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Greening the blue Pacific: Lessons on reducing emissions from deforestation and forest degradation (REDD+)

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ABSTRACT

Across the Pacific, deforestation and forest degradation are driving the loss of ecosystem services. Increasing recognition of the need for mechanisms that can bridge economic development and environmental sustainability has led to the emergence of the broad concept of Nature-based Solutions (Nbs), including Payments for Environmental Services (PES) such as ‘reducing emissions from deforestation and forest degradation’ (REDD+) of forested areas. REDD+ projects are being piloted in the region, but the scale of adoption remains limited raising doubts about whether the concept has much appeal beyond small-scale government-supported initiatives. Although a relatively simple concept, it is proving difficult to translate into an appealing practice that is widely understood and adopted by rural land managers. We conducted a review of the achievements and challenges of REDD+ projects in Melanesia while drawing on global and regional lessons. Most projects are reaping the benefits of enhanced community development, employment, capacity building, and stronger governance. Perverse incentives, lack of systematic assessments of carbon offsets, poor stakeholder engagement, insufficient feedback mechanisms, marginalisation of women, and the lack of prosperous and sustainable alternative livelihoods remain key challenges. This suggests the need for developing policy mixes, understanding the drivers of deforestation and forest degradation, addressing equity concerns, strengthening tenure security, removing perverse incentives, and ensuring financially competitive conservation incentives for enhancing the appeal of REDD+ to rural communities, policymakers, and the private sector, so its reach across the Pacific can be extended.

1. Introduction

Ecosystem services are the ecological functions and processes through which ecosystems contribute to human well-being (Costanza et al., 1997; MEA, 2005). The challenge of enhancing the provision of ecosystem services is enormous, as the Millennium Ecosystem Assessment (MEA) in 2005 reported that 60% of all assessed ecosystem services were either degraded or unsustainably utilised (MEA, 2005). Loss of ecosystem services is a serious concern in the Pacific Island Countries (PICs), with urbanisation and globalisation being key drivers that have transformed landscapes across the region (Shah et al., 2018). The situation is exacerbated by poor stakeholder collaboration, under-resourced government departments, insufficient data, and calls for economic development at the expense of the environment (Jupiter et al., 2014), for example modernising agriculture in Fiji (Ministry of Agriculture, 2014). Similarly, increased access to Indigenous-owned land through leasing

coupled with the transition from traditional to commercial mechanised farming of export crops in Tonga, Samoa and Niue has accelerated the decline in forest resources (Kingdom of Tonga’s Fifth National Report to the Convention on Biological Diversity, 2014; Ministry of Natural Resources and Environment, 2015; Niue State of Environment Report, 2019). Other examples of these pressures include the extensive loss of mangroves due to infrastructure development including tourism in Samoa (Boon, 2001), Tonga (MESCAL, 2022) and Fiji (Cameron et al., 2021). Gold mining is a driver of native forest clearance in Papua New Guinea (PNG), Fiji and Solomon Islands (Banks, 2002; Wairiu, 2017). In Nauru, over a century of open cast phosphate mining has caused landscape degradation over 70% of the island (Feary, 2011).

Several actions have been directed towards resource conservation in the region. While all PICs are signatories of the Convention on Biological Diversity (CBD), most PICs have developed National Biodiversity Strategy and Action Plans (NBSAPs) which are critical for the

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implementation of the CBD (SPREP, 2016). The Pacific Islands Framework for Nature Conservation and Protected Areas 2021–2025, a regional strategy of coordinated action for addressing environmental threats was adopted in 2020 (SPREP, 2021). The 2018 Boe Declaration on Regional Security identified climate change as the single greatest threat to the well-being, security, and livelihoods of Pacific Islanders. It affirmed an expanded concept of security both traditional and non-traditional including environmental and resource security through regional cooperation and collective action (Cain, 2020). Landscape restoration programmes including rehabilitation of degraded lands (such as Fiji's 30 million trees in 15 years) are gaining momentum across the region (Woinarski, 2010). Considered socially and ethically appropriate, several Community Conserved Areas (CCAs) have also been established. Despite such diverse mechanisms, conservation approaches are increasingly failing across the Pacific (Keppel et al., 2012).

Globally, rights-based, and market-based approaches have dominated the conservation paradigm (Koh, 2022). The rights-based approach is fraught with both synergies and tensions between access rights and ecological conservation. While conservation can facilitate the realisation of a broad array of human rights, physical displacement of communities from land or economic displacement from resources through the establishment of protected areas (PAs) based on fences and fines can also impinge upon human rights (Campese et al., 2009; Domínguez and Luoma, 2020). Consequently, calls for decolonising conservation are fast gaining traction (Domínguez and Luoma, 2020). Baird (2011) argued that in the Pacific region the low regional ratification of the International Human Rights Treaties reflects inadequate resources, complexities of reporting obligations, and cultural relativism. Often considered Western in origin, human rights emphasise the rights of the individual as opposed to collective community rights embedded in the Pacific worldview. Despite inclusive agendas, rights-based approaches can often disregard and marginalise Indigenous people (Olowu, 2006). The transition towards approaches that incentivise communities for conservation has garnered much attention but is fraught with concerns over neoliberal conservation (Fletcher and Büscher, 2017) and commodification of nature (Chan et al., 2017). Limited adoptability in developing countries is attributed to: 1) difficulties in seeking sustained funding to allay concerns of local communities' suspicious of outsiders who promise future benefits (Fletcher et al., 2016); 2) power asymmetries between different actors with different social positions, value systems, and competing or collaborative relationships; and 3) insecurity of land tenure often due to failure of identifying differences between *de facto* and *de jure* tenure (Larson et al., 2013; Merlet, 2021; Robinson et al., 2018). In addition, Karsenty (2007) asserted that the poor and marginalised may remain within a poverty trap as they become passive conservation rentiers denied opportunities of pursuing activities that could have potentially led to greater innovation and learning by doing. Kronenberg and Hubacek (2013) emphasised that the resource curse hypothesis operates in poor developing countries rich in ecosystem services where resource revenues either bring or aggravate economic problems such as rent seeking and unequal bargaining power of buyers and sellers. Despite such issues, market-based approaches such as PES are increasingly gaining recognition as a viable policy tool to protect the environment while providing scope for economic development by local communities (Corbera et al., 2009).

PES is a novel conservation paradigm which pays incentives to landowners/managers for the provision of ecosystem services (or forest management strategies that are likely to secure the desired ecosystem services) by the beneficiaries of such services (Prokofieva, 2016). In his seminal report on PES, Wunder (2005) emphasised that such projects should meet the criterion of 'conditionality' which implies that payments are subject to the continuous flow of ecosystem services. Unfortunately, most PES programmes across the Pacific are insufficiently documented (Mangubhai and Lumelume, 2019) and can be limited in scope by reducing complex ecological systems into a user-friendly tool

for measuring and remuneration. For example, whether biodiversity is considered a 'service' or integral for an ecological system may alter if someone is paid for its 'production'. Also, some ecological components and functions can lead to trade-offs or perverse outcomes, such as displacing native biodiversity for introduced crops, livestock, and tree plantations, yet the net biomass may have increased with this landscape conversion and lead to increased payments for carbon sequestration than if the native biodiversity was retained (Lele et al., 2013). While decentralisation of resource management is being advocated, it is not usually accompanied with robust capacity building at the institutional (provincial and district) levels (ADB, 2004). Moreover, economic development strategies continue to promote logging of forests while marginalising resource sustainability through improved management practices (Chape, 2006). As such, forest and biodiversity conservation remain key challenges.

Deforestation and forest degradation have historically been dominant features of the Pacific landscape with repeated burning by farmers and pastoralists resulting in the formation of grasslands, degraded lands, and fire climax forests (Kull, 2012). In recent times, deforestation and forest degradation are fuelled primarily by commercial logging and agriculture (Gamoga et al., 2021). Reducing emissions from deforestation and forest degradation (REDD), a form of PES, is often advocated as an instrument for forest conservation. Further development of the REDD mechanism was agreed in 2013 which has since been referred to as REDD+ (see the Warsaw Framework for REDD+). Investment in REDD+ commercial and pilot projects over the past decade – with more than 350 projects in at least 50 countries (Duchelle et al., 2019), has led to increasing knowledge about the factors for success of REDD+ (Caplow et al., 2011; Cronkleton et al., 2011; Kanowski et al., 2011; Lawlor et al., 2013; Lima et al., 2017; Mahanty et al., 2013; Poudyal et al., 2016; Jacob and Brockington, 2020). In the Pacific, REDD+ projects have been primarily implemented in the larger countries of Melanesia which have substantial forest cover. Though a relatively simple concept, it is proving difficult to translate into an appealing practice that is widely understood and adopted by rural land managers. This article gives an overview of the decline of natural forests across the Pacific, the difficulties of economic development at the expense of environmental protection facing many countries in the region, the achievements and challenges of REDD+ projects in Melanesia and reviews global and regional lessons suggesting how it can be developed to appeal to farmers (smallholders) and rural communities, policymakers, and the private sector, so its reach across the Pacific can be extended.

