Midterm Review of the Sendai Framework for Disaster Risk Reduction 2015–2030

Thematic Report on Local, Indigenous and Traditional Knowledge for Disaster Risk Reduction in the Pacific

July 2023

UN Office for Disaster Risk Reduction
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<tr>
<td>ACSE</td>
<td>Adapting to Climate Change and Sustainable Energy [programme]</td>
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<tr>
<td>APCP</td>
<td>Australia Pacific Climate Partnership</td>
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<td>CATD</td>
<td>Centre for Appropriate Technology and Development</td>
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<td>CCA</td>
<td>Climate change adaptation</td>
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<td>COSPPac2</td>
<td>Climate and Oceans Support Program in the Pacific Phase 2</td>
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<td>CROP</td>
<td>Council of Regional Organisations in the Pacific</td>
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<td>CSO</td>
<td>Civil society organization</td>
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<td>DFAT</td>
<td>Department of Foreign Affairs and Trade [Australia]</td>
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<td>DRM</td>
<td>Disaster risk management</td>
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<td>DRR</td>
<td>Disaster risk reduction</td>
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<td>EBA</td>
<td>Ecosystem-based adaptation</td>
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<td>EU</td>
<td>European Union</td>
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<td>FRDP</td>
<td>Framework for Resilient Development in the Pacific</td>
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<td>FSM</td>
<td>Federated States of Micronesia</td>
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<td>GCCA</td>
<td>Global Climate Change Alliance</td>
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<td>GEDSI</td>
<td>Gender equality, disability and social inclusion</td>
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<td>GESI</td>
<td>Gender equality and social inclusion</td>
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<td>IRIS</td>
<td>Infrastructure for Resilient Island States</td>
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<td>ISP</td>
<td>Island Strategic Plan</td>
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<td>ITM</td>
<td>Indigenous Terrain Mapping</td>
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<td>JNAP</td>
<td>Joint National Action Plan</td>
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<td>LITK</td>
<td>Local, Indigenous and traditional knowledge</td>
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<tr>
<td>LMMA</td>
<td>Locally Managed Marine Area [Network]</td>
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<td>LPG</td>
<td>Liquefied petroleum gas</td>
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<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and evaluation</td>
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<td>MEL</td>
<td>Monitoring, evaluation and learning</td>
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<td>NAP</td>
<td>National Adaptation Plan</td>
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<td>NBS</td>
<td>Nature-based solution</td>
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<td>NBSAP</td>
<td>National Biodiversity Strategy and Action Plan</td>
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<td>NDMO</td>
<td>National Disaster Management Office</td>
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<td>NGO</td>
<td>Non-government organization</td>
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<td>PACRES</td>
<td>Pacific Adaptation to Climate Change and Resilience Building [programme]</td>
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<td>PCCFAF</td>
<td>Pacific Climate Change Finance Assessment Framework</td>
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<td>PEUMP</td>
<td>Pacific-European Union Partnership</td>
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<td>PIC</td>
<td>Pacific island country</td>
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<td>PIFS</td>
<td>Pacific Islands Forum Secretariat</td>
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<td>PNG</td>
<td>Papua New Guinea</td>
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<td>PREP</td>
<td>Pacific Resilience Program</td>
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<td>PRIF</td>
<td>Pacific Region Infrastructure Facility</td>
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<td>PRP</td>
<td>Pacific Resilience Partnership</td>
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<td>PRS</td>
<td>Pacific Resilience Standards</td>
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<td>RMI</td>
<td>Republic of the Marshall Islands</td>
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<td>SAMOA Pathway</td>
<td>SIDS Accelerated Modalities of Action Pathway</td>
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<td>SCALE</td>
<td>Strengthening Competitiveness, Agriculture, Livelihoods and Environment [project]</td>
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<td>SDGs</td>
<td>Sustainable Development Goals</td>
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<td>SIDS</td>
<td>Small Island Developing States</td>
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<td>SPC</td>
<td>Pacific Community</td>
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<td>SPREP</td>
<td>Secretariat of the Pacific Regional Environment Programme</td>
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<td>STI</td>
<td>Science, technology and innovation</td>
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<td>SUPA</td>
<td>Scaling Up Pacific Adaptations [programme]</td>
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<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>TVET</td>
<td>Technical and vocational education and training</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>UNDRR</td>
<td>United Nations Office for Disaster Risk Reduction</td>
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<td>UNYT</td>
<td>Uto Ni Yalo Trust</td>
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<td>USP</td>
<td>University of the South Pacific</td>
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<td>V&amp;A</td>
<td>Vulnerability and adaptation</td>
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<td>WASH</td>
<td>Water Access, Sanitation and Hygiene [project]</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Foreword to this report

