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Frictions around rendering technical: Land disputes over climate change mitigation projects in Suau, Papua New Guinea

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Abstract

This paper focuses on how land and trees are ‘rendered technical’ in Suau, Papua New Guinea through the Central Suau Reducing Emissions from Deforestation and Forest Degradation Pilot Project and Save the Forest conservation projects. These climate change mitigation interventions apply tools—such as Incorporated Land Groups, maps, and satellite imagery—to make environments measurable and valuable, thereby generating ‘frictions’ between different ways of being and knowing. Through ethnographic accounts of land disputes, we highlight how these tools conflict with the ways that people in Suau relate to and look after their environments. As processes of rendering technical work to recognise and exclude certain forest uses and users, this produces frictions that impact on local livelihoods and matrilineal land tenure systems. Employing the concepts of rendering technical and friction together provides a situated framework for extending attention from distributional and procedural elements of land disputes to consider ethical and ontological layers.

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KEYWORDS

climate change, friction, Papua New Guinea, REDD+, rendering technical

1 | INTRODUCTION

This paper focuses on attempts to mitigate climate change and reduce deforestation in Suau, Milne Bay Province, Papua New Guinea (PNG). In particular, it centres on the Reducing Emissions from Deforestation and Forest Degradation (REDD+) program and Save the Forest biodiversity conservation projects.¹ We explore how these interventions work to govern Indigenous environments in ways that render land and trees technical, thereby recognising as well as excluding certain forest uses and users. The conceptual frame of rendering technical (Li, 2011) offers a way to identify the tools and assumptions implicated in disputes over land and trees, and the associated frictions (Tsing, 2005) between different ways of being and knowing. It helps to extend attention from distributional and procedural elements of land disputes to consider ethical and ontological layers in analyses of how climate change interventions intersect with and impact local livelihoods, social and kinship relationships, and connections to land and trees over time and space. Building on extensive and important literature that has critiqued REDD+, the commodification of nature and impacts on local communities (Dalsgaard, 2016; Eilenberg, 2015; Howell, 2014; Lounela, 2019; Miles, 2021), we explore the ontological and epistemological dimensions—assumptions about the nature of existence and knowledge production. In PNG, previous research has centred on the implementation of REDD+ (Babon et al., 2023; Filer, 2015), but there has been relatively little ethnographic research into intersections with local lives compared to the findings from other studies across the region, including from Indonesia (Eilenberg, 2015; Lounela, 2019; Miles, 2021).

Histories of colonisation, intervention, and global agendas influence how these climate change mitigation projects are designed and become entangled with repeated, overlapping, and messy attempts to govern local environments, people, and resources. Underpinning these attempts are assumptions about reality and knowledge production that often work to simplify, categorise and ‘render technical’ (Li, 2011) land and trees. In these climate change and conservation projects, tools like Incorporated Land Groups (ILGs), maps, satellite imagery, and GPS work to reveal certain measures of land value and legitimate claims to land within a particular frame of reference (Goldstein & Yates, 2017, p. 210; Li, 2016). Processes of knowledge production and control necessitate simplification to make land and trees more legible and able to be measured, governed, and valued according to external criteria (Scott, 1996). Such simplifications not only enable power to be exercised (Burow et al., 2018), but reproduce the very assumptions about reality, and the environment, that underpin the process of rendering technical. However, the tools, survey instruments, and associated forms of property used to enable these governance strategies are often overlooked (Blomley, 2013; Fletcher, 2019). Different ways of being and knowing are excluded in processes that are mediated by, and reproduce, power relations and inequalities (Hall et al., 2011, p. 4). Viewing land and trees through these tools denies other ways of perceiving and enacting the environment, often obscuring the complex relations between humans, non-humans, life, and death.

Drawing on Li's (2011) framing of rendering technical, we consider practices that enable ‘the domain to be governed as an intelligible field with specifiable limits and particular characteristics ... defining boundaries, rendering that within them visible, assembling information about



that which is included and devising techniques to mobilize the forces and entities thus revealed (Rose, 1999, p. 33). Rose's (1999) understanding of rendering technical centres on 'persuasion', or communicating claims to others, that requires an 'active doing' (Blomley, 2013). In this way, to turn land and trees 'to productive use requires regimes of exclusion that distinguish legitimate from illegitimate uses and users, and the inscribing of boundaries through devices such as fences, title deeds, laws, zones, regulations, landmarks and story-lines' (Li, 2014). This process necessarily involves the foregrounding and marginalising of different ontological assumptions and epistemological practices to make land and trees visible and productive. Inscribing boundaries is a key part of rendering a domain technical where multiple legal orders including global forestry networks are translated through local interactions (Vandergeest & Peluso, 1995, 2015). These processes are imbued with notions of expertise that separate those who claim to know how others should live from those whose conduct is to be governed (Li, 2007).

