



A silver lining to REDD: Institutional growth despite programmatic failure

Monique Borgerhoff Mulder^{1,2} | Tim Caro³ | Assa Sharif Ngwali⁴

¹Department of Human Behavior, Ecology and Culture, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

²Department of Anthropology, University of California at Davis, Davis, California

³School of Biological Sciences, University of Bristol, Bristol, United Kingdom

⁴Department of Forestry and Non-Renewable Natural Resources, Zanzibar, Tanzania

Correspondence

Monique Borgerhoff Mulder, Department of Anthropology, University of California at Davis, Davis, CA 95616.

Email: monique_borgerhoff@eva.mg.de

Funding information

Max-Planck-Institut für Evolutionäre Anthropologie; Seed Grant for International Activities, Grant/Award Number: UC Davis Global Affairs; UC Davis' College of Letters and Sciences

Abstract

What happens when conservation interventions ostensibly fail? We outline a REDD+ intervention on Zanzibar, Tanzania which is adapting to a failure to implement carbon compensation payments and to the increased global price of cloves. Using a mix of quantitative and qualitative methods we provide preliminary evidence that well-managed *shehia* (wards) with registered Community Forestry Management Agreements (CoFMAs) are slowing their rates of deforestation. We also find an increase in the number of *shehia* with CoFMAs despite the absence of carbon payments. Using this island-wide case study we make inferences about the mechanisms whereby institutional expansion has occurred in ways consistent with cultural evolutionary dynamics of institutional change. We draw lessons for planning and practice that may help with the design of future conservation interventions and with bolstering the morale and effectiveness of disappointed partners.

KEYWORDS

cultural evolution, governance, institutions, REDD+, Zanzibar

1 | INTRODUCTION

The sustainable management of common pool resources requires trust and cooperation among users. For this reason institutions of governance have long been recognized as being of critical concern both locally and globally (Cox et al., 2020; Ostrom, 1990). Increasingly investigators recognize the need to understand the evolutionary processes underlying how institutions change (Currie et al., 2016; Kallis, 2007; Norgaard, 1994), spawning a literature with promising conceptual framings (e.g., Lubell, 2013; Reyers, Folke, Moore, Biggs, & Galaz, 2018; Schlüter et al., 2019) and cogent calls for sustainability scientists to embed institutional change more deeply into their

research (e.g., Caldas et al., 2015). On the other hand, empirical investigations into how institutions persist and change over the period of a project intervention, with their potential to illuminate institutional dynamics, are remarkably few, especially those conducted in real time. Given the challenge for sustainability scientists to identify and clarify the mechanisms involved in institutional change (Brooks, Waring, Borgerhoff Mulder, & Richerson, 2018; Ostrom, 2009; Waring et al., 2015) we describe the case of an apparently failing Reduced Emissions from Deforestation and Degradation (REDD+) project to explore how, despite the absence of carbon payments, some of the institutional features of the intervention have persisted and spread. We present this as a

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2020 The Authors. Conservation Science and Practice published by Wiley Periodicals LLC. on behalf of Society for Conservation Biology

Perspective because, on account of what had actually happened on the ground, we were unable to test specific theoretically-derived hypotheses regarding the institutional effects of REDD+ payment (Andrews & Borgerhoff, 2018), but instead relied on opportunistically-collected data to determine developments as they occurred in real time.

Institutions are human-devised mechanisms for generating rules of social interactions through communication and negotiation (Gardner & Ostrom, 1991). They change over time as a result of both selective forces (e.g., Waring, 2010), and direct deliberation and agency among people and communities (e.g., Bowles & Gintis, 2011; Folke, Colding, & Berkes, 2003). Accordingly, institutions can emerge *de novo* through design, from selective copying, and/or by imposition. They may, or may not, percolate through a society as widely-held social norms (Smaldino, 2014); similarly they may or may not ensure adaptive outcomes (Currie et al., 2016). Further, their emergence and change will depend on socioeconomic, cultural and institutional preconditions, as well as on external triggers and challenges (Paciotti & Borgerhoff, 2004). As such, an understanding of institutional change, and indeed cultural change more generally, calls on disciplines ranging from psychology, anthropology, ecology, history, organizational theory, economics and politics (Gintis, 2007), all trying to grapple with an as yet under-developed co-evolutionary framework.

Environmental outcomes of conservation programs are notoriously hard to measure (Baylis et al., 2016), and can often only be observed over time frames longer than project interventions (Brooks, Waylen, & Borgerhoff, 2012). Furthermore, successful outcomes consist not only of desired environmental states, but of the *mechanisms* that have the potential to ensure such environmental states (e.g., Miller, Rana, & Wahlén, 2017). This means that successful institutions of environmental governance are not merely proxies for success, but inherent features of success. For example, to evaluate the success of an intervention designed to reduce illegal lion *Panthera leo* killing in Tanzania it is more important to monitor shifts in community attitudes toward lion killers and adherence to new community-instituted bylaws than to census changes in the number of lions in adjacent protected areas. The former indicates cultural and institutional shifts whereas the latter only indirectly gauges illegal offtake given multiple pressures on protected areas and wildlife populations that might confound analysis (Borgerhoff Mulder et al., 2019).

According to this view, institutional rules of governance, together with their adaptive capacity (the ability to adjust flexibly and effectively to changing social and environmental conditions), are a key determinant of whether communities succeed or fail in solving

challenges, both biophysical and social. These are obviously not new insights—that governance is key to common pool resource management and that institutions require adaptive capacity—but serve to remind conservation practitioners and researchers of the need to monitor how resource users and their partners adopt, adapt, modify, and reinvent institutions. Here we ask if it is possible that palpable project failure can catalyze institutional responses among resource users, thereby laying potential foundations for new solutions?

To explore this question empirically, we present a descriptive case history of a REDD+ institutional intervention in Zanzibar and its ongoing challenges (Andrews et al., 2020). More specifically, we provide empirical evidence of the dynamic processes whereby the Community Forestry Management Agreements (CoFMA) delivered by the REDD+ intervention have percolated across the island despite the failure of REDD+ to eventually deliver on carbon payments, its principal objective. We also show how some features of these CoFMAs, in particular the quality of their governance, have served to protect community forests. In this way we reveal how communities of resource users, together with implementing partners, evolve and adapt under the changing opportunities and constraints associated with community-based conservation interventions.

Our message is this. Labeling an institutional intervention as a success or failure is required for development partners' reports, and more broadly for informing the design of future interventions. But such a dichotomy distracts from exploring the routes whereby community values and institutions coevolve, or how institutions originally designed to provide one social good might be repurposed to serve another function. We aim to shed light on the specific dynamics whereby such institutional interventions might evolve and spread. We argue that conservation practitioners should avoid the all-too-common but tiresome cycle of adopting, criticizing, and then abandoning conservation fads, but instead learn from them. Accordingly, we need to examine how communities exploit institutional opportunities, as already shown for other controversial interventions in Tanzania's wildlife (Wright, 2017) and forestry (Lund & Saito-Jensen, 2013) sectors.

2 | BACKGROUND TO REDD+

As a climate change mitigation mechanism, REDD+ projects aim to slow forest loss and land degradation. More than 50 countries have initiated REDD+ programs, and there are now over 350 localized projects across the tropics (Duchelle, Simonet, Sunderlin, & Wunder, 2018),

including Tanzania (Burgess et al., 2010). REDD+ has had a checkered history. Some see REDD+ as a potential triple-win (for carbon, biodiversity and poverty alleviation, for example, Angelsen, 2008), citing proven results (Jayachandran et al., 2017) and its potential to garner considerable public and private finance (e.g., Seymour & Busch, 2016). Others are concerned with the dangers to local community well-being inherent in the commodification and monopolization of natural resources (Phelps, Webb, & Agrawal, 2010; Sandbrook, Nelson, Adams, & Agrawal, 2010), particularly in the context of poor governance structures where vulnerable populations are at risk of displacement from multinational corporate interests (McDermott, 2017). For these reasons most now agree that monitoring of non-carbon outcomes (namely co-benefits such as livelihoods, tenure security, equitable benefit sharing, and also biodiversity [Hinsley, Entwistle, & Pio, 2015]) is of critical importance.