This study captures the progress and challenges in integrating local, Indigenous and traditional knowledge (LITK) and practices for disaster risk reduction (DRR) in the Pacific, and recommendations for future work on how LITK can be used to “build back better”. Overall findings show:

- Increasing recognition of the value of integrating LITK approaches for successful DRR and climate change adaptation (CCA) initiatives – LITK has been thoroughly integrated in regional and national policies and plans, but is sometimes missed out in local-level strategies.
- Coordination and collaboration between DRR and CCA actions will enable improved synergies.
- Localization is crucial for the integration of LITK for successful community DRR and CCA actions.
- Integration of LITK also improves localization; following traditional methods of governance improves successful resilience interventions.
- Local community, non-government organizations (NGOs), national governments, and donor-funded programmes are supporting some LITK interventions for DRR. Donor-funded programmes often work with national governments to ensure appropriate protocols for traditional governing systems while implementing DRR and CCA activities.
- The significance of localizing, contextualizing, and understanding traditional governance systems is recognized by many local NGOs, regional agencies and national governments that implement successful DRR and CCA initiatives.
- There is a need for further engagement between national government and decision-makers in local communities, particularly when interventions involve land tenure and land use issues.
- There is some localization, capacity building, inter-ministerial coordination and collaboration regarding LITK.
- Emerging findings from the Sendai Framework Midterm Review on Gender Equality and Social Inclusion (GESI) show increasing involvement of women in DRR activities at community levels, including: “women’s leadership in early action and resilience building at community level is demonstrated across multiple initiatives”, “evidence of women's formal and informal leadership and participation in resilience building activities”, and “initiatives supporting women in leadership positions contributing to shifts in traditional views of women's roles” with “male community leaders voicing pride in women's achievements” (Gero et al., 2022, p. 1).

Looking beyond 2022, as work progresses on the implementation of the Sendai Framework, further initiatives are needed to support:

- Implementation of the LITK elements in regional and national frameworks, policies and plans associated with DRR and CCA. Although there is comprehensive integration of LITK in regional and national frameworks, policies and plans on DRR and CCA, there is limited progress on implementation of LITK plans.
- Capacity building in the area of LITK, including integration of LITK in school curricula and training programmes for women and youth (both informal and formal education at tertiary level).
- Systematic integration of LITK into science, technology and innovation (STI) and modern approaches for DRR, including early warning systems, improvements in traditional housing structures, food security, water security and natural resource management.
- Documentation and accessible storage of LITK.
- Awareness programmes on LITK for DRR at all levels, targeting stakeholder at national, sub-national and community levels, and other groups, including civil society organizations, women's groups, and youth groups.
• Including elders, particularly local village community elders, during consultations and discussions for planning and development of policies, plans and other mechanisms such as the early warning systems. The older generation can offer a wealth of wisdom and LITK through their years of experience that would be invaluable for DRR initiatives.

• Coordination and collaboration between national and local governing systems. Although the specifics of LITK and practices are unique to national (and often local community) settings, broad lessons learned on integration of LITK for DRR may be shared across countries with similar settings, including Pacific island countries and territories, and the Caribbean and African countries.

• Integration of LITK into DRR and CCA actions – while noting the integration of LITK into policies at all levels, and the need for localization, normalizing the integration of LITK into DRR and CCA actions, via a practical guide or adaptable strategy, will enable successful DRR outcomes.

