil and farming practices as a form of "life-making process". In Putumayo, farmers are attempting to build sustainable livelihoods amid chemically degraded ecologies after being displaced from fertile areas of the Andean region through waves of the state's structural and armed violence against illicit coca production. The farming practices of Lyons' collaborators rely on decay and decomposition in the soil (Lyons 2016: 59). Lyons is especially concerned with the decomposition of leaves as compost, and the ways farmers cultivate their gardens, care for the forest and grow food in damaged landscapes, and the potentials that lie in the farmers' place-based sensitivities to practice. These "do-it-yourself" practices of decay and decomposition are also similar to those of Sebastian. In the process of soil regeneration, the landscape becomes the bridge for the possibility of future life. In these experimental farming spaces, there are myriads of multispecies entanglements, in which birds and bees are drawn to gardens (ibid.: 74). The soil is recuperated, and there is an emergence of microbial life as plants return and thrive (ibid.). Through Lyons' meticulous description of these practices, there is an approach to farming where *current* growing conditions is not the most important. Rather, it is the *future* growing conditions that matters the most, which also implicates the landscape as a whole. Lyons explains how soils and landscapes are interconnected, which becomes visible through practices of care that is oriented towards the future conditions of the landscape.

Environmental humanities and STS scholar Anna Krzywoszynska (2019) suggests that the obligation for soil care needs to extend to all actors in the system of agricultural production. She argues that in the face of ecological and resource crises, we need a new form of "eco-sociality", similar to Lyons' collaborators, "in which caring for human survival and well-being starts to implicate caring for the survival and well-being of non-human entities (Krzywoszynska 2019: 672). Krzywoszynska also advocates that farmers' power to act has been limited by state agencies' rationale and standardization of methods for keeping up productivity (ibid.). Krzywoszynska's example show how production and knowledge becomes separated from the landscape, and how people's connection to it can be severed. Similarly, Rob Nixon writes "[t]o an almost occult degree, production has become disaggregated from consumption" (2011: 41). Much of this is also true for Hawai'i. Even in Hawai'i, where most of the coffee is sold and consumed in-state, and where plantations offer guided tours as a part of the tourism industry, coffee becomes a commodity. As a commodity, coffee has always been separated from its form of cultivation, much like the trees have been separated from the soil, and the soil becomes separated from its complex vitality. HDOA policies and regulations limit what practices and

possibilities there are for cultivating coffee and emphasize productivity. Krzywoszynska and Marchesi call for an "understanding of soils as dynamic ecologies in becoming of which human beings are implicated, with whom they are shaped, and on which they depend" (Krzywoszynska and Marchesi 2020: 194). Again, Sebastian perspective on coffee farming is not in competition with the vitality in the landscape. Rather, his practices are about being attentive to the multitude of the farm ecology.

Soils in Hawai'i can tell multiple stories of the landscape: From the power of volcanic eruptions and the beginning of soils, to the microbial activity and mineral composition which allows for vegetation to grow and be cultivated. Soils can tell stories about the expansion of industrial sugarcane to fallow agricultural land, to over-grazed pastures in which wildfires potentially rage. These stories are simultaneously geological, socio-historical, political and economic. Soil conditions are result of a history of political economy, settler colonial extraction and farming practices. Engagement with soils in farming practices is an encounter which can evoke new perspectives of care in farming. I argue that these encounters are affective, and uncover relations between practices and the landscape, and between the human and nonhuman. Going back to Sebastian's farming practices, the compost pile, for example, became an important part for explaining Sebastian's perspective on the relationships between the soil and the trees, and his own relationship to the land, the coffee trees and the connections between the past and the present. As mentioned, if I picked unripe cherries, or if cherries were over-matured, unusable or dried out, I would throw them in the compost pile. Sebastian explained this as a circular movement of nutrition in which the cherries would be decomposed in the compost pile, and later used to fertilize the soil in the spring. The trees nurture the soil, and the soil nurtured the trees. The farm is Sebastian's livelihood, and he wants the production to succeed. At the same time, not only did Sebastian express a form of care and concern for the land, but also the life in the landscape: the plants, microbes and insects in the soil. The soil is where the coffee production starts, which is also composed by a form of multispecies complexity that needed attention. Next, I will explore animal-landscape and other nonhuman relations in the farming landscape.

CHAPTER 7
- A MULTISPECIES LANDSCAPE

Vignette

As I came out of the car, there was an earthy and slightly sweet smell lingering in the air. The rays of sunshine burnt against my skin, it was humid, and the air had a pressing dampness which almost made it hard to breathe. In the distance, I could hear cows bellowing and their bells ringing. Insects made their presence known by a constant buzzing. The sound of insects was ever-present, especially in the clearing after heavy rainfall. The land was lush and green, much like the rest of the Windward side of the Big Island. The drying hut was a few meters down the road from where my car was parked, and I could smell the sweet smell of fermenting coffee cherries. Some days, I could not help opening the door and take a deep breath, hoping to fix the smell of naturally dried cherries to my memory. Next to the drying hut was a small pile of compost. The compost was made up of leaves, soils, food waste and cherries picked too premature. I went to pick up my picking-bucket and lomi-stick[33] from the toolshed, which now seemed to be an automated task, even after such a brief period. As I walked across the grass towards the lanai of the main house, the two sheep stared at me while laying the shadow of a gunpowder tree[34] chewing grass. The sheep were quite weary of people, even Sebastian.

[33] A wooden stick shaped with a "hook" and modified with a rope with loops in them, to make cherry-picking optimal.

[34] A gunpowder tree is a trunk tree, native to Australia. It is considered a weed in agricultural land, and has a far-reaching root system which tends to dominate nearby plants for nutrition. The gunpowder tree is a common sight in the Hilo and Puna districts on the Big Island.

As I passed them, they got up, walked away slowly and disappeared into the rows of coffee trees I had harvested the week before. I could spot newly matured cherries in that section of the farm, and even though the farm was relatively small, the maturing was happening faster than we could pick. On the farm, there was also a small flock of geese. Unlike the sheep, the geese were far form shy. I had only been coming to the farm for just over week, so the geese were not entirely used to my presence just yet. On this particular day, I had to hit my lomi-stick repeatedly into the ground to keep the geese at distance, and to avoid getting charged. They came very close, but kept their distance, still hissing slightly and flapping their wings. My slight fear of birds was not exactly minimized during my time on the Puna farm - on the contrary - it had gotten a bit worse.

On the lanai, Sebastian's two cats were relaxing on the sofa in the shadow. Sebastian had just finished eating breakfast. He gave me a banana as I took of my shoes and came through the porch. After finishing the banana, I threw the banana peel over the side of the porch and could hear the feet of the geese step faster in the grass on the outside, rushing to get to the peel first. After the geese had gathered on the other side of the porch, Sebastian threw his mango peels over as well which seemed to create more fuzz in the other side. I closed my eyes and inhaled deeply: I could feel that this day would be long and hot. I was wearing a long sleeve viscose shirt and joggers to cover most of my skin, as well as a sunhat to shield my face from direct sun exposure. Unlike the other days, there was little wind and cloud cover that morning. Sebastian pointed east, and assured me that there would be some cloud cover later in the day, and perhaps some rain. I put my shoes back on, grabbed my bucket and lomi-stick and ventured into the southern field of the farm to start harvesting from a tree, top to bottom and clockwise, and moving onto the next. I heard bird song from the surrounding forest mix with the sound of cow bells,

buzzing insects and the noise from Sebastian weeding machine – all of which seemed to harmonize in a way.

Introduction

In this chapter, I explore the role of animals in Sebastian's farming practices, and his perspectives of nonhuman relations in the coffee farming landscape. The farm has about 1200 trees with plans to expand. In comparison, a larger coffee plantation on the Kona coast have about 19 000 trees. Hence, their operational requirements differ. As described in the vignette, the Puna farm was a site of liveliness in ways that the Plantations were not. The bellowing cows belonged to the neighboring farm, which surrounded Sebastian's property on the Northern, Eastern and Western side. In conversations with Sebastian, all animals on the farm had a purpose. As I spent many hours in the field picking coffee cherries, I noticed a wide range of different elements which sparked my curiosity. What makes that sweet earthy smell? What is the black soot on the branches of the coffee trees? What is the role of the animals on the farm? All of these things, and more, made me think of all the living beings on the farm, and the complex entanglements that emerge in the farming landscape.

