Global Gateway

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From Linear Vulnerability to Circular Resilience

Mainstreaming Circular Economy and Sustainable Consumption and Production into Climate Ambitions of Pacific Island Countries

Regional Whitepaper

Acknowledgements

This report was developed as a part of an exploratory Technical Advisory (TA) called 'Integrating Sustainable Consumption and Production (SCP) and Circular Economy Policy Approaches to Enhance the Climate Policy Ambitions and Impactful Actions including the Nationally Determined Contributions (NDCs) of the Pacific Countries'.

The report covers policy assessments of eight Pacific Island countries, as follows: Fiji, Vanuatu, Samoa, Papua New Guinea (PNG), Tonga, Kiribati, Timor Leste and Federated States of Micronesia (FSM). This report was prepared on behalf of the EU SWITCH-Asia Policy Support Component (PSC) by Ranga Pallawala, Key Expert, Climate Change and Environment Policy, Ron Simpson, Expert, and Vinay Singh, Expert, under the supervision of Dr. Zinaida Fadeeva, Team Leader, SWITCH-Asia PSC.

The SWITCH-Asia Programme

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List of Acronyms and Abbreviations

3Rs	Reduce, Reuse, Recycle
ADB	Asian Development Bank
AFOLU	Agriculture, Forestry, and Other Land Use
C&D	Construction and Demolition
CCMA	Climate Change (Management) Act (Papua New Guinea)
CE	Circular Economy
CLT	Cross-Laminated Timber
COP	Conference of the Parties
CSA	Climate-Smart Agriculture
EPR	Extended Producer Responsibility
EUD	European Union Delegation
EU	European Union
FDB	Fiji Development Bank
FNU	Fiji National University
FSM	Federated States of Micronesia
GCF	Green Climate Fund
GHG	Greenhouse Gas
GPP	Green Public Procurement
GST	Global Stocktake
IRP	International Resource Panel
KDP	Kiribati Development Plan
KE	Key Expert
KV20	Kiribati 20-Year Vision
LEDS	Low Emission Development Strategy
LPG	Liquefied Petroleum Gas
LULUCF	Land Use, Land-Use Change, and Forestry
MC	Micronesia Challenge
MC2030	Micronesia Challenge 2030
MRV	Monitoring, Reporting, and Verification
NDC	Nationally Determined Contribution
NISP	National Infrastructure Strategic Plan
NKE	Non-Key Expert
NSDP	National Sustainable Development Plan
NWMS	National Waste Management Strategy
PIC	Pacific Island Country
PNG	Papua New Guinea
PSC	Policy Support Component
PV	Photovoltaic
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SCP	Sustainable Consumption and Production
SDG	Sustainable Development Goal

SDP	Strategic Development Plan
SDS	Strategy for the Development of Samoa
SIDS	Small Island Developing States
SPC	Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
SRWMA	Samoa Recycling and Waste Management Association
TA	Technical Advisory
TNC	The Nature Conservancy
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

This report demonstrates that Sustainable Consumption and Production (SCP) and Circular Economy (CE) approaches are not optional 'add-ons' to climate policy: they are fundamental instruments for raising the ambition, credibility and resilience of Nationally Determined Contributions (NDCs). Global evidence shows that material extraction, processing and use drive the majority of the world's greenhouse-gas emissions and biodiversity loss, meaning that decarbonisation strategies that focus only on energy systems will leave large sources of emissions and vulnerability unaddressed. Integrating CE/SCP widens the policy toolkit to include demand-side measures, lifecycle thinking and resource-loop closing interventions that deliver simultaneous mitigation, adaptation and sustainable development outcomes.

For Pacific Island Countries (PICs), the logic is particularly compelling. PICs are among the smallest global emitters yet face some of the most severe climate impacts. Geographic isolation, narrow economic bases and deep dependence on imported goods have produced entrenched linear material flows that (a) expose countries to fuel and supply-chain shocks, (b) drain foreign exchange, and (c) generate waste streams that local systems struggle to manage. Reframing NDCs to prioritise CE and SCP therefore addresses climate ambition while directly strengthening economic security, food and water sovereignty, and disaster resilience. This 'resource-sovereignty' framing is both pragmatic and politically potent for the Pacific.

Scope and approach of the assessment

This rapid scoping assessed the explicit and implicit integration of CE/SCP principles across eight NDCs (Fiji, Vanuatu, Samoa, PNG, Tonga, Kiribati, Timor-Leste and FSM). The analysis applied four criteria – explicit mention, implicit alignment, systemic integration and measurability – and combined country case reviews with a regional synthesis to identify high-impact entry points for NDC 3.0 updates.

Key findings

Widespread implicit alignment, but only a few countries are leveraging CE/SCP as a system-level framework

Many NDCs already contain measures that align with circular thinking (renewables, agroforestry, waste infrastructure), but these actions are generally isolated and not presented as part of a strategic CE/SCP transition. Vanuatu is the important exception among the NDCs reviewed: this country is explicitly undertaking a transition to the circular economy and therefore provides a practical model for systemic framing.

Sectoral opportunities with large, under-realised potential

While SCP and CE must ultimately be pursued as 'entire-economy transformations' due to their inherently cross-cutting nature, initial progress can be accelerated by targeting high-impact sectors such as energy; waste; agriculture, forestry, and other land use (AFOLU); and tourism. These areas represent strategic entry points – low-hanging fruits, so to speak – that allow Pacific Island Countries to demonstrate feasibility, generate quick wins, and build the institutional and financial capacity needed for deeper system-wide integration.

- **Energy**: strong renewable targets exist, but lifecycle and demand-side measures (appliance standards, building codes, photovoltaics (PV) end-of-life management) are often missing.
- **Waste**: most NDCs emphasise collection or landfill capture – i.e. end-of-pipe – rather than upstream prevention, reuse, recycling, composting and EPR (extended producer responsibility).
- **AFOLU/bioeconomy**: agroforestry, mangrove restoration and soil-health actions are strong entry points for circular bioeconomies (compost, biochar, value-added processing) that both sequester carbon and create local livelihoods.

- **Built environment & tourism**: the construction sector, the single biggest driver of embodied carbon and post-disaster material flows, is a glaring omission across many NDCs; tourism likewise is rarely mobilised as a circular-supply chain engine.

Key obstacles are: absence of national CE/SCP roadmaps and demand-side policy instruments (GPP, EPR), weak MRV and circularity indicators, limited institutional capacity at sector ministries, and the lack of tailored finance instruments to scale systemic interventions. These constraints are practical and solvable – but they require a different type of policy sequencing and finance architecture than typical project-by-project support.

NDC 3.0 is the strategic moment

The upcoming NDC updates provide a high-leverage policy window to translate scattered measures into a coherent circular strategy that both raises ambition and strengthens finance-readiness. Framing CE/SCP within NDCs signals to donors and climate funds that countries are pursuing systemic, investible pathways rather than isolated pilot projects.

Priority recommendations

The following measures should be prioritised in NDC 3.0 packages and national implementation plans.

Immediate (Policy framing & measurement: high return, low cost)

- Embed CE/SCP explicitly in the NDC narrative and targets. Add economy-wide companion targets (e.g. material footprint, recycling/diversion targets, percentage of circular procurement).
- Integrate circular indicators into MRV systems. Adopt a compact set of indicators (circular material use rate, organic diversion rate, local value-added from waste streams) so that progress is both verifiable and bankable.
- Declare a National CE/SCP Roadmap linked to the NDC. Roadmaps translate vision into ministries' responsibilities, milestones and funding needs.

Near term (Regulatory & market instruments: medium effort, strong leverage)

- Launch Green Public Procurement (GPP) and initial EPR pilots for plastics, packaging and solar PV/batteries to create demand and close product loops.
- Revise building codes and public infrastructure standards to require resilience + material circularity (design for disassembly, recycled content, rainwater capture, passive cooling). These measures reduce embodied emissions and lower reconstruction costs after extreme events.

Strategic investments (Project pipelines & finance: higher effort, transformational potential)

- Scale circular bioeconomy and waste-to-resource projects (composting, anaerobic digestion, biochar and agro-processing) that deliver mitigation, adaptation and local jobs.
- Develop country and regional financing vehicles (blend concessional climate finance with development bank instruments) to fund capital-intensive systems (regional recycling hubs, mass-timber value chains, PV end-of-life facilities). Use the NDC to structure bankable pipelines for green climate funds (GCF), Green Bonds, and donor support.

Illustrative country priorities (To demonstrate rapid wins)

- ***Vanuatu:*** move from commitment to implementation by publishing a detailed CE Transition Roadmap, integrating CE metrics into MRV and piloting 'Circular Tourism' standards.
- ***Samoa:*** convert strong renewable targets into demand-side action (energy efficiency + green building code) and scale municipal organic diversion/composting linked to agriculture.
- ***Fiji:*** leverage existing leadership (plastic bans, low-emissions development strategies or 'LEDS') to legislate EPR, formalise circular bioeconomy programmes and embed CE into national infrastructure planning.

- ***Kiribati:*** reframe NDCs around resource sovereignty: aggressively reduce import dependency via water/food/energy loops (harvesting, local processing, composting).
- ***Papua New Guinea:*** explore sustainable mass-timber value chains and CE-compatible livelihood support for the informal sector to reduce embodied emissions and create domestic industries.