2. Deforestation and forest degradation in the Pacific

Over the 30-year period of 1990 to 2020, forest area has decreased by 358,640 ha, 1150 ha and 9720 ha in Melanesia, Micronesia, and Polynesia, respectively (Fig. 1). Most of this forest conversion was concentrated in Melanesia specifically in PNG and Solomon Islands. In PNG over the period 2000–2015, c.253,391 ha of tropical forest was cleared for agriculture and expansion of oil palm plantations, while c. 2,373,940 ha of forest was degraded mainly due to commercial logging (Gamoga et al., 2021). Between 1990 and 2015, the total forestland area decreased by 375,259 ha in PNG and 18,290 ha in Solomon Islands, and the area of primary forests decreased by 13,730,000 ha in PNG while there was no change recorded in Solomon Islands. Over the same period in Fiji, the area of total forestland increased by 166,930 ha due mostly to afforestation of pine and mahogany while the area of primary forest decreased by 78,101 ha (FAOSTAT, 2023).

In Melanesia commercial logging has been an important source of revenue for governments (Jupiter, 2017), and landowners are under constant pressure to provide access to their land to logging companies for short-term profits. In the Solomon Islands, commercial logging intensified during the 1980s and today the last tracts of accessible unlogged forests are being heavily exploited. Gibson (2018) reported a rapid rise in log exports to around seven times the sustainable level;

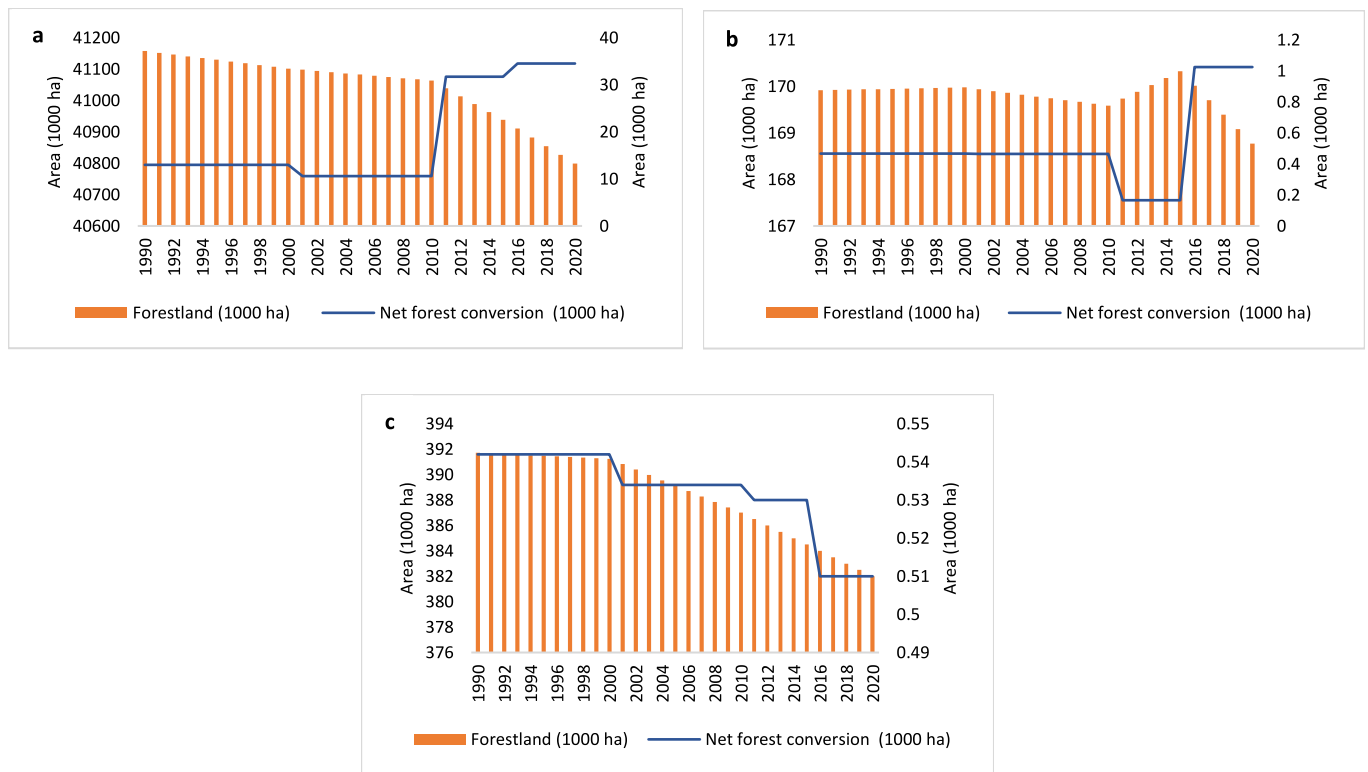


Fig. 1. Changes in forest area and net forest conversion in a) Melanesia, b) Micronesia and c) Polynesia over 1990–2020 (Source: FAOSTAT, 2023).

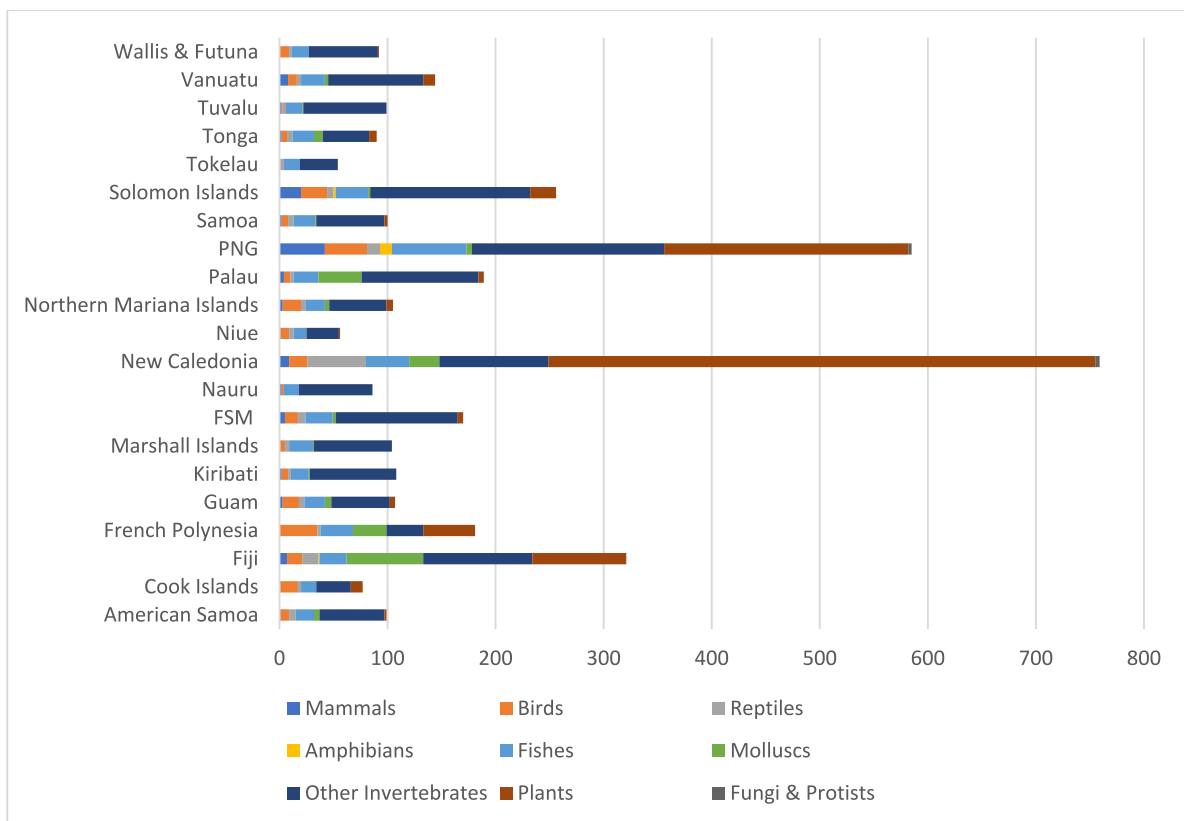


Fig. 2. Number of threatened IUCN Red list (Source: IUCN, 2020). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

deforestation is fuelled by vested economic interests, corruption, poor monitoring of selective logging, and easy accessibility of forests (Katovai et al., 2015). In areas where logging has occurred, social disruption has been observed. Uneven distribution of logging royalties, including capture by a few (particularly the senior males), and the exclusion of women has given rise to discontent and conflict (Minter et al., 2018). Although codes of logging practices exist, poor implementation and lack of post-logging site restoration and rehabilitation initiatives have caused extensive ecosystem degradation. In the Solomon Islands, for example, re-entry logging is often premature, unregulated, and excessive, and the threshold diameter limit may be as small as 15 cm (Katovai et al., 2015). In PNG, large scale industrial logging has caused extensive environmental damage due to non-compliance with the logging code of practice. Commercial agriculture remains another major driver of deforestation in Melanesia. The Special Agricultural and Business Leases (SABLs) for crops such as oil palm in PNG involve extensive clear felling of forests; over 90% of the licenses have been acquired illegally without landowner consent (Lawson, 2014). Similarly, in Fiji the export driven agriculture sector is responsible for the expansion of agriculture frontiers into native forests (Shah, 2023). Taveuni, a major exporter of taro (*Colocasia esculenta*) and kava (*Piper methysticum*) is an appalling example of farmers moving beyond the blue lines (boundaries of forest reserves) into vulnerable ecosystems such as Tropical Montane Cloud Forests.