2.1 | Evidence from Zanzibar

On Zanzibar, a “REDD+ readiness” program was administered between 2010 and 2015 by the Hifadhi ya Misitu ya Asili (HIMA) program. This was part of a nationwide program with nine sites (Blomley et al., 2017; Burgess et al., 2010) designed to slow deforestation through poverty reduction, and generate green-house gas (GHG) emission reductions through developing and strengthening the capacity of communities to manage existing forests (Caplow et al. 2014). The HIMA program involved a four-way collaboration between a local facilitating umbrella non-governmental organization, CARE International, the government's Department of Forestry and Non-Renewable Natural Resources (hereon in, the Forest Department), and a San Francisco-based technical advisor (Terra Global Capital). Central HIMA activities entailed: (a) facilitating the registration of *shehia* (wards) with documents that secure land tenure, (b) zoning high protection forested areas within each *shehia*, (c) supporting *Shehia* Conservation Committees (SCC) through education, planting, restoration and the patrol and fining of illegal forest harvesting, and (d) administering trial “motivation payments” on the basis of *shehia* performance.

On the island of Pemba 18 *shehia* were invited by CARE, in conjunction with the Forest Department, to participate in the HIMA program. Selection criteria included a high percent of forest cover, rapid rates of deforestation (shown to average 3.3% per annum between 2001 and 2010 for the 18 initial *shehia* (Collins 2020), and free and informed consent. In August 2015, all 18 *shehia* on Pemba had their CoFMAs formally registered with a document that specifies the legal rights and responsibilities between

communities and their forests, essentially establishing “REDD-readiness.” At this point the project ended (Royal Norwegian Embassy, 2015b) and CARE withdrew. There was no further funding available, even though the application for validation and verification of carbon issuance had not yet cleared the auditing process.

2.2 | Current challenges

Despite some clear successes (Jarrah, 2014), HIMA failed to achieve its major goal of securing carbon revenue (Royal Norwegian Embassy, 2015b), paralleling the outcome at all other pilot REDD+ sites across Tanzania (Royal Norwegian Embassy, 2015a; Sunderlin et al., 2015). Furthermore, several measures indicate that, without carbon payments, deforestation continued apace on the island: (a) overall forest extent on Pemba (protected areas excluded) was 25% in 2001 but had declined to 15% by 2018, (b) median forest cover change across the island was -3.1% /year for 2001–2010, but -3.4% /year for 2010–2018, (c) ward-level rates of forest cover change were generally negative, with 89% of wards experiencing a reduction in forest area during 2001–2010 and 75% during the 2010–2018 period (Collins, 2020), and (d) a comparison of baseline rates of deforestation in the first period to rates in the second period shows that of the 18 Pemban *shehia* that had registered CoFMAs, six had managed to slow their rates of net deforestation in the latter period and two had greater forest cover in 2018 than 2010 (i.e., they had reversed the trend, Andrews et al., 2020).

In conjunction with these changes, there is marked frustration in communities that have been motivated with the promise of carbon payments over the last 9 years, a dynamic Fletcher, Dressler, Büscher, and Anderson (2016) call an “economy of expectations.” Many community members feel that the project has failed to provide them with anticipated financial assistance. Furthermore, some SCC members are suspected by members of their communities to be already privately receiving carbon payments from the international carbon market, payments which in actuality do not exist. In addition, the local non-governmental organization (NGO) set up to coordinate the distribution of carbon payments, and generally administer the program after the departure of the donor and implementing parties, has unsurprisingly disbanded. Pressures on forested land have increased, due to a strengthening of the global price of cloves (Brzoskiewicz, 2018), an important cash crop for many Pembrans. Some families are now reviving abandoned clove trees and planting anew, both on their private plots and in areas designated for community forestry.

Finally, in late 2019, there were further developments that potentially affect the institutional autonomy and financial independence of the SCC. Specifically, some revenue collecting and management functions of the CoFMAs have been shifted to municipal, district or central government, and the 5-year period for carbon validation has expired. These are explained and discussed in Supplementary Materials S1, as it is still uncertain how HIMA institutions will respond.

3 | EVIDENCE OF INSTITUTIONAL ADAPTIVE CAPACITY

What signs of success, or of institutional change, if any, can we discern in this situation? Here we present two independent sources of evidence to suggest that investments in “REDD+-readiness” by the HIMA program have stimulated institutional adaptation and growth in CoFMAs and their partners. Our data are based on five periods of fieldwork (2015–2020) during which we (a) made field visits to all CoFMA sites on various occasions (2015 to present), (b) ran focal group discussions and brief household-level surveys in 36 communities including eight with original HIMA CoFMAs (2016), (c) hosted a participatory workshop for community feedback (2017), (d) conducted expert witness interviews (2015–2019), and (e) combined findings with ongoing satellite imagery analysis (Andrews et al., 2020) as part of a long-term ethnographic study of REDD+. We also marshal some evidence based on 630 randomly selected households across 18 original HIMA *shehia*, with CoFMAs (Andrews & Borgerhoff, in prep). Using these data, we provide preliminary evidence that *shehias* with higher quality CoFMA management had lower rates of deforestation. We also show that there has been an increase over the last 5 years in the number of CoFMAs, despite no carbon payments. We emphasize that our mixed and participatory methodology makes study replication difficult. Accordingly, we offer our findings within the framework of how institutions adapt and coevolve with conditions on the ground, without making conclusive claims about the success or failure of REDD+ in achieving a more efficient outcome for Zanzibari forests over time (the definition of adaptive capacity, Smit & Wandel, 2006).

3.1 | Institution performance rankings and reduced deforestation

Comparing baseline rates of deforestation (2001–2010) to current rates (2010–2018) showed that of the 18 Pemban

shehia with registered CoFMAs, six had slowed their rates of net deforestation since the onset of the HIMA project, and two had greater forest cover in 2018 than 2010 (Andrews et al., 2020). This prompted an analysis of the variation in that performance, to determine whether the institutional quality of the SCC was associated with forest cover change between 2010 and 2018. With experimental data on SCC institutional quality still under analysis, we ranked SCC based on a series of expert witness interviews with personnel closely associated with monitoring CoFMAs island-wide (ASN), supplemented with phone calls to key informants in each *shehia*, where necessary; each ranking was based on the views of at least two of the following: regular citizens, respected community leaders, NGO personnel and/or DFNRNR staff. We ranked SCCs according to the expert witnesses' judgment (“good” if SCC members very active, “medium” if they were somewhat active, and “poor” if very little management was occurring), with respect to the following responsibilities: planting, monitoring, policing, communicating, and controlling leakage—all important indicators of institutional quality as well as easily monitored by community members (Andrews & Borgerhoff, 2018, see Table 2). Note first that inter-observer reliability could not be calculated as experts often discussed cases among themselves before coming to an agreement; second that judgments were made by outsiders, not SCC members themselves (who might tend to inflate estimates of activity).

Shehia with well-functioning committees showed significantly lower annual rates of forest cover change than *shehia* with medium or poorly-functioning committees although the association was not strong (Figure 1). It is relatively straightforward to identify the precise dynamics entailed. From focus groups and household surveys (Andrews & Borgerhoff, 2018) we found that SCCs that are viewed by the community as effective are those that conduct patrols of the forests and fine illegal wood poachers (especially those coming from outside of the *shehia*). In addition they had (until 2019, see Supplementary Materials S1) been issuing permits (that require payments) for individuals who want to commercially harvest timber, charcoal, and firewood for sale outside of the *shehia*. They also coordinated reforestation initiatives, and woodlot developments. In short, a well-functioning SCC might be expected to slow down deforestation and improve forest quality.