Figure 11 Picking equipment: a bucket for cherries and a lomi-stick to get a hold of branches. Photo by author.

Figure 10 Inside the drying hut. Newly picked berries in the bottom part of the photo. Drying cherries on the back-tray. Photo by author.

Sebastian's practices are based on basic coffee farming knowledge as well as Sebastian's own "do-it-yourself" (DIY) experiments. While I focus mostly on the Puna farm, I will also draw comparatively on both the Kaʻū and Kona plantations.

The Role of Animals and Insects on the Farm

Admittedly, I was a bit surprised to see geese in the field. During lunch on my first day, Sebastian started to throw banana and mango peels off the lanai. I looked at him curiously, before he told me that the geese loved to eat it. It also helped to keep the food waste to a minimum, he explained. What is not edible for the geese was thrown into the compost pile. Furthermore, as the geese could show some aggression towards strangers, Sebastian said they could also be used as potential guards against other animals or intruders. However, there were only four geese on the property, which made it challenging to guard the entire grounds. The geese were also good foragers and grazed on weeds on the property. As they defecate, they also fertilized the soil. Moreover, they ate insects that could be potentially harmful for the trees. The geese also seemed to be a source of entertainment for the sheep, as the sheep sometimes would chase the geese around playfully.

When I asked Sebastian about the sheep, he told me he kept sheep on the farm mostly to graze weeds. Although grazing animals is a method for weed control[35], weeds grow at an enormous speed in Hawai'i, and I noticed that Sebastian spent most of his time weeding himself. Sebastian does not apply any herbicide to keep out weeds, as the sheep graze on them. Furthermore, he prefers the soils to be covered so that it is protected, and also root systems keeps the soil from being washed out during heavy rainfall. Like the geese, the sheep's dung also helps to fertilize the soil. Similarly, a study conducted on coffee farms in Mexico, also argues that introducing grazing sheep to the landscape can relief the farmer of some labor, as well as having positive environmental impact through improved soil health and microbial diversity (Dávila-Solarte et al. 2019). In conversation, Sebastian told me he used to have twenty sheep on the property, but they were simply too many, and did more damage than good by over-grazing and stomping the ground. Having too many sheep, Sebastian explained, put too much stress on the soil, and damaged the ground. Therefore he got rid of a majority of the sheep, kept two of them, and got the geese instead. The weeding is important because too much grass can attract unwanted fungus, such as the dreaded coffee leaf rust.

An interesting case was that of the feral pigs in Hawai'i. According to Sebastian, the presence of pigs in farms is a symbol of healthy growths. In general, healthy and lively soils make good conditions for earthworms, and especially the root-knot nematodes which can pose

[35] Over-grazing can be an issue as well. See for example the case of depleted soils in the reforestation event in chapter two.

a challenge to the coffee trees as they compete for nutrition found in the soil. Unlike the bigger plantations, Sebastian did not graft the coffee trees[36], because his farm was much smaller, and thus made some parts of the farm easier to manage although it was a lot of work for one person. The presence of nematodes attracts feral pigs to the farm. The first time I noticed the "crime scene" of feral pigs, I had no idea what it was. One day I saw patches of the ground were dug up and dark soil was scattered around the dig sites. I assumed Sebastian had dug a hole on the ground to plant new coffee trees. When I reached the lanai of the main house, Sebastian pointed his coffee mug to the pillaged soils that I had just noticed. While shaking his head, he said that the pigs always left such a mess, but that they loved the nematodes. Feral pigs love digging in nearby tree-roots because it is usually rich with nematodes – a delicacy for the pigs. What the pigs do, is that they dig into the soil around the trees in order to get to them. This leaves larger areas of around the trees exposed. In order to deal with the pigs doing too much damage, Sebastian considered getting a dog or two, since the geese obviously did not chase the pig away. The feral pigs have an interesting backstory in Hawai'i. It was first believed that the feral pigs in Hawai'i were descendants from domesticated pigs brought by settlers starting in the 1780's. However, newer research shows that most feral pigs descend form the populations introduced by the Polynesian settlements (Linderholm et al. 2016). Although it is hard to trace the damages pigs have caused to native ecosystems, new ecosystems have allowed feral pigs to be able to thrive with new sources of protein, such as earthworms found in coffee farms (ibid.), and other edible fruits, vegetables and plants domesticated by people in backyard gardens.

Sebastian also had two cats, which he admitted, were mostly for company. However, they also caught mice or mongoose. This was mostly nearby the houses on the farm, and not so much in relation to the trees themselves. The trees on the other hand, had a rich vitality of themselves as well.

Whilst the larger animals have their roles on in the farming landscape, there are also other critters that are prevalent on the coffee farm. On my first day, I was put immediately to harvest cherries after a short brief on the "how-to's" of picking cherries. Harvesting cherries only requires a bucket and perhaps a lomi-stick. Sebastian talked me through what color the cherries should have before picking them, how to use the lomi-stick and how to avoid damaging the trees while using it. Sebastian also told me that I should be wearing long sleeve shirts and full-length pants to avoid the little fire ants. The fire ants became one of my personal nemesis when

[36] See chapter five for an explanation of grafting trees.

picking in the fields. Although the lomi-stick helped with avoiding touching the stems of the tree, the fire ants have bad grip, and would fall of the stems if the branches were to move too abruptly. Inevitably, the ants found their way to my skin. Most days, my wrists, forearms and neck would be stinging with the bites of fire ants, and the sting would linger for days.

One time during lunch, while scratching myself like crazy, I asked Sebastian about the ants. He explained that the ants, the little red fire ants, were common in tropical climates, and especially on farms. In coffee farming, the ants enter a symbiotic relationship with other invasive species on the coffee trees, such as the coffee leaf miner (*Leucoptera cofeella*). Sebastian continued, and explained how the leaf miners eat away the sap of the leaves, causing honeydew to be produced. The ants love the honeydew. Also, *Capnodium*, a fungus, almost pitch black and sooty in texture, thrives in the presence of honeydew. While this fungus is not harmful in its own right, the covering of leaves could eventually lead to the hindering of photosynthesis which could have fatal effects on the trees, the cherries and all the species which thrive on and with the trees.

Figure 12 Unripe coffee cherries, covered in Capnodium. Photo by author.

The little red fire ant (*Wasmannia auropunctata*) is native to South America (Big Island Invasive Species Committee [BIISC]) and was most likely carried unwittingly to Hawai'i together with plant nurseries. As the ants thrive in the coffee trees, they also interfere with the

daily life of the green anole lizards. Green anole lizards (*Anolis carolinensis*) normally eat the coffee leaf miner, but the presence of little fire ants interacts negatively with the lizards and shields the coffee leaf miner. This is also supported by Ivette Perfecto's and colleagues' (2021) work in Puerto Rico, where they argue the same. They also explain how the coffee leaf miner can be shielded from other natural predators when pesticide application reduces the leaf miners' other natural enemies (ibid.: 107104). When the coffee leaf miner thrives, so do the ants, which in turn keeps the lizards away, allowing the coffee leaf miner and ants to proliferate together. However, the little fire ants can also be helpful for coffee farmers. The little fire ant is a natural predator of the coffee borer beetle (CBB), one of the biggest challenges for coffee farmers worldwide. The CBB was described as especially "pesky" as it eats away the actual coffee cherry fruit and the mucus around the coffee bean in order to lay its eggs. Because the CBB lays its eggs inside the coffee cherry, which is very high in caffeine, it remains relatively safe from predators as there are few "caffeine eaters".[37] There were traces of the CBB in both the Kona and Kaʻū plantations, as well as the Puna farm. Traces of the CBB were hard to spot, but small holes, almost like pores, in the cherries reveal the infection of CBB.[38] On the Puna farm, I experienced that when picking a CBB infected cherry, the cherry would crack easily and you could see the beetle inside with its eggs. Also, cherries who appear 'soggy' or a bit dried out would often be the result of the CBB.