While Li's (2011) concept of 'rendering technical' offers an encompassing view of how environmental governance operates, Tsing's (2005) concept of 'friction' brings a situated way to understand the awkward, unstable, and unequal interactions that are produced in this process. The concept of friction provides a way to ground analysis of global connections in concrete engagements, while remaining attentive to power and knowledge (Tsing, 2005, p. 267). Using friction in this way highlights the importance of interaction—the intersections between different ways of being and knowing that create friction. But friction is also active, productive, and moves governance forward in ways that are messy, unplanned, and generate new and different insights and relationships. Beyond examining how conservation and climate change interventions foreground Western scientific knowledge and practices, this paper explores local responses to attempts to govern land, trees, and climates. This exploration considers how people navigate and negotiate multiple, intersecting ontological assumptions and how such assumptions may be foregrounded or marginalised in ways that produce conflicts (Blaser, 2013; Rarai et al., 2022).

In Suau and other parts of PNG, conflicts are often centred around land use and ownership claims, which have material consequences for local lives and livelihoods. But these disputes also point to deeper ontological conflicts between different ways of seeing and enacting reality. While there are important discussions around the risks of radical alterity in the ontological turn in anthropology (Vigh & Sausdal, 2014), focusing on ontological assumptions enables understanding of how people are continually negotiating and navigating intersecting worlds (Blaser, 2009; Holbraad & Pedersen, 2017). Engaging with anthropological thinking around ontological conflicts (Blaser, 2013; DePuy et al., 2022), this paper asks: What frictions are generated through attempts to render technical land and trees in climate change mitigation projects? To answer this question, we draw on ethnographic fieldwork undertaken with local villages in Suau and project proponents in provincial and national centres, as well as the stories that people tell of land disputes. What is at stake here is not just access to and control over land, but local livelihoods, food security, social and gender relations, and the very ways that people perceive and enact their environments and realities.

2 | ENVIRONMENTAL GOVERNANCE IN PAPUA NEW GUINEA

With the third-largest tract of intact tropical rainforest in the world, 5% of the world's biodiversity in less than 1% of the world's land area, and a high proportion of greenhouse gas emissions from land use, land use change, and forestry (LULUCF), PNG is an ideal site for climate change



mitigation and biodiversity conservation (Filer et al., 2000). However, efforts to manage environmental problems pose risks to local livelihoods, particularly in projects that seek to restrict and prevent certain kinds of land use, as the majority of the PNG population live in rural areas and rely on subsistence agriculture (Bourke & Harwood, 2009; Laurance et al., 2012). PNG first proposed the idea of REDD+ to the United Nations Framework Convention on Climate Change (UNFCCC) in 2005 as a mechanism to provide developing countries financial incentives to reduce emissions from deforestation (Babon, 2014). Since then, PNG has become a leading proponent of REDD+ internationally and is a pilot country for UN-REDD and the World Bank's Forest Carbon Partnership Facility (FCPF). PNG is also host to a range of conservation and development initiatives intended to protect biodiversity (West, 2006), including several projects run by Save the Forest, a charity based in the United Kingdom (UK).

This paper focuses on the Central Suau REDD+ Pilot Project and Save the Forest conservation projects in the Milne Bay Province of PNG. The REDD+ Pilot Project was intended to include 64,000 hectares of lowland forest along the coast of Central Suau, in an area with an estimated population of 7000 people (SPC/GIZ, 2015b). Planning for the REDD+ demonstration site changed from an approach focused on Reduced-Impact-Logging to a Logged-to-Protected approach. As there has not been commercial logging in this area, this approach means that the project necessitates changes in land use and subsistence agriculture to reduce emissions, which was planned to be achieved through the establishment of conservation plots. Within the same area, Save the Forest initiated a project to provide communities with alternatives to logging and oil palm and protect 400 acres of biodiversity-rich forest. Under a Forest Protection Agreement, the community has committed to not cut or sell any tree species for commercial use, which is monitored through satellite imagery, photography, and forest surveys.





It is important to acknowledge that REDD+ does not operate alone and is embedded in a constellation of activities, actors, landscapes, external interventions, histories, and ideologies (Li, 2007). Recent interventions like REDD+ and Save the Forest need to be placed within the broader context of colonisation and missionisation, which began in the Suau area in the early twentieth century (Armstrong, 1922; Williams, 1933). The colonial encounter in Suau was largely focused on extraction—exploiting natural and human resources, for example by establishing waged labour on rubber plantations—and also involved the relocation of villages to be closer to administration stations (Demian, 2004, 2007b). This, of course, has had significant implications for how people in Suau relate to and use their lands, and has contributed to high rates of land disputes. Likewise, more recent resource extraction and development interventions, including palm oil and commercial logging, continue to extract value from land and trees for global markets. With this in mind, we investigate how people in Suau perceive and engage with land and trees in the context of the REDD+ and Save the Forest projects.