Note that unidirectional causality cannot be inferred. It is quite possible that SCCs in charge of forests with less harvesting pressure have higher morale and fewer opportunities for corruption. It is also possible that institutional rankings were contaminated by our expert witnesses' perceptions of the forest condition, even though we

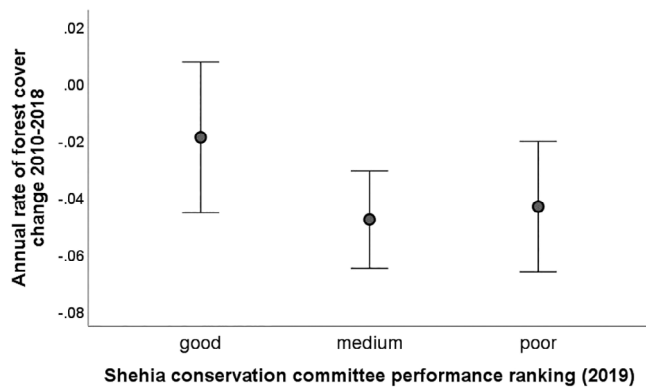


FIGURE 1 Institutional performance and deforestation. The annual rate of forest cover change of registered CoFMAs since the initiation of the REDD+ project (2010) is plotted on expert witness categorizations of Shehia Conservation Committee performance ($-2 \text{ Log Likelihood} = 53.191$ for an ordinal regression with a logit link function, $\text{chi-square} = 6.344$, $df = 2$, $n = 18$ [5 “good,” 8 “medium” and 5 “poor], $p = .042$). Means and 95% confidence intervals shown on the Y-axis

cautioned against this by asking them to focus on the performance of the SCC not the state of the forest. That said, SCCs that are ranked as high performing are clearly found in *shehia* with greater forest health and persistence. While forests and their SCC may coevolve in a dynamic relationship, the evidence is clear that institutional quality is an important component of successful forest protection in Pemba, as indeed one would hope.

3.2 | An expansion of community forest management agreements

Of the 18 Pemban *shehia* that formally received CoFMA documentation in 2015, one ceded its status in 2019. This was due initially to boundary problems with a neighboring non-CoFMA *shehia*, and once that problem was resolved, to illegal cutting against which the SCC was unable or unwilling to take action.

Despite this one loss, there had been an increase in the number of CoFMAs over time (Figure 2) and across the island (Figure 3), with another 22 *shehia* in various stages of entry into the program (Table 1) as of January 2020. Six of these *shehia* (part of the “Coastal” project [as labeled in Table 1], starting 2012) ran largely in parallel with the HIMA program, but under different funding, and were still waiting for formal documentation, without which they were unable to collect revenue. In 2014 one community (“Independent”), a single village rather than a full *shehia*, developed an entirely autonomous bid at registering as a CoFMA, with Forest Department support, and had been largely successful in protecting its village

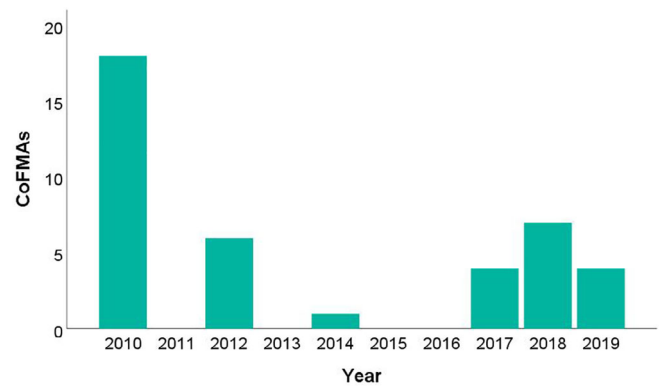


FIGURE 2 Initiation of CoFMA activities by year. For further details on the additions and extensions see text and Table 1

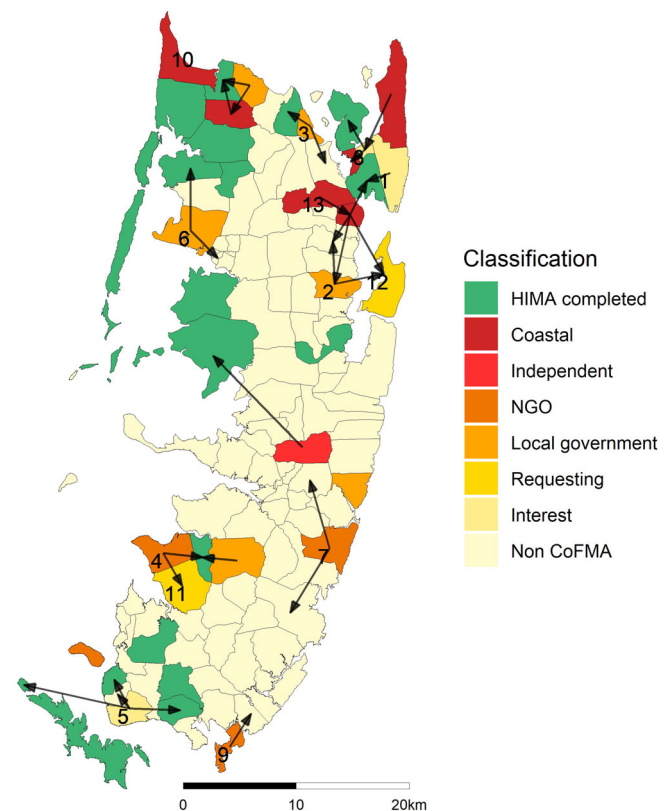


FIGURE 3 The expansion of CoFMAs across Pemba. The location of 40 *shehia* with forests at different phases in the CoFMA process, with arrows indicating the outward movement of trees for all *shehia* that have entered (or are entering) the process post the completion of the first 18 HIMA CoFMAs. Note that in a few cases shape files were not yet available for newly formed *shehia* resulting from a splitting of a previous *shehia*, so the original *shehia* area is shown. *Shehia* mentioned in the text are Maziwa Ngombe (1), Shenge Juu (2), Tumbe Mashariki (3), Wambaa (4), Chokocho (5), Ukunjwi (6), Pujini (7), Chamboni (8), Shamiani Kiweni (9), Makangale (10), Chumbageni (11), Kojani (12), Wingwi Mapofu (13)

TABLE 1 Original HIMA *shehia* with CoFMAs and new sites at various stages in the CoFMA process

N	Label	Year start	Status	<i>Shehia</i>
18	HIMA	2010	Working CoFMAs	Changaweni, Fundo Island, Gando, Kambini, Kangani, Kifundi, Kisiwa Panza, Mgelema ^a , Mgogoni, Michenzani, Mjimbini, Mjini Wingwi, Msuka Mgh., Mtambwe Ksk., Mtambwe Kus., Shumba Mjini, Tondooni, Tumbe Mgh.
6	Coastal	2012	CoFMAs implemented by UNDP “coastal forests” project following Forest Department priorities for scaling up; all steps completed, only waiting for ministerial signature	Kiuyu Shanake, Kipange, Majenzi, Makangale, Wingwi Mapofu, Wingwi Mtemani
1	Independent	2014	Independent initiative; no papers submitted yet	Vikunguni village
4	NGO	2017–2018	CoFMAs implemented by Community Forests Pemba following Forest Department priorities for scaling up; all steps completed, only waiting for ministerial signature	Makoongwe, Pujini, Shamiani-Kiweni, Wambaa.
6	Local government	2018	CoFMAs prioritized for local government funding, following Forest Department priorities for scaling up. Partially through process; funding issues	Chonga, Msuka-Mashariki, Shenge Juu, Tumbe Mashariki, Ukunjwi, Vitongoji-Kibokoni village
2	Requesting	2018/2019	Requesting CoFMA status with letters submitted	Andikoni village, Kojani
3	Interest	2019	Expressed interest, but not letter of request submitted yet	Chambani, Chokocho, Maziwa Ng'ombe

^aCoFMA status revoked 2018.

forest (paralleling successes of village initiatives stemming coastal forest loss on the mainland, Burgess et al., 2017). Such cases had motivated other communities, according to expert witness accounts. In late 2017/early 2018 four *shehia* (“NGO”), three of which had already been identified by the Forest Department in a “scaling up” initiative from HIMA and which were particularly keen to enter the program, were facilitated through the NGO Community Forests Pemba (CFP), as part of that organization’s program to ensure that poorer households have access to community forests as a source of insurance. These four communities were awaiting only ministerial signature (delayed by recent shuffles in that post). Six further *shehia* (“Local Government”), also part of the “scaling up” initiative, entered the process in 2018 with a promise of local government funding; some of the “REDD+ readiness steps were complete, but the registration paperwork not yet submitted. Finally, during the last year two communities (a *shehia* and a village, “Requesting”) had submitted letters to the Forest Department asking for CoFMA activities to be started, and another three (“Interest”) had visited the Department on multiple occasions to find out more about the program.