Deforestation and forest degradation and the ensuing habitat loss have imperilled biodiversity across the region. Fig. 2 shows the number of threatened species by life form across different Pacific Islands. Melanesia has the highest number of threatened species in the region (New Caledonia, PNG, Fiji, Solomon Islands). Out of the 41 endemic conifer species found in New Caledonia's ultramafic substrates, 30 are threatened and near-threatened due to mining and fire (Jaffré et al., 2010). In PNG, the number of birds in threatened and near-threatened categories increased from 12 to 21 due to forest clearance over the period of 1989–2000 (Buchanan et al., 2008). Similarly, 36% (463 species) of the country's endemic tree flora is threatened with extinction due to land use change (Barstow et al., 2022). Reid et al. (2018) reported that due to deforestation of about 70% of Fiji's forests, 15 land birds are threatened with extinction (Fiji has 66 land birds recorded, with half of these being endemic species).

3. Development and environment conflict

Rural communities across the Pacific region, as elsewhere globally, typically have livelihoods that are deeply entwined with the surrounding natural environment – whether farming, fishing or in forests. Across the Pacific region, 61% of the population live in a rural setting (World Bank, 2021). While they understand the ebb and flow of the natural environment, many face increasing pressures that are beyond their control leading to the use of natural resources that exceeds the ecological resilience. Depletion and degradation of natural resources (e.g. decline in species replenishment, loss of ecological functions) directly impacts on the nature-dependent livelihoods of the local communities and undermines their long-term resilience (Race et al., 2023).

While Fiji has been assessed as an 'upper middle-income' country since 2012 (ADB, 2021), in rural areas the proportion of people living in poverty (41.5%) is about twice that of urban areas (20.4%) (World Bank, 2021). As such, there is growing pressure to increase rural development with the local natural environment seen by many as being an asset that is not fully utilised, with calls for '... a national land use plan to ensure efficient allocation of land' (GoF, 2023, p.153). Perceived 'underutilised' forested areas are vulnerable to conversion to more active development, such as the establishment of cash and commodity crops (e.g. coffee plantations, fruit orchards, kava crops). Though Fiji has a considerable forest area (1.14 million ha, 62% of land area), most is allocated for harvesting and other uses (SPC, 2020). The 11% of forests inside PAs (SPC, 2020) indicates that most forests are available for multiple uses. Such forests are vulnerable to potential decline,

particularly those considered degraded or of low value (e.g. spread of invasive weeds like kudzu *Pueraria* spp. and African tulip tree *Spathodea campanulate*), and conversion.

In addition, governance issues exacerbate existing complexities between development and the natural environment jeopardising the ability of local communities to secure sustainable livelihoods. Toatu (2001) alluded to a Pacific paradox wherein despite richly endowed with natural resources, Pacific Islands lag in social and economic development. Avalos et al. (2013) asserted that countries like PNG are grappling with a natural resource curse due to weak governance which can lead to rent seeking, corruption and social conflict. This results in improper or wasted use of the revenue from natural resources, further trapping countries in a poverty cycle. Land disputes are another contentious issue in the region wherein development activities compete with the interests of local communities. In PNG, Solomon Islands and Vanuatu, from 1990s to early 2000s several conflicts between logging, mining and real estate firms and Indigenous people fuelled widespread resentment (Naupa and Brien, 2020). In Marshall Islands, Solomon Islands, Vanuatu, Palau, and the Federated States of Micronesia (FSM), land disputes frequently constitute a major proportion of existing litigation (Hassall, 2005).

4. The need for REDD+

While achieving biodiversity conservation and enhancing livelihoods is often sought, it is too often simplified as a trade-off between the two objectives. Reinforcing this simplification is when short-term assessments and proposed solutions fail to capture long term cycles and fluxes in natural ecosystems (e.g. multi-year variations in breeding and population dispersal) and rural livelihoods (e.g. change in community demographics, new agricultural enterprises). It is increasingly accepted by policymakers and other stakeholders that a more effective mechanism is needed that can bridge economic development and environmental sustainability.

Much effort has been committed over recent decades to design market feedback loops and policy mechanisms to create a positive incentive for natural resource managers. Strategies that allow natural resources to remain in ecological abundance beyond the immediate development and extraction by current smallholders are of particular interest. The concept of Nbs is an approach to identify and support examples where markets, policies and programmes can be aligned to achieve sustainable development to meet the needs of local livelihoods and environmental goals. For example, conserving the natural environment of a water catchment can support the supply of freshwater for local livelihoods and business development. Also, providing ecological refugia can allow the populations of wild species to replenish for future harvests (e.g. forest reserves, marine parks). A contemporary expression of an Nbs is the concept of ecotourism, where the health of the natural environment attracts self-funded tourism that leads to local employment and associated business. In the forestry sector, the mechanism of REDD+ aims to contribute to sustaining local livelihoods while conserving the environment.

The loss of tropical forests has been a critical global issue for decades (Brown et al., 1993; Wright, 2005; Roberts et al., 2021) – for the loss of the inherent ecological values and the decline of local livelihoods. More recent attention has focused on the critical value of tropical forests in moderating global weather patterns and mitigating climate change (Goodman and Herold, 2014). Efforts to support sustainable forest management via REDD+ have grown in popularity among policy-makers. By using funding from foreign aid (e.g. North–South transfer) (Angelsen, 2013, 2017), the sale of 'carbon credits' (Neeff and Ascui, 2009; Peskett et al., 2011; Wong et al., 2016) and more recently 'green' bonds (Banga, 2019; Reboledo and Ugolini, 2020), REDD+ arrangements have been designed so that local land managers are paid to conserve and enhance designated forests, rather than pursue widespread harvesting of forests for short-term income.

The PICs have very little arable land to support current populations.

So, while the island populations are relatively small in comparison to most other countries, the population density can be high and land available for REDD+ can be highly constrained. For example, Fiji has almost twice the population density per km² as that of Brazil. Hence, REDD+ may offer an alternative strategy to balancing multiple demands on land-use where reserving large areas of forest that largely exclude benefits for local communities is not an option. In 2012, the Pacific Islands Regional Policy Framework for REDD+ was endorsed to assist the PICs to transition towards REDD+ readiness. The framework not

only provided information on REDD+ to interested countries but aimed to improve collaboration, coordination of advisory services (through a regional organization the Pacific Community (SPC)) and attracting contributions from donors. To enable countries to participate in REDD+ projects, the policy emphasised the value of capacity building and provided guidelines on Forest Reference (emission) Levels (FRLs), Measuring, Reporting and Verification (MRV) Systems, and Safeguards Information Systems (SISs). It also recognised the need to address the regional drivers of deforestation and degradation to avoid regional

Table 1
REDD+ Projects across Melanesia.