Implementation principles and next steps

- Use NDC 3.0 as the structuring instrument, not only for new targets but for sequencing reforms as well (policy → pilots → scale), so as to align donor support behind economy-wide roadmaps.
- Prioritise enabling instruments (GPP, EPR, MRV) that shift markets and crowds towards private investment rather than relying solely on grant funding.
- Invest early in the process in diagnostic data (e.g. national material flow analyses, baseline circularity metrics). Diagnostics reduce project risk and make finance applications more competitive.
- Regional cooperation multiplies impact: implementing shared standards (e.g. resilient circular construction), pooling processing facilities, and facilitating joint advocacy on global waste trade will generate economies of scale and stronger bargaining power internationally.

Conclusion: A strategic case for ambition

CE and SCP offer Pacific Island Countries a pragmatic pathway to raise climate ambitions while simultaneously delivering the economic security and resilience that these countries urgently need. The evidence and the country diagnostics in this assessment show that modest changes in framing, measurement and the ordering of policy instruments can unlock much larger and more systemic gains. NDC 3.0 is therefore not merely another reporting exercise: it is the pivotal moment to re-cast climate commitments as whole-of-economy transformations toward circular, resilient, and locally rooted development. The Pacific has the political will and many of the building blocks. What remains to be developed is strategic sequencing, measurement, and finance to turn vision into durable impact.

1. Introduction

1.1. The European Union's SWITCH-Asia Programme

Through the European Union Green Deal and Global Gateway, the EU is committed to supporting the transition of countries to a low-carbon, resource-efficient and circular economy while promoting sustainable production and consumption patterns. As part of this engagement, the SWITCH-Asia Policy Support Component (PSC) aims to enhance SCP progress through scaling up and mainstreaming SCP policy in the target region of 42 countries spanning from the Middle East to Central Asia, South Asia, East Asia, Southeast Asia, and the Pacific.

The SWITCH-Asia PSC builds on this programme's long and successful track record of providing technical assistance. It also links with the SWITCH-Asia grants component and connects with the programmes and priorities of the EU Delegations (EUDs). The programme's flexible and on-demand interventions, and its mandate to foster cooperation, strengthen networking, and build a platform for exchange firmly position the PSC to meet the needs of the target region in addressing the triple planetary crises of climate change, biodiversity erosion, and environmental pollution, and in meeting international commitments, including the SDGs and the Paris Agreement.

As a mode of operation, the PSC liaises with and advises national governments and regional organisations and networks in the target region. Typically, it engages countries in regional and multi-country approaches on scaling up SCP policy and implementation, delivering Technical Advisories (TAs), exchanging knowledge, and building the capacities of regional institutions. Key points of intervention are the UN Sustainable Development Goal (SDG) 12, along with providing progress and support to SCP-related goals; integrating SCP into the NDCs and climate-related actions by involving regional stakeholder engagement, with particular attention to business and industry representatives; and communicating on SCP. The PSC team works in close exchange with the Consortium Partners (GOPA and NIRAS), DG INTPA Unit C3 in Brussels (Programme Manager), and is in addition in continuous contact with the target regions' EU Delegations (EUDs). With a duration of 48 months from 1 January 2023, the PSC consists of a team of Key Experts (KEs) focusing on different aspects of implementation, including policy advisory, knowledge exchange, and stakeholder engagement. To support these actions, and with the ambition of developing regional capacities, non-key experts (NKEs) are mobilised for long-term (> 12 months) and short-term assignments to address key SCP policy and implementation needs as expressed by the countries within the target region.

This report was developed as a part of an exploratory TA called 'Integrating Sustainable Consumption and Production (SCP) and Circular Economy Policy Approaches to Enhance the Climate Policy Ambitions and Impactful Actions including the Nationally Determined Contributions (NDCs) of the Pacific Countries'. The report covers the policy assessments of eight PICs: Fiji, Vanuatu, Samoa, Papua New Guinea (PNG), Tonga, Kiribati, Timor Leste, and the Federated States of Micronesia (FSM). However, the proposed policy alignment strategies to integrate SCP and CE into climate ambitions are applicable to the entire Pacific region.

1.2. Introduction to the Technical Advisory (TA)

1.2.1. The Global Resource-climate Nexus

Unsustainable consumption and production patterns constitute the fundamental drivers of three interlinked planetary crises: climate change, biodiversity erosion, and environmental pollution. Evidence demonstrates that strategic modifications to these patterns could substantially reduce global greenhouse gas emissions through both direct and indirect pathways. Deploying sustainable consumption and production (SCP) frameworks yields significant co-benefits for climate change mitigation and sustainable development, particularly concerning natural resource extraction and utilisation. The International Resources Panel's (IRP) *Global Resources Outlook 2024*[1] presents compelling evidence to support this relationship. The extraction and processing of material resources (fossil fuels, minerals, non-metallic minerals and biomass) account for

1 https://www.unep.org/resources/Global-Resource-Outlook-2024

over 55% of greenhouse gas emissions (GHG) and 40% of particulate matter health-related repercussions. If land use change is included, climate impact grows to more than 60%, with biomass contributing the highest quantities of emissions (28%), followed by fossil fuels (18%) and non-metallic minerals and metals (17% combined). Biomass (agricultural crops and forestry) also accounts for over 90% of total biodiversity loss and related water stress. A linear 'take-make-dispose' economic model is the primary driver of global greenhouse gas (GHG) emissions.

The implications are clear: a successful climate mitigation strategy cannot focus solely on a renewable energy transition, because it must also encompass a fundamental shift towards resource-efficient and circular economies. The Circular Economy (CE), which designs out waste, keeps products in use, and regenerates natural systems, alongside the broader framework of Sustainable Consumption and Production (SCP), are therefore not merely environmental add-ons but are central to achieving the goals of the Paris Agreement (World Bank, 2022).

These findings emphasise the substantial potential for both climate change mitigation and adaptation strategies through enhanced material resource efficiency and sustainable resource management practices. According to Impact Investor (2024),[2] SCP frameworks effectively balance economic growth and ecological sustainability by targeting resource efficiency and sustainable consumption. The data demonstrate clear pathways for intervention through improved production processes and consumption patterns. Despite its significance, however, the nexus between climate change and sustainable consumption and production remains substantially underexplored in global climate policy frameworks. The Paris Agreement and its associated Nationally Determined Contributions (NDCs), however, do present a strategic opportunity for countries to explore this critical relationship more comprehensively, and to integrate SCP strategies into climate actions while developing more holistic approaches to emissions reduction and climate change resilience building.

1.2.2. Nationally Determined Contributions (NDCs)

The Nationally Determined Contribution (NDC) is the building block of the Paris Agreement, which was agreed at the 21st Conference of Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC), which paved the way towards a bottom-up approach to a global agreement for solving global climate change challenges, plus an opportunity to integrate national priorities with climate actions. All the parties are supposed to update their NDC progressively every five years in order to achieve the overall objectives of the Paris Agreement. The NDC process has been recognised as an opportunity to address other global commitments in an integrated manner. The Sustainable Development Goals (SDGs), a landmark agreement in the 2030 global development agenda, has also recognised the Paris Agreement as a main contributor for achieving global climate change targets. The Paris Agreement thus opened a window of opportunity for countries to establish a development pathway that would contribute to multiple global and national commitments through a common process including monitoring, reporting and verification processes.

In 2025, all the parties to the Paris Agreement are required to submit their third round of Nationally Determined Contributions (NDC 3.0), which must demonstrate increased climate ambitions guided by the Global Stocktake (GST) outcomes. This update presents countries with a strategic opportunity to integrate their national priorities – including sustainable consumption and production (SCP) – into their enhanced climate commitments. This bottom-up approach to the NDCs enables countries to effectively align their domestic objectives with international climate ambitions, ensuring both national relevance and global climate action. Aligning the national development policies with climate change priorities will enable the countries to ensure that 'locally appropriate' and ambitious climate targets are reflected in the NDC. The TA aims to add value by making the NDCs more relevant and pragmatic, helping countries bridge the gap between ambitious climate goals and practical implementation strategies.

2 https://impact-investor.com/

1.3. The Pacific Paradox

The PICs are facing a profound paradox: they are among the smallest contributors to global GHG emissions, yet they experience the most severe and immediate climate consequences, including sea-level rise, intensified cyclones, and ocean acidification (SPREP, 2021). Their vulnerability is exacerbated by geographic isolation, narrow economic bases, and a heavy reliance on imported goods, which creates costly, wasteful, and polluting linear material flows. This dependency leaves them exposed to global supply chain shocks and undermines their resilience (World Bank, 2021). Despite this, PICs have been pioneers in global climate advocacy, ratifying the Paris Agreement and submitting NDCs with a strong adaptation focus. Nonetheless, their climate strategies present substantial opportunities to integrate Circular Economy (CE) and Sustainable Consumption and Production (SCP) principles, generating systemic benefits that can simultaneously advance economic security, resource independence, and climate resilience. This dependency on a linear import model not only leaves them exposed to global supply chain shocks but also undermines their resilience by generating waste streams that go beyond their management capacity; and in addition they are exporting capital for goods that could be produced locally.