3 | METHODOLOGY

This research involved two methodological processes: (1) ethnographic fieldwork that involved exploratory and interpretive observation and storytelling; and (2) reflexive and collaborative analysis, discussion and synthesis between the authors (see also Pascoe & Minnegal, 2023; Sanders & Pascoe, 2023). Ethnography was conducted by the first author in PNG from February to November 2017 and January to March 2019 with communities implicated in the Central Suau REDD+ Pilot Project and Save the Forest conservation projects in the Milne Bay Province. In addition to the fieldwork in Suau, the first author spent 2 months undertaking ethnography in institutions associated with REDD+ and Save the Forest in Port Moresby, Alotau, and London—namely semi-structured interviews, participant observation, and policy analysis (see also Pascoe, 2018). Our collaborative and comparative reflections and discussions sought to grapple with the ways in which these projects resonated with interventions in Indonesia and other sites for climate change mitigation activities.

The methodological approach underpinning this paper is informed by the work of Oceanic scholars. It acknowledges the ways space is constructed through people's interactions with each other and with their land and trees (Stella, 2007). In PNG, storytelling is one way that these assumptions are enacted, and stories teach people how to deal with their environment and ground their self-awareness in relations to land (Waiko, 1981, p. 11). In Suau, storytelling is known as *pilipili dai* and involves participating in open-ended discussions or the communal retelling of a shared story. Pascoe engaged in *pilipili dai* with people from a range of positionalities of gender, age, status, and clan, and participated in garden walks and the mapping of family trees to elicit stories about people's connections to land and trees. During this process, we learnt that when you ask people about land in Suau, you get a story of social relations and kinship networks across space and time. These stories are always partial, political, and contested; people from other clans bring alternative claims and accounts. Pascoe's positionality as a *dim dim* (white) outsider also influenced processes of storytelling. The co-authors emphasise the partiality of their collaborative, methodological approach, drawing on their respective ethnographic fieldwork in PNG and Indonesia and ongoing, collective conversations around empirical, conceptual, and ontological thinking (Sanders & Pascoe, 2023). Through these methods and collaborative discussions, we are able to glimpse how people in Suau relate to, use, and manage land, and trees and the frictions produced by outside forms of governance.

4 | LIVING WITH, AND DYING OVER, LAND AND TREES IN SUAU

4.1 | 'It's the women's land, but men speak for the land'

In Suau, people have responsibilities to look after, rather than 'own', land, and their rights and roles to act on land are always negotiable (Demian, 2003, p. 34, 2007b). Like other coastal areas in Milne Bay, land in Suau is matrilineal. A local leader explained: 'If the mother is from Suau, the men's children belong to the mother. But if they are going to be on their father's side [live on their father's land], they need to submit to their cousins from their daddy's sisters'. While land is typically inherited through the matrilineage, there are multiple mechanisms for obtaining usage rights, including transferral of land rights through the father and adoption practices (Demian, 2007b, p. 155). When explaining matrilineal land tenure, people in Suau often make statements along the lines that women are the custodians of the land and men are the stewards. Kai, a former local government official from Suau, said:

The good thing about ladies ... the title will be given to them, so they will maintain that forever, they still maintain that today. Men are the ones who are going to talk, organise things. When it is feasting times, they are the ones to rise up. But the ladies will still stand there and listen [to check] whether their brother or uncle is doing the right thing. Because that is their land. But we are the stewards there. Men are the stewards.

As this quote explains, although land is transferred through the female line and women play an important role in guiding land management, first-born sons typically become principal landowners (PLOs), meaning they play a public role in decision-making over land and are responsible for upholding custom relations. The category of PLO is not a traditional status or role. The word for landowner in Lausaha is *tanu tanuwagana* (from the word *tanu*: land), but this can refer to men and women and is applied to all clan landowners. The word *baisah* may offer the closest equivalent to the term PLO but is used more generally to refer to a person who is a 'boss of the land' or, in current usage, to refer to a man who makes decisions on land, sometimes called a 'chief'. The concept of a PLO was introduced in colonial times and has gained saliency within development interventions, typically assigning decision-making roles to men. PLOs are called on to make decisions about land use, like assigning gardening blocks, giving permission to cut trees for household use, and also about development projects that may alienate land for many years. Multiple men may claim PLO status, but the role is performed through relations to land and people: 'Land rights are based on the care you give people, the care and effort you give to the LOs [landowners]. It's not just through first-borns, but through work and custom as well'. However, the growing prominence of PLOs brings women's matrilineal land rights into a precarious balance with increasingly male-dominated decision-making processes (see also Hermkens, 2011; Hermkens et al., 2022).