REDD+ Project	Country	Area (ha)	Communities	Biodiversity	Activities	Carbon offsets (tonnes of CO ₂ e/eq/year)	Carbon Standard	Co-benefits
Drawa Forest Conservation Project	Fiji	4,120	Land owned by eight mataqali (tribal clans) of the Drawa Block	Near threatened Fiji ground frog (<i>Cornufer vitianus</i>), endemic butterfly (<i>Hypolimnas inopinata</i>) and stick insect (<i>Cotylosoma dipneusticum</i>)	Avoided conventional logging, Improved Forest Management, Protected area management	15,176	Plan Vivo	Biodiversity conservation, community development, water quality, catchment protection
Emalu REDD+ Pilot Site	Fiji	7,347	Mataqali Emalu residing in Draubuta village	Critically endangered drautabua (<i>Acmopyle sahniana</i>), vulnerable masiratu (<i>Degeneria viitensis</i>), endemic and rare butterfly (<i>Hypolimnas inopinata</i>), near threatened Fiji ground frog <i>C. vitianus</i>	Sustainable Forest Management, Grassland reforestation	Not systematically estimated yet	None	Biodiversity conservation, Alternative livelihoods
Loru Forest Carbon Project	Vanuatu	293	Serakar Clan, Espiritu Santo	Critically endangered Coconut Crab (<i>Birgus latro</i>), Critically endangered Megapode bird (<i>Megapodu layardi</i>)	Avoided deforestation, Improved Forest Management, Agroforestry	3,029	Plan Vivo	Biodiversity conservation, community development, water quality
Babatana Rainforest Conservation Project	Solomon Islands	6,863	Sirebe, Siporae, Padazeka, Garesa, Lukulombere and Vuri tribes	Midget Flowerpecker (<i>Dicaeum aeneum</i>), Song Parrot (<i>Geoffroyus heteroclitus</i>), Crested Cuckoo-Dove (<i>Reinwardtoena crassirostris</i>), White-billed Crow (<i>Corvus woodfordi</i>), and Ultramarine Kingfisher (<i>Todiramphus leucopygius</i>)	Avoided conventional logging, Improved Forest Management	17,423	Plan Vivo	Biodiversity conservation, community development, water quality
April Salumei Sustainable Forest Management Project	PNG	196,703	Five cultural groups organised into 163 Incorporated Land groups (ILGs)	New Guinea Kauri species (<i>Agathis labillardieri</i>), Palm Cockatoo (<i>Probosciger aterrimus</i>), Scheepmakers Crowned Pigeon (<i>Goura scheepmakeri</i>), Purple-Bellied Lory (<i>Lorius hypoinochrous</i>), Brown-Backed Whistler (<i>Pachycephala modesta</i>), Lawes's Parotia (<i>Parotia lawesii</i>), Northern Cassowary (<i>Casuarus unappendiculatus</i>), Stephanie's Astrapia (<i>Astrapia stephaniae</i>), and Ribbon-tailed Astrapia (<i>Astrapia mayeri</i>)	Avoided deforestation, Sustainable Forest Management	1,628,812	VCS, CCBS	Biodiversity conservation, community development
Tavolo REDD+ Project	PNG	21,782	Mukus, Tavolo, Lausus	–	Avoided deforestation, Improved Forest Management	168,438	VCS, CCBS (registration and verification requested)	–
NIHT Topaiyo REDD+ Project	PNG	110,000	Kamlapar ILG in Konoagil, 12 other ILGs will be joining in future	–	Avoided deforestation	2,262,521	VCS, CCBS (under validation)	Biodiversity conservation, community development, alternative livelihoods

Note: The Plan Vivo Standard is a set of criteria in the Voluntary Carbon Market used to certify smallholder and community initiatives based on their benefits to the environment, climate, and livelihoods.

'leakage'. Since Melanesia has over 98% of the total forest cover in the Pacific, Polynesia has 0.92% and Micronesia has 0.41% (FAOSTAT, 2023), REDD+ readiness activities have primarily been undertaken in PNG, Fiji, Solomon Islands, and Vanuatu (see Table 1). However, in both Polynesia and Micronesia the forest area is declining despite making significant contributions to the well-being of the local communities (Fig. 1). From this experience, it is important to create an enabling context for NbS to succeed irrespective of the scale of natural resources.

5. REDD+ projects in Melanesia

The regional organisation of SPC in collaboration with the German Agency for International Cooperation (GIZ) initiated the Climate Protection through Forest Conservation in Pacific Island Countries (REDD+ I) Project which operated from 2010 to 2015. The project aimed at assisting four Melanesian countries: PNG, Fiji, Solomon Islands and Vanuatu in achieving REDD+ readiness (Kirsch-Jung and Bulai, 2015). The project had three components: the development of a regional policy framework to support the implementation of REDD+, establishing a REDD+ information platform along with training and capacity building, and REDD+ Readiness and Demonstration Activities including setting up pilot projects in the four countries. The REDD+ Forest Conservation in Pacific Island Countries (REDD+ II) Project which operated from 2015 to 2021, focused on facilitating the development of methodologies for biomass inventories, FRLs, MRV Systems and SISs in partner countries.

Around 58% of Fiji's land area is forested constituting 85.3% native forests, 2.4% pine and 5% mahogany plantations; with over 90% of these forests occurring on Indigenously owned land (Government of Fiji, 2017). The country has adopted a hybrid approach with sub-national pilot projects with the aim that these be aggregated into the national REDD+ programme. Fiji has analysed its drivers of deforestation and forest degradation while developing a FRL, MRV system, SIS, and benefit sharing plan. A pilot project is underway in Emalu while a community forest management project in Drawa has already started trading with the voluntary carbon market. In the Solomon Islands, 80% of the land area is under forest cover and 90% of the forests are under customary ownership (Bennett et al., 2014). The country has adopted a national approach to REDD+ and developed a FRL and guidelines for REDD+ stakeholder engagement and safeguards. The Choiseul province has been selected for the REDD+ pilot project. In Vanuatu 74% of the total land area is forested, out of which production forests constitute 36%. With a pilot site in Loru, Espiritu Santo, Vanuatu has analysed its drivers of deforestation and forest degradation and established a FRL. Forests cover over 70% of PNG's land area out of which 86% are tropical rainforests (Shearman et al., 2008). PNG has developed its FRL, MRV and SIS systems and prepared a national REDD+ strategy. The pilot projects operate in the provinces of East New Britain, New Ireland, and East Sepik.

We discuss case studies from Melanesia to highlight the achievements and challenges of REDD+ projects in the region. Table 1 provides an overview of the REDD+ projects as per area (ha), land owning communities or cultural groups involved in the projects, biodiversity value of the associated forests, key REDD+ activities such as avoided deforestation, avoided conventional logging, improved forest management, sustainable forest management, grassland reforestation and protected area management, carbon offsets generated annually, carbon standards used for certification, and non-carbon co-benefits of projects such as biodiversity conservation, community development, water quality, catchment protection, and alternative livelihoods.

It is evident that although REDD+ is a popular policy instrument, the factors governing its implementation at the local level are typically far more complex than policymakers or programme managers working at a national or international level may appreciate. Such complexity may often be ignored or understated and make implementation of well-intentioned REDD+ projects difficult with successful outcomes far

from being assured. The case studies reveal that most projects are providing opportunities for forest growth and improved standard of living to rural communities. Carbon payments are directed to fund community development works, alternative livelihoods are championed for avoiding deforestation and forest degradation, and local communities are finding forest-related employment (e.g. forest rangers). However, in Fiji and Vanuatu, community dissatisfaction is associated with poor visibility of the livelihood impacts with most farmers still preferring to plant lucrative cash crops along the forest-agriculture frontier. Moreover, exclusion of women from decision making processes, resource rights, and direct lease payments coupled with elite capture owing to insufficient feedback to the wider community are impeding progress towards ensuring social equity in the distribution of REDD+ benefits. In PNG, poor stakeholder engagement has led to discontent while land tenure disputes make it difficult for communities to access carbon payments. In addition, experiences from projects in Fiji and Solomon Islands expose the cumbersome and time-consuming nature of the administrative processes involved in securing conservation leases.

Successful implementation of REDD+ projects require policymakers being cognisant of the socio-economic heterogeneity within communities and implications of alternate land-use. As with any mechanism that seeks to override the signals received by smallholders that emanate from local markets, REDD+ is typically complex – dependent on the extent and nature of behavioural change sought, the status quo of the community and perceptions of those advocating change. The signals received by smallholders from local markets can often be dynamic, as prices and other incentives fluctuate in response to a myriad of domestic and global factors. As such, a steady payment from a REDD+ initiative may only be persuasive (competitive) for some smallholders for some of the time. Also, any change in land-use, such as that required by REDD+, will present different opportunities and trade-offs for individual families, given that communities are typically socio-economically diverse (Andersson et al., 2018). Indeed, recent global studies caution that REDD+ may only offer a modest (minor) influence on land-use practices and livelihoods, and sometimes exacerbate inequality between 'rich' and 'poor' households (Ickowitz et al., 2017). Part of the complexity in assessing the attribution and value of REDD+ is that even within a single community, not everyone will depend on or use forest resources in a uniform way or extent. Development theory indicates that poorer members of a rural community often depend more heavily on common resources (e.g. forests) than wealthier members. So, decisions to reduce harvesting from community-based forests will tend to disproportionately affect poorer members. Sensitivity in the calculation and negotiation of payments will be required to reflect the differential changes to achieve the objectives of a REDD+ project at the local level. Even seemingly fair approaches, such as paying each household the same amount for every tree planted or protected will invariably favour those who have tenure over a large area and can support more trees – typically the wealthier members. The complexity of achieving a fair basis for payments to individual households should not be underestimated, yet to do otherwise will merely reinforce, if not exacerbate, existing inequity at the local level.