For the naked eye, a coffee tree might just be a coffee tree. The coffee cherry might just be cherry. However, working closely with the trees one encounters the effervescent life that the trees have; for better and for worse. There are also multiple histories, narratives, relations and practices that go into the cultivation of coffee. Although coffee farming is faced with many challenges such as feral pigs, the CBB and little fire ants, I am reminded of what Sebastian told me: that every farmer wants a healthy farm, which also implies that the farm becomes a livable place for other forms of life. I argue that these are affective encounters which uncovers various relations: relations of global movement, as these species are non-native, relations beyond the productive, and that ecologies have lives of their own beyond human control. In the coffee farming practices I engaged with during fieldwork, there was a constant balance between control and care, and the balance of what is "healthy" and what is "diseased" or "infected".

[37] Caffeine is considered a chemical defense from herbivory species.

[38] See figure 6, chapter five.

Ecological Relations

In her article about multispecies relations in oil palm plantations in Indonesia, anthropologist Sophie Chao (2021) writes about ecological forms of mutualistic alliances and parasitism. Both forms are part of an emerging ecosystem within the plantations. Chao writes that monocrop ecologies emerge as dynamic, lively and complex realms of multispecies collaboration and frictions (ibid.: 478). Similarly, Eben Kirksey writes that emerging ecosystems are partially due to "entrepreneurial plants, worms and other animals generating their own multispecies communities" (2015: 195). This is exactly what the ants, lizards, pigs, nematodes and CBB do on the coffee farms: the coffee leaf miner releases honeydew from the trees, which the little fire ants love. Whilst lizards are a natural predator of the coffee leaf miner, the presence of ants protects the leaf miner from the lizards. The honeydew also facilitates for the sooty black fungus to grow. Although the ants might seem like the arch-nemesis of both the hungry anole lizard as well as the coffee farmers, the little fire ants are predators of the CBB. These beings are "entrepreneurs" of the possibilities that the coffee trees offer, often evading the human intention of control. What the coffee farm is, is both a site of production for coffee, and also a site of possibility for other species to flourish. The landscape is the arena for both human and nonhuman activity, and it is important to consider the affective dimensions of these presences, and what they evoke. Ironically, unwanted pests benefit from the simplified ecology that monocrop agriculture facilitates for when not kept at bay. Apart from the parasites of coffee trees, the relationship between the coffee trees and some of the insects and animals found in the coffee trees can be considered as "mutualistic relations"[39] (Chao 2021). Chao writes about mutualistic relations and describes how such relations work *within* the logic of simplified agricultural ecologies (2021: 483). By drawing on Kirksey's and Chao's exploration of the entanglement of agricultural logic of monocrops with entrepreneurial multispecies communities, I suggest that this is an example of how encounters uncover relations. This is an encounter caused by different agents, which forms an emergent relation between the human and

[39] Similarly Donna Haraway (2003) writes: "'Companion species' is a bigger and more heterogeneous category than companion animal, and not just because one must include such organic beings as rice, bees, tulips, and intestinal flora, all of whom makes life for human what it is - and vice versa" (ibid.: 15). As a term, companion species bring together the human and nonhuman; nature and culture (ibid.: 4). However, I do not necessarily agree with Haraway that companion species brings *together* the human and nonhuman. This does not mean I intend to uphold a nature/culture dichotomy, but that it is more an issue of togetherness versus interconnectedness.

nonhuman. As Anna Tsing writes, humans are shaping entangled multispecies complexities "when our living arrangements make room for other species" (2015: 22). These multispecies connections emerge in farming landscapes that are at once political, economic, social and cultural; shaped by decisions, movements, flows, knowledges, peoples and agencies of "entrepreneurial multispecies communities" (Kirksey 2015: 195). These landscapes are affective, in which human and nonhumans become both symbolically and materially involved in each other's lives (Chao 2021: 485). Encounters between peoples, insects and animals form part of an affective landscape in which multiple histories, agencies, and practices of care and control are taking place – all of which evoke new knowledges and ways of "being-in-relation" (Pina-Cabral 2007).

Human and Multispecies Landscapes

In agricultural production, such as coffee, Kirksey explains how the commodification of crops leads to asymmetrical relations (2015: 146). In this asymmetrical relation, what is grown on the land is severed from the landscape in which it is produced, thus becoming something else – a commodity. However, this is not entirely consistent with my fieldwork.

Michael, one of the workers on the Kona plantation, told me that "the coffees" are like people.[40] He explained that too much sun causes the trees to stress, and they get sunburned, just like humans. He continued and told me that they need the mid-day shade the Kona weather provides. Michael said that many of the trees were also the same age as himself, and as we were walking through a row of coffee trees, he continued to share his thoughts on working on the Kona Plantation. He explained that he felt like he "shared a kinship with these trees," and that he did not only come to work at the farm, but also to "grow together with the trees". When he would tend to the trees, either by spraying, pruning or weeding the ground, he considered himself as a caretaker for the trees. Furthermore, Annie and some of the other workers on the Kona Plantation, also referred to the coffee trees as people. Annie said that the trees are just like people: "like us, they need their minerals," and listed several essential minerals such as potassium, calcium and more. However, there were a few key distinctions between the narratives form the plantations, and Sebastian's perspective on coffee farming. When talking about the landscape and how the plantation used to be a macadamia nut farm, production and

[40] This can be perceived as a form of anthropomorphism.

profitability was in center. For Annie, Michael and the Kona plantation owner, the switch from cultivating macadamia nut to coffee was unquestionable, and necessary to meet new and emerging market demands. Michael also described how the coffee cherries were the most valuable things on the plantation. While seasonal workers were huddled together in bunk beds, the cherries got to lie in the only air-conditioned room on the property to ensure that the end-product would be prime. People I talked with on the plantations, like Michael and Annie, were indeed most concerned with the coffee production and "the coffees". Nevertheless, the trees were not severed form the landscape, and there was a form of tending to and talking about the trees that was not solely about a commodity.

The Puna coffee farmer Sebastian's focus was the landscape altogether, not only the trees or cherries. Sebastian was faced with many of the same challenges as the plantations, but he expressed a form of responsibility to the landscape and not only the trees. Sebastian was more concerned with taking care of the landscape as a whole, by turning his attention to what the soil, trees and other critters needed. Whilst the plantations were concerned with keeping what they considered to be unproductive for the coffee trees out of the plantation area, Sebastian expressed an urge to tend to the landscape and to restore vitality from the soil, to the trees and the coffee cup.

Care for the Landscape

The aforementioned examples can speak to different forms of care. In their book *Care in Practice* (2010) Annemarie Mol, Ingunn Moser and Jeannette Pols write about care practices as including technologies (ibid.:14). In the case of coffee farming, practices such as the grafting of trees, composting, chemical spraying, and animal gazing could be examples of such technologies. Mol, Moser and Pols try to dissolve the assumed tension between technology, and that technologies do not work or fail in and of themselves. They propose that technologies depend on care work. They explain that care is embodied and based on experience, and not an innate human capacity (ibid.). They conceptualize "good care" as "persistent tinkering in a world full of complex ambivalence and shifting tensions" (ibid.). I argue that this speaks to my fieldwork experiences, and an affective landscape which evokes a form of care work.