4.2 | 'To fight over land, sorcerers can come and kill'

Land disputes in Suau are frequent and tensions can lead to sorcery and, as a result, death. People in Suau have migrated along the coastline over time; some lineages have been moved through



colonisation and missionisation, or they have migrated through marriage, but retain land rights in other areas of Suau (Demian, 2007a). As a result of this mobility, there are high rates of land disputes across Suau. As a local pastor explained: 'There will be some sisters coming in and another sister coming here and, all of a sudden, the other moves out from that area and then stays there for years and years and then later comes back again. But then they dispute'. Disputes over land often precipitate sorcery, where land becomes not only a source of life, but also a source of death (Nabobo-Baba, 2006). This connection between land and death in PNG, and other parts of the Pacific, has been explored by several scholars (e.g., Bratrud, 2017; Damon & Wagner, 1989; Demian, 2006; Macintyre, 1989; McDonnell, 2015), highlighting the potentially lethal relationship between land and sorcery.

In Suau, sorcery is seen as a way to 'defend the land' and is used when it is perceived that a certain clan has too much land or is not looking after land appropriately. Sorcery was described by one local as 'a traditional way of how they can defend their land or secure their land'. Richard, an elder from Fife Bay, explained further: 'If there are land disputes or maybe other families are not happy, one can easily order somebody, a sorcerer, to do the killing'. During fieldwork, multiple stories were shared about families hiring a sorcerer to defeat their enemies in a land dispute; sometimes if the sorcerer was not paid, this could lead to deaths within the clan as well. The relationships between people and land imbricate more-than-human actors and practices that stretch across generations.

4.3 | 'We don't cut trees any how'

Relations to trees are significant for people in Suau, not only in terms of the links between trees, land, sorcery, and death, but also in the ways people use trees to make sense of their worlds. In PNG, certain trees facilitate continuity of personhood across generational time (Kirsch, 2006). In Suau, the *badila* and *kwila* trees are used by people to tell the seasons, which indicates how trees are intimately linked to people's sense of temporality (Pascoe et al., 2019). Trees also play a practical role in establishing claims to land. Trees in Suau mark the matrilineage of the area and certain trees may be named after the person who planted them (Demian, 2004, p. 60). Planting trees, and cutting trees for the cultivation of land, are often preconditions for land claims. As Yali, a man who has PLO status in Suau, revealed:

The moment you plant a coconut in our custom, your children and everybody else will believe the land belongs to you. Gardening, only planting like vegetables, they normally don't dispute that because [those crops are short-term]. Trees will grow again. But for coconut, it will last for years. ... it's permanent [compared to garden crops]. So, whoever plants coconut, it indicates that the land belongs to them. So that is where the arguments always arise. Or like small-scale business, like logging, slabbing and then reselling in Alotau. Those are the things, in terms of money, that's where disputes arise.

This quote explains how trees—particularly income-generating trees like coconut and betel nut palms—can establish land claims but can also cause disputes. Planting 'permanent' trees—that is, trees that last longer than garden crops and must be planted—creates a claim to land and harvesting or cutting those trees is seen as acting on that claim. Cutting trees may also be seen to be challenging another's claim to land by removing the marks that someone else has made (see



also Minnegal & Dwyer, 1999). Disputes related to trees contain ethical and ontological layers in ancestral and kinship connections, which have been disrupted through histories of colonisation, intervention, and global agendas. To avoid such disputes, people are careful about planting and cutting down trees. PLOs are called in to approve the cutting down of trees to make gardens or build houses; they may refuse requests if people are not following custom—‘not sharing or talking to them badly’. PLOs may check on people’s gardens to make sure they are not planting income-generating trees or cutting down trees without permission.

People in Suau take great care when cutting down trees and follow custom processes, particularly if they are not landowners in the area. For example, one day when Pascoe was staying with Yali’s family in a village in Suau, his mother’s brother’s son decided to cut down a large palm tree that was close to the family’s permanent house. He feared that the tree might fall down and damage the roof. But as this tree was planted by his father, he could not cut it down himself, because it belonged to his father’s line and not his mother’s (and thus his own) line. Instead, he asked his father’s sister’s son to cut it down—he had to submit to his auntie’s children and get permission to remove trees. People in Suau do not cut down trees ‘anyhow’; they follow custom processes and seek permission from PLOs. Often when disputing the cutting of trees, people are concerned with the potential for a tree to be alienated from the land and landowners—appropriated for individual benefit instead of maintaining ongoing relations. By listening to the stories people tell of land and trees, we can glimpse the fluid and contested relations that people negotiate in Suau.