5.1. Drawa forest conservation project, Fiji

In 2011 the Drawa Forest Conservation Project was initiated with the assistance of Live & Learn Environmental Education (NGO). The project is jointly owned by eight Indigenous landowning units (*mataqali*) who have formed the Drawa Block Forest Communities Cooperative (DBFCC) for managing carbon trading and involves a change in landuse from commercial logging to forest protection through the establishment of a Protected Area (PA). The Drawa Conservation Management Plan stipulates the permitted, prohibited, and regulated activities within various zones of the PA along with management measures for compliance.

In 2018, Drawa became the first community in Fiji to receive

payments for conservation through the voluntary carbon market; the project generates c.15,176 carbon offsets/year. Under the existing benefit sharing mechanisms, while 58% of the sales income goes to the project owner DBFCC, the project coordinators Live & Learn and Nakau receive 20% and 22% respectively (Live and Learn, 2019). DBFCC uses the funds for community development including improving existing infrastructure, promoting income generating opportunities (group benefits), and administering member dividends (individual benefits). Other than the carbon payments, the *mataqali* benefitted through stronger governance, direct employment, capacity building, and forest protection for sustainable livelihoods (Table 1). Community governance was strengthened with the formation of the DBFCC. Rangers were appointed from the *mataqali* and trained in boundary marking, biodiversity surveys, and forest monitoring. Live & Learn also worked closely with DBFCC to promote apiculture as an alternative livelihood strategy particularly among women and youth. The Drawa Forest Conservation Project received the SPREP-SPC Award for Excellence in Implementing Island Ecosystem Management Principles (2015) and the International Energy Globe Award (2020). Among major challenges encountered were delay in finalising the conservation lease (2011 to 2018) due to the *iTLTB*'s requirement of 60% consensus which often requires consulting *mataqali* members living away from the village, and desire to continue trading with the voluntary carbon market despite indications from the Fijian government of nesting Drawa within the national REDD+ scheme. In addition, while women can inherit land in their own *mataqali* in Fiji, however, cultural norms and social status often restrict their benefit from land use and participation in decision making. A recent report by USAID (2020) revealed that though women were consulted in land use planning in Drawa, most remain unaware of the benefits and obligations of REDD+, suggesting a disconnect between efforts towards inclusion and actual inclusion on ground. The problem is compounded by poor access to bank accounts which implies that rural women are not able to receive direct lease payments.

5.2. Emalu REDD+ pilot site, Fiji

The Emalu pilot site in Nadroga-Navosa Province of Viti Levu is customarily owned by the *mataqali* Emalu (over 60% of the members are women), whose traditional home is Draubuta Village. Emalu is under a 99-year conservation lease with plans to hand over the lease ownership to the landowners once the carbon benefits start flowing to the people. Agriculture is the principal threat with over 60 farms located within the boundaries of Emalu and forests cleared for planting kava. Free roaming livestock, invasive species, forest fires and pressures from loggers are other key threats to the forests of Emalu (CCPIR, 2015).

A land use plan was developed which included practices such as sustainable land management, livestock management, grassland reforestation and alternative livelihoods including bee keeping and community nurseries (Table 1). Awareness workshops were coupled with training of local field guides in forest inventories and biomass measurements (Ministry of Forestry, 2019). Preliminary assessment of total carbon stocks in Emalu's forests was 516,121 tCO₂eq (CCPIR, 2015) and 72 tCO₂eq/ha in *talasiga* grasslands (Rounds, 2014). However, systematic assessments of carbon offsets are still lacking (Ministry of Forestry, 2019). Without such crucial information, it is difficult to estimate the future benefits of forest conservation and associated carbon sequestration in areas set aside for REDD+. Community consultations during the Fiji benefit sharing plan revealed concerns regarding no visible impacts of the REDD+ pilot project on the livelihoods of the local communities despite years of engagement. Communities are still drawn towards planting lucrative cash crops such as kava by encroaching into forest lands. Conflicting interests of the Ministries of Agriculture and Forestry wherein the former focuses on export earnings and the latter advocates conservation, make it challenging to transform farmer practices (Conservation International, 2021).

5.3. Loru forest carbon project, Vanuatu

The Serakar clan are the customary landowners of Loru, a mosaic of intact and degraded rainforests and abandoned agricultural farms in Espiritu Santo. Loru is Vanuatu's first Indigenously owned carbon offset project initiated to address the problem of forest conversion to coconut plantations and cattle ranches. Recognised as a CCA, it falls under Vanuatu's Environmental Protection and Biodiversity Act 2010. The Loru Management Plan entailed using a variety of strategies such as agroforestry plots for food security and improved income in degraded areas, establishment of the SERTHIAC enterprise for implementation of a business plan outlining the fair and equitable sharing of benefits among farmers, value adding of indigenous *Canarium* nuts, managing invasive species, and carbon offset sales (Carodenuto et al., 2022) (Table 1).

In terms of the social impact of the project, the consumption of local food produce by the Serakar clan members increased by 21%, and household incomes increased by 68% and 38% over 2014 levels for men and women respectively (Nelson and Dyer, 2020a; Payne, 2020). Attempts to overcome the gender income gap by training women in nut processing are ongoing. However, gender inclusivity in land management remains a key issue in Vanuatu and elsewhere in the Pacific. Women cannot be chiefs (titles are handed down patrilineal lines) and are excluded from ownership and resource rights. Though there is transparency in terms of fund disbursement yet the risk of elite capture of carbon finance cannot be discounted due to insufficient feedback mechanisms (Payne, 2020). Moreover, Carodenuto et al. (2022) reported that while REDD+ alternatives (agroforestry, reforestation) generate higher net present value (NPV) than business as usual (BAU) scenario (clearing forest for cattle ranching and copra, subsistence farming, semi-commercial farming with kava) yet people continued with BAU due to overpowering impact of government export policies on land use decisions and long-time span to materialising economic returns on investment. Marketing of agroforestry products particularly nuts and oils is challenging due to the absence of well-developed markets for such tree products and distance to high-value markets such as Australia (Carodenuto et al., 2022). However, recently a local business, the Aelan Chocolate Makers has been buying cocoa from farmers in Loru and processing it into chocolate.

5.4. Babatana rainforest conservation project, Solomon Islands

The Babatana project was initiated in 2015 on land belonging to the Indigenous tribes of the Babatana language group in Choiseul province with the assistance of a local NGO Natural Resources Development Foundation (NRDF) and Nakau Programme. Babatana is a 'grouped project' wherein the Sirebe tribe were the first to join through an inception project followed by the Siporae, Padazeka, Garesa, Lukulombere and Vuri tribes. The project involves a change in land use from commercial logging to forest protection for climate mitigation, but biodiversity conservation and watershed management are important co-benefits (Table 1).

In 2019 the Sirebe rainforest was declared a PA under the Protected Areas Act 2010 and Protected Area Regulations 2012. The inception project included three governance bodies responsible for project management. The Sirebe Tribal Association developed a Conservation Management Plan for the protected area. The Protected Area Management Committee was responsible for the management of the protected area. The Sirebe Community Company managed and disbursed the project funds through a Community Business Plan which outlined the operational budget and benefit sharing mechanisms. In 2022, the Sirebe Tribal Association received an amount of \$SBD3 million (\$SBD1.2 million/year) as carbon credits from the voluntary market after verification under the Plan Vivo Standards for the offset of 10,529 t of CO₂/year. These funds are being used for forest monitoring, salaries of rangers and casual labour hired from the community, sanitation, and

development works (Iroga, 2022). The project involved the recruitment of rangers from the Sirebe community, the formation of a Women's Savers Club and the development of alternative livelihood opportunities (Nelson and Dyer, 2020b). A major bottleneck to conservation is that though tribal communities interested in REDD+ approach NRDF which assists them in securing PA status, the process is both cumbersome and time consuming.

5.5. April Salumei sustainable forest management project, PNG

The April Salumei REDD+ project in the East Sepik province protects rainforest which was previously designated for logging. In 2009, the project was implemented by the Rainforest Management Limited under the Pacific Forest Alliance, and in 2011 received verification from the Climate and Community Biodiversity Standards (CCBS). CCBS validation expired for the project in 2016 and is pending verification. In 2013 the project was awarded Verified Carbon Standards (VCS) certificate. Over 90 villages, 20,000 Indigenous people and 163 Incorporated Land Groups (ILGs) inhabit the area.

The communities in the April-Salumei region are regarded as some of the most underprivileged and underdeveloped in PNG due to their low incomes, lack of access to basic government services, and inadequate educational and medical infrastructure. The communities mainly depend on subsistence agriculture, which includes hunting, gathering, and shifting cultivation, due to the remote locations and poor market access. Hence, a key focus of the project is on improving access to healthcare, education, and infrastructure (Table 1). However, the project has encountered some challenges in implementation. The planned benefit-sharing mechanisms for April Salumei allocated 65% of benefits to landowners, 15% to the state, and 20% to the project developer. Sub-national discussions revealed that expectations among landowners were as high as 80–90% of benefits (Babon and Gowae, 2013). There is also a mismatch between the global and local scales in April Salumei wherein REDD+ global governance institutions have prioritised global emission reductions (mitigation) over local concerns about livelihoods and land use (adaptation). Restricting access to land and resources, where a substantial portion of the population relies on subsistence agriculture poses a threat to local livelihoods. Moreover, the REDD+ programme in PNG has failed to mobilise the Indigenous people in designing and implementing the REDD+ strategies. While landowner consultation is considered critical for project success on customary land, poor stakeholder engagement has fueled discontent. Lastly, tenure insecurity makes it difficult to access payments particularly in the absence of well-defined guidelines on forest carbon rights. While the project documents deny the existence of any land tenure disputes, customary landowners in April Salumei argue that redefining boundaries and outsiders claiming kinship to maximise benefits are serious causes of concern (Pacsoe, 2015).