The relations on the farm are complex and diverse. Sebastian's perspective on the relationships between the landscape and the trees are deeply embedded in history, care and the affective relations between humans and the landscape. This is also about a form of multispecies

care, in which Sebastian dreaded to spray the coffee trees because he deeply cared about the landscape, and its vitality. STS scholar Vicky Singleton writes that "[g]ood farming emerges as embodied, located, collective, responsive practices that are crafted by care rather than control and that remain in tension with the effects of the system that dreams of control" (Singleton 2010: 252). The plantations in Kona and Kaʻū focused on the coffee product and specifically on the trees themselves. For example, in combating the coffee berry borer, the Kona and Kaʻū plantations used Botaniguard, which contains a specific kind of mineral composition which sticks underneath the beetles' bodies, blocking their airway system, eventually causing them to die. In a conversation with people at the Kona Plantation, I was curious about their perspective on the mass death of the beetles. Most of the workers said that when the beetles fall and die on the land, they become nutrition for the trees. In their eyes, instead of harming the coffee trees, the beetles could fuel the soil with their dead bodies. Although they talk about taking care of the landscape, they take lightly on the "necessary labor of killing" (Kirksey 2015: 219), and to "poison the pest, and fertilize the crops" (ibid: 218). Also, in the talk about switching crops, both Annie and the Kona Plantation owner were adamant in that switching form macadamia nut to coffee was necessary in order to meet the demand of Hawaiian coffee and to not be economically affected by the decline of demand of macadamia nut. Furthermore, when talking about coffee trees, and Kona Coffee as a commodity, Michael and Annie told me that they were in the process of planting Gesha coffee trees, because of the higher market value. They explained that Gesha coffee was "on the radar" in the consumer-end of the market, and that it would increase revenue.[41]

In contrast to the Kona Plantation, Sebastian placed emphasis on his relationship between the landscape and the coffee trees. As Singleton describes from her research, caring practices are series of daily routines which are accompanied by considerable knowledge specific of the farm, the land and what one grows or raise. Sebastian built some of his practices on the history of the landscape in which he talked about "the land 'remembering'" the sugarcane plantation era. The history of the landscape, not only in Puna but Hawai'i more generally, also made Sebastian hesitant to apply chemical input. In a way, the landscape itself was affective,

[41] A more pragmatic approach can also be taken here. Since the Plantation is the working place and home for many people, there is also a different form of responsibility in terms of wages and providing a roof over their heads. Nevertheless, most of their employees are volunteers from the mainland. During harvest season, they have migrant laborers from Central-America who are paid per pound of cherry – meaning that the Plantation always make sure that they can make a profit.

and guided Sebastian's farming practices. Instead of severing the relationships between the trees, the animals and the soil, his focus is on the ecosystems and the possibility of learning with the emergent ecologies – a landscape of potential.

Sebastian was trying to manage the farm by introducing animals as actors, or "workers", in the farming landscape. In this way, The Puna farm was in contrast to the Kaʻū and Kona Plantations. Whilst the larger plantations were almost devoid of insect and animal life, the Puna farm was a lively multispecies landscape with domesticated animals, the occasional feral pig visitors, root-knot nematodes and insects. These animal relations work with the landscape: the geese and sheep maintain it by grazing as well as fertilizing the soil, which in turn improves the soil biota and the presence of earthworms, which again attracts feral pigs. Sebastian expressed a concern for the feral pigs, but also a form of gratitude. He explained that the feral pigs are only attracted to the farm because the farm was healthy, which was something he was proud of. The encounters and presences of animals and insects are affective in the way that they influence the ways in which people engage with the landscape. In conversation, Sebastian explained that as long as he left the landscape in a better condition than it was when he arrived, he would consider himself a successful farmer. I argue that this is a form of situated practice care which has emerged in the context of encounters between peoples, histories, and multispecies presences in the landscape. To continue the exploration of encounters and affects in the coffee farming landscape, I will shift the focus to the coffee trees themselves and the outbreak of coffee leaf rust.

CHAPTER 8
- ENCOUNTERING COFFEE LEAF RUST

Vignette

"You never know what will go into the trees and the fruit", Sebastian said. He was referring to the use of fungicide, and his reluctance towards spraying fungicide on the trees to prevent the further spread of the coffee leaf rust. Sebastian told me that the case of rust this season (2022) was especially bad. Before the 2022 harvest season, there had only been a few reported observations of rust on Hawaiian coffee farms and the outbreaks were well-contained. It was everywhere now, he said. As I had been picking coffee cherries for over two weeks, I had noticed the rust on the leaves of several trees. In some of the trees, the orange, rust-like colored powder had been glaring back at me in stark contrast with the green coffee leaves. In the northeastern part of the farm, the rust had almost become abundant. As I was picking cherries every day, moving from tree to tree and in physical contact with them, I was worried that I was contributing to the spread of rust. I asked Sebastian if there was anything I could do to prevent the rust from spreading through my movement in the field. Sebastian told me to keep picking as usual, and that if the rust had already infected the trees, the damage was already done. He said that the winds would continue to spread the spores of the rust to more trees, regardless of how careful we would be while picking cherries. It was just about picking mature cherries as fast as possible, so that the others would ripen faster. At the end of the day, my joggers and shirt had traces of orange spores smudged on the surfaces.

Figure 13 An example of an infected tree on the Puna farm. Here one can clearly see the orange-powdered spores. Photo by author.

A week later, Sebastian had gone to a local coffee mill to roast parchment coffee to sell at the local farmers' market. He returned from the mill with newly roasted beans, which filled the air with an incredible scent. The powerful smell of roasted coffee beans became mixed with the sweet smell of fermenting coffee cherries, decomposing weeds and the compost pile. However, as he stepped out of the car, Sebastian looked distraught. He came over to the *lanai* and shook his head. He explained that one of his coffee farmer colleagues who farmed a few kilometers away had decided to cut down almost all his trees after this season's harvest because his trees had been severely infected with the rust. Sebastian looked anxious. His friend had planted the Gesha coffee tree, because of its assumed higher resistance to pests such as the rust and its higher market value. Sebastian told me he was worried, as the rust was posing an increasing risk for coffee farmers' livelihoods now that even the more resistant varieties were becoming infected. The farm was his livelihood, his home, his passion and his legacy. It was his way of life. He told

me that the thought of having to cut down all of his trees was devastating. Nevertheless, he was still reluctant to spray the trees with fungicide to beat the rust infection. Sebastian also said that the fungicide in question was not even documented to have a good effect on the rust. Sebastian could apply several measures to prevent the spread of the rust. But regardless of how many measures implemented, the rust is still a fungus, and the spores could spread like wildfire through the farm and devastate the trees. Sebastian took the bags of roasted coffee beans inside. I took my bucket and lomi-stick and went back into the field of coffee trees to pick more cherries. It might be the last season for a while if Sebastian must cut down the trees after this year's harvest.

Emergence of Coffee Leaf Rust

Much like the emerging case of coffee leaf rust in Hawai'i, rust has a history of devastating farmer livelihoods as well as impacting the price of coffee worldwide.[42] Before 2022, the coffee leaf rust was not a big issue in Hawai'i. However, in 2021, Hawaiian coffee farmers began talking about the orange, powder-like fungal disease affecting their coffee trees, and coffee leaf rust was confirmed on all coffee producing islands in Hawai'i. The source of the rust outbreak in Hawai'i is still not known. The ruling hypothesis is that the invasive fungus was introduced via already infected coffee plants or accidentally carried with clothing of people travelling from the Caribbean or Central America (Ramírez-Camejo et al. 2022). Research also show that the rust genotype is similar to the "big rust" epidemic outbreak in South and Central America in 2012 (ibid.: 8). Although the outbreak of rust is relatively new for Hawai'i, the rust has a long history within commercial coffee production.

The rust is believed to originate from Sri Lanka in the 1860's (Clarence-Smith 2003: 102; Ramírez-Camejo et al. 2022: 2). Although the disease does not necessarily kill the coffee trees, the quality of the beans and yield is severely impacted. Also, Arabica trees were notably more infected than other varieties such as Robusta and Liberica[43], and the effects and responses varied across regions (ibid.: 103-105). What facilitated the outbreak of rust is also debated but there are a few key indicators. Firstly, rust outbreaks are considered to be most severe in older coffee tree groves where Dutch coffee farmers in Indonesia found that young trees in already coffee cultivated areas were highly susceptible (Clarence-Smith 1994). Secondly, soil health and types also had an impact on the severity of rust outbreaks, in which exhausted soils made trees more vulnerable (Clarence-Smith 2003: 105). So-called "virgin soils" of recently cleared forest areas were found less impacted (ibid.). Thirdly, lack of shade trees has been a documented trigger for rust (Clarence-Smith 2003: 106; Perfecto, Jiménez-Soto and Vandermeer 2019). The deforestation and removal of shade trees in coffee farms was initially done in order to combat the coffee leaf rust. Because it is a fungal disease, the spores need dewdrops to germinate and shade trees facilitated rust's proliferation by creating more humid conditions (Perfecto et al.

[42] Although the farmers I talked with during fieldwork were mostly concerned with a "healthy" farm, farming was also their livelihoods and dependent on the production of coffee. I am not aiming to portray some "ecotopian" vision of Hawaiian coffee farming. It is important to also be representative to my interlocutors, whose intentions are not only to care for the landscape, but also to some form of income.

[43] Robusta and Liberica variants were, and are, less in demand by consumers because of taste preferences. This also leads to the continued cultivation of Arabica varieties.