1.4. The objectives of the Technical Advisory

The TA has been designed to support the Pacific Countries by providing policy options to align their climate change strategic direction, especially their NDCs, so that their national sustainable development priorities align with CP and CE principles. The overall objective of the TA is to enhance the climate ambition and resilience of the Pacific Region with regionally and nationally appropriate SCP and CE policies and actions. The TA aims at achieving the following three specific objectives:

- enhancing the understanding of and interest in the potential of SCP and CE as strategies towards resilience building
- identifying the potential, opportunities, and challenges of integrating SCP and CE aspects, policies and actions, in the climate change ambitions in the priority sectors of a number of Pacific countries
- co-creating policy recommendations to amplify climate ambitions through effective SCP and CE policies and actions at the national and regional levels.

1.5. Methodology

This study was carried out as a policy assessment in which the regional and country national policies pertaining to climate change, SCP, CE and related national development policies and strategies were analysed. Timor-Leste is included in this assessment as a small island developing state in the Pacific region that faces climate and resource challenges very similar to other Pacific Island Countries, while also piloting notable circular economy and plastics reforms; it therefore offers both policy relevance and transferable lessons for a Pacific-focused study on climate change and CE. The methodology is based on a qualitative content analysis of the most recent publicly available national and regional policy documents.

The report aims to support PICs in this endeavour by:

- Analysing the current integration of CE/SCP principles within the NDCs of eight PICs: Fiji, Vanuatu, Samoa, Papua New Guinea (PNG), Tonga, Kiribati, Timor Leste and the Federated States of Micronesia (FSM)
- Identifying common gaps, challenges, and opportunities for alignment of climate change policies and ambitions with SCP- and CE-related policy priorities
- Providing actionable, country-specific and regional recommendations for mainstreaming CE/SCP into future NDC cycles

We also believe that this assessment and the recommendations will be valuable for the overall policy making processes in the Pacific Region while facilitating the international development partners in planning and delivering their support programme in the region.

2. Analytical framework: Assessing CE/SCP integration in NDCs

2.1. Defining CE and SCP in the Pacific Context

For PICs, CE and SCP are pragmatic development strategies, involving:

- CE: Transitioning from a linear model to a system where materials are continuously cycled, waste is designed out, and economic activity builds natural capital. Examples include transforming organic waste into compost or biogas, and remanufacturing and repairing imported goods.
- SCP: Doing more and better with less, focusing on resource efficiency across lifecycles and supply chains, and promoting sustainable lifestyles and consumption patterns (UNEP, 2015).

2.2. Key Sectors for CE/SCP integration

A fundamental tenet of both CE and SCP is their inherently cross-cutting nature; they are not standalone sectors but transformative frameworks that must be integrated across all economic activities to disrupt linear resource flows effectively (UNEP, 2015; Ellen MacArthur Foundation, 2017). The transition requires systemic change, involving policy coherence, innovation in business models, and shifts in consumer behaviour that span multiple sectors simultaneously. However, strategic prioritisation is essential for effective policy intervention, particularly in resource-constrained contexts like the Pacific. The selection of key sectors for focused CE/SCP integration should be guided by their material and energy throughput, contribution to greenhouse gas (GHG) emissions, and alignment with national development priorities and vulnerability profiles (IRP, 2019; World Bank, 2022). Sectors with high material resource intensity–where resource extraction, consumption, and waste generation are concentrated–offer the greatest potential for achieving rapid reductions in environmental footprint and enhancing economic resilience through circular strategies. Therefore, while the ultimate goal is a whole-of-economy transformation, initial focus on high-impact sectors such as energy, waste, AFOLU, and tourism creates strategic entry points to demonstrate feasibility, build capacity, and generate tangible co-benefits for climate mitigation, adaptation, and sustainable development.

- Energy: Shifting to renewables and promoting energy efficiency and circular business models for energy systems (e.g. solar panel recycling).
- Waste: Moving beyond collection and disposal to prioritise reduction, reuse, recycling, and organic waste treatment (composting, anaerobic digestion).
- Agriculture, forestry, and other land use (AFOLU): Promoting agroecology, agroforestry, composting, sustainable forest management, and reducing food loss and waste.
- Tourism: Developing green tourism standards, reducing waste and energy consumption, and sourcing locally produced goods and services.

2.3. Criteria for analysis

Each NDC was assessed against the following criteria.

1. **Explicit mention**: Does the NDC explicitly use the terms ‘circular economy’ or ‘sustainable consumption and production’?
2. **Implicit alignment**: Do the described actions and targets align with CE/SCP principles (e.g. waste reduction targets, sustainable agriculture practices)?
3. **Systemic integration**: Are these actions presented as part of a cohesive strategy, or are they isolated measures?
4. **Measurability**: Are there specific, measurable indicators for CE/SCP outcomes?

3. Regional synthesis: Patterns of CE/SCP integration across Pacific NDCs (NDC 2.0)

The analysis reveals a spectrum of integration, from implicit actions to explicit strategies.

3.1. Explicit mentions and implicit alignment

Within the eight NDCs assessed, Vanuatu is the sole outlier in explicitly committing to 'transition completely to a circular economy' in its NDC. (Other Pacific countries have incorporated circular economy language in related national policies and strategies, even where their NDCs do not yet use the term.)

3.2. Sectoral analysis: Energy, waste, AFOLU, and tourism

- **Energy.** Strong performance on renewable energy targets (e.g. Samoa's 100% renewable electricity goal) but limited focus on the circularity of energy infrastructure or demand-side management.
- **Waste.** Common focus on landfill management and, in some cases, waste-to-energy. However, there is a significant gap in policies targeting the upstream (reduction, reuse) and midstream (recycling, composting) stages of the waste hierarchy.
- **AFOLU.** High levels of implicit alignment through sustainable forestry, agroforestry, and climate-smart agriculture. This sector holds the most immediate potential for deepened circular integration.
- **Tourism.** Notably underdeveloped in NDCs from a CE/SCP perspective, despite being a primary economic sector for several PICs (particularly Fiji, Samoa, Tonga, and Vanuatu). For countries such as PNG and FSM, where tourism plays a smaller role, the priority for circular economy integration lies more heavily in other sectors (e.g. agriculture, fisheries, or forestry).

3.3. Common enablers and critical barriers

- **Enablers.** High-level political will for climate action; existing regional strategies (e.g. Cleaner Pacific 2025); and strong community-based resource management traditions.
- **Barriers.** Lack of national CE/SCP policy frameworks; data and MRV limitations; technical and institutional capacity constraints; and access to tailored finance.

4. Country-level NDC analysis and recommendations

4.1. Vanuatu

The Republic of Vanuatu is a Y-shaped archipelago of 83 islands with a population of approximately 300,000, whose economy is primarily driven by agriculture, tourism, and offshore financial services. As one of the world's most climate-vulnerable nations, it faces severe threats from cyclones, sea-level rise, and ocean acidification. Vanuatu has emerged as a global climate leader, pioneering policies that intertwine climate action and sustainable development. Its groundbreaking National Sustainable Development Plan 2016–2030 (Vanuatu 2030) and its status as the first Pacific Island Country (PIC) to explicitly commit to a circular economy in its NDC demonstrate the country's visionary approach. This policy context makes Vanuatu a critical case study for implementing circular economy (CE) and sustainable consumption and production (SCP) principles to enhance resilience against existential threats.

Analysis

Vanuatu's Second NDC (2021) is a landmark document, being the only one in the Pacific to explicitly commit to a 'complete transition to a circular economy' as part of its vision to remain carbon-negative. This is not merely aspirational; it is being operationalised through 20 mitigation and 116 adaptation actions that are fundamentally circular in nature. Vanuatu's policy positioning as visionary and integrated represents the most advanced conceptual marriage of climate resilience and economic transformation in the region. Their NDC moves beyond siloed projects, presenting a coherent, albeit initial, framework for systemic change.

The country's commitment is action-oriented. In the waste sector, targets for introducing the 3Rs (Reduce, Reuse, Recycle), constructing composting facilities, and training on waste minimisation (Actions M15-M20, A59-A63) directly tackle waste while creating valuable resources from organic streams. In energy, the goal to install 1,000 biogas plants (M7) is a quintessential circular model, transforming waste into energy and fertiliser, thereby addressing energy poverty, waste management, and soil health simultaneously. The promotion of coconut oil-based electricity further exemplifies a circular bioeconomy approach, utilising a local renewable resource to shift from imported diesel.

Gaps and challenges from the perspective of SCP/CE

Despite these pioneering efforts, the analysis has identified gaps between Vanuatu's visionary commitment and the mechanisms for its full realisation.

- **Lack of a detailed national CE roadmap.** The NDC itself does not constitute a full implementation strategy. It lacks a national material flow analysis and quantified, economy-wide targets for reducing virgin material consumption or increasing material productivity, which are essential for measuring progress toward a CE.
- **Underdeveloped economic policy instruments.** The NDC does not leverage powerful demand-side policies such as mandatory Green Public Procurement (GPP) for all government spending or Extended Producer Responsibility (EPR) schemes for packaging and plastics, which are critical for driving market innovation.
- **Incomplete sectoral integration.** High-impact sectors are not fully addressed through a circular lens. Notably, tourism, a primary economic driver, lacks explicit circularity standards (e.g. for zero-waste operations, mandatory local sourcing) in the NDC, representing a missed opportunity to leverage a major industry for systemic change.
- **Monitoring and verification gaps.** The MRV framework does not yet include specific indicators to track circularity, such as the circular material use rate, reduction in material footprint, or the economic value generated from circular activities.