5.6. Tavolo REDD+ project, PNG

The Tavolo REDD+ project is in East New Britain Province of PNG over customary land, 84% of which is forested. The project area was earmarked under the Mukus-Melkoi SABL and the Kakuna-Lote Project for large scale conversion to plantations under the guise of agroforestry without any free, prior, and informed consent (FPIC) (Table 1). A local NGO, FORCERT assisted the Tavolo community to initiate a REDD+ project for biodiversity conservation and climate change mitigation.

A sustainable land use plan was developed to serve as a framework for forest management and conservation. A Community Conservation Monitoring System was initiated in 2020 along with training in field measurements. The project established the PNG Communities Benefits from Environmental Services Trust (BEST) which aims at generating sustainable income through forest protection. Other social benefits include community health clinics, subsidised school fees, capacity building, and village development works. CCBS and VCS registration

and verification have been requested for the project (Verra, 2023a). The Tavolo Community Conservation Association (TCCA) aims at ensuring sustainable land management through FSC certified small scale reduced impact logging operations restricted to a certain section of the forest while the rest is allocated for conservation. However, lack of recognition of community conservation laws by both community members and outsiders has been reported as a challenge. In response, TCCA has associated compliance with community conservation laws as a prerequisite for access to rights and benefits, as well as issued fines.

5.7. NIHT Topaiyo REDD+ project, PNG

The NIHT Topaiyo REDD+ Project area is threatened by deforestation due to industrial logging and conversion to oil palm plantations. The project aims to achieve emissions reduction by avoiding the industrial logging that was initially planned for the forests. The initiative uses community involvement, sustainable land management, inventories, patrols, and monitoring to preserve the integrity of the forest. NIHT Topaiyo is a grouped project consisting of several Project Activity Instances (PAIs) within a designated land area. The first PAI included land owned by the Kamlapar ILG in Konoagil who formalised a carbon credits contract in 2018 with NIHT Inc. Ever since twelve other ILGs in Konoagil have been identified to join the project.

The project has VCS registration while CCBS is under validation. Around 71% of the revenue generated through the sale of carbon credits is designated to stay within the community. Social benefits include health surveys, payment of individuals for the national ID programme to assist in opening bank accounts, and improved communication (Table 1). However, the project has its own set of challenges. Though the project covers a total area of 110,000 ha, carbon credits have only been generated to date from a much smaller area 11,000 ha (first PAI). The first PAI agreement was signed by members of a single clan in two villages who may not be the only landowners of the area considering that in PNG each village has several clans and members of each clan are dispersed in several villages. Moreover, while NIHT is alleged to have earned millions of dollars through carbon credits, the only payment to villagers in New Ireland was a paltry amount issued for initially signing the project agreement (Babon et al., 2023). Communities have since called for greater transparency by ensuring that the chiefs of each clan have access to all project documents (Verra, 2023b).

6. What can policymakers do to support viable outcomes?

6.1. The need for policy mixes

Policy interventions can reconcile goals of development and conservation. Conventionally, conservation has been achieved through 'command and control' instruments such as the development of PAs which often involves expropriation of land, and regulations or prohibitions on land-use and resource extraction. Conservation areas that exclude human use overlook the increasing evidence that suggests Indigenous-governed PAs exhibit higher forest integrity compared to state-governed PAs, mainly by adopting management practices that enhance biodiversity and carbon while reducing deforestation and forest degradation (Sze et al., 2022). In Indonesia, the creation of the Betung Kerihun National Park alienated the Dayaks from their ancestral lands which restricted access to culturally valuable resources governed by customary law, leading to widespread resentment (Sunkar and Santosa, 2018). Similarly, the eviction of the Batwa community from the Kahuzi-Biega Forest following the creation of the Kahuzi-Biega National Park in the Democratic Republic of Congo, uprooted their traditional way of life (Domínguez and Luoma, 2020). Moreover, institutional frameworks to manage PAs and ensure compliance with regulations are limited in most developing countries (GGGI, 2016). McDermott et al. (2018) emphasised the need to exercise caution as pre-emptive behaviour can drive resource exploitation and/or degradation rather than conservation. A

notable example is the red-cockaded woodpecker which received endangered status under the US Endangered Species Act (ESA), following which landowners deliberately destroyed forests (and their habitats) to prevent stringent land-use regulations introduced to protect the bird's habitat (Lueck and Michael, 2003). Similarly, in Phoenix Islands Protected Area (PIPA), Kiribati, fishing activity increased dramatically (more than two times) as fishers became aware that the reserve was earmarked for protected status (McDermott et al. 2018).

Within the domain of environmental economics, it is widely recognised that since people are responsive to incentives, this behaviour needs to be considered when designing policies to be effective. Hence, market-based solutions such as PES are being promoted as a viable alternative that can ensure ecosystem conservation while generating direct payments to landowners. Policy mixes can generate complementary additive effects when 'command and control' (to discourage undesirable behaviour) and market-based measures (to encourage desirable behaviour) are employed simultaneously, allowing both disincentives and incentives to operate in mutually beneficial ways (Barton et al., 2017; Maor and Howlett, 2021); with REDD+ being an example that can offset some of the costs for landowners of environmental regulations or prohibitions. The world's first jurisdictional REDD+ programme, the State System of Incentives for Environmental Services (SISA) in Acre, Brazil and the world's largest PES programme, Bolsa Floresta in the Amazon, are two notable examples where policy mixes have worked reasonably well by combining controlling regulations and conditional incentives (Wunder et al., 2020). A study by Simonet et al. (2018) on the efficacy of REDD+ reported a 50% decrease in deforestation owing to conditional incentives that called for forest conservation, maintenance of riparian forest buffers and adoption of fire-free production systems in the Sustainable Settlements in the Amazon (PAS) project. While eligibility for payments was contingent upon participants maintaining a minimum of 30% forest cover, for the full payment, 50% of forest cover was a key requirement. On a cautionary note, Wunder et al. (2020) emphasise security of land tenure and consistent financial flows as essential preconditions for conditionality.

6.2. Understanding the drivers of deforestation and forest degradation

Understanding the complexity of drivers that affect deforestation and forest degradation (e.g. global commodity markets, insecure tenure, subsidies for agricultural products) is fundamental to ensuring the successful implementation of REDD+ projects. Such information is critical to designing REDD+ that reflects the local context. Among the drivers of deforestation, 27% of global forest loss between 2001 and 2015 was commodity driven due to permanent land-use change to agriculture, mining and energy infrastructure (Curtis et al., 2018). In the Pacific, agriculture remains a major driver of deforestation, for example for oil palm in PNG (Gamoga et al., 2021), cattle farming in Vanuatu (Carodenuto et al., 2022), and taro and kava farming in Fiji (Shah, 2023). However, early REDD+ interventions did not target the actual drivers of deforestation, instead they focused on promoting production of biofuels, sustainable forestry and agroforestry (Duchelle et al., 2019). Similarly, Skutsch and Turnhout (2020) argue that REDD+ discourses continue to focus on small scale actors (small scale farmers and communities), since the community narrative remains attractive to policymakers, while disregarding large scale industrialized actors or complex drivers of forest degradation. More recently, REDD+ interventions have incorporated requirements for no further deforestation in agreements as in Ecuador and Colombia. However, Curtis et al. (2018) opined that despite such agreements there has been no decline in the rate of commodity-driven deforestation.

Forest degradation in the Pacific is a product of both the over-use and under-use of resources. The over-use (and/or overexploitation) of forest resources includes activities such as unsustainable logging, uncontrolled grazing and firewood collection (Wairiu, 2017). Conversely, the under-use of forest resources such as the abandonment of secondary forests due

to increasing rural-urban migration (Connell, 2021) has led to biological invasions by pests and weeds. Under both instances, forests lose their capacity to deliver goods and services. Forest rangers have been appointed from local communities in the REDD+ projects to monitor forest resources, however, it is important that they receive a fair share of the benefits to ensure ongoing support and commitment.