• Nature-based solution (NBS) initiatives should be integrated with similar LITK and practices, such as traditional practices on natural reserves (tabu, bul, and mo), reforestation and traditional agroforestry. Nature-based solutions not only offer cost-effective options for DRR and CCA, but present a system of managing natural resources that is familiar to local communities and easier for them to comprehend and work with.

This study demonstrates best practices for LITK using impact stories from the LITK initiatives in the Pacific.

Background to Midterm Review of the Sendai Framework for Disaster Risk Reduction 2015–2030

Adopted by the United Nations in 2015, the Sendai Framework for Disaster Risk Reduction provides a blueprint for an all-of-society and all-of-state institutions engagement in preventing and reducing disaster risks. It advocates for the substantial reduction of disaster risk and losses in lives, livelihoods and health, and aims to achieve significant reduction of disaster risk across the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

In advance of the Sendai Framework reaching its midpoint in 2023, a midterm review was conducted in 2022 by the United Nations Office for Disaster Risk Reduction (UNDRR). In collaboration with countries and stakeholders, the review examined the progress and challenges experienced since 2015 and explored efforts to integrate disaster risk reduction into decision-making, investment, and behaviour.

The global midterm review included stakeholder consultations, regional forums, and written submissions. It resulted in a comprehensive collection of regional reports, national reports, thematic reports and literature reviews.

For the Pacific, the regional midterm review was led by the UNDRR Pacific Office and formed part of the broader Asia-Pacific review. The UNDRR Pacific Office supported Pacific island countries to undertake their own reviews as part of the National Voluntary Review process. The Pacific Office also coordinated reviews into key thematic areas of Gender Equality and Social Inclusion; Disability Inclusion; Climate and Disaster-Resilient Infrastructure; and Local, Indigenous and Traditional Knowledge.

To best understand these themes, the UNDRR Pacific Office worked with regional partners through the Pacific Resilience Partnership, and engaged a wide range of stakeholders including national and local governments, civil society organizations, development partners and financial institutions.

The findings and recommendations of these thematic reviews are designed to be practical and grounded in the real-world experiences of those living in the Pacific. They seek to provide a clear basis for discussion of the future of the Sendai Framework for Disaster Risk Reduction with a view to maximizing its effectiveness to 2030.
2. Context and approach

The Pacific island countries (PICs) have a high level of vulnerability to environmental, social and economic contexts (Barnett & Waters, 2016; Hemstock et al., 2017). The PICs are remotely situated with densely populated coastal areas and ecosystems exposed to impacts of climate change, climate variations and other natural and manmade hazards.

In recent years, PICs have experienced devastating and economically draining impacts of climate change. Increasing temperatures cause coral bleaching and severe tropical storms that generate the destructive cycles of loss and damages, which affect economies and ecosystems. Rising sea levels are consuming coastal areas, damaging coastal properties and infrastructure, and causing saltwater intrusions that affect freshwater supplies. Tropical cyclones, floods and droughts impact fisheries and agricultural activities, economies and human health, while increasing atmospheric carbon dioxide levels cause ocean acidification that harm coral reef ecosystems and fisheries resources (Mcleod et al., 2019; Johnson et al., 2020; Veitayaki et al., 2021).

Additionally, and most recently, Pacific societies and economies have been devastated by the COVID-19 pandemic, leading to what could be described as a “lost decade of development” as a consequence of economic devastation and the Pacific governments’ inability to finance necessary initiatives to limit damage (Rajah & Dayant, 2020).

Despite their vulnerabilities, the PICs are not simply passive victims of disasters (Nalau et al., 2018; Warrick et al., 2017). For centuries, the local communities of the PICs have used Indigenous, traditional and local knowledge to cope with and adapt to various situations, including changing social, cultural, economic conditions and the impacts of disasters (Nalau et al., 2018). The holders of Indigenous and traditional knowledge in PIC communities connect closely with their localities to inform their day-to-day decision-
making on resource use management, social interactions, cultural practices and spirituality. Considering the value of Indigenous and traditional knowledge in the daily lives of people in the Pacific, it is critical to integrate this knowledge and related practices in key frameworks, policies, plans and strategies, and actions to manage and reduce disasters.