Recommendations for integration and impact in NDC 3.0

To bridge these gaps and realise its pioneering vision, Vanuatu should consider:

- **Developing and launching a National Circular Economy** Transition Roadmap. This detailed strategy, aligned with Vanuatu 2030, should include SMART targets for material footprint reduction, recycling rates, and the share of the circular economy in GDP, providing a clear implementation plan beyond the NDC.
- **Integrating circular criteria into economic and fiscal policy.** Enact a Green Public Procurement Act mandating circular principles for all government purchasing. Explore fiscal incentives for circular businesses and the feasibility of an EPR scheme for key waste streams.
- **Strengthening the MRV Framework with CE indicators.** Integrate core circularity metrics into the national monitoring system to track progress, ensure accountability, and attract targeted green finance.
- **Launching a 'Circular Tourism Vanuatu' initiative.** Partner with the Vanuatu Tourism Office to develop certification standards for resorts based on principles of zero waste, energy and water circularity, and preferential procurement of local products and materials.

By addressing these strategic gaps, Vanuatu can evolve from a visionary declarer of the circular economy to becoming its foremost implementer, creating a powerful model of sustainable development that other SIDS can emulate. This would solidify its leadership and translate its ambitious climate goals into tangible economic and resilience benefits for its people.

4.2. Samoa

The Independent State of Samoa, with a population of 205,000, is a Polynesian nation whose economy relies heavily on tourism, remittances, and agriculture. Its fragile ecosystems, including rainforests and coral reefs, are highly susceptible to cyclones, droughts, and rising temperatures. Samoa has long been a regional hub for environmental governance, hosting the Secretariat of the Pacific Regional Environment Programme (SPREP). The Strategy for the Development of Samoa (2016–2020) and National Waste Management Strategy provide strong policy foundations for climate action. Samoa's NDC reflects a pragmatic, integrated approach to climate resilience, offering a solid base for deeper SCP and CE integration to mitigate economic and environmental vulnerabilities.

Analysis

Samoa's Second NDC (2021) presents a robust commitment to climate action, anchored in an economy-wide emissions reduction target of 26% by 2030. A leading climate policy researcher would note that while the document is strategically sound in its sectoral focus (energy, waste, AFOLU), it operates within a predominantly **linear framework of incremental improvement** rather than articulating a transformative vision for a circular and resource-efficient economy. The alignment with SCP and CE principles is almost entirely implicit, revealing a significant opportunity to enhance ambition, coherence, and effectiveness in the NDC 3.0 update.

1. Energy transition

Samoa's flagship commitment to achieving 100% renewable electricity generation by 2025, articulated as a conditional target within its NDC and contingent upon external support and financing, reflects a transformative SCP pathway aimed at reducing reliance on imported fossil fuels while enhancing energy security and climate resilience. This transition decouples economic activity from volatile global fuel markets and embodies the SCP principle of 'doing more with less' by drastically increasing the efficiency of the energy system's primary energy input.

However, the energy strategy of the NDC is overwhelmingly focused on supply-side mitigation. It lacks a complementary, robust framework for demand-side management and energy efficiency – a cornerstone of both SCP and CE. The built environment, a major energy consumer, is also conspicuously absent. There is no mention of:

- **Deficient building codes.** The absence of mandatory construction building energy performance standards represents a highly visible missed opportunity to advance resource efficiency within built environment. Without such standards, new and existing buildings can be locked into high material and energy consumption patterns, undermining long-term climate and sustainability objectives.
- **Material choices for embodied energy.** Also absent is promoting the use of local, low-emission building materials (e.g. sustainably harvested timber, volcanic rock aggregate) over imported, high-emission materials like concrete and steel, which carry a significant carbon footprint from production and transport.

2. Waste management: End-of-pipe solutions vs. upstream circularity

The primary waste-related mitigation action of the NDC is landfill gas capture at the Tafaigata landfill. While this reduces potent methane emissions, it is a classic end-of-pipe solution that deals with waste after it has been created. A CE approach would prioritise preventing waste generation in the first place.

The NDC implicitly acknowledges this through its alignment with the National Waste Management Strategy 2017–2026, which emphasises the 3Rs (Reduce, Reuse, Recycle). Nonetheless this has not been translated into specific, measurable circular economy targets within the NDC itself. Key omissions include:

- **No targets for waste reduction.** The NDC does not set targets to reduce per capita municipal solid waste generation, a key SCP indicator.
- **No targets for material recovery.** No goals were included in the NDC for increasing recycling rates, developing composting infrastructure for organic waste (a major stream in Samoa), or supporting formalised recycling markets.
- **Lack of producer responsibility.** The NDC does not explore policy instruments like Extended producer responsibility (EPR) so that producers of packaging and durable goods are held financially responsible for their products' end-of-life, a powerful driver for circular design.

The innovative work of non-state actors like the Samoa Recycling and Waste Management Association (SRWMA) demonstrates the viability of circular models (e.g. the 'Cero Waste Glass' project). Samoa's NDC 3 is missing an opportunity to formally integrate and scale these grassroots initiatives into national climate policy.

3. AFOLU: Strong nature-based solutions with missed circular linkages

The AFOLU sector presents Samoa's strongest implicit CE alignment. Actions like expanding agroforestry, mangrove restoration, and sustainable forest management are inherently circular. They enhance natural capital, sequester carbon, improve soil health, and regulate water cycles, creating regenerative systems.

However, the linkages between these actions and a broader circular bioeconomy are underdeveloped. For example:

- **Agricultural waste valorisation.** There is no strategy for converting agricultural residues (e.g. coconut husks, banana stems, crop waste) into valuable resources like biochar (for soil amendment and carbon sequestration), compost, or bioenergy, which represents a loss of material value and a disposal challenge.
- **Sustainable construction materials.** The forestry sector's potential to produce sustainable timber for local construction, displacing imported materials, is not explicitly linked to climate mitigation or adaptation goals in this NDC.

4. The built environment: A glaring omission

The most significant gap in Samoa's NDC, however, is the near-total absence of the **buildings and construction sector**. This sector is a major consumer of imported materials, energy, and water, and is highly vulnerable to cyclones. Excluding this sector from the NDC represents a systemic blind spot.

- **Embodied carbon.** The emissions from manufacturing, transporting, and constructing buildings (embodied carbon) are ignored, focusing only on operational energy.
- **Resilience and materials choice.** Post-cyclone reconstruction often defaults to linear models. The NDC does not promote circular construction principles: designing for disassembly, using recycled content (e.g. crushed concrete from debris as aggregate), or mandating the use of locally sourced, resilient materials that can better withstand climate impact.
- **Green Public Procurement (GPP).** The government could be a powerful market driver for CE by mandating circular and resilient criteria for all public infrastructure projects, but this lever remains unused.

Gaps and challenges

In summary, Samoa's key challenge is the siloed and implicit nature of its CE/SCP actions. The country is performing many of the right actions, but it lacks an overarching, cross-sectoral framework for the following:

- **explicitly naming SCP and CE** as guiding principles for national development and climate action
- **setting quantified, economy-wide targets** for material consumption, waste reduction, and recycling
- **integrating the built environment** as a core sector for mitigation and adaptation
- **creating policy synergies** between sectors (e.g. by linking agricultural waste to energy production, or sustainable forestry to low-carbon construction).

Recommendations for NDC 3.0

To transform their NDC into a vehicle for systemic change, Samoa should consider implementing the following strategies.

1. **Adopt a national circular economy framework**. Develop a stand-alone CE Strategy that explicitly guides the implementation of NDC 3.0, setting cross-cutting goals for resource productivity and waste reduction.
2. **Mainstream CE into the built environment**. Enact a mandatory **Green Building Code** that integrates energy efficiency, water conservation, and mandates for the use of local and recycled content materials in all new construction.
3. **Strengthen waste targets and policies**. Include specific NDC targets to:
   - reduce X% per capita municipal solid waste generation by 2030
   - divert Y% of organic waste from landfill to composting
   - increase the recycling rate to Z%
   - legislate an EPR scheme for packaging and tires.
4. **Foster a circular bioeconomy**. Launch programmes to support value-added industries around agricultural waste (e.g. biochar production, composting facilities) and promote sustainable timber for construction, creating green jobs and reducing imports.
5. **Leverage Green Public Procurement (GPP)**. Mandate circular economy criteria for all government purchasing and infrastructure projects to create immediate market demand for circular products and services.

4.3. Fiji

The Republic of Fiji is a Melanesian nation of over 900,000 people and the Pacific's largest economy, centred on tourism, sugar exports, and a growing services sector. Facing intensifying cyclones, coastal erosion, and devastating floods, Fiji has become a powerful international advocate for climate justice. Domestically, it has enacted pioneering policies, including their *Climate Change Act* mandating carbon budgeting and some of the world's earliest bans on single-use plastics. The *National Development Plan*

and *Low Emission Development Strategy* explicitly link climate action with economic development. Fiji's robust policy environment presents a prime opportunity to leverage SCP and CE for systemic, low-carbon transformation.