Acquiring credible and robust data to establish the baseline land-use condition (e.g. forest quality, livelihoods) and the change in land-use condition over time (e.g. use agreed national or international standards for data collection, compilation, and storage, draw on local or traditional ecological knowledge) is fundamental for the success of REDD+ programmes. It is critical to not only involve the local communities in the design of 'change' proposed but also allow scope for local adaptation, trialing and innovation (i.e. localise the design and implementation to engender commitment, agree on targets and timeline, identify appropriate 'entry points' for introducing change). While establishing credible baseline data, it is critical to monitor change – both in forest resources and livelihoods. This is because change in forest use must (will) be linked to change in livelihoods. A positive example of land-use monitoring is reported in Indonesia, where part of the national REDD+ programme contributed to the 'One Map' initiative to digitise and harmonise spatially referenced land-use data to improve administrative efficiency and reduce conflict when all ministries and tiers of government refer to a single 'map' (i.e. source of data).

6.3. Addressing concerns about equity

REDD+ negotiations often involve power asymmetries between different actors with different social positions, value systems, and competing or collaborative relationships. Such power asymmetries may exacerbate existing inequalities in access and utilisation of natural resources, instead of eliminating or mitigating these. In Pimampiro, Ecuador, Rodríguez de Francisco et al. (2013) reported that PES made it more difficult for smallholder farmers to use their own land for crop production. The traditional land rotation cycle involved leaving the land fallow for some time but was categorised as land under regeneration with potential to enter conservation (as per municipal laws). As such, fallow land came under the regulations of PES clearance restrictions. Smallholder farmers responded by continuous cropping with no fallow period, which accelerated land degradation or sharecropping outside the conservation area which reduced the pool of collective labour. Similarly, Merlet (2021) examined the ineffectiveness of a PES scheme introduced to address deforestation caused by cattle farming in the Indio-Maíz Biological Reserve in Nicaragua. The study reported that existing inequalities were amplified through vertical patron and client relationships, wherein large-scale cattle ranchers continued to access cheap labour and additional pasture by contracting or share-breeding with small-scale farmers. Another equity risk for REDD+ is the focus on targeting heavily threatened forests which is likely to benefit large scale deforestation agents such as wealthy cattle ranchers and oil palm planters, while marginalising smallholder farmers particularly where their land tenure is insecure (Kaimowitz, 2008). Therefore, it is critical for policymakers to prioritise the interests of the least powerful actors when negotiating agreements to ensure REDD+ projects contribute to more equal distribution of natural resource rights and benefits.

Understanding the socio-economic heterogeneity within communities and the implications of alternate land-use is an important requirement when designing REDD+ programmes in the Pacific. Households may vary in terms of their wealth (wealthy versus poor), forest dependence (high versus low), land-use options (farming, grazing, aquaculture), age, gender, and level of education of the decision maker. An analysis of the community livelihoods and social structure can inform a more inclusive and holistic approach to understanding how any change in access is likely to affect forest resource utilisation across households. Enhancing women's role in land-use decision making is a common challenge across the region. A positive example is evident in

Fiji which has developed its Feedback, Grievance, and Redress Mechanism (FGRM) and is working towards addressing gender-based violence and gender-based risk in conservation initiatives. The USAID (2020) gender and environment analysis report on REDD+ has suggested several measures, such as increasing awareness on FGRM including land-use rights of both men and women, confidentiality of complaints, support of traditional leaders, and utilising existing community structures such as women groups and faith-based organisations to promote FGRM, so that FGRM is complementary rather than displacing customary laws.

Facilitating a transparent communication process that encourages public participation prior to, during and post-project stages (e.g. different frequency and modes of communication may be required for different segments of the community, awareness of unintended impacts – positive and negative) is needed to ensure that communities understand how and why change is sought. The theory of change in REDD+ recognises the complexity of socio-ecological systems and reflects the need for interactions among communities and stakeholders for amplifying positive feedback loops (Martius et al., 2018). In Drawa, Murti et al. (2007) reported positive inter-stakeholder relationships with increasing collaboration achieved under the traditional leadership of the *vanua Drawa*. However, conflicts emerged due to: 1) the individual *mataqali* units as some preferred short-term revenue from logging while others preferred long-term revenue and other benefits from sustainable forest management, leading to a decline in cooperation, and 2) with the iTaukei Land Trust Board (iTLTB) over the amount charged as an administration fee and the logging premiums. Therefore, examining how PES schemes are designed and negotiated between different actors, including inter-stakeholder relationships, should be a key task when considering equity concerns in the design of REDD+ projects.

6.4. Strengthening tenure security

Insecure land tenure in the tropics often overlaps with areas of high conservation concern. Even in countries where land tenure is relatively well-defined, tenure security is often weakest for poor rural communities. While 65% of the global land area is held by Indigenous people under customary systems, they hold legal rights to only 18% of this area (RRI, 2015). Given the rising demand for land, their territories and resources are increasingly vulnerable to capture and control by governments and private actors. Rights-based movements in South Asian countries offer hope as Indigenous people reclaim their land and resources. In the province of Aceh, Indonesia, Indigenous people received legal titles for 22,549 ha of forests under customary ownership (Jong, 2023). Similarly, in Mindanao, the Philippines, the Federation of Matigsalug-Manobo Tribal Councils received legal title over 102,000 ha of ancestral territories (Lilley, 2021).

Robinson et al. (2018) argue that PES may increase competition for controlling resources and eviction of the marginalised by the elites. Clearly defined property and tenure rights are therefore a prerequisite and fundamental to the success of any PES programme. In the Melanesian countries of PNG, Fiji, Solomon Islands, and Vanuatu, land under customary tenure ranges between 87 and 98% (Jupiter, 2017). In Fiji, the boundaries of customary land are legally demarcated which provides clarity on the flow of benefits. Customary rights over land tenure are handed down the *mataqalis* and are also registered with the iTLTB, the statutory body responsible for administering and managing *iTaukei* (Indigenous) land. The *iTaukei* Lands and Fisheries Commission (TLFC) and the *iTaukei* Lands Appeals Tribunal (TLAT) (established under the *iTaukei* Lands Act 1905) are the two principal bodies responsible for overseeing land ownership disputes. TLFC is also the custodian of the *Vola ni Kawa Bula* (Native Register of Land) which is being digitised for easier access. Moreover, the consent of 60% members of the *mataqali* is required for the issue of leases by the iTLTB, including conservation leases, that can extend up to a maximum of 99 years. Delay in acquiring the *mataqali*'s consent is often cited as a major bottleneck for REDD+

projects since villagers may have migrated to towns and cities, including overseas. Fast tracking conservation lease agreements could be facilitated by modernising communication and engagement procedures, whereby members of the *mataqali* are informed about the procedure and timetable for decision-making, so there is a genuine and transparent process for engagement. In PNG, Solomon Islands, and Vanuatu, boundaries of customary land are not legally demarcated. Instead claims to land are linked to genealogy as in the Solomon Islands or historical hunting practices as in PNG. This makes the fair and adequate transfer of benefits to communities relatively more complex and subject to conflicts (Jupiter, 2017; Mangubhai and Lumelume, 2019). Policy interventions should therefore focus on strengthening tenure security particularly through registration and demarcation of customary land and tribunals for resolving land ownership disputes.

6.5. Removing perverse incentives

Pendrill et al. (2022) estimated that between 90 and 99% of all tropical deforestation is driven directly or indirectly by agriculture. In Fiji, agriculture is the main driver of deforestation (Hass, 2015; O'Brien et al., 2021). The expansion of commercial agriculture for meeting export demands of taro and kava has accelerated encroachment into forest areas. While policies in the forestry sector are directed to mitigate deforestation and forest degradation, those in other sectors often impede progress. The Fiji National REDD+ Policy 2011 identified mitigating emissions from deforestation and forest degradation via forest protection and improved forest management as key REDD+ activities. The policy also recognised the need to address agriculture-driven forest clearance. However, tax incentives for commercial agriculture and processing facilities act as perverse incentives that drive deforestation and forest degradation. Similarly, calls for the modernisation of agriculture and transition from subsistence to commercial farming (Ministry of Agriculture, 2014) impinge upon conservation goals in the forestry sector. In PNG, the SABLs were responsible for extensive land grabbing and illegal logging under the guise of agriculture development (Nelson et al., 2014). As the National Forestry Development Guidelines 2009 prohibited the export of raw logs from areas under timber permits, but this prohibition did not apply with the forest clearing permits granted to SABLs, so logging firms started 'land grabbing' under the pretext of oil palm plantations. SABLs involved the transition of land from customary ownership to long term corporate leases allowing logging of native forests for oil palm. The PNG government announced the cancellation of SABLs in 2016, however Firth (2018) reported that this was far from reality and the SABLs continued to exist. Future policies should therefore focus on mitigating and/or removing perverse incentives that drive deforestation and degradation that jeopardise the efficiency and effectiveness of REDD+ initiatives.