2019: S243). However, the lack of shade trees has probably made it easier for the fungal spores to spread more easily through winds. Ivette Perfecto, Estelí Jiménez-Soto and John Vandermeer (2019) have explored how the outbreak of rust in Mexican coffee plantations could be a result of oversimplified landscapes more generally. They argue that it is not the fungal infection per se that devastates coffee crops (ibid.: S244). Instead, they argue that it is the longer process of material relations and agricultural practices which has facilitated the conditions for the proliferation of coffee leaf rust (ibid.). By drawing on the history of coffee farming practices, they argue that coffee leaf rust is partially caused by deforestation and the lack of shade-trees (ibid.) The lack of surrounding trees and shade causes lower-level wind spurs, which can be a very plausible reasons for the spread of coffee rust (ibid.). Whilst the rust is thus most likely to settle in larger coffee plantations with little biodiversity, lack of shade-trees, and high input of chemical fertilizers, herbicides, pesticides and fungicides, the rust can spread more easily to smallholder farms through winds (Perfecto et al. 2019; Tsing, Mathews and Bubandt 2019: S186). Based on what the coffee leaf rust needs in order to germinate, grow and spread, the conditions for rust in Hawai'i are near optimal: large-scale deforestation and lack of shade trees, poor soil quality, and older agricultural lands. The high-standing reputation of Hawaiian coffee, Kona Typica, an Arabica variety, also makes farmers hesitant in changing coffee tree variants that may be more resistant. The reputation and (local) market demand for Hawaiian Kona Typica combined with legislation that makes it challenging to introduce new species to Hawaiian agriculture, the coffee leaf rust becomes especially challenging to handle.

In dealing with the rust, there is a considerable difference between sizes and operations of coffee farms and plantations. Larger coffee plantations with thousands of trees and capital have a lot more resources in containing the spread of the rust. They can also stump infected sections of their plantations, while continue to produce coffee cherries on the other. Second, their properties are often a lot larger in size, hence larger profits, and they are also prone to use chemical fungicides as well. However, the instruction manual and label of the chemical fungicide approved for use in Hawai'i can be frightening. Larger plantations use seasonal labor, sometimes young volunteers from the mainland U.S., and for the picking season, plantations are known for recruiting Central American migrant workers, which was also the case for both the Kona and Kaʻū Plantations. These are also the people who are mostly given the task of fungicide application. In sum, there are indicators implying that it can harder for a smaller farm to handle an outbreak of coffee leaf rust.

Managing Coffee Leaf Rust

Because the rust usually thrives in warm and wet climates, the drier climate conditions has left the Kona Coast relatively at bay from the infections but infected, nonetheless. As both the Kona and Kaʻū plantations were affected by the rust, they try to handle the outbreak through a number of measures. First, they put small collars around the trunk of the tree, and to make sure no weeds get too close to the roots of the tree which can lead to increased humidity and in turn increased germination of rust spores. This was also one the reasons the ground around the trees on the plantations were bare. Along with the plastic collars, effective weeding also helps with tree nutrition as the trees do not have to compete with other plants for nutrients. Second, distance between trees is important as well as pruning the trees vertically. Distance between the tree plantings and pruning give more air between branches and reduce humidity. These practices also prevent branches from having physical contact. However, spores spread easily through winds. Third, and the most aggressive solution is to apply a fungicide. Nonetheless, if a tree has been infected, chemical spraying has little documented effect and must be applied thoroughly on all trees. Altogether, researchers at the College of Tropical Agriculture and Human Resources at the University of Hawai'i encourage close monitoring of the trees, and physically removing infected branches and leaves, and potentially stump the trees to contain the spread of a rust outbreak (Kawabata 2021).

As mentioned in the vignette in this chapter, the rust had become quite severe on the small farm in Puna. Because the farm is located on the windward side, the climate is more than in Kona and Kaʻū. The rust thrives in humid environments and is dependent on humidity to be able to germinate and evolve. Because of the increased cases of rust on the Hawaiian Islands, including Sebastian's farm, he considered to start spraying. I asked if he was worried if that would have negative impact on the trees, soils and ecology, to which he replied no. He said that he was considering using a contact fungicide[44] with very little harmful chemicals, even though it is not 100% organic. He mentioned copper and nickel as two main ingredients to battle the invasive fungus, but that the amounts were not significant enough to do any big damage to the trees or the farm ecology at large. Because of the sum of efforts he put into building a healthy farm, Sebastian argued that the soils were better prepared for handling the small dosages of copper and nickel which exists in the fungicide.

[44] Contact fungicides must be applied *before* infection.

The Issues with Chemical Application

There are political and economic aspects in the application and distribution of chemicals control agents. In Hawai'i, the regulations concerning the distribution of chemicals is very much based on the perspective of conservation, in the fear of damaging remaining native ecosystems, or in making plants resistant to chemical agents. Until 2021, only contact fungicides were available for Hawaiian coffee producers. Now, there is only one approved locally systemic[45] fungicide for combating the rust. The fungicide Priaxor Xemium was accepted under an Environmental Protection Agency Section 18 Emergency exemption. Yet, to read the instructions and warnings that accompany Priaxor was daunting. Applicators and any other handlers must wear long-sleeved shirts and pants, shoes and socks, chemical-resistant gloves made of barrier laminate, face mask with approved standard as well as eye-wear.[46] Furthermore, if a farmer intends to use Priaxor, they must notify the HDOA at least seven days beforehand. The fungicide can also only be applied via manual spraying. Priaxor also comes with several risks of environmental harm: groundwater pollution, toxic to water organisms such as fish and invertebrates, as well as "having high potential for reaching aquatic sediment via runoff for *several months or more* after application".[47] Along with these warnings, the fungicide should only be used when there is little chance of rainfall within the next seven to ten days, no temperature inversions or in slope landscapes to reduce the risk of runoff (ibid.). This makes it challenging to apply on islands' windward sides as they get frequent rainfall. Also, solvent naphtha, a component in Priaxor, has had carcinogenic effects with animals and could potentially lead to skin tumors. The latter poses a particular risk as cherries are harvested by hand.

Evidently, there were many elements that argue against this chemical application of fungicide on coffee trees in Hawai'i. Both human health and ecosystem health are put at risk with the application of Priaxor, and contact fungicides are only a preventative measure. Furthermore, with the sloped hills of Kona and Ka'ū coffee plantations chemical waste runoff becomes inevitable. But what are the alternatives?

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[45] Locally systemic fungicides are absorbed into the plants and can sometimes combat fungal diseases *after* infection.

[46] From instruction label:
https://www.hawaiicoffeeed.com/uploads/2/6/7/7/26772370/priaxor_section_18_label_2022_final.pdf

[47] From instruction label, my italics:
https://www.hawaiicoffeeed.com/uploads/2/6/7/7/26772370/priaxor_section_18_label_2022_final.pdf

Tree Cemetery in Kaʻū

In Kaʻū, there had been a rampage of coffee leaf rust. The fields were located in a steep hillside on the southern slopes of Mauna Loa. The weather was a bit gloomy yet humid. Like the Kona Plantation, the ground around the trees is cleared, leaving the top soil exposed. The Kaʻū Plantation is much larger than the Kona Plantation, almost double in size. When I first arrived to the Kaʻū Plantation, I initially thought the property surrounded a cemetery – a rather bizarre conclusion. Deceivingly, on a closer inspection, it turned out be a vast field of stumped coffee trees that had just about started to regrow. From afar, it might as well have been a cemetery, and in some ways it still was. In the center of the stumped coffee trees stood an acacia tree. The large section of stumped coffee trees was done in an effort in trying to contain a coffee leaf rust outbreak. In retrospect, the number of stumped trees in Kaʻū was probably close to the total number of trees on the Puna farm. A large plantation like the one in Kaʻū has the economic capacity to actually stump a vast number of trees, and still make a profit.

Figur 14 Close-up of a stumped coffee tree. Photo by author.

Figur 15 The acacia tree surrounded by stumped coffee trees in Kaʻū. Photo by author.