Analysis

Fiji is a climate leader in the Pacific, as demonstrated by its early ratification of the Paris Agreement and its ambitious Updated NDC, which commits to a 30% emissions reduction from a business-as-usual scenario by 2030 and net-zero by 2050 (Government of Fiji, 2020). Fiji has also pioneered **world-leading policy instruments** that are de facto circular economy policies. The country's Climate Change Act 2021 creates a robust legal framework for climate action, including carbon budgeting. Crucially, the **ban on single-use plastics and polystyrene** (effective from 2020/2021) is a powerful upstream SCP intervention that reduces waste, pollution, and the resource footprint of the tourism and retail sectors (Fiji Ministry of Economy, 2021).

Fiji's Low Emission Development Strategy 2018–2030 (LEDS) provides a long-term framework that implicitly supports SCP by focusing on resource efficiency, behavioural change, and economic transformation. The energy sector's focus on renewable energy and energy efficiency is strong. Furthermore, Fiji's development banking sector is emerging as an enabler; the Fiji Development Bank's (FDB) **Sustainable Blue Finance** product offers loans for investments in a sustainable blue economy, including areas like e-mobility and sustainable aquaculture (FDB, 2023).

Fiji's NDC is more advanced, listing under its Adaptation Actions: *Climate proofing of infrastructure* and *Incorporate climate change and disaster risk reduction measures into building codes and planning policies*. Fiji is a regional leader in policy development. The Fiji National Building Code (FNBC) is being updated, and there is active discussion on incorporating green building principles. The work of the **Fiji National University** in developing sustainable construction materials from local waste streams (e.g. coconut fibre, recycled glass) is a prime example of circular innovation waiting for policy support (FNU, 2021). Furthermore, Fiji's high rate of urbanisation makes energy efficiency in buildings a critical mitigation opportunity that has not yet been fully captured in the NDC. While the NDC mentions energy efficiency, it does not specifically target the building sector's operational energy use through mandatory standards for appliances, lighting, and passive cooling design. Despite these robust policy foundations and implicit alignments, the NDC itself fails to explicitly frame these actions under a cohesive CE or SCP umbrella.

Gaps and challenges

Despite these robust foundations, the NDC itself **does not explicitly frame these actions under a CE or SCP umbrella**. This represents a missed opportunity to create a cohesive narrative and strategy that would maximise synergies. Key economic sectors are not addressed through a circular lens: the **construction sector** lacks mandates for using recycled content or designing for disassembly; and the **tourism sector**, beyond the plastic ban, lacks a comprehensive circularity framework. The immense potential for a **circular bioeconomy** around sugarcane waste (bagasse) and coconut products is not explicitly linked to climate goals in the NDC (Nunn et al., 2021). The NDC also lacks specific indicators to measure progress on circularity.

Recommendations for NDC 3.0

1. **Explicitly link the LEDS and NDC to a national CE vision**. The government should articulate a clear 'Fiji Circular Economy Vision 2040' and ensure the NDC 3.0 and LEDS implementation are key delivery mechanisms.
2. **Introduce comprehensive EPR legislation**. Building on the plastic ban, implement a full EPR scheme for all packaging, electrical and electronic equipment (e-waste), and end-of-life vehicles, holding producers financially responsible for the collection and recycling of their products.
3. **Develop Green Building Codes and standards**. Mandate the use of recycled materials, rainwater harvesting, and solar water heating in new buildings, particularly in the tourism and public sectors.

4. **Catalyse the circular bioeconomy**. Launch targeted programmes to support investment in valorising agricultural waste streams (sugarcane, coconut, forestry) into bioenergy, biocomposites, and other high-value products, creating green jobs and reducing waste.
5. **Mainstream CE into the national infrastructure plan**. The upcoming update to the National Infrastructure Strategic Plan (NISP) must integrate CE principles, including green public procurement for infrastructure projects, mandatory life-cycle cost analysis, and material passports for major public buildings.
6. **Launch a 'Local materials for resilience' programme**. Provide technical standards, training, and financial incentives for architects and builders to use certified local timber, bamboo, and other bio-based materials. This reduces import dependency, supports local economies, and lowers embodied carbon.
7. **Transform the Fiji national building code into a 'Green & Resilient' code**. The update should go beyond climate-proofing to include mandatory energy efficiency standards (e.g. envelope insulation, solar hot-water readiness), water recycling, and requirements for using recycled content in construction.
8. **Develop a national strategy for sustainable construction materials**. Create policy incentives and standards for the production and use of low-carbon cement blends, recycled aggregates, and bio-based insulation materials, leveraging local research and development.

4.4. Federated States of Micronesia (FSM)

The Federated States of Micronesia is a vast nation of 607 islands across the western Pacific, with a small population of approximately 114,000. Its dispersed geography and low-lying atolls make it acutely vulnerable to sea-level rise, saltwater intrusion, and typhoons. The economy is dependent on subsistence agriculture, fishing, and substantial external grants. FSM is a founding member of the Micronesia Challenge, a landmark conservation commitment to effectively manage 30% of its coastal and 20% of its terrestrial resources by 2020. This foundational commitment to ecosystem-based management provides a crucial platform for integrating CE and SCP into its climate policies to enhance regional self-sufficiency.

Analysis

FSM's NDC takes an integrated approach to resilience planning, focusing on energy, food, and water security, with elements like the Coconut National Export Strategy supporting local value chains. However, it lacks an explicit CE framing and contains significant gaps, particularly in waste management and, critically, in the built environment. FSM's infrastructure is highly vulnerable, and a significant opportunity lies in promoting community-led, circular construction using local materials.

Gaps

Lack of explicit CE framing and no focus on waste management or product lifecycle extension. FSM's NDC has a pillar on 'Resilient transport systems' but does not explicitly address circular construction principles (such as design for disassembly, use of local materials, or construction and demolition waste management). While infrastructure and resilience are mentioned, the absence of a circular-economy lens for the built environment remains a significant gap. FSM's infrastructure is highly vulnerable. A significant opportunity lies in rural and community infrastructure**.** Community-based projects using local materials for schools, clinics, and evacuation centres can be models for circular, low-carbon construction. Organisations like The Nature Conservancy are already working on community-led adaptation that includes infrastructure; these projects could be used as pilots for circular building practices (TNC, 2021). Furthermore, FSM's high electricity costs make **passive cooling design** in buildings a highly effective mitigation and adaptation strategy with rapid payback periods, yet it remains unmandated.

Recommendations

1. Develop a circular economy framework for the coconut and other key value chains.
2. Integrate waste reduction and management into national resilience planning.

3. Explore circular models for fisheries and aquaculture.
4. **Develop Guidelines for Community-Led Circular Construction**: Create and disseminate best-practice guides for using local materials in climate-resilient construction, empowering communities and reducing costs.
5. **Incentivise Passive Design in Public Buildings**: Mandate passive cooling, ventilation, and daylighting principles for all new government buildings and schools to drastically reduce operational energy costs and enhance comfort.

4.5. New Guinea (PNG)

Papua New Guinea is the Pacific's largest and most populous nation, with over 9 million people and extraordinary cultural and biological diversity. Its economy is dominated by resource extraction, including liquefied natural gas, minerals, timber, and palm oil, creating a complex nexus between development, deforestation, and climate vulnerability. PNG faces diverse climate impacts, from coastal erosion to highland landslides. Its *Vision 2050* development strategy and a suite of climate policies, including a *Climate Change Management Act*, aim to balance economic growth with sustainability. PNG represents a critical test case for applying CE and SCP to decarbonise a resource-dependent economy and manage land-use change, the source of most of its emissions.

Analysis

PNG's NDC focuses on LULUCF (REDD+, sustainable forestry) and renewable energy, representing significant implicit CE potential. However, it overlooks the informal economy, lacks a waste management strategy, and fails to make an explicit link between sustainable forestry and circular bioeconomy development. A critical omission is the built environment sector, despite rapid urban growth. The mass timber industry presents a colossal opportunity to create a high-value domestic industry based on a renewable resource that sequesters carbon.

Gaps

The informal economy is overlooked; waste management is absent; and there is no explicit link between sustainable forestry and circular bioeconomy development. PNG's NDC does not address the **built environment sector**. This is a critical omission given PNG's rapid urban growth, particularly in Port Moresby and Lae, and the associated informal settlement expansion. The linear model of urban development is creating long-term lock-in of vulnerability and high emissions. The **Mass Timber** industry presents a colossal opportunity. PNG's vast forest resources, if managed sustainably, could be used for cross-laminated timber (CLT) construction, which sequesters carbon and has a much lower embodied energy than concrete or steel (World Bank, 2022). This would create a high-value domestic industry based on a renewable resource. Furthermore, the informal sector's building practices need support to be more resilient and less resource-intensive.

Recommendations

1. **Develop a circular bioeconomy strategy** linked to forestry and agriculture.
2. Integrate **CE principles into the REDD+** Finance and Investment Plan.
3. Design CE-compatible livelihood programmes for the informal sector.
4. **Develop a National Policy on Sustainable Timber for Construction**: Incentivise the development of a value-added mass timber industry for domestic use and export, linking sustainable forestry directly to low-carbon urban development.
5. **Support Circular and Resilient Housing in Informal Settlements**: Work with communities to develop and disseminate affordable building techniques that use recycled or low-impact materials and are designed to withstand extreme weather.