5 | RENDERING LAND AND TREES TECHNICAL

The previous section explored the links between land, trees, sorcery, life, and death in Suau, highlighting the complexity, mobility, and contestation around land tenure and land usage rights and the deeply relational form of those rights. This section begins to problematise how REDD+ and Save the Forest proponents work from positions of power to employ specific tools to render land and trees technical. Tools like Incorporated Land Groups (ILGs), maps, satellite imagery, and GPS enforce certain assumptions around ‘land ownership’ and ‘boundaries’ while excluding other ways of perceiving and relating to land and trees. Conservation requires imposing regimes of exclusion that distinguish legitimate and illegitimate land use and users (Hall et al., 2011) and also make certain relationships and ontological assumptions visible or invisible (DePuy et al., 2022).

5.1 | Making landownership static: Incorporated Land Groups

Part of rendering land and trees technical involves making landownership static; in PNG, one way this is undertaken is through ILGs that recognise landowning groups as legal corporate entities to enable the distribution of benefits derived from land (Amos, 2009, p. 10). Under the Central Suau REDD+ Pilot Project, people in Suau have been engaged in the ILG process to identify customary landowners entitled to share in any benefits the project may generate. While ILGs were not originally intended to act as a mechanism for benefit distribution (Kalinoe, 2001, p. 4), they have acquired new functions under resource extraction and development projects, which has led to unanticipated and severe difficulties in their implementation (Lea, 2013; Stead, 2017; Weiner, 2013).

Under the REDD+ project, the ILG process was initiated in 23 wards from Dahuni to Modewa, but many people across Suau expressed confusion about these ILGs. In one village, a team visited in the evening and put up a projector screen displaying a map of the area and asked people to point out their boundaries. Not all of the people in the village attended this meeting; as it was in the evening, many women could not attend as they had to look after children. Lauli, a women's leader, recalled, 'They said to confirm the boundaries, that was the reason they put up that projector'. The next morning, the visiting REDD+ team called people in the village to come to the market area and asked them to sit in their clan groups. They then began filling out the ILG forms and adding people's names under each clan group. But the team did not return to the village after this and the status of the ILGs remains uncertain. A community leader from another village shared a similar experience, 'We only filled in the forms and then they took them, and they never came back with them or approved those ILGs, so we don't know whether it's approved. They have to come back and let us know'. The ILGs for this project have not yet been approved or finalised. Nevertheless, the process of drawing boundaries and organising people into ILG clan groups has led to disputes.

People in Suau link disputes over land and REDD+ to this ILG process. In explaining a disputed REDD+ plot, Kai stated: 'That's where the conflict came in. That's where the dispute came, because of that ILG, the signing of the ILG, because people were still not understanding'. A local leader detailed some of the complications and conflicts that may emerge through the ILG process:

The only issue, I would say, is because of our customary and traditional process of acquiring land, whereby land has been given away at some stage as a compensation payment from one clan to another ... that particular clan may want to register for REDD+ under their own name, under their own ILG. But the original landowner may also want to capture their piece of land under his ILG. ... And that's where conflicts might arise.

As this quote explains, the ILG process may render ownership static and unambiguous but only by forcing people to decide between multiple claims, accepting some and denying others. REDD+ project proponents recognised the challenges of implementing ILGs, particularly the problems that arise when you define an area and this excludes certain people from asserting their land claims or denies access rights to people who have land usage rights. As one project proponent recognised:

We also have intermarriages within local clans or local villagers from this area to that area where the REDD+ project is. Then when you are trying to set up an ILG, this person will say 'my daughter or my son also married into [that clan],' then you have to include her too. ... It's difficult for us as an office, I mean an organisation, to look into due to the different cultures and diversities that we have ...

Another actor mentioned the challenges of land registration processes, but insisted on communities having ILG certificates to define 'genuine' landowners:

The challenge would be there are sometimes different groups registering ILGs and they would want to do REDD+ and there might be duplications of REDD+ for the same area. And also the process is very long ... [the ILG has] to go through

the provincial administration and it takes a while for this type of thing to go up. ... Sometimes a lot of people at the local level have their own representatives and some may be genuine, some may not be genuine, others have other intentions of bringing other projects. ... That's why in REDD+ projects we always tell them you must have an ILG certificate ... you must have the GPS referencing of that place, you must have a land use plan.

As this quote indicates, ILGs formally recognise the land claims of some people and not others. This may well render land technically available for projects such as REDD+, but this process generates frictions and inequalities.

Comparatively, Save the Forest staff from the UK indicated that having an ILG in place for communities in Suau may make these areas attractive to resource extraction companies, specifically palm oil and logging companies, who may be able to persuade members of an ILG into resource extraction projects with the promise of monetary benefits. As such, Save the Forest have not followed the ILG process as a path to benefit sharing in their conservation projects in Suau, but they still render land ownership static by securing land tenure for people who live in the area, thereby excluding landowners who may live outside the project boundaries.