Lack of inter-ministry collaboration leads to divergent policies affecting deforestation and forest degradation in the Pacific region (Shah, 2023). The Pacific could learn from Brazil's Permanent Inter-Ministerial Working Group for addressing deforestation which in 2004 launched an Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm). This provided an unprecedented opportunity to break down the institutional silos as deforestation became a federal government issue. It was no longer considered the sole responsibility of the Ministry of Environment but also included ministries governing agribusiness, infrastructure and justice (Larson et al., 2013). Between 2004 and 2012, deforestation in the Amazon declined by over 80% (although it increased thereafter) (West and Fearnside, 2021). A study on REDD+ readiness of 11 countries in the Asia-Pacific region revealed that improved partnerships among stakeholders and their focus on forest governance, including participatory policies and action plans, were considered fundamental to successful implementation of REDD+ (Maraseni et al., 2020).

6.6. Competitive conservation incentives

Across the tropical zones of the world, agricultural intensification policies are gaining popularity as one response to address deforestation and forest degradation. While countries such as the Democratic Republic of Congo are focusing on increasing productivity of subsistence farming, Nepal, Indonesia, Madagascar, Mozambique, Argentina and Kenya are encouraging agricultural intensification to replace traditional 'slash and burn' approaches (Phelps et al., 2013). However, the relationship between agricultural intensification and conservation is a contentious issue. The land sparing hypothesis suggests that agricultural intensification may enhance production on existing agricultural land and therefore 'spare' rich biodiverse forests from encroachment. Conversely, some argue that agricultural intensification can increase profitability and land rents which can either incentivise forest encroachment or increase the costs of conservation, leading to a rebound effect causing further forest loss (Pratzer et al., 2023).

Adolph et al. (2023) reported that agricultural intensification can increase forest encroachment under conditions of poor governance and unavailability of alternative livelihood opportunities. As such in areas most vulnerable to cropland expansion (such as those in the vicinity of forests), it is critical to monitor land-use change and the socio-economic drivers of deforestation (such as market demand) as well as understand the institutional and governance structures. Safeguards can then be designed to support conservation targets such as improving governance mechanisms and/or establishing income-generating initiatives. The payments households receive under arrangements for REDD+ is a critical aspect of a project's success or failure. Whether the payments reflect the magnitude of change (e.g. effort, loss), are made to individual households or to the community, and in a timely way (e.g. soon after the change has been implemented and verified), are all key aspects that contribute to smallholders' level of satisfaction. A credible and reliable source of data is key to verifying the 'change' made by land managers and the extent forests have been enhanced. Robust biophysical data is required as well as socio-economic data, so that those who have changed their behaviour in favour of the REDD+ objectives can be identified and appropriately rewarded. Selecting the relevant biophysical and socio-economic indicators that reflect the desired change is an important step, as this will be the basis for fairly rewarding the households involved. Concurrently, it is important that conservation incentives remain financially competitive against opportunity costs. This also implies that livelihood strategies (and associated income streams) of REDD+ should outweigh the benefits of logging, to ensure that communities continue to consider it a viable alternative. Complex or large-scale change will require more than simply financial payments to land managers to be fully understood and implemented on a sustained basis (consider an incremental or a transformative approach). It is crucial to encourage local adaptations and innovations as our 'science' is incomplete, and forest-livelihood systems are dynamic (seasonally, year-to-year) with varying dependence, uses and trade-offs. Changes in the 'cost of living' and opportunity costs are also dynamic with influences often driven by macro forces beyond the local context (e.g. climate change impacts, fuel, food prices).

Most smallholder farming communities in the tropics are grappling with issues such as low farm yield and profitability, and food insecurity. These smallholders may therefore be more willing to accept alternatives such as participation in a REDD+ project. However, when farm yields and/or profitability increases, their continued participation in a REDD+ project may not be assured. Hence, in landscapes that are modified by agricultural intensification such as oil palm plantations in PNG (Nelson et al., 2014), policies should consider the possibility of increasing conservation incentives (Phelps et al., 2013). Ensuring payments reflect the magnitude of change undertaken by households and the wider community (e.g. level of investment made by households, loss of benefits incurred by community), and made on timely basis (i.e. reduce lag between verification and payment) will ensure greater fairness and

efficiency in the implementation of REDD+ projects, indicating that programme managers will need to monitor an array of financial data to ensure conservation payments reflect contemporary context (Christen et al., 2020).

REDD+ incentives should be directed towards community projects (e.g. building/renovating priority infrastructure, hosting community events) and to individuals (households) most affected (employment as forest rangers, community enterprise facilitators). However, the mix of allocating funds needs to be carefully and sensitively negotiated at the community level and may need a skilled 'outsider' to facilitate the discussion. In addition, it is also important to consider how payments to communities are determined. If recent historical baselines are considered as the reference to determine progress, then there is a risk of ignoring or disadvantaging communities and/or households that were active in past conservation initiatives and therefore they may be 'unrewarded' for their historical stewardship of forests.

7. Conclusion

REDD+ has been criticised for failing to protect the rights of Indigenous people (Barletti and Larson, 2017). Some also question the morality of paying the world's poorest nations to absorb emissions from the world's richest nations who often continue with the business-as-usual trajectory. Others argue that REDD+ does not address the drivers of deforestation, it merely pushes the 'bad actors' away towards less protected forest frontiers (DeShazo et al., 2021). The market compliant nature of forest conservation through REDD+ coupled with the outsider driven narrative are also key concerns. In our view, REDD+ is a 'blended' policy instrument as it is neither a purely market-based solution (e.g. donors often fund the preliminary scoping of projects and facilitation of stakeholder engagement) nor a purely government (outsider)-driven or prescribed solution (e.g. payments to forest owners correlates with current global market for carbon). Despite all the criticism, REDD+ remains a potentially valuable tool to protect forests by balancing goals of socio-economic development and nature conservation in tropical countries, including those in the Pacific. REDD+ projects in the region can learn from each other and globally regarding the most appropriate pathways for enhancing its appeal to communities, policymakers, and the private sector.

The small but increasing number of REDD+ projects in Melanesia have benefitted communities by funding development work including improved infrastructure, health, and education services. Projects have also created direct employment of village youth as forest rangers for boundary marking, biodiversity surveys, and forest monitoring generating income streams. Also, most communities involved in REDD+ projects exhibit stronger governance through the formation of co-operatives and associations. Capacity building through awareness workshops and training of local field guides in forest inventories and biomass measurements has been another notable achievement. Among the key challenges are perverse incentives driving deforestation and forest degradation, lack of systematic assessments of carbon offsets, poor stakeholder engagement due to a lack of transparency and communication, insufficient feedback mechanisms, exclusion of women from benefits of land-use and decision making, and the lack of prosperous and sustainable alternative livelihoods.

Developing policy mixes, understanding the drivers of deforestation and forest degradation, addressing equity concerns, strengthening tenure security, removing perverse incentives, and ensuring financially competitive conservation incentives can enhance the appeal of REDD+ to rural communities, policymakers, and the private sector, so its reach across the Pacific can be extended. Policy mixes including both prescribed programmes and market-based measures are required that can produce complementary additive effects for incentivising the desired action and positive outcomes. For example, REDD+ can partially offset the costs associated with environmental regulations or landowner prohibitions (e.g. restrictions on logging). It is important to invest in data

collection to establish the baseline (e.g. forest reference) and subsequent monitoring, reporting and verification of the change in forest area and quality. Forest inventories should be accompanied with livelihood inventories since any change in forest use must (will) be linked to any change in livelihoods. REDD+ programmes in the Pacific will need to fully appreciate the socio-economic heterogeneity within communities and the trade-offs with alternative land-use. Examining how changes in access are expected to impact different households' forest resource use will require an analysis of the social structure and livelihoods of the local community. While changing forest management implies that alternate decisions will be made by individual households, a shared agreement of the REDD+ arrangements will also be required by the community. Establishing a transparent process that encourages public participation will be needed for a project to be widely understood and agreed to. Even community members not directly involved in the REDD+ project, should have regular opportunities to be informed to avoid any misinformation and fracturing of support within the community. A well-managed process for community engagement will also allow unintended impacts to be readily identified and potentially addressed. Being sensitive to the complexity of land-use at the local level requires establishing trusted partnerships with the relevant social segments of the community (e.g. a single spokesperson may not be able to give a complete picture of local land-use decision making). Relying on rapid assessments or assumptions and generalisations documented in official publications may be misleading, so strengthening the process for FGRM will be important. Enhancing tenure security, especially through customary land demarcation and registration, as well as the establishment of tribunals to settle disputes over land ownership, should be encouraged. Overall, while the global experiences and lessons on REDD+ reveal it to be a complex and multi-dimensional policy instrument, if it is carefully designed to reflect the context and needs of the Pacific region, it offers great potential as a mechanism that can bridge the conservation-development dilemma and contribute to sustainable development.

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CRedit authorship contribution statement

Shipra Shah: Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Funding acquisition, Conceptualization. **Digby Race:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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No data was used for the research described in the article.

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