4.6. Kiribati

The Republic of Kiribati, a nation of 33 atolls scattered across 3.5 million square kilometres of ocean, is on the front line of the climate crisis. With a population of 120,000, its highest point is just a few meters above sea level, making it profoundly threatened by sea-level rise, saltwater intrusion, and storm surges. Its narrow economic base relies on fisheries licenses and limited exports. Kiribati's policies, including the Kiribati 20 Year Vision (2016-2036), are overwhelmingly focused on adaptation, migration strategies, and preserving territorial integrity. This extreme vulnerability makes the pursuit of SCP and CE not a choice but a necessity for survival, aiming to reduce debilitating dependencies on imported food, water, and energy.

Analysis

Kiribati's Updated Nationally Determined Contribution (2021) prioritises adaptation in response to severe climate vulnerabilities, including sea-level rise, coastal erosion, and freshwater scarcity. The document focuses squarely on safeguarding essential resources, reducing dependency on imports, and enhancing community resilience. While not explicitly framed in such terms, these efforts align practically with the objectives of sustainable consumption and production by promoting efficient resource use and greater self-sufficiency. Kiribati's climate strategy is inherently a strategy for resource sovereignty. Its NDC actions, while not explicitly framed as such, are fundamentally concerned with breaking its crippling dependency on imported goods, energy, and water–a dependency that defines its linear economy and amplifies its climate vulnerability.

The NDC's alignment with SCP and CE principles is almost entirely implicit and incidental, focused on securing basic needs rather than transforming economic systems. However, this presents a powerful opportunity, namely reframing adaptation actions as the foundation of a circular, resilient economy.

1. Energy and transport: Reducing linear lock-in

Kiribati's energy system is a textbook case of linear vulnerability: 100% reliant on imported diesel, subject to price shocks, and contributing to pollution. The NDC mitigation actions are therefore crucial SCP interventions.

- **Solar PV deployment**. The promotion of solar energy for power generation and water pumping (e.g. solar-powered desalination) directly reduces the consumption of fossil fuels. This is the most direct application of SCP–'doing more with less' by harnessing a renewable, abundant local resource instead of a imported, finite one

Gap analysis. The approach remains technology-centric rather than system-centric.

- **Missing lifecycle and circularity**. There is no strategy for the **end-of-life management** for solar panels and batteries. As the first major wave of solar installations reaches its end-of-life, Kiribati risks creating a new waste crisis (e-waste and hazardous waste), swapping one linear problem for another. A CE approach would integrate a nationwide take-back and recycling scheme for solar components from the outset.
- **Energy efficiency omitted**. The NDC is silent on energy efficiency. Improving the efficiency of appliances, lighting, and public buildings would reduce the scale and cost of the renewable energy transition, a core SCP principle. The embodied energy of imported goods is not considered.

2. Water security: A classic circular economy loop

Kiribati's focus **on rainwater harvesting** and water conservation is perhaps its clearest, albeit least recognised, circular economy practice, and involves:

- **Closing the water loop**: Capturing a previously unutilised resource (rainfall), using it, treating it, and reusing it, thereby reducing extraction from strained freshwater lenses and expensive desalination.
- **Designing out waste**: Preventing the 'waste' of rainwater as runoff.

Gap analysis. The implementation is often siloed. The NDC is missing the chance to mandate integrated water-cycle management in building codes. All new public infrastructure and buildings should be designed as water catchments, with storage integrated into their design. Furthermore, the potential for greywater recycling for non-potable uses (toilet flushing, irrigation) is not explored, which would further close the loop.

3. The built environment: The front line of resilience and linear risk

One of the most significant gaps is the absence of circular economy principles for the built environment. While Kiribati's NDC addresses infrastructure resilience, it does not incorporate circular construction approaches, such as designing for disassembly, using corrosion-resistant local materials, or managing construction and demolition waste as a resource. This oversight locks in linear, import-dependent rebuilding after disasters.

- **Maladaptive linear model**. Kiribati's construction is almost entirely linear, relying on imported, corrosion-prone materials like concrete and steel, which have high embodied carbon and are ill-suited to a saline, humid environment. Reconstruction after king tides or storms simply replicates this vulnerable model.
- **Missed CE opportunities**. There is no promotion of local, resilient materials (e.g. treated coconut timber, which is corrosion-resistant), design for disassembly, or material recycling. Concrete debris from damaged infrastructure is seen as waste rather than a resource for new construction.
- **No energy efficiency design**. Buildings are not designed for passive cooling, leading to higher energy demand for fans and air conditioning if available.

4. Waste management: From a problem to a resource

The NDC views waste primarily as an environmental and health problem (a driver of pollution and disease) and waste management as an adaptation measure. It does not view waste as a potential resource.

- **Organic waste**. A significant portion of Kiribati's waste is organic, and opportunities are lost for composting to create soil amendments to improve agricultural productivity and water retention in poor soils, or for anaerobic digestion to produce biogas for cooking (reducing LPG imports) and fertiliser.
- **Limited ambition**. The focus is on basic waste collection and management. There are no targets for waste reduction at source (e.g. policies to reduce single-use plastic imports) or for material recovery and recycling.

5. Agriculture and food security: Linear dependency vs. circular resilience

Kiribati's heavy reliance on imported, processed food is a major vulnerability. The NDC's promotion of climate-smart agriculture (CSA) is a step towards resilience but could be dramatically enhanced with a CE lens.

- **Beyond productivity**. Current CSA projects focus on improving the yields of traditional crops. A CE approach would integrate nutrient looping by using compost from urban organic waste to enrich agricultural soils, and using agricultural waste (e.g. coconut husks) as mulch or biochar to improve soil health and sequester carbon.
- **Local value addition**. There is little focus on reducing post-harvest losses or developing local food processing and preservation, which would extend the life of local produce and reduce dependency on imported canned goods.

Gaps and challenges

In summary, Kiribati's key challenge is that its NDC *addresses the symptoms of its linear economy (dependency, pollution) without diagnosing the cause*. The actions are reactive and siloed, missing the synergistic benefits of a systemic circular approach. The document lacks the following components.

1. **A national resource security strategy**: A plan to systematically reduce import dependency across water, energy, food, and materials.
2. **Circular economy principles**: An explicit framework that designs out waste, keeps materials in use, and regenerates natural systems.

3. **The built environment**: The sector most critical for adaptation is ignored from a mitigation and material perspective.
4. **Data and targets**: No baselines or targets for material consumption, waste generation, or recycling rates.

Recommendations for NDC 3.0

To transform its climate strategy into a blueprint for circular resilience, Kiribati should address the following points.

1. **Reframe the NDC around 'Resource Sovereignty'.** Explicitly state the goal of reducing import dependency through circular economy strategies. This frames adaptation and economic security as two sides of the same coin.
2. **Integrate circularity into the built environment**. Develop and enforce 'Pacific Resilience Standard' guidelines for all new builds, mandating:
   a. Use of corrosion-resistant local materials (e.g. treated timber).
   b. Integrated rainwater harvesting and solar energy generation.
   c. Passive cooling design to reduce energy needs.
   d. Plans for managing construction and demolition waste.
3. **Launch a national 'Waste-to-Resource' programme**. Set ambitious targets for:
   a. Diverting 100% of organic waste from landfills to composting and anaerobic digestion facilities.
   b. Establishing a nationwide e-waste take-back system for solar components and electronics.
   c. Banning specific single-use plastics to reduce waste at source.
4. **Close the loop on water and energy**. Mandate water recycling and rainwater harvesting for all public buildings. Develop a national strategy for the repair, recycling, and responsible disposal of solar PV systems.
5. **Foster a circular bio-economy**. Link urban waste management with agricultural development by creating a formal market for compost. Support innovation in value-added products from coconut and fish waste.

For Kiribati, the circular economy is not an abstract concept; it is the practical pathway to national resilience. By making these strategic shifts, Kiribati can protect its people, preserve its culture, and build an economy that thrives in harmony with its fragile environment.

4.7. Tonga

The Kingdom of Tonga is a Polynesian archipelago of 170 islands and a population of 100,000. Its economy is based on remittances, tourism, and agriculture. Tonga is exceptionally vulnerable to cyclones and sea-level rise, which threaten the country's limited land and freshwater resources. The national Tonga Strategic Development Framework (2015–2025) prioritises climate resilience and environmental sustainability. Tonga's NDC reflects a focused, practical approach to securing basic needs – energy, water, and food security – making it an essential example of how CE and SCP principles can be woven into foundational adaptation and mitigation efforts to build self-reliance.

Analysis

Tonga's Second NDC presents a structured and sincere climate response, prioritising adaptation and mitigation across Energy, AFOLU, and Waste sectors. The assessment recognises that NDC document is fundamentally **risk-averse and infrastructure-centric**, focusing appropriately on securing basic needs and protecting physical assets from imminent climate threats. Within this necessary focus, several actions provide a critical entry point for a more robust, resource-efficient economic model. However, like many of its regional neighbours, Tonga's approach is currently **reactive and incremental**, addressing symptoms of

linear vulnerability rather than strategically engineering a circular system for long-term resilience.