5.2 | Inscribing boundaries: Maps, satellite imagery and GPS

In line with processes that attempt to bound sets of people and identify these with clearly bounded places, tools like maps, satellite imagery, and GPS are used to inscribe boundaries for REDD+ and Save the Forest projects. These tools do not just record the presence of land as a resource, they are integral to assembling it as a bounded entity legible to different actors. Maps, satellite imagery, and GPS play interconnected roles in framing land and land use through a particular lens. These tools and processes determine the boundaries around land, the kinds of land use, and land claims that are deemed acceptable within those boundaries (Hall et al., 2011, p. 5). For the Central Suau REDD+ Pilot Project, these tools were instrumental in the development of the project design documents and establishing plots of land and trees to be measured and monitored for carbon. For the Save the Forest project, such tools were used to map community forest resources and monitor forest loss. People in Suau tell different stories about these tools and often dispute the ways they inscribe boundaries around their land and trees. As described by youth leader Bandi, REDD+ teams used maps and satellite imagery to inscribe boundaries around areas designated for conservation:

They told us they've got their maps, and they told us they've marked certain areas which they want us to preserve. And they said there is a couple of clans in [the village], so we looked at the map and they put the mark where they wanted to preserve that particular area. ... When they marked the areas, they told us ... it will be under a kind of satellite. They will put the watch on it, so when you [cut big trees] ... they can also come [and monitor the land].

Bandi's quote indicates how maps and satellites are used to govern land and trees in Suau—how REDD+ has introduced new forms of surveillance to control land use. The kinds of maps used in the REDD+ project—for example, topographical maps made from satellite imagery that classify 'primary' and 'secondary' forest—represent local land and land use in forms that are



legible to institutional actors and that make land and trees productive for conservation and economic valuation.

Similarly, Save the Forest use satellite imagery to map community forest boundaries. The Forest Protection Agreement between the community and Save the Forest states that the charity, 'will not continue its support if the [community] cut their trees, with the previously mentioned exceptions, which will be monitored and corroborated through visits and satellite monitoring'. The exceptions mentioned here include that, 'the community may cut a select number of trees for community use, in the construction of houses and community spaces, tools for personal or collective use or for agro-forestry with the approval of [the community association]'. In this project, maps and satellite imagery are used to establish and monitor land use, but they also work to categorise and enforce what trees can be cut down, who can cut trees and for what purposes. By monitoring land use, these projects impact people's relationship to their land, disturbing connections with ancestors and influencing how environments are perceived and enacted.

To demarcate areas where trees can and cannot be cut down, maps and satellite imagery reinforce particular definitions of 'forest' and 'classes of land cover', namely 'primary' and 'secondary' forest. In practice, this involves using tools to establish bounded plots of land to measure and monitor trees and the carbon they store. For the Central Suau REDD+ Pilot Project, preliminary sample plots were initially located using satellite imagery and maps and confirmed using GPS to mark the boundaries of each plot (SPC/GIZ, 2015a). This process led to disputes. The *Forest Carbon Inventory* (SPC/GIZ, 2014, p. 11) report reveals: 'A number of cluster sites and also parts of clusters had to be dropped due to landowner permission issues...'. Bandi, who accompanied a forestry team attempting to establish one of these plots, discussed how the team used GPS and the disputes over marking fixed boundaries in areas where land tenure is shared between a number of clans and boundaries are not clearly defined: 'They [the landowners] say that this land is not really settled, there is some bother, this place [goes to this clan] and this place [goes to another clan], then [another clan] came in and they all meet together here. So here it is about the border. So when they got the GPS, there are some boundaries. I mean, the owners are not really sure [of the boundaries]'.

Like REDD+, Save the Forest projects generated tensions around using tools like GPS and focusing on preserving 'primary' forest. Save the Forest promotes a 'pristine forest' discourse (see Macintyre & Foale, 2002, p. 2) and selected the project site in Suau because the area is 'strategically placed to shield the pristine rainforest behind', which fails to recognise the ways that people in Suau have always used their land and trees. Early in the project, a visiting team attempted to mark boundaries using GPS and put cameras in the forest to monitor wildlife activity. However, this led to disputes and a group of local landowners threatened to break the equipment; Save the Forest have since been careful to avoid such mapping activities. By attempting to inscribe boundaries around land and trees, and around people, in Suau, both REDD+ and Save the Forest have generated friction.