Absence of funds had led to little progress with respect to implementation in these last two categories.

While none of these 22 sites had had their formal CoFMA status formally registered (and were indeed at various stages of the process), the key point is that there was considerable grassroots demand for a status (“REDD + readiness”), as well as NGO cooperation (in the case of CFP), *despite* the failure of the HIMA program to garner carbon payments.

4 | DISCUSSION

In view of our interest in examining how and why institutions adapt to change, and to failure, we focus our discussion on identifying the precise dynamics whereby the number of *shehia* with CoFMAs on Pemba is expanding, despite the absence of carbon payments. This is no simple task, given the complexity of factors influencing CoFMA formation and adoption, and the changing political, economic, and local contexts.¹ Combining our quantitative description above with qualitative accounts (cf., Roe, Grieg-Gran, & Mohammed, 2013) we try to answer this

question first with a focus on proximate indicators in the empirical data, second by speculating on the general mechanisms underlying institutional adaptive capacity, and third through aligning our observations with a cultural evolutionary perspective. We acknowledge that the situation is in flux, and that new developments being implemented in 2020 (Supplementary Materials S1) will require yet further stretching the adaptive capacity of the HIMA institutions.

4.1 | The benefits of CoFMAs as seen by communities

Tenure security, leakage, and control of threats consistently emerge as key drivers associated with the persistence and spread of CoFMAs since the original HIMA program. Regarding tenure security, communities clearly value the relative formality that CoFMA registration brings to delineating their boundaries, an issue which is particularly complicated in mangrove areas where two communities across a narrow mangrove-forested sea inlet might belong to different *shehia* (as a result of long land travel distances) yet find each other's forests to be easily accessible, even by foot, at low tide. Such cases are very common in Pemba, particularly in *shehia* at the north of the island such as Maziwa Ngombe, Shenge Juu, and Tumbe Mashiriki (see Figure 3 for locations), where there are conflicts over mangrove destruction. Communities see CoFMA registration as strengthening their claims to forested areas.

Leakage of cut trees across *shehia* boundaries may also trigger CoFMA expansion. By leakage we refer to communities with CoFMAs compensating for reduced harvests in their own jurisdictions by harvesting illegally from their neighbors' forests, particularly neighbors without an active conservation committee conducting patrols—namely those without CoFMAs. These neighboring communities, suffering a loss of trees to outsiders (see arrows in Figure 3), are motivated to request CoFMA status to be better able to protect their forests. Indeed, of the 22 *shehia* joining, or interested in joining, the CoFMA process since 2010, 18 (82%) were reported as regularly losing trees to outsiders, typically to between one and six of *shehia* nearby. In short, leakage prompts non-CoFMA *shehia* to seek CoFMA membership. In this respect leakage provides an opportunity for the Forest Department to promote CoFMA awareness with a community bordering on, or surrounded by, *shehia* with CoFMAs that seek to externalize deforestation. Prominent examples of this are Wambaa, Chokocho, and Ukunjwi. We should nevertheless note that 17 of the 18 original existing CoFMAs (94%) are also losing trees to neighboring *shehia*,

meaning that CoFMA status does not actually render *shehia* immune from theft (or poaching).

Another more general dynamic that may be promoting CoFMAs is the motivation for communities to control or mitigate threats to their forest that emanate from both external and internal sources (Agrawal, Chhatre, & Hardin, 2008; Borgerhoff Mulder & Coppolillo, 2005). On Pemba many communities harbor an explicit desire to keep outside extractors at bay, whether this be for salt and lime (as in Pujini and Chamboni) or from urban timber demand (as in Ukunjwi, which is connected by a good road to a large district town). Similarly CoFMA status is favored by some as a strategy to keep foreign (or Unguja-based) hotel developers out, as in Shamiani-Kiweni and Makangale, although there are often conflicting views on this within communities. A somewhat different dynamic can be seen where community members seek to adjudicate internal conflicts by registering their *shehia* as a CoFMA. Thus, in one community, young SCC members seek CoFMA status to weaken the power of village elders who purportedly allow illegal mangrove cutting. In another, some members of the community would like to use CoFMAs to establish community woodlots in order to undercut private woodlot owners selling firewood at unreasonable prices. In a third, the community used Forest Department support to completely replace the corrupt members of the SCC.

Finally, there are explicitly endorsed less material objectives for requesting CoFMA status—community pride in their forests (as in Andikoni), fervent desire for autonomous management (Kojani), maintenance of traditional knowledge of cultivar diversity (communities supported by CFP), and the protection of sacred sites (as in Wingwi Mtemani). These motivations build on an economy of forest-dependency (Newton, Miller, Byenkya, & Agrawal, 2016; Walsh, 2007; Walsh, 2009), a history of customary forest management norms (Benjaminsen, 2014; Craster, 1913; Pakenham, 1947; Shao, 1992), a recognition of the forest as a safety net for vulnerable households (Benjaminsen & Kaarhus, 2018; Fagerholm, Käyhkö, & Van Eetvelde, 2013) and a source of spiritual power (sacred groves [misitu ya jadi, misitu ya mizimu] as described by Madeweya, Oka, & Matsumoto, 2004), all dynamics previously demonstrated across Zanzibar. While it is hard to quantify these cultural values invoking identity, security, recreation, spirituality and aesthetics (cf., Fagerholm et al., 2013), they appear to play a significant role in aligning community interests with HIMA objectives, as detected in exchanges during long walks with community members in 2015 and 2016 (see Gross-Camp, 2017 for Tanzania more generally).

So do *shehia* with CoFMAs present an appealing model to others, as gauged by views among community

members? Data from a small random sample of interviews ($n = 155$) conducted in 2016 with household heads across the original 18 HIMA *shehia*, indicated general satisfaction with at least some aspects of CoFMA activities planting and education, (see Andrews & Borgerhoff Mulder, 2018), suggesting some level of community-wide buy in. Furthermore, community members nominated multiple values for their forests, including direct economic use, ecosystem services, and a range of cultural and aesthetic considerations (Supplementary Materials S2). A more recent detailed study across the 18 *shehia* with CoFMAs, based on interviews with heads of randomly selected households ($N = 630$), shows that 90% of interviewees agree that the SCC is an important institution, 85% that the SCC is efficient/skilled, and 45% that the SCC is trustworthy, while only 37 and 26% of interviewees have directly participated in SCC activities or report benefitting directly, respectively (J. Andrews, unpublished data).² Accordingly, we might expect a somewhat favorable impression to be conveyed from CoFMA-*shehia* to neighboring non-CoFMA-*shehia*. Notably Pemba does not diverge from the rest of Tanzania with respect to at least partial success in community forest management, as we point out below.