The commitment to **70% renewable electricity generation by 2030** is the NDC's strongest SCP-aligned mitigation action. This directly tackles the unsustainable consumption of imported diesel, aiming to reduce the significant financial and environmental drain of fossil fuel imports. This is a clear application of 'doing more with less' by harnessing endogenous renewable resources.

Similarly, the ambitious national initiative to **plant one million trees** by 2023, while primarily framed for ecosystem-based adaptation and carbon sequestration, is a profound, though underleveraged, circular opportunity. This initiative could form the backbone of a circular bioeconomy, supporting sustainable forestry for local construction, non-timber forest products, and soil regeneration, thereby reducing import dependency.

In the waste sector, the NDC's focus on **expanding formal waste collection systems** is a crucial first step for public health and environmental protection. Yet, it reflects a linear 'collect-and-dispose' mentality. The documented actions pave the way for future waste-to-energy or recycling but stop short of articulating a vision where waste is designed out and resources are recirculated. A significant strategic oversight is the complete absence of the construction sector in the NDC, a sector critical for a nation supremely vulnerable to cyclones.

Gaps and challenges

Several critical gaps that hinder Tonga from maximising the co-benefits of its climate actions with CE/SCP may be identified.

1. **The built environment: A glaring strategic omission**. For a nation that is extremely vulnerable to cyclones and sea-level rise, the **complete absence of the construction sector** in the NDC is a significant strategic oversight. Reconstruction and development currently rely on a linear model of imported, high-emission materials (e.g. cement, steel), which locks in vulnerability and high embodied carbon. There is no promotion of:
    - **Circular construction principles**: Design for disassembly, use of local and recycled materials (e.g. volcanic rock aggregate, treated timber), and material passports for buildings.
    - **Resource efficiency standards**: Building codes that mandate material efficiency, water harvesting, and passive cooling design to reduce lifetime energy demand.
    - **C&D waste management**: A national strategy for managing construction and demolition waste, particularly crucial for post-disaster recovery, where debris is seen as a problem, not a resource.
2. **Waste management: An end-of-pipe approach**. Tonga's waste strategy is nascent. The focus on collection expansion does not mention *upstream waste reduction, reuse, or recycling frameworks*, which are the core of a circular economy. In particular, these elements are lacking.
    - **No specific targets**. Measurable targets have not been defined for waste reduction per capita, recycling rates, or organic waste diversion through composting.
    - **No policy instruments**. Powerful demand-side policies like Extended producer responsibility (EPR) for packaging, or Green Public Procurement (GPP) to create markets for recycled products, have not been considered.
3. **Siloed sectoral approaches.** The potential for synergistic, cross-sectoral circular models remains as yet untapped. For example:
    - The **one million trees** programme is not explicitly linked to providing sustainable building materials to reduce import dependency in the construction sector.
    - **Organic waste** from agriculture and municipalities is not viewed as a feedstock for composting to enhance soil health in the AFOLU sector, closing the nutrient loop.
    - **Tourism**, a key economic sector, is not leveraged to drive circularity through local supply chains and zero-waste operations.

Recommendations for integration and impact in NDC 3.0

To transform its climate strategy from foundational to transformative, Tonga should consider the following actions.

1. **Develop a national resource security strategy**. Frame the NDC 3.0 within a broader national strategy to reduce import dependency across energy, food, and materials. This positions circularity as an economic and security imperative, not just an environmental one.
2. **Mandate a circular & resilient building code**. The Ministry of Infrastructure should lead the development of a building code that integrates:
   - **Resilience**: Standards to withstand cyclones and flooding.
   - **Resource efficiency**: Mandates for using local materials (e.g. timber, aggregate) and recycled content (e.g. from construction waste).
   - **Passive design**: Requirements for natural ventilation, solar orientation, and rainwater harvesting to drastically reduce operational energy and water use.
3. **Elevate waste ambition with circular economy targets**. Integrate specific, measurable targets into the NDC, such as:
   - Diverting X% of organic waste from landfills to composting by 2030.
   - Increasing the recycling rate for key streams (plastics, metals) to Y%.
   - Legislating an EPR scheme for packaging and tires.
4. **Foster cross-sectoral circular synergies**.
   - Link AFOLU and Construction: Formalise the link between the forestry initiative and the construction sector by supporting a sustainable value chain for local timber.
   - Link Waste and Agriculture: Develop a national program for composting organic waste to produce soil amendments for climate-resilient agriculture.
   - Integrate Tourism: Develop 'Circular Tourism' standards with the Tonga Tourism Authority, focusing on waste reduction, water conservation, and local sourcing.

By bridging the gaps in their national action plan, Tonga can grow its climate strategy from managing discrete risks to transforming into a systemic, circular, and self-reinforcing economy that enhances sovereignty, creates green jobs, and delivers deeper, more durable resilience for its people.

4.8. Timor-Leste

The Democratic Republic of Timor-Leste is a young nation in Southeast Asia with a population of approximately 1.3 million. Its economy is currently dominated by a diminishing petroleum fund, driving an urgent need to diversify towards sustainable sectors such as agriculture, tourism, and light manufacturing. The country faces severe climate vulnerabilities, including increased flooding, landslides, soil erosion, and coastal threats, which directly influence food security, water resources, and infrastructure. Guiding policies like the Strategic Development Plan 2011-2030 and the *National Climate Change Policy (2022)* emphasise sustainable natural resource management and climate-resilient development. Timor-Leste's NDC reflects a transformative vision for a green economy, making it a prime candidate to integrate SCP and CE principles from the outset, avoiding carbon-intensive lock-in while pursuing a genuinely sustainable development path.

Analysis

Timor-Leste's Updated NDC outlines a forward-looking vision structured around four pillars: climate risk governance, nature-positive growth, low-carbon development, and adaptation. The assessment recognises that the NDC document is aspirational and nature-centric, heavily focusing on large-scale ecosystem restoration and renewable energy as vehicles for sustainable development. This is well-understood with the national circumstances of Timor Leste. Within NDC 2.0, several actions provide a foundational, though largely implicit, alignment with SCP and CE principles. However, the approach is currently project-based and

siloed, so to speak, by sectors, which promotes green activities more than it designs a systemic circular economy to fundamentally reshape resource use and consumption patterns.

The commitment to large-scale reforestation, including the ambitious initiative to plant one million trees annually, is the NDC's most significant CE-relevant action. Programmes like the EU-supported *Ai ba Futuru* (*Trees for the Future*) and *Rai Matak* (Green Land) aim to restore degraded landscapes, sequester carbon, and enhance livelihoods. This represents a profound circular and regenerative approach to land management, aiming to rebuild natural capital. Furthermore, the focus on transitioning to renewable energy and promoting climate-smart agriculture demonstrates an intent to reduce dependency on imported fossil fuels and build food system resilience.

Gaps and challenges from a SCP/CE perspective

There are several potential opportunities for Timor-Leste to fully capitalise on the systemic benefits of a circular transition.

1. **The built environment, a missed opportunity for sustainable urbanisation**. As the nation experiences rapid urbanisation and a construction boom, the NDC completely overlooks the **buildings and infrastructure sector**. This omission is strategic, as construction is a major consumer of imported, high-emission materials (e.g. cement, steel) and a generator of waste. There is no promotion of:
    - **Circular construction principles**. Mandating the use of local, low-carbon materials (e.g. bamboo, traditional stones, recycled aggregate) in public infrastructure projects.
    - **National building codes**. Integrating energy efficiency, water-sensitive design (rainwater harvesting, greywater reuse), and resilience to floods and landslides into construction standards.
    - **Construction & demolition waste management**. A strategy to treat debris from development and future disasters as a resource for new construction.
2. **Waste management: an underdeveloped pillar of the circular economy**. The NDC's treatment of waste is peripheral, mentioned only in the context of flood management. This reflects a linear view of waste as a problem rather than a resource. Key gaps include:
    - **No systemic strategy**. A national waste management strategy that prioritises the waste hierarchy (Reduce, Reuse, Recycle) and sets targets for waste reduction and recycling is lacking.
    - **Absence of key policies**. No exploration of foundational policies like Extended producer responsibility (EPR) for plastics and packaging, or Green Public Procurement (GPP) to stimulate markets for recycled products.
    - **Organic waste neglect**. No focus on valorising organic waste – a major stream in Timor-Leste – through large-scale composting or anaerobic digestion to produce soil amendments and biogas.
3. **Siloed vision and lack of economic instruments**. The NDC's green growth vision lacks the economic and policy mechanisms to make it circular. Initiatives are treated in isolation, missing opportunities for synergistic loops.
    - The **reforestation programme** is not explicitly linked to creating a sustainable timber value chain for local construction, nor to producing non-timber forest products for economic diversification.
    - **SCP elements** like eco-labelling, sustainable product standards, and support for circular business models (e.g. repair, remanufacturing) are absent.
    - There is no dedicated section or indicator framework to track **material flows, resource productivity, or circular economy contributions to emission reductions.**

Recommendations for integration and impact in NDC 3.0

To transform its climate strategy from aspirational to operational, Timor-Leste should consider including the following in their NDC 3.0.