6 | DISCUSSION

So far, this paper has described the complex and contested ways that people use and make claims to land in Suau. It has also explored the tools that REDD+ and Save the Forest proponents employed to flatten that diversity by rendering land and trees technical. The consequences of these practices are manifold, including limiting Indigenous people in Suau from having access to their ancestral lands, thereby potentially alienating them from maintaining ancestral and community



connections, but also increasing the precarity of people's lives by reducing their livelihood options and food sources. As the last section pointed out, 'rendering technical' causes local disputes, which have arisen due to the ways landownership and boundaries are defined under these projects, and how the techniques themselves are being challenged. This shows how friction is produced as global power intersects with local lives—it is a product of encounters across difference, encounters that can be unequal.

6.1 | Friction, power, and inequality

As a conceptual lens, friction allows us to question dominant assumptions about the nature of reality—assumptions reinforced through processes of rendering technical—not in terms of truths or lies, but as 'sticky engagements' (Tsing, 2005, p. 6). Friction encapsulates unstable, unexpected, and unequal encounters across difference (Tsing, 2005). Within this instability and movement, friction is not only a product but is productive for governing environmental problems. Friction enables exploration of how supposedly 'universal' or 'technical' knowledge moves from global to local and comes up against other ways of being and knowing. By examining disputes over the order and control of land as sites of friction, we can investigate the intersections between ontological and epistemological dimensions of land and practical concerns of livelihood inequalities (West, 2016, p. 128). Disputes over land and trees are not only about usage rights and livelihoods, they are about the very ways people perceive and enact their realities.

Attempts to render landownership static in the REDD+ and Save the Forest projects in Suau have generated significant frictions, not only about claims to land, but in transforming previously mobile and negotiable land tenure systems into a system comprising fixed and formalised landowner groups (Filer, 2007; Gilberthorp, 2007). As Minnegal et al. (2015, p. 500) highlight, the ILG process is focused on the 'definition of categories and drawing of boundaries, rather than on the negotiation of relationships'. This has the potential to reshape and fix previously fluid social and political forms. Even though Save the Forest have not utilised ILGs in their projects, they also attempt to stabilise communities into a fixed group that excludes customary landowners who live outside the project area. Kinship histories and stories from Suau illustrate that lineages are mobile (see also Demian, 2007a, p. 103), that land is not necessarily owned exclusively by stagnant clan units but, rather, that usage rights depend on complex relations between people, land, and trees. The performance of co-existing land claims in Suau reveals the flexible relationships between people and land, the different ways in which clan groups and places are perceived and enacted. These frictions are influenced by, and have consequences for, power relations, both between communities and project proponents and within communities themselves (see also Stead, 2017, p. 76). Undermining the flexibility of land use rights can negatively impact local livelihoods and food security (Weiner, 2013).

Further, bounding and fixing landownership in these ways may exacerbate gender inequalities by undermining matrilineal land tenure systems. In Suau, there are concerns about land registration processes being corrupted by patrilineal sensibilities of outside groups (Demian, 2006, p. 524) and ongoing changes to gender relationships since missionisation (Kaniku, 1977). Although women from Milne Bay have been more prominent in public affairs than women in most other parts of PNG (Kaniku, 1981), as men continue to occupy formal positions of authority, the roles of women in decision-making are continually being (re)negotiated. Under matrilineal land tenure systems, women in Suau play important roles in negotiation and decision-making processes, but



these roles are changing. Formalising the roles of these men through the ILG process may damage the processes that underpin matrilineal land tenure systems. The ILG registration process has been criticised for excluding women from decision-making and legal systems and, in doing so, validating male power structures (Beer, 2018, p. 354; Macintyre, 2003). Since colonisation, there have been disruptions in women's traditional power over land (Kaniku, 1981, 1989), with men increasingly being recognised, not just by outsiders but internally, in formal decision-making roles (see also Hermkens, 2011). In as much as REDD+ and Save the Forest project proponents recognise certain landowners and exclude others, they could further undermine the complex decision-making processes that facilitate matrilineal land tenure.

6.2 | Maps, boundaries, and abstractions

Tools used to inscribe boundaries, namely maps, satellite imagery, and GPS, have also contributed to these frictions, ontological conflicts, and resultant inequalities. In environmental governance interventions, maps operate as instruments of control that transform fluid and contested ways of knowing and using land into fixed boundaries, while also defining the economic value and productivity of areas of land (Chao, 2017). Maps are always abstractions; they reduce information to content but are not the lived relations between people and land (Dwyer & Minnegal, 2014). As Tsing (1993, p. 287) discusses, maps mark out a dream of development in which the 'untidy forests' and 'backward peoples' are tamed and transformed. Boundaries drawn on maps, with connotations of ownership and property rights, intrude on the lives of other people (Minnegal & Dwyer, 2017, pp. 164, 165). Making land and trees productive in this way can erase local forest claims. Maps and satellite imagery present particular—limited—interpretations of land and land use (Bong et al., 2016), which may not fully capture the variety of ways people in Suau engage with land and trees and the deep ancestral and kinship connections that exist within these engagements.