Knowledges and Practices

As described, the practices, limitations and knowledges about coffee leaf rust are varied. Possibly, some of these practices also makes it more plausible for future coffee leaf rust outbreaks to occur. For example, as explored by Isabelle Hugøy and Cecilie Vindal Ødegaard

(2019), chemical application in coffee farms is only meant to be short-term. Based on ethnographic fieldwork with coffee farmers and agronomists in Costa Rica, Hugøy and Ødegaard argue that chemical control of the rust outbreak is met with skepticism, just like my experience with Sebastian at the Puna farm. Hugøy and Ødegaard also explore the differences between "technified" knowledge, scientific management, and other farming practices. In their article, they show how other farming practices were informed by different ways of relating to the environment, the landscape and a response the agro-industrial logic. Much like Sebastian in Puna, some of Hugøy's interlocutors also expressed their concerns regarding chemical application, and how the trees could grow resistant against fungicides, be less sustainable, and seep into the soil and "sterilize the earth by 'stealing' its nutrients" (ibid.: 14). Nonetheless, chemical application is promoted as one of the best ways of combating the rust outbreak along with preventative measures. What partially makes the rust outbreak in Hawai'i less manageable, are strict agricultural regulations. As mentioned, rust resistant coffee tree varieties have to be approved by the HDOA before it can be introduced to the islands. Also, the methods and processes of shipping, containing and distributing new coffee trees is long. Furthermore, introducing rust resistant coffee trees also pose the danger of the rust adapting to new conditions, and also infect new varieties. The limitations put forward by the HDOA, especially regarding new species introduction, fungicides and other chemical agents in Hawai'i, are somewhat well-meaning. Protective policies and restrictions are informed by the history of ecological alteration in Hawai'i, and the attempt at conserve and restore the islands' ecologies and biodiversity. This also speaks to how landscapes are affective on a political level, in which a policy of increased conservation and restoration of native ecologies is a response to the history of ecological degradation and landscape transformations on the islands.

Yet, livelihoods are at risk from being eradicated by the orange-powdered spores, and the simplified agricultural landscape gets some of the blame. The coffee farms are mostly monocultures which means that they are farms with identical trees. In turn, identical trees are more susceptible to rapid spread of diseases, and there is a fear that diseases also could spread further to other trees or plants.

Simplified Landscapes and Intensified Production

For Sebastian and the workers on the Ka'ū and Kona plantation, it is important that the trees are healthy and productive, and the "daily running's" of the farm is always in center. However,

large-scale monocultures have been named as a symptom of a larger political economic agenda (Chao 2022).[48] Regarding the plantation as a system of production, anthropologist Alyssa Paredes writes that the plantation "has become a landscape of political *impossibility*" (2016: 1, my italics). Through her work on banana plantations in the Philippines, Paredes refers to the plantation's industrial mode of production and scientific management which has led to large-scale ecological harms as well as threatening lifeways (ibid.: 1). Scientific management of agricultural landscapes is also something political scientist and anthropologist James Scott describes in his benchmark volume *Seeing Like a State* (1998). In this book, Scott argues how industrial agricultural landscapes needed to be easily managed, measured and homogenous thus requiring simplification (Scott 1998: 11). He draws on an example of forestry, showing how the landscape was shaped in a way that was easy for managers and states to control through scientific methods and perspectives (ibid.). Intensified agricultural production has promoted a simplification of ecologies and landscapes to the border of the extreme. It is in these simplified landscapes, feral entities emerge.

Feral, or the concept of ferality, "describes a situation in which an entity, nurtured and transformed by a human-made infrastructural project, assumes a trajectory beyond human control" (Tsing et al. 2021). In their digital volume, Tsing and colleagues argue that certain infrastructures, such as the radical simplification of ecologies in industrial monocrop also brings radical shifts in ecologies' function (ibid.). In such shifts, it is not the feral proliferations that are a challenge per se, but the challenge these feral proliferations potentially pose to the capitalist logic of production. In the words of Anna Tsing, ferality is unavoidable (ibid.). Through the spread of coffee leaf rust, Hawaiian coffee landscapes become sites of encounters between plantation history, global political economy, flows of peoples, species and commodities, which affect human-landscape relations. Nevertheless, in changing direction from these descriptions, I have found that the coffee farming landscape could be a place of possibilities and potential. It is in the encounters between the monocrop agriculture, and feral proliferations, such as coffee leaf rust, that new practices and relations emerge. I argue that

[48] The difference between a farm and a plantation has not been made clear. A farm can be many things, but the plantation has a more contentious historical connotation (see Mintz 1985; Chao 2022). In short, whilst farming has historically been regarded in relation to subsistence (and now more production), plantations are large-scale operations of a single "cash crop", often implicating the displacement of peoples, plants and animals in the process.

there are possibilities for new ways of viewing and managing landscapes, through relational practices of the human and nonhuman, and new knowledges.

Living with the Feral

Spores have their own ways of moving through and with the world. Going back to Hugøy and Ødegaard's article about coffee rust in Costa Rica, coffee farmers similarly talked about the rust as having its own agency (Hugøy and Ødegaard 2019: 13). The case of the coffee leaf rust demonstrates how one cannot fully control the ferality which emerges from in landscapes of simplification or ruination. However, what such feral proliferations can do for us, is to cast new light onto our relational practices and invite us to rethink agricultural practices. Also, to draw on Paredes' example from the Philippines and her research of the fungal disease outbreak of Fusarium on banana plantations, illustrates how the Fusarium has become more resistant against chemical fungicide application. In exploring responses to the harm the Fusarium has done in the landscape, Paredes' interlocutor, Isidro, stated: "That's why I say, 'Thank you, Fusarium, for coming'. Because we are working together. Nature is providing the challenge and opportunity to find our way to light. Because this is darkness. Fusarium is a teacher" (Paredes 2021: 22). Paredes' interlocutor experiments with microbial cultivation as a natural way of beating the Fusarium outbreak (ibid.: 10). By learning from and with the forest and local ecologies, Paredes argues that Isidro's experimental practices with biodiversity inspires a form of life into the landscape. The hope is to combat Fusarium with natural pathogens and work *with* nature's own capability to resist the fungal disease (ibid.: 22-23). In this example, lies Paredes' central argument: the Fusarium outbreak in banana plantations can be an opportunity to look towards hope in midst of ecological crisis, anchored in interspecies collaboration (ibid.: 4). It can also be worthwhile, as explored by Paredes in this example, to not only look towards structurally viable solutions such as chemical application and "scientific management" because it distorts the ecological balance of the forest. Chemical application had failed to combat Fusarium, in which Paredes explore ground-up responses. By engaging with small-scale farmers' movements who experiment with their practices mend agricultural landscapes and cultivate new, relational ecologies, lies a possibility to explore the emergent. Such a process literally starts from the ground, in the soils and the microbes, and the multispecies life which facilitates for increased biodiversity, vitality of coffee trees, and the perception of the landscape as a whole (Paredes 2021; Perfecto et al. 2019; Hugøy and Ødegaard 2019).

Like Fusarium, coffee leaf rust is a form of feral proliferation that pervades in coffee farming landscapes. With the risk of the rust becoming resistant to fungicides, research shows how other techniques or practices explore new ways of responding to the rust outbreak, and to learn to live *with* these rhythms and synchronize with nature rather than antagonizing and "fixing" it through with agro-industrial management. Chemical control through fungicides has become an option that larger plantations go for to contain and limit the spread of coffee leaf rust to keep up their production. However, small-scale farmers may have limited economic resources to access them.[49] Furthermore, as the rust continues to proliferate it also holds the potential of growing resistant to the fungicides as well. Resistance to fungicides was one of Sebastian's concerns, and a driver for him to try to manage the rust outbreak by traditional as well as more experimental practices. In the end, Sebastian was adamant about the ecological relations in landscape, and that regardless of the outcome, nature would provide.

Emergent Ontological Beings?