1. **Development of a national circular economy roadmap**. Create a standalone strategy that explicitly links the NDC to economic diversification goals. This roadmap should set targets for reducing the material footprint, increasing resource productivity, and stimulating circular businesses, positioning CE as a core development strategy.
2. **Integrate circularity into the national infrastructure boom**. Mandate **Green Public Procurement** for all public buildings and infrastructure, requiring the use of local and recycled-content materials, water-harvesting systems, and energy-efficient design. This would instantly create a domestic market for circular products and practices.
3. **Launch a national 'Waste-to-Resource' programme**. Elevate waste management in the NDC by including specific, measurable targets, for example:
    - diverting **X%** of organic waste from dumpsites to composting facilities to support agriculture
    - establishing a nationwide **EPR** scheme for plastics and packaging
    - developing **recycling micro-enterprises** to manage key waste streams and create green jobs.
4. **Foster cross-sectoral synergies for a circular bioeconomy**.
    - **Link reforestation and construction**. Formally link the million trees initiative to the development of a sustainable, legal timber industry for local housing and furniture manufacturing, reducing import dependency.
    - **Link agriculture and waste**. Develop a national composting programme to transform urban organic waste into valuable soil amendments for farmers, closing the nutrient loop and reducing reliance on imported fertilisers.
    - **Mainstream SCP in tourism**. Develop standards for a 'Green Timor-Leste' tourism brand, focusing on zero-waste operations, local sourcing, and cultural preservation.

By adopting these strategies, Timor-Leste can leverage its NDC to build not just a greener economy, but one that is more resilient, self-reliant, prosperous, and circular, and thus ensuring that the country's development trajectory is sustainable from the start. Timor-Leste's climate ambitions would thus become a lasting legacy for its people.

5. Cross-cutting and strategic recommendations

Based on the regional and country-level analyses, this report proposes the following cross-cutting recommendations for Pacific Island Countries (PICs) to strengthen the alignment among climate action, SCP, and CE in their NDC 3.0 processes and broader national planning. The PICs are global champions of climate action. Their ambitious NDCs, developed in the midst of significant economic, environmental, and social complexities, stand as a powerful testament to their commitment to a resilient future. This report celebrates the strong foundations already in place. Across the region, we see inspiring examples of innovation – from Vanuatu's pioneering vision for a circular economy to community-led waste management in Samoa, and from Fiji's plastic bans to Kiribati's efforts with respect to water security.

The purpose of this chapter is to support such innovations by offering a menu of potential options, drawn from regional insights, that may be useful for policymakers as they consider how to further strengthen their work. The integration of SCP and CE principles is presented as a potential pathway for amplifying existing efforts, and for helping to achieve climate goals while also addressing other national priorities like creating jobs, reducing import dependency, and managing waste.

The following recommendations can be considered within the Pacific region to strengthen the alignment between climate action, SCP and CE.

5.1. Building on existing strengths: National planning and vision

Many Pacific nations have already laid the groundwork for sustainable consumption and circular economies through strong national climate policies and development plans. The following options could be considered to further weave circularity into this robust planning fabric:

- **Exploring national CE/SCP action plans**: For countries where it is useful, developing a national framework could help to harmonise ongoing efforts across different sectors. Such a framework would be owned and driven locally, and designed to support the goals already set out in national development plans and NDCs.
- **Understanding material flows**: Some countries have found it helpful to conduct a national material-flow analysis. This can help in identifying key opportunities to reduce waste, save money, and create new local industries.
- **Setting complementary targets**: Building on ambitious NDC targets, countries might consider adding specific, complementary goals for material efficiency. These are not additional burdens, but new ways to measure the success of existing climate and development efforts.

5.2. Transforming sectors: Creating opportunities in key areas of the economy

Pacific economies are vibrant and diverse. The following suggestions highlight potential ways to create new economic opportunities while enhancing environmental sustainability.

- **Building a resilient and resource-smart future**: There may be opportunities to complement existing work on resilient infrastructure by also encouraging the use of locally sourced, recycled, or low-carbon building materials. Such strategies can reduce costs, create local jobs, and lower the environmental footprint of development.
- **Strengthening the link between tourism and sustainability**: For countries where tourism is a major economic driver (e.g. Fiji, Samoa, Tonga, Vanuatu) and building on existing eco-tourism initiatives, there may be value in developing supportive standards for 'circular tourism', encouraging practices like reducing single-use plastics and sourcing more food locally. For other PICs where tourism is less prominent, circular economy efforts can focus proportionally on sectors such as agriculture, fisheries, or local manufacturing.

- **Nurturing a circular bioeconomy**: There may be exciting opportunities to build on traditional knowledge by supporting businesses that add value to agricultural waste. This can turn waste into wealth, improve food security, and create new green jobs.

5.3. Creating an enabling environment: Supportive policies, finance, and knowledge

The work already under way in the region can be further supported by creating an environment that empowers businesses, communities, and government agencies.

- **Supportive policies**: Some countries in the Pacific have explored policies like extended producer responsibility (EPR), which can help involve product manufacturers in the management and recycling of packaging waste. For smaller island states with limited institutional and market capacities, such instruments may need sequenced implementation; for example, starting with voluntary agreements or pilot schemes before moving to mandatory frameworks, and prioritising simpler waste streams (e.g. packaging) before more complex ones (e.g. e-waste or material passports).
- **Unlocking finance**: There is growing interest internationally in funding CE projects. There may be opportunities to work with development partners to design strong proposals that would attract investment for local priorities.
- **Sharing knowledge and building skills**: Creating more opportunities for communities and officials to share success stories about CE approaches could help spread effective solutions more quickly.

5.4. Leveraging regional cooperation: Learning and advocating together

The Pacific's greatest strength is its spirit of cooperation. By continuing to work together, countries can achieve results far more effectively.

- **Sharing best practices**: Regional organisations provide invaluable platforms for countries to share their own experiences and learn from each other's successes with CE initiatives.
- **Exploring joint solutions**: For challenges that are too big for any one country, there may be potential for joint action, such as exploring regional recycling options for certain materials.
- **A unified voice on the global stage**: By also championing the need for global rules that reduce plastic waste exports, the region can help create a fairer global system.

6. Conclusion

The analysis of the NDCs of these eight Pacific Island Countries reveals a powerful and consistent truth: the journey to a secure climate future is inextricably linked to the management of resources. Pacific nations, as architects of some of the world's most visionary climate policies, have already embedded the seeds of a transformative economic model within their commitments. From Vanuatu's explicit ambition for a circular economy (CE) to the implicit, resource-smart adaptation actions of Kiribati, the foundational elements for a paradigm shift are present.

This report has demonstrated that the core principles of SCP and CE – doing more with less, designing out waste, and regenerating natural systems – are not alien concepts: rather, they are aligned with Pacific realities and wisdom. They represent a pragmatic and strategic evolution of current climate actions, offering a pathway to amplify their benefits. The ongoing work to achieve 100% renewable energy, implement plastic bans, promote agroforestry, and improve waste management are all critical first steps on this journey. The challenge and opportunity now lie in moving from discrete, siloed initiatives to a comprehensive, systemic strategy that will redefine resource use across entire economies.

The NDC 3.0 process is the perfect vehicle to catalyse this shift. It is more than a reporting requirement; it is a strategic platform to align climate ambitions with economic planning, disaster-risk reduction, and sustainable development. By consciously integrating a CE lens, PICs can use their updated NDCs to:

- **Enhance climate resilience**: Reducing dependency on imported goods and fossil fuels builds economic buffer zones against global market shocks and supply chain disruptions, making nations more self-reliant and resilient.
- **Maximise co-benefits**: A single circular intervention, like composting organic waste, simultaneously mitigates methane emissions, adapts by creating soil amendments for climate-resilient agriculture, and creates green jobs, which in turn generates a powerful multiplier effect on investment.
- **Secure financing**: A well-articulated CE strategy within an NDC provides a clear and compelling narrative for development partners, moving beyond a simple list of projects to present a visionary, investment-ready framework that can attract dedicated funding from climate-finance mechanisms like the Green Climate Fund.

However, this transition requires a concerted effort that extends beyond national borders. The Pacific's strength has always been in its collective voice and action. Therefore, achieving a circular transition will demand:

- **Regional cooperation**: Developing Pacific-owned standards for resilient and circular construction, exploring joint waste processing facilities, and creating a knowledge-sharing platform for CE policies are areas where regional solidarity can create economies of scale and accelerate progress for all.
- **Supportive global partnerships**: International partners must align their support with a global vision. This means providing funding that is flexible and accessible for systemic capacity building and policy development, not just isolated projects. It also means supporting the Pacific's call for a fairer global system, including rules that halt the export of plastic waste to the region as well as trade policies that encourage sustainable consumption.

The Pacific is at a crossroads. The choice is not between development and sustainability, but between a vulnerable, linear economic model and a resilient, circular paradigm. The evidence is clear: continuing on a linear path will only deepen dependency and exposure to crises. By contrast, embracing circularity is a proactive strategy to assert resource sovereignty, unlock economic opportunities, and build lasting resilience.

For smaller island states where regulatory and market capacities are limited, a phased approach, starting with foundational policies (such as green public procurement and organic waste diversion) and piloting more advanced instruments once systems mature (for example, extended producer responsibility, material

passports) will be more effective than attempting all measures simultaneously. The time for decisive action is now. Let the NDC 3.0 be the moment the Pacific fully embraces the circular opportunity and secures its future for generations to come.

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