Despite these consistently-observed triggers for CoFMA expansion (and tentative evidence of community support), we acknowledge the difficulties in discerning the extent of autonomous agency among the 22 late-joining communities. Indeed 16 of these *shehia* (“Coastal” ($N = 6$), “NGO” ($N = 4$), “Local government” ($N = 6$), see Table 1) were expressly identified by the Forest Department as in need of CoFMAs (to control leakage, or to resolve boundary issues) as a “scaling up” priority. The relative role of local autonomy versus state directive remains much contested in the Tanzanian forestry sector (Lund & Bluwstein, 2018; Mascia & Mills, 2018). In our view from Pemba, although REDD+ is by definition a “top down” process, its recent expansion requires grassroots agency insofar as the community must autonomously approach the Forest Department for assistance and advice. Without a letter from the community no “REDD-readiness” activities can go forward, although how exactly a community agrees on a letter is somewhat opaque, and village-specific. In fact it is only in cases where CoFMA development is classed as “Independent” ($N = 1$), “Requesting” ($N = 2$) and “Interest” ($N = 3$) that can we assume complete community autonomy. In addition, even in such cases there may be diverse opinions within the community, particularly insofar as a *shehia* is an administrative category not necessarily a naturally occurring community. This is especially so in western *shehia*, most suitable for clove production, where some of the wealthier farmers want to expand clove

production into CoFMA-protected forests to capitalize on rising global prices. In short, CoFMA initiation and expansion must be seen as the outcome of a two-way communication between the Forest Department and the community.

4.2 | Mechanisms underlying institutional adaptive capacity and persistence

Why might this apparent survival and spread of community managed forestry institutions be occurring, given the palpable failure of REDD+ to compensate communities with carbon payments for avoiding deforestation? Our aim here is not to review the attractiveness of community-based forestry management which, in its many different configurations, has considerable (but often still unrealized) potential to benefit communities worldwide (Agrawal et al., 2008; Hajjar et al., 2016). Rather, and in line with this Perspective's focus on governance, we build on our empirical account to speculate on several possible mechanisms that may be responsible for the specific persistence and spread of CoFMAs on Pemba.

First, an institution promoted to secure carbon payments and other co-benefits has to some extent taken on a life of its own, whether it is to secure tenure, control threats to the resource base, or provide less material forms of satisfaction, as outlined above. Modification of institutions for different functions (or “exaptation,” Currie et al., 2016) is of course nothing unique to the institutions employed by REDD+, but understanding how individual or partisan interests feed into these dynamics (e.g., Ensminger & Knight, 1997) is important if we want to understand how institutions evolve over time.

Second, REDD+ was not introduced into an institutional vacuum, neither in Tanzania nor Zanzibar. Much has been made of Tanzania's progressive decentralized forestry policies, with a strong emphasis on participatory forest management (Blomley et al., 2016; Burgess et al., 2010; Kweka et al., 2015; Sungusia et al., 2020), and of the more effective community management in the forestry than the wildlife sector (Nelson & Blomley, 2010). With respect to Pemba the HIMA program grew out of an earlier (1996–2005) small community forestry project funded by CARE which focused on conservation and community development in just 10 villages around Ngezi forest in the northwest, and more speculatively out of deeper community management institutions (Madeweya et al., 2004; Pakenham, 1947; Shao, 1992). Because of early successes around Ngezi, HIMA partners elected to scale up this community management model from the

village to the *shelia* level and roll it out across the archipelago. HIMA was not imposed on a void but built onto a history of decentralized forest management and co-management; indeed, conservation committees, albeit of varying skills, reputation and credibility, already existed at some sites. Not surprisingly, then, the failure to deliver on REDD+ is not such a crucial blow to community forest management as it might at first appear, since it has deeper institutional roots. As many institutional economists have pointed out, and empirical evidence bears out (e.g., Haider et al., 2019; Paciotti & Borgerhoff Mulder, 2004), consistency with preexisting institutions favors successful outcomes.

Third, while the HIMA program has not produced marketable carbon, it produces “co-benefits” (effectively non-carbon outcomes) which may have attracted communities (neighbors and beyond) to the CoFMA concept. These potential “pull factors” include secure land tenure (specifically zoning agreements that help to keep outsiders at bay), institutions to help reduce threats (both internal and external), and the alignment (to some extent) with cultural, economic and aesthetic preferences, as outlined above. In addition HIMA gave SCCs the authority to charge revenue for the legal extraction of timber and charcoal to be sold outside the *shelia* (until recently revoked), provided support in forest management and conflict adjudication, made “motivational” payments to demonstrate how carbon payments would work, provided funds for small-scale enterprises, and offered free technical advice and materials. Regarding small-scale enterprise the HIMA program supported groups in planting wood lots and bee-keeping, generating direct material benefits for at least subsets of individuals. Regarding technical advice, *shelia* with registered CoFMAs receive help from the Forest Department with nursery development, mangrove planting, and woodlots. Finally, with respect to management, Forest Department personnel provide much-needed moral cover (cf., Benjaminsen & Kaarhus, 2018) for committee members in punishing both insiders and outsiders for illegal offtake, and in some cases removing corrupt SCC members. As noted above, communities seeking CoFMA status appear to view one of more of these relatively tangible features, or “co-benefits,” as motivating reasons for persisting with or joining the initiative.

Finally, the loss of trees from *shelia* without CoFMAs into *shelia* with CoFMAs (leakage) creates a clear incentive for the former to organize themselves against illegal cutting from outsiders. This provides a somewhat counterintuitive perspective to leakage, typically seen as a weakness of the design of project-based REDD+ interventions. It suggests that interventions need to consider carefully spatial dynamics in prioritizing sites for CoFMA

awareness (see also Eilola et al 2015 for emphasizing spatially sensitive planning for Zanzibar).

4.3 | Cultural evolutionary perspective

Sustainable management of natural resources raises stark collective action problems. Initially Andrews and Borgerhoff Mulder (2018) had proposed that carbon payments could motivate collective action through cultural multilevel selection (see also Waring et al., 2015; Waring, Goff, & Smaldino, 2017). Specifically, we argued that when the benefits to communities arising from REDD+ performance payments outstrip the costs to individuals of restraining forest harvest, individuals should preferentially adopt cultural institutions that ensure conservation. Furthermore, if the REDD+ program was to reward communities in proportion to their success in slowing deforestation, nonparticipating communities would copy participating communities, such that sustainable norms spread through endogenous processes. Specific mechanisms proposed for the spread of collective action within and between communities included prestige-biased transmission, pooled punishment, and the adoption by neighbors of the norms of successful *shelia*. These mechanisms are rendered largely irrelevant in the absence of artificially-induced payoffs (as in REDD+) to cooperation, or at least the benefits of sustainable management are pushed so far out into the future that payoffs seem unlikely. So what cultural evolutionary mechanisms might account for the spread of institutions put in place by HIMA?

We posit four cultural evolutionary dynamics that may contribute to this CoFMA expansion. First, from our consideration of the empirical material presented here it seems that when external forces create strong selection on groups, group-beneficial cooperative behaviors and institutions emerge, as predicted by cultural group selection models (Richerson et al., 2016). This is because these pressures can shift cost-benefit ratios of cooperation for individuals and communities. Thus, where a neighboring *shelia* poaches “our” trees in an attempt to externalize their harvests, “we” may favor adopting cooperative institutions to protect “our” trees. Such dynamics would appear to be driving the eagerness with which at least some communities are adopting CoFMA institutions, even in the absence of carbon payments. A similar between-group selection pressure may come into play when communities secure land tenure, or resist land grabs by external prospectors, as a result of their CoFMA status.

Second, while REDD+ schemes can easily become prey to elite capture there are some indications that its institutions, when well-functioning, can also serve to adjudicate internal conflicts, as we have seen in examples above. Clearly

this is a delicate balance, and appropriation by the wealthy undoubtedly persists, both on Unguja (Benjaminsen, 2014) and Pemba (Andrews & Borgerhoff Mulder, 2018). Nevertheless, we also saw empowered SCC members challenge abuses from the wealthy and otherwise influential, and fine community members who were cutting timber for sale outside of the community. This serves to reduce within group variance relative to between group variance, key to the operation of cultural group selection (Andrews & Borgerhoff Mulder, 2018; Richerson et al., 2016).