2.1 Thematic study approach

The objectives of the study conducted to develop this report were:

• To capture the progress and challenges on integrating LITK and practices for DRR in the Pacific since the introduction of the Sendai Framework for Disaster Risk Reduction in 2015.
• To make recommendations for future work on how LITK can be used to build back better.

These objectives were achieved through the following:

• Collating information on Indigenous, local and traditional knowledge for DRR in the Pacific through literature reviews and consultations and interviews with relevant stakeholders at all levels. To ensure a comprehensive data collection process, a diverse range of interviewees and survey respondents were targeted (see section on “Interviewees and Survey Respondents” below for details). The literature review was equally diverse, encompassing both DRR and CCA work across the following sectors and themes: governance, transmission of LITK, food security and resources, water security and resources, energy security and resources, housing and infrastructure, health and sanitation, natural resources, ecosystem services and sustainability, and natural hazards.
• Examining whether Indigenous, local and traditional knowledge associated with DRR in the Pacific is mainstreamed into key national, sub-national and community plans and policies, and DRR programmes implemented by the various national and regional stakeholders.
• Identification of gaps and challenges in DRR policies, plans and programmes associated with local and traditional knowledge and DRR.
• Development and consultation on recommendations and priority actions for inclusion in the thematic report and to feed into the wider Midterm Review of the Sendai Framework.

To ensure the study followed an exhaustive process for capturing relevant DRR information, data on LITK and practices was collected under 10 categories: governance; transmission of LITK for DRR; food security and resources; water security and resources; housing and infrastructure; health and sanitation; natural resources, ecosystem services and sustainability; natural hazards; and youth and LITK. Information was gathered through a desktop study, consultations, semi-structured interviews and survey questionnaires designed for each of the above-mentioned categories. The survey questionnaires were distributed online using emails and Google forms. The interviews took place virtually using the Microsoft Teams platform. A collection of impact stories associated with LITK and practices for DRR in the Pacific was compiled from interviews, consultations and the literature review.

The data collection process was aligned with the design of the Midterm Review of the Sendai Framework in the Pacific; capturing progress on integration of LITK for DRR, efforts towards resilience building at the regional, national and local levels, lessons learned, challenges and ways forward to accelerate and/or recalibrate actions to meet the commitments of Sendai Framework. Findings of the thematic study will feed into the Midterm Review of the Sendai Framework, which will support and guide Pacific communities, governments, and partners to identify appropriate areas to invest efforts and resources.

The surveys were structured around community Vulnerability and Adaptation (V&A) assessments and the Pacific Resilience Standards (PRS) (PIFS, 2021); aimed at operationalizing the principles of the Framework for Resilient Development in the Pacific (FRDP) (SPC et al., 2016). The PRS ensures the quality, effectiveness and integrity of resilience building by providing good practice essentials and progress criteria that can demonstrate stakeholder achievement of the FRDP guiding principles. FRDP’s strategic objective highlights “an integrated approach where possible within social and economic development planning processes and practices to build resilience” in the Pacific region (SPC et al., 2016, p. 14). It also places emphasis on “documenting traditional, contemporary and scientific knowledge, and lessons learned, to develop and utilize
appropriate awareness, communication, education and information materials for communities, media, schools, training providers and universities” (SPC et al., 2016, p. 16). The FRDP Monitoring, Evaluation and Learning (MEL) needs assessment further recommends “the incorporation of traditional knowledge and culture into national resilience M&E processes” (PRP, 2020, p. 30).¹