Maps, satellite imagery, and GPS are used not only to define boundaries but to classify different categories of land use and trees. The definitions of 'primary' and 'secondary' forest underpinning the Central Suau REDD+ Pilot Project and the discourse of 'pristine' forest in Save the Forest project generate frictions with the ways that people in Suau use their land and trees. The classification of primary forest is particularly problematic as an area that lacks any obvious signs of human habitation may be important as a hunting ground or sacred site (Stella, 2007, p. 31). The swidden agriculture practiced by people in Suau means their food gardens are constantly moving. Any map that purports to inscribe boundaries around areas of 'primary' and 'secondary' forest is thus necessarily contingent and will be of short-lived validity. These categories have little salience for people living with, gardening, and hunting in the forest. The abstraction of trees into homogenous categories of 'forest' also obscures the role trees play in making land claims, negotiating land management and practicing sorcery (see also Scott, 1996, p. 44).

With its focus on preserving 'primary' forest, REDD+ necessitates that people in Suau alter their subsistence agriculture practices, often shortening fallow cycles in designated 'secondary' forest, which risks degrading land and reducing crop yields. People have also been instructed by Save the Forest not to cut down trees, putting pressure on local livelihoods. In the context of climate change impacts, including rising sea levels and changing rainfall patterns, this may lead to food insecurity. But these projects are not the first interventions seeking to reduce clearing of land; the colonial administration also attempted to govern land in Suau by encouraging



intensified use of old garden sites. A colonial government anthropologist noted that the system of 'rotation of areas' in Suau is a 'destructive one' where the 'actual gardening methods are very primitive' and 'involves no small waste of time and energy' (Williams, 1933, p. 66). Colonisation, and other governance interventions, operate by foreclosing ontological possibilities and marginalising Indigenous ways of enacting land (Burow et al., 2018, p. 58). Indeed, climate change mitigation and conservation programs occlude Suau ways of perceiving and representing land, which has material and livelihood consequences.

While the concept of rendering technical is useful analytically for understanding how land and trees are made productive and valuable in environmental governance interventions, engaging with the concept of friction works to ground these processes at the points where they intersect with local lives. Land and trees that are 'rendered technical' in REDD+ and Save the Forest projects do not cease to be 'rendered relational' by local landowners and users. Processes of rendering technical do not occur independently nor in isolation from local social relations. It is the foregrounding of categorical framings of land and trees over the relational connections and conceptualisations that generate frictions, inequalities, and ontological conflicts (Blaser, 2009). Engaging with the concepts of rendering technical and friction together enables consideration of ontological politics—what constitutes reality, what is the nature of existence, and what is foregrounded or marginalised in governance interventions.

7 | CONCLUSION

This paper has presented stories from Suau to complicate the ways that land and trees are framed in REDD+ and Save the Forest projects. Climate change mitigation and conservation programs attempt to make land ownership static and inscribe boundaries around land and trees using tools like ILGs, maps, satellite imagery, and GPS. The exercise of power within processes of rendering land and trees technical generates frictions between different assumptions of the nature of reality. Through ethnography and collaborative reflection, this paper has described the complex relations between people, land, trees, and sorcery in Suau; land tenure systems and land use patterns are complex, contested, and contextual. More categorical frames, which exclude this relational way of knowing and being, cannot account for the ways that people in Suau use and engage with their land and trees. As people depend heavily on subsistence agriculture in this area, this process of excluding certain people, limiting claims to landownership, and restricting land use impact significantly on livelihoods. The increasing fixity and rigidity of decision-making roles over land also undermines fluid matrilineal land tenure systems. Rendering land and trees technical impacts not only the ways people use and relate to land and trees, but generates land disputes producing frictions between different ways of being and knowing.

Employing the concepts of 'rendering technical' (Li, 2011) and 'friction' (Tsing, 2005) together offers a way to examine how global agendas operate in practice and how they intersect with local lives in ways that generate conflicts—across material, procedural, epistemological, ontological, and ethical dimensions. This is important for understanding processes of translation and implementation of climate change mitigation regimes and the grounded and nuanced ways that local people use and relate to their environments and interventions. As climate change is impacting on food security, health, and wellbeing globally, we need careful and situated frameworks to understand how these unequal impacts intersect with, and affect, Indigenous people's relationships to land, trees, ancestors, and community.



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DATA AVAILABILITY STATEMENT

Due to the ethnographic nature of data and potential to identify research partners, data is not available for this article.

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Endnote

¹ To protect anonymity, we use the pseudonym 'Save the Forest' for non-government organisations and the generic term 'project proponents' instead of the names of government and multilateral agencies. As a publicly declared demonstration site, the Central Suau REDD+ Pilot Project is an exception and is, therefore, named throughout the paper. The names of all people and clans have been changed and place names have been generalised.

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