Third, HIMA delivers significant co-benefits. These are unlikely to be of sufficient value to drive prestige- or payoff-biased transmission between communities as originally predicted (Andrews & Borgerhoff Mulder, 2018), but they appear to be attracting at least some members of some communities to work with the Forest Department or CFP, for example to obtain seedlings for tree nurseries, getting access to beekeeping equipment, or adjudicating conflicts. While these are not the benefits originally promised, they generate immediate and observable rewards that, at least for some people, shift the cost-benefit calculus central to pay-off biased social transmission (Andrews & Borgerhoff Mulder, 2018) with respect to following HIMA rules.

Fourth, HIMA institutions and CoFMA practices align quite closely both with non-material values of the forest (in offering a sense of identity, security, religiosity, and autonomy) and with reported traditional management practices. This may serve to reduce cultural barriers to the adoption of HIMA institutions. Barriers for institutional adoption and diffusion are raised by cultural distance (between the source of the new cultural trait and the adopters, *sensu* Spolaore & Wacziarg, 2009), and REDD+ is clearly a foreign imposition, but its emphasis on sustainable management of forests is not alien (Supplementary Material S2). As noted above, at least some of the REDD+ readiness practices were consistent with local custom, and in most of the communities that we visited we met ardent defenders of forests and forestry management. That said, a focused study of the coevolution of CoFMA institutions and community values, in the context of power dynamics and social relations, would offer a fruitful area for future theoretical development and empirical understanding.

In short, a palpable failure (no carbon payments), which may in part result from external perturbations (a weak global carbon market and no follow up from original partners), is not necessarily the end of the road. As Miller et al. (2017, p.55) note we should be constantly cognizant of “project afterlives.” Even when interventions stall, they have the potential to catalyze institutional responses among resource users and their partners that potentially lay the foundation for new solutions, as the continued expansion of CoFMAs might indicate.

5 | POLICY IMPLICATIONS

From the insights we draw from this empirical study of the fate of REDD+ over a 10-year period, we make three specific recommendations for conservation planning and policy more widely.

First, planners should carefully consider spatial dynamics. Previously, we pointed to how conflict across boundaries, and specifically leakage, could promote cooperative institutions (Andrews & Borgerhoff Mulder, 2018). With two further years of longitudinal CoFMA monitoring, the evidence continues to suggest the importance of this dynamic. More generally, an understanding of how and why interventions might spread spatially as a result of boundary conflicts and leakage, or alternatively might be damaged by such dynamics, must now be central to how interventions are targeted spatially across heterogeneous landscapes. Similarly, the degree of community tolerance (Pisor & Surbeck, 2019) to outgroup members such as inhabitants of neighboring communities may also be key to the spatial selection of sites for interventions.

Second, policy makers should beware of research findings that boldly claim successes, or equally failures, based on short-term study. Researchers, particularly those focused on monitoring and evaluation, have a tendency (and often an incentive) to draw crisp conclusions about the merits and demerits of particular instruments, focusing on short term outcomes. The current bandwagon for totally dismissing REDD+ as an effective conservation instrument is a case in point (e.g., Lund, Sungusia, Mabele, & Scheba, 2017) whereas in reality outcomes associated with REDD+ are highly disparate and difficult compare across cases (Duchelle et al., 2018). It is obviously imperative to determine whether an intervention's objectives have been met, as well as to identify the reasons specific interventions fail, to better guide future project design. But it is also important to monitor features that might be predictive of the more distal socioeconomic impacts of an intervention (cf., predictive proxy indicators, Miller et al., 2017) or of improvements in perceived government capacity (as shown by Salerno et al., this issue). Here evolutionary social scientists, with their interest in longer-term dynamics, can make a key contribution with their focus on the specific ways in which institutions and culture coevolve. For conservation activists and policy makers we stress that HIMA's failure is not decisive. Generally, it may be wiser to pay more attention to the longer-term outcomes of interventions, and specifically to build on their achievements, rather than to jostle over the supremacy of different conservation “fads.”

Third, and related, designers of conservation interventions should consider carefully how to monitor success. As noted in the introduction, vibrant community forestry institutions, functioning in a manner consistent with Ostrom's

core design principles for commons governance (Wilson, Ostrom, & Cox, 2013), may be the most robust indicator of future success. In this particular case we propose that even if “REDD+ is dead” (a common sentiment as reported, for example, by Fletcher et al., 2016), the institutions that it has spawned have the potential to manage community forests as both an insurance for poorer forest-dependent households and a critical source of ecosystem services, an argument also made by Blomley et al. (2017). The message for conservation planners and funders then is to consider carefully which outcomes are most likely to be indicative of long term success, given that every funded program has a term limit.

In summary, new behavior, preferences and strategies have emerged in response to the opportunities and challenges offered by REDD+ on Pemba and, to the extent, they are desirable, they should be fostered. A good example of this is the assistance CFP has provided by supporting CoFMA development in *shehia* for which the Forest Department had no funding. The future for community forest management under REDD+ in Pemba, and Tanzania more broadly, is uncertain given problems with carbon pricing as a global climate mitigation strategy (Rosenbloom, Markard, Geels, & Fuenfschilling, 2020) and the concomitant compromised status of REDD+ as an economic instrument. There are, however, new bio-accreditation ideas afoot (Porrás & Steele, 2020) that may help incentivize communities to continue investing in their forests as a source of livelihood. With ongoing support from partners, both government and non-government, communities can perhaps continue to adapt their institutions and practices to the ever-changing novel challenges, as they have done over the last 10 years since the start of HIMA.

ACKNOWLEDGMENTS

This fieldwork was funded by a Seed Grant for International Activities from University of California, Davis Global Affairs, by University of California, Davis' College of Letters and Sciences, and with further support from the Max Planck Institute of Evolutionary Anthropology (Leipzig). We thank the Department of Forestry and Non-Renewable Natural Resources for supporting our research and for allowing us to work with their staff when needed. We are grateful to our many colleagues in Pemba for their expert witness information, Said Ali Juma for a careful review of our findings, Ilaria Pretelli for preparation of Figure 3, Jeff Andrews for manuscript comments and citation of unpublished data, Tim Waring for reminding M. B. M. to assiduously record small changes that occur over time—however, insignificant they seem, and our reviewers for constructive comments. Open access funding enabled and organized by Projekt DEAL.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Monique Borgerhoff Mulder designed the study; Monique Borgerhoff Mulder, Tim Caro, and Assa Sharif Ngwali collected the data, Tim Caro and Monique Borgerhoff Mulder analyzed the data, and Monique Borgerhoff Mulder and Tim Caro wrote the paper.

DATA AVAILABILITY STATEMENT

All data are available on request from the corresponding author (monique_borgerhoff@eva.mg.de).

ETHICS STATEMENT

This research was conducted with permission of the Revolutionary Government of Zanzibar. Ethical clearance was granted by University of California Davis Institutional Review Board ID991486 to MBM for “Community-Based Forest Conservation under REDD in Pemba, Zanzibar.”

ORCID

Monique Borgerhoff Mulder  <https://orcid.org/0000-0003-1117-5984>

ENDNOTES

¹ We acknowledge our account of considerable support for HIMA institutions differs strongly from that of Benjaminsen and Kaarhus (2018), but point to the very specific case of their single focal village (the only site of 45 on Unguja that rejected HIMA) and its particular relationship with an area protected for tourism. While some of our observations are consistent with their detailed ethnographic fieldwork, we find (at least on Pemba) the situation to be not simply one of resistance but entailing more complex and subtle strands (as outlined here).

² In some cases sustainable forest management was favored by migrants returning from Oman (where they had been living since the 1964 Revolution) who envisaged restoring their villages to an equilibrium they or their parents remembered from prior to their departure from the island (cf. Haider, Boonstra, Akobirshoeva, & Schlüter, 2019).