Everything wants to live and thrive when the conditions are good, including the coffee leaf rust. I propose that the coffee leaf rust becomes a form of "ontological being" (Kirksey 2015: 136). Kirksey builds his conceptualization of ontological amphibians from Peter Sloterdijk (in ten Bos 2009) and Isabelle Stengers' notion of "cosmopolitics" (2011). In his articulation of the term, ontological beings can be so-called nomads: they are dangerous, destructive, tolerant and unruly (Stengers 2011, in Kirksey 2015: 18). The challenge, and potential, is to entrap ontological beings, and to include them in the production of a cosmopolitical world – "communities that are formed through contingent *political* articulations against the backdrop of an unknown *cosmos*" (Kirksey 2015: 18, italics in original). Stengers' "cosmos" "refers to the unknown constituted by multiple divergent worlds, and to the articulations of which they could eventually be capable" (Stengers 2005: 995). To simplify these accounts, an ontological being, such as coffee rust, is nomad, which has the ability to permeate through different worlds, or ontologies, in which they are refigured as something else – they are "being-in-relation" in the landscapes they emerge in which also impacts the human-landscape relation.

[49] As Hawaiian coffee is a commodity high in demand, less production yield, even caused by pests and invasive species, could further increase the price of Hawaiian coffee. As mentioned in chapter five, there is a general reluctance to switch to other types of trees because of the taste and reputation of Hawaiian coffee, and the identity of the Hawaiian coffees stands high in the ways of responding to challenges such as the rust outbreak.

While Kirksey refers to ants, domesticated snakes and amphibians such frogs, I have shown how the rust becomes entangled with human projects. In a way, the rust can be perceived and understood as an emergent ontological being as it enters the human agrarian social world. They are beyond management and control but enter the social world and claim their place in the landscape. As people engage and work in landscapes, the proliferation of rust evokes feelings, sentiments and responses – the landscape becomes affective. Like Paredes, I also want to argue that such invasive species in simplified landscapes and agriculture can offer a new perspective. This perspective promotes a form of attunement to the landscape, and to understand the complexity of the encounters that occur, regardless of how much one tries to control. Even in "ruins" (Paredes 2021; Tsing 2015) and absences lie new discoveries, lessons and affects that evoke future possibilities. Feral beings can be beyond management and control, but nevertheless a part of the landscape. Coffee farming practices are in a constant relation with the landscape, and the landscape affects the ways in which humans and nonhumans engage with each other.

Summary

In this chapter, I have explored how the coffee leaf rust impacts farmers' engagement with the landscape. The rust outbreak in Hawai'i is fairly recent compared to other coffee producing regions, but agricultural legislation and the reputation of Hawaiian coffee makes it challenging to take big steps in combating the rust. The proliferation of rust and the potential need for chemical application raises concerns for the landscape as a whole, mediated through the human body and the harm chemical application could have for the human body. An essential part of human-landscape relations is the human body, and the body as a medium and for understanding affects. In the final chapter of this thesis, I will explore how landscapes also affect peoples' perceptions through different forms of exposures, such as chemical spraying.

CHAPTER 9
- EXPOSURE AND AFFECTIVE LANDSCAPES

"How does a gathering become a 'happening,' that is, greater than a sum of its part? One answer is contamination. We are contaminated by our encounters; they change who we are as we make way for others. As contamination changes world-making projects, mutual worlds – and new directions – may emerge" (Tsing 2015: 28)

Human-Landscape Relations

Whilst the previous chapters have been focusing on more direct encounters in the landscape, this chapter will explore some of the more experiential perspectives of coffee farming practices and the affective relations between humans, nonhumans and the landscape. Central to this exploration is the body, and how the body's encounters, senses and experiences affect human-landscape relations. This final thematic chapter will explore how encounters with various forms of exposures change the ways in which humans relate to landscapes, and their place within them.

Sebastian mentioned that there are other "man-made" changes that affect the landscape on the farm. He talked about the Fukushima nuclear catastrophe in 2011 in Japan, in which traces of radioactivity was found in the soils and crops on the leeward side of Hawai'i Island. Although the levels of radioactivity were below levels of concern for the authorities, Sebastian expressed a more general concern, because in his opinion, what goes into the soils, goes into the plants, and when consumed could affect human bodies as well. This conversation about radioactivity evolved into a general conversation about exposure. More specifically, we talked about human-landscape relations through practices or consumption, and about what was harmful and not. Sebastian bent down to the grass and picked up what seemed to be a piece of a torn plastic bag. He pointed out that the levels of plastic he found around the farm was baffling and steadily increasing, and that he himself tried to not buy anything with plastic wrapping – let alone throw it out in the open. Most of the plastic found on the farm was potentially carried

there with the winds. Even though coffee cherries grow from trees and become dried and roasted in the making of coffee, Sebastian had concerns regarding the increasing amount of plastic on the farm. He explained that you never know where the plastic goes and the potential harm it does. “It’s even in our blood now,” Sebastian said, while pointing to veins on his left arm. He was referring to something he had read about some scientists who had found micro-plastics in people’s bloodstream, and how plastic can harm people in even the smallest amounts. He did not only express a concern for himself, but also for the soil, the trees and the cherries, and was worried that if chemicals in plastic could harm people, it most definitely could harm the farm’s ecology.

Exposures in the Landscape

Although he was not sure about the validity of what he had read, he had some concerns. What Sebastian was worried about was how much of what surrounds us also enters or permeates the human body. A connection to this, is the anthropomorphic qualities that Annie and Michael from the Kona plantation give to the coffee trees described in chapter six: the trees can get stressed from too much sun exposure, or that they need minerals like potassium and magnesium just like people: the landscape is the arena in which the human and nonhuman become connected through. For Sebastian, his worries were not only in relation to plastic or radioactivity, sun exposure or minerals. As mentioned in chapter eight, what Sebastian feared the most was the effects of potential spraying fungicide to prevent the coffee leaf rust. The newly approved fungicide that was potentially carcinogenic, could lead to fertility issues, and a generally disturbing instruction manual. Clearly, Sebastian told me, that if the fungicide could do this harm to people, he could only imagine what the harm would be to the potential biodiversity and health of the farm’s environment which he worked hard to recuperate.

This could be an example of an affective relationship between himself and the landscape, and that through the threat of exposure to harmful chemicals, he grows to care differently for the vitality of the farm. In this case, Sebastian’s perspective of how one treats the landscape one cultivates, will also affect the human body. In this exploration lies a form of

porosity, in which the human can be affected by even the smallest chemicals or microbes that surround us. In these landscapes, humans become "porous".[50]

The Porous Human

Through the concept of porosity, anthropologist Vanessa Agard-Jones shows how people, and bodies, interact with material and physical matter that change the ways in which one can view the world (2013). The concept of porosity refers to how bodies' boundaries are not fixed nor bounded neither in space or time (ibid.: 191). Agard-Jones draws on empirical example from Martinique, where chlordécon contamination is affecting the island's soil, water and residents' bodies: "There exist today, throughout the world, billions of objects and living being whose very presence testifies to the links between the apparently remote place where they are found and the rest of the world" (Trouillot 1988, in Agard-Jones 2013: 187). Another example can be taken form anthropologist Annemarie Mol's, *Eating in Theory* (2021). In her book, Mol shares her perspectives on the cycles of nutrients between the human body, its surroundings, and how food is all-encompassing biologically, socially, culturally and geographically. Food is a prerequisite for bodies to be maintained and everything it experiences. In the way Mol describes the movement of nutrients and energy crossing human body boundaries, Mol also explains how body boundaries to some extent dissolve. What one eats, becomes part of oneself. Some of the cells in what we eat become building blocks to rebuild or strengthen cells in our bodies, and other parts of what we eat are excreted and return to nature. From this Mol asks, is what we excrete also our body in some ways? What has been outside our body becomes part of it, and what has been in our body is excreted and becomes part of the environment we are a part of (Mol 2021: 49). Like Mol's tinkering exploration of animals, food, nutrients and excretion, Dorion Sagan (2011) also challenges the assumption of a human-body-landscape dichotomy. He writes: "life deals with mixed cultures. […] Most of the DNA of the estimated 100 quadrillion cells in our bodies is not 'our', but belong to cohabiting bacteria. […] Ten percent of our dry weight is bacteria, but there are ten of 'their' cells for every one of 'our'. […] What we call human is also impure, laced with germs" (ibid.). Then what is the boundary between

[50] It can also be discussed *which* bodies become exposed to chemicals in agriculture. Julie Guthman (2019) and Seth Holmes (2013) takes up this issue, and show how migrant laborers are disproportionally affected in agricultural sector and the use of harmful chemicals.

human and the landscape? The human body becomes porous and is exposed and connected to the landscape through its perceptions and engagements with it.