REFERENCES

- Agrawal, A., Chhatre, A., & Hardin, R. (2008). Changing governance of the world's forests. *Science*, 320, 1460–1462.
- Andrews, J., & Borgerhoff Mulder, M. (2018). Cultural group selection and the design of REDD+: Insights from Pemba. *Sustainability Science*, 13, 93–107.
- Andrews, J., & Borgerhoff Mulder, M. (in prep) Forest Income on Pemba: A sectoral analysis of returns, inequality, demographics, shocks, and institutions.
- Andrews, J. B., Caro, T., Khamas, H. S., Juma, S., Ngwali, A. S., Mzee, A., ... Borgerhoff Mulder, M. (2020). Does REDD+ have a chance? Implications from Pemba Tanzania. *Oryx*, 1–7. <https://doi.org/10.1017/S0030605319001376>.

- Angelsen, A. (2008). *Moving ahead with REDD: Issues, options and implications*. Bogor, Indonesia: CIFOR.
- Baylis, K., Honey-Rosés, J., Börner, J., Corbera, E., Ezzine-de-Blas, D., Ferraro, P. J., ... Wunder, S. (2016). Mainstreaming impact evaluation in nature conservation. *Conservation Letters*, 9, 58–64.
- Benjaminsen, G. (2014). Between resistance and consent: Project-village relationships when introducing REDD+ in Zanzibar. *Forum for Development Studies*, 41, 377–398.
- Benjaminsen, G., & Kaarhus, R. (2018). Commodification of forest carbon: REDD+ and socially embedded forest practices in Zanzibar. *Geoforum*, 93, 48–56.
- Blomley, T., Edwards, K., Kingazi, S., Lukumbuzya, K., Mäkelä, M., & Vesa, L. (2016). *REDD+ hits the ground: Lessons learned from Tanzania's REDD+ pilot projects*. London: IIED.
- Blomley, T., Edwards, K., Kingazi, S., Lukumbuzya, K., Mäkelä, M., & Vesa, L. (2017). When community forestry meets REDD+: Has REDD+ helped address implementation barriers to participatory forest management in Tanzania? *Journal of Eastern Africa Studies*, 11, 549–570.
- Borgerhoff Mulder, M., & Coppolillo, P. B. (2005). *Conservation: Linking ecology, economics and culture*. New Jersey: Princeton University Press.
- Borgerhoff Mulder, M., Kwiyega, J. L., Beccaria, S., Bwasama, S. S., Fitzherbert, E., Genda, P., & Caro, T. (2019). Lions, bylaws, and conservation metrics. *Bioscience*, 69, 1008–1018.
- Bowles, S., & Gintis, H. (2011). *A cooperative species: Human reciprocity and its evolution*. Princeton, Princeton: Princeton University Press.
- Brooks, J. S., Waring, T. M., Borgerhoff Mulder, M., & Richerson, P. J. (2018). Applying cultural evolution to sustainability challenges: An introduction to the special issue. *Sustainability Science*, 13, 1–8.
- Brooks, J. S., Waylen, K. A., & Borgerhoff Mulder, M. (2012). How national context, project design, and local community characteristics influence success in community-based conservation projects. *Proceedings of the National Academy of Science*, 109, 21265–21270.
- Brzoskiewicz R. 2018. Tanzania Spice Industry Outlook to 2018 – Driven by Local Association Endeavors and Organic Farming. Available from <https://www.satprnews.com/2018/01/24/tanzania-spice-industry-outlook-to-2018-driven-by-local-association-endeavors-and-organic-farming/>.
- Burgess, N. D., Bahane, B., Clairs, T., Danielsen, F., Dalsgaard, S., Funder, M., ... Kabalimu, K. (2010). Getting ready for REDD+ in Tanzania: A case study of progress and challenges. *Oryx*, 44, 339–351.
- Burgess, N. D., Malugu, I., Sumbi, P., Kashindye, A., Kijazi, A., Tabor, K., ... Gereau, R. E. (2017). Two decades of change in state, pressure and conservation responses in the coastal forest biodiversity hotspot of Tanzania. *Oryx*, 51, 77–86.
- Caldas, M. M., Sanderson, M. R., Mather, M., Daniels, M. D., Bergtold, J. S., Aistrup, J., ... Sheshukov, A. Y. (2015). Opinion: Endogenizing culture in sustainability science research and policy. *Proceedings of the National Academy of Sciences*, 112, 8157–8159.
- Caplow, S., Putri, A. A. D., & Kweka, D. L. (2014). Piloting REDD in zanzibar through community forest management, Tanzania. In E. O. Sills (ED), *REDD+ on the Ground* (pp. 234–244). Bogor, Indonesia: CIFOR.
- Collins, A. C. (2020). Conservation strategies that address habitat loss and fragmentation: Implications for forest cover change and wildlife behavior. (PhD Thesis). University of California, Davis
- Cox, M., Villamayor-Tomas, S., Ban, N. C., Epstein, G., Evans, L., Fleischman, F., ... Meek, C. (2020). From concepts to comparisons: A resource for diagnosis and measurement in social-ecological systems. *Environmental Science & Policy*, 107, 211–216.
- Craster, C. J. E. E. (1913). *Pemba, the Spice Island of Zanzibar*. Leipsic: T. Fisher Unwin.
- Currie, T., Turchin, B. J., Richerson, P. J., Schwesinger, G., Steinmo, S., Wacziarg, R., & Wallis, J. (2016). Evolution of institutions and organizations. In D. S. Wilson & A. Kirman (Eds.), *Complexity and Evolution: Toward a new synthesis for economics*. MA: MIT Press.
- Duchelle, A. E., Simonet, G., Sunderlin, W. D., & Wunder, S. (2018). What is REDD+ achieving on the ground? *Current Opinion in Environmental Sustainability*, 32, 134–140.
- Ensminger, J., & Knight, J. (1997). Changing social norms - common property, bridewealth, and clan exogamy. *Current Anthropology*, 38, 1–24.
- Fagerholm, N., Käyhkö, N., & Van Eetvelde, V. (2013). Landscape characterization integrating expert and local spatial knowledge of land and forest resources. *Environmental Management*, 52, 660–682.
- Fletcher, R., Dressler, W., Büscher, B., & Anderson, Z. R. (2016). Questioning REDD+ and the future of market-based conservation. *Conservation Biology*, 30, 673–675.
- Folke, C., Colding, J., & Berkes, F. (2003). Synthesis: Building resilience and adaptive capacity in social-ecological systems. In C. Folke, F. Berkes, & J. Colding (Eds.), *Navigating social-ecological systems: Building resilience for complexity and change* (pp. 352–387). Cambridge: Cambridge University Press.
- Gardner, R., & Ostrom, E. (1991). Rules and games. *Public Choice*, 70, 121–149.
- Gintis, H. (2007). A framework for the unification of the behavioral sciences. *Behavioral and Brain Sciences*, 30, 1–61.
- Gross-Camp, N. (2017). Tanzania's community forests: Their impact on human well-being and persistence in spite of the lack of benefit. *Ecology and Society*, 22.
- Haider, L. J., Boonstra, W. J., Akobirshoeva, A., & Schlüter, M. (2019). Effects of development interventions on biocultural diversity: A case study from the Pamir Mountains. *Agriculture and Human Values*, 1–15.
- Hajjar, R., Oldekop, J. A., Cronkleton, P., Etue, E., Newton, P., Russel, A. J., ... Agrawal, A. (2016). The data not collected on community forestry. *Conservation Biology*, 30, 1357–1362.
- Hinsley, A., Entwistle, A., & Pio, D. V. (2015). Does the long-term success of REDD+ also depend on biodiversity? *Oryx*, 49, 216–221.
- Jarrah, R. (2014). *Review of Lessons Learned April 2010 to March 2014. HIMA - Piloting REDD+ in Zanzibar*. Tanzania: CARE International.
- Jayachandran, S., De Laat, J., Lambin, E. F., Stanton, C. Y., Audy, R., & Thomas, N. E. (2017). Cash for carbon: A randomized trial of payments for ecosystem services to reduce deforestation. *Science*, 357, 267–273.
- Kallis, G. (2007). When is it coevolution? *Ecological Economics*, 62, 1–6.

- Kweka, D., Carmenta, R., Hyle, M., Mustalahti, I., Dokken, T., & Brockhaus, M. (2015). *The context of REDD+ in Tanzania: Drivers, Agents and Institutions*, Bogor, Indonesia: CIFOR.
- Lubell, M. (2013). Governing institutional complexity: The ecology of games framework. *Policy Studies Journal*, *41*, 537–559.
- Lund, J. F., & Bluwstein, J. (2018). When conservation research goes awry: A reply to Mascia and Mills (2018). *Conservation Letters*, *11*, e12461.
- Lund, J. F., & Saito-Jensen, M. (2013). Revisiting the issue of elite capture of participatory initiatives. *World Development*, *46*, 104–112.
- Lund, J. F., Sungusia, E., Mabele, M. B., & Scheba, A. (2017). Promising change, delivering continuity: REDD+ as conservation fad. *World Development*, *89*, 124–139.
- Madeweya, K., Oka, H., & Matsumoto, M. (2004). Sustainable management of sacred forests and their potential for eco-tourism in Zanzibar. *Bulletin of the Forestry and Forest Products Research Institute*, *3*, 33–48.
- Mascia, M. B., & Mills, M. (2018). When conservation goes viral: The diffusion of innovative biodiversity conservation policies and practices. *Conservation Letters*, *11*, e12442.
- McDermott, C. L. (2017). Whose forests, whose gain? *Nature Climate Change*, *7*, 386–387.
- Miller, D. C., Rana, P., & Wahlén, C. B. (2017). A crystal ball for forests?: Analyzing the social-ecological impacts of forest conservation and management over the long term. *Environment and Society*, *8*, 40–62.
- Nelson, F., & Blomley, T. (2010). Peasants' forests and the King's game?: Institutional divergence and convergence in Tanzania's forestry and wildlife sectors. In F. Nelson (Ed.), *Community rights, Conservation & Contested Land: The politics of natural resource governance in Africa* (pp. 79–105). London: Earthscan.
- Newton, P., Miller, D. C., Byenkya, M. A. A., & Agrawal, A. (2016). Who are forest-dependent people? A taxonomy to aid livelihood and land use decision-making in forested regions. *Land Use Policy*, *57*, 388–395.
- Norgaard, R. B. (1994). *Development betrayed: The end of progress and a coevolutionary revisioning of the future*. London: Routledge.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science*, *325*, 419–422.
- Paciotti, B., & Borgerhoff Mulder, M. (2004). Sungusungu: The role of preexisting and evolving social institutions among Tanzanian vigilante organizations. *Human Organization*, *63*, 113–125.
- Pakenham, R. H. W. (1947). *Land tenure among the Wahadimu at Chwaka, Zanzibar Island*. Zanzibar Protectorate: The Government Printer.
- Phelps, J., Webb, E. L., & Agrawal, A. (2010). Does REDD+ threaten to recentralize Forest governance? *Science*, *328*, 312–313.
- Pisor, A. C., & Surbeck, M. (2019). The evolution of intergroup tolerance in nonhuman primates and humans. *Evolutionary Anthropology: Issues, News, and Reviews*, *28*(4), 210–223.
- Porras, I., Steele, P. 2020. Making the market work for nature: How biocredits can protect biodiversity and reduce poverty. London: IIED.
- Reyers, B., Folke, C., Moore, M.-L., Biggs, R., & Galaz, V. (2018). Social-ecological systems insights for navigating the dynamics of the Anthropocene. *Annual Review of Environment and Resources*, *43*, 267–289.
- Richerson, P., Baldini, R., Bell, A. V., Demps, K., Frost, K., Hillis, V., ... Newson, L. (2016). Cultural group selection follows Darwin's classic syllogism for the operation of selection. *Behavioral and Brain Sciences*, *39*, e58.
- Roe, D., Grieg-Gran, M., Mohammed, E. 2013. Assessing the social impacts of conservation policies: rigour versus practicality. IIED Briefing Paper-International Institute for Environment and Development. IIED: London.
- Rosenbloom, D., Markard, J., Geels, F. W., & Fuenfschilling, L. (2020). Opinion: Why carbon pricing is not sufficient to mitigate climate change—And how “sustainability transition policy” can help. *Proceedings of the National Academy of Sciences*, *117*, 8664–8668.
- Royal Norwegian Embassy. (2015a). *Final review of the project. Lessons learned from the implementation of REDD+ projects in Tanzania (2009–2014)*. Finland: NIRAS.
- Royal Norwegian Embassy. (2015b). *Final review of the project. Piloting REDD+ in Zanzibar through community forest management, June 2015*. Finland: NIRAS.
- Salerno, J., Andersson, K., Bailey, K., Hilton, T., Mwaviko, K. K., Simon, I. D., ... Hartter, J. (this issue). More robust local governance suggests positive effects of long-term community conservation. *Conservation Science and Practice*. e297.
- Sandbrook, C., Nelson, F., Adams, W. M., & Agrawal, A. (2010). Carbon, forests and the REDD paradox. *Oryx*, *44*, 330–334.
- Schlüter, M., Haider, L. J., Lade, S. J., Lindkvist, E., Martin, R., Orach, K., ... Folke, C. (2019). Capturing emergent phenomena in social-ecological systems. *Ecology and Society*, *24*.
- Seymour, F., & Busch, J. (2016). Why forests? In *Why now? The science, economics, and politics of tropical forests and climate change*, Washington, DC: Center for Global Development.
- Shao, I. F. (1992). *The political economy of land reforms in Zanzibar: Before and after the revolution*. University of Dar es Salaam Press, Dar es Salaam.
- Smaldino, P. E. (2014). The cultural evolution of emergent group-level traits. *Behavioral and Brain Sciences*, *37*, 243–254.
- Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, *16*, 282–292.
- Spolaore, E., & Wacziarg, R. (2009). The diffusion of development. *Quarterly Journal of Economics*, *124*, 469–529.
- Sunderlin, W. D., Sills, E. O., Duchelle, A. E., Ekaputri, A. D., Kweka, D., Toniolo, M. A., ... Otsyina, R. M. (2015). REDD+ at a critical juncture: Assessing the limits of polycentric governance for achieving climate change mitigation. *International Forestry Review*, *17*, 400–413.
- Sungusia E, Lund JF, Hansen CP, Amanzi N, Ngaga YM, Mbeyale G, Treue T, Meilby H. 2020. Rethinking Participatory Forest Management in Tanzania. IFRO Working Paper, No. 2020/02, University of Copenhagen, Department of Food and Resource Economics (IFRO), Copenhagen.
- Walsh, M. (2009). The use of wild and cultivated plants as famine foods on Pemba Island, Zanzibar. *Études Océan Indien*, *42–43*, 217–241.
- Walsh, M. T. (2007). Island subsistence: Hunting, trapping and the translocation of wildlife in the Western Indian Ocean. *Azania*, *42*(43), 83–113.
- Waring, T. M., Kline, M. A., Brooks, J. S., Goff, S. H., Gowdy, J., Janssen, M. A., ... Jacquet, J. (2015). A multilevel evolutionary framework for sustainability analysis. *Ecology and Society*, *20*, 34.

- Waring, T. M. (2010). New evolutionary foundations: Theoretical requirements for a science of sustainability. *Ecological Economics*, *69*, 718–730.
- Waring, T. M., Goff, S. H., & Smaldino, P. E. (2017). The coevolution of economic institutions and sustainable consumption via cultural group selection. *Ecological Economics*, *131*, 524–532.
- Wilson, D. S., Ostrom, E., & Cox, M. E. (2013). Generalizing the core design principles for the efficacy of groups. *Journal of Economic Behavior & Organization*, *90S*, s21–S32.
- Wright, V. C. (2017). Turbulent terrains: The contradictions and politics of decentralised conservation. *Conservation and Society*, *15*, 157–167.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Borgerhoff Mulder M, Caro T, Ngwali AS. A silver lining to REDD: Institutional growth despite programmatic failure. *Conservation Science and Practice*. 2020;e312. <https://doi.org/10.1111/csp2.312>