These discussions illustrate that different forms of experiences and exposure endure and linger; they are not simply passing. Especially for Sebastian whose entire lifestyle revolves around his farm and the landscape of the farm. He expressed a form of awareness to the landscape through his own encounters with it. In trying to "master" the ecology in farms, new human-landscape relations emerge when nonhuman agents adapt or react back. Some forms of exposure are voluntary, such as eating (Mol 2021), whilst other are imposed such as through chemical exposure (Creager 2018). In the exposures of different elements in the landscape, the landscape and the human become connected, and evokes an affective relationship in which questions of practices of care become central. As phenomenology philosopher Maurice Merleau-Ponty writes: "the body does not belong to itself" ([1945] 2002: 81, 177). The human is always in a relation with the nonhuman. They are not the same, but they have the capacity to affect and be affected by each other in encounters in the landscape.

Affective Landscapes

In the context of coffee farming, humans are always in a "being-in-relation" with the landscape through experience and practice. Historian Angela Creager (2018) writes that through engagement with the environment and how "the molecular" permeates bodies, humans experience a "global environment" (ibid.: 79). What she means is that humans experience the landscape through exposures. This exposure also evokes a form of care: a care for the environment, its living organisms, and its past, present and future. Things do not just happen and occur; they linger and endure – also in our bodies and minds – they have affects. In the landscapes of coffee farming, humans, animals, insects and soil become together through their own practices. At the same time, the landscape is shaped through multiple relations and responses: through history, deforestation, sugarcane plantations, soil regeneration, nematodes and pigs, plastic and people. The relationship between the human, nonhuman and the landscape are transformative as they affects beyond the material, evoking an emergent form of care.

CONCLUSION

"If we are interested in livability, impermanence, and emergence, we should be watching the action of landscape assemblages. Assemblages coalesce, change, and dissolve: this *is* the story" (Tsing 2015: 158, italics in original)

Thesis Summary

Throughout this thesis I have explored a variety of topics related to human-landscape relations. In chapter two, I explained how I used the landscape methodologically, and how experiences and senses played an important role during fieldwork. Landscapes were not only the places I did my fieldwork, but they were also "trigger for narratives" (Syse 2014). Thereafter, in chapter three, I explained the analytical and theoretical framework for the thesis, with the inertia being landscape studies, or "landscape ethnography". I emphasized that different encounters in the landscape are important, which are embedded into landscapes and affect human-animal-landscape relations. Such encounters are historical, political, cultural and economic as well as met with nonhuman activities. In chapter four, I did a condensed exploration of historical changes of landscapes in Hawai'i. I explained how plantation agriculture transformed landscapes to work in the favor of sugarcane, and how the emergence of industrial agriculture along with settler colonialism radically changed land relations and ownership. In general, the transformation of landscapes, or the simplification of landscapes, has had far-reaching consequences in terms of both ecology as well as farming opportunities in present-day Hawai'i. Whilst plantation agriculture demanded a lot of labor, other forms of farming became a way of escaping work at the plantations, and the opportunity to farm for oneself. One of these forms was coffee farming. Subsequently in chapter five, I described the role of Hawaiian coffee production, both locally as well as part of the larger consumer-end market. However, apart from a few high-end consumers in the Asian market, most of Hawaiian coffee is never exported to other countries. Hawaiian coffee farming has become a "specialty-blend", and the farmers are proud to be able to be a part of this journey. Coffee farming is also like most other forms of agriculture, a monoculture. As explained throughout chapter five, monocultures are also prone to disease or attacks from invasive species as well. In the following chapters I delved into the

ethnography of my fieldwork, and how an ethnography of landscapes speaks to human-landscape relations more broadly.

In chapter six, I described the role of soils and different perspectives on soil and soil health. Soil was considered an important factor for farming and sustainability in production, and perspectives on soil health affected the practices on different farms as well. Moreover, people I talked to during fieldwork mentioned how soil health is linked to the health of the land in general. Then in chapter seven, I elaborated on the importance of noticing and knowing nonhuman critters in the landscape, and the affects they have on farming practices. The presence of animals, insects, and fungi affect the ways in which the farmer came to engage with the landscape, and the care they had for the land. In chapter eight, I described the possible devastation of the recent outbreak of coffee leaf rust can have on the coffee farming community in Hawai'i. Here I argued that the presence of coffee leaf rust influences human-landscape relation in which the ways of combating the coffee leaf rust evokes a form of care for landscapes. Like Massumi has argued, to think about affect in landscape encounters, evokes a form of care (2015: 122, 202).

Finally, in chapter nine, I argued how the landscape becomes affective through experience and exposure. In doing so, I drew on the Puna farmer's, Sebastian, perspective on chemical application and pollution in the landscape, such as plastic and radiation, in which human-landscape relations became visible. In this encounter, new human-landscape relations emerge which binds the human experience of the self in a landscape to the condition of the landscape itself.

Emerging Relations in Affective Landscapes

What this thesis has explored is the affective relationship between humans and landscapes. As I have described in the pages of this thesis, landscapes are site of encounters, and that these encounters are affective. One of these encounters is the encounters between human and nonhuman histories. In these encounters, I argue, lies a way of perceiving the human and nonhuman as a constant "being-in-relation" through the landscape. In this sense, the landscape is affective, in the way that being with, and knowing the landscape, can transform human-nonhuman relations and sensitize care practices. For example, as I explored in chapter six, soil degradation caused by industrial agriculture and high levels of chemical input affects the farming practices of Sebastian. He knew he could continue to apply chemicals, but he thinks

beyond his own productivity, and thinks of the ways in which chemical applications has consequences projected forward in time.

What I ultimately argue for with this thesis is that landscapes are affective. By this, I mean two things. First, that the knowledge of landscape histories has an effect on present coffee farming practices. Second, in relation to agricultural land, that an attunement to landscape, and to and meaningfully engage with landscape requires attention beyond what is cultivated. In means to care for what is there, and to learn *with* the encounters and the nonhuman relations that exist, proliferate, disappear and emerge within the landscape. Through such a relation with the landscape, the landscape becomes affective. In turn, the affective landscape incites different farming practices that moves beyond production, and towards forms of practice that also cares for nonhuman lives as well as the future. An approach to affective landscapes gives room for also exploring a temporality of agrarian practices: What does one leave behind? What comes next? In this view of landscapes, I argue that we can begin to explore affective human-nature relations that move beyond productivity in the present and think about productivity in the future. Moreover, as explored in chapter nine, when the human body is potentially exposed to harmful chemicals, there is an emergent relation between humans and the landscape that also reflects on the potential harm to the landscape as well as the human. Therein lay possibilities for new ways of viewing and managing landscapes, through relational practices of the human and nonhuman, and the emergence of new knowledges. Landscapes are always "being-in-relation", shaped by global processes, movements, flows and encounters, as well as concrete human and nonhuman activities. By engaging with landscape as a system of interrelated connections of capital, human, nonhuman, I argue that close engagements with landscapes are essential in understanding and responding to ecological degradations.

An approach to affective landscapes "consider space and place beyond their material properties" (Davidson, Park, and Shields 2011: 6). As mentioned in the introduction to this thesis, the invitation to think about the affective relation between humans and the landscape as a form of emergence, has implications for how the land is used, represented, defined and "exploited". This way of thinking can be an incentive to juxtapose established ways of viewing, working and managing landscapes, especially agrarian landscapes, in a time of ecological uncertainty. As Ghassan Hage has argued, uncertainty is at the very core of hope (2016: 465). My hope is that to think about landscapes as affective, as being open to the potential of human-landscape connections and the future of the landscape, can lead to emergent practices of care in which the human and nonhuman are joined.

I am hopeful that there is an opportunity to learn from farmers like Sebastian in Hawai'i, to learn *with* the coffee leaf rust. My hope is that this thesis can contribute to methodological and analytical innovation of engagements with landscapes in times of ecological crisis. By arguing that landscapes give us the opportunity to sense, explore, and trigger narratives, I also suggest that affective landscapes invite us to think differently about the ways we work and manage landscapes and natural resources, and the power of perspective and place-based knowledges. Arguably, this opens up the possibility of exploring human-landscape-nonhuman relations as a constant form of "being-in-relation" that is oriented towards the future.

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