There are multiple terminologies used for Indigenous and traditional knowledge, including “Indigenous Knowledge”, “Traditional Knowledge”, “Traditional Ecological Knowledge”, “Indigenous and Traditional Knowledge”, and “Local Knowledge” (Nalau et al., 2018; Becken et al., 2013; Huntington et al., 2004; Parsons et al., 2016). Local knowledge is associated with daily practices and is place-specific, Indigenous knowledge has its roots with Indigenous people, while traditional knowledge is historical knowledge that is passed down from generation-to-generation over time. Indigenous and traditional knowledge are considered subsets of local knowledge (Krasteva, 2016; Blaikie et al., 1997). While recognizing the various epistemologies around these, and further terminologies such as traditional environmental knowledge and traditional wisdom, this report uses the term “Local, Indigenous and Traditional Knowledge” (LITK) to capture information on the local, Indigenous and traditional aspects of knowledge, skills and behaviours that are relevant to DRR in the context of PICs.

Interviewees and survey respondents

Stakeholders working across a range of sectors, as per the above-mentioned categories, were interviewed. The interviewees included representatives from national and local governments, NGOs, the Council of Regional Organisations in the Pacific (CROP) agencies (including the Pacific Community, the Secretariat of the Pacific Regional Environment Programme (SPREP), and the University of the South Pacific (USP)), and PhD and Masters candidates working in the area of LITK and practices and DRR.

A total of 61 interviewees and survey respondents participated in the study. Of the interviewees, 62% were women and 38% were men; 50% of the participants were 20–40 years of age, and 50% were greater than 40 years old. The online survey respondents included 51% women and 49% men; 82% of the respondents were 20–40 years old and 18% were greater than 40 years old. Survey responses and interviewees encompassed stakeholders from the following countries: Federated States of Micronesia (FSM), Fiji, Niue, Palau, Papua New Guinea (PNG), Republic of the Marshall Islands (RMI), Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. In addition to direct engagement with the countries, a number of CROP agencies were interviewed that were able to share regional perspectives on LITK and practices in the Pacific.

In addition, the study also included information gathered through participation in the following virtual meetings and consultations:

- Pacific SIDS Consultation: Sendai Implementation on 21 June 2022.

2.2 The Sendai Framework and local, Indigenous, and traditional knowledge

The Sendai Framework emphasizes the inclusion of Indigenous peoples and integration of LITK and practices for DRR. It recognizes the lessons learned, gaps identified and future challenges highlighted by the Hyogo Framework for Action on a “people-centred preventive approach to disaster risk”, and that “Governments should engage with relevant stakeholders, including women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples, volunteers, the community of practitioners and older persons in the design and implementation of policies, plans and standards” (UNDRR, 2015, 7, p. 10).

The guiding principles of the Sendai Framework further state that: “Disaster risk reduction requires a multi-hazard approach and inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as on easily accessible, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge.” (UNDRR, 2015, III, 19g, p. 13)

¹ For more information about the FRDP and PRP, see https://gem.spc.int/projects/frdp
The need for integration of LITK and practices are included in various sections of the Sendai Framework’s priority areas:

• **Priority 1 – Understanding disaster risk:** "To ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans and programmes of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context" — section IV, 24i (p.15).

• **Priority 2 – Strengthening disaster risk governance to manage disaster risk:** "To empower local authorities, as appropriate, through regulatory and financial means to work and coordinate with civil society, communities and indigenous peoples and migrants in disaster risk management at the local level" — section IV, 27h (p. 18).

• **Priority 3 – Investing in DRR for resilience:** "To protect or support the protection of cultural and collecting institutions and other sites of historical, cultural heritage and religious interest” — section IV, 30d (p. 19).

• **Priority 4 – Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery:** "To invest in, develop, maintain and strengthen people-centred multi-hazard, multisectoral forecasting and early warning systems, disaster risk and emergency communications mechanisms, social technologies and hazard-monitoring telecommunications systems; develop such systems through participatory process; tailor them to the needs of users, including social and cultural requirements, in particular gender; promote the application of simple low-cost early warning equipment and facilities; and broaden release channels for natural disaster early warning information” — section IV, 33b (p. 21).

• **The role of stakeholders:** "Indigenous peoples, through their experience and traditional knowledge, provide an important contribution to the development and implementation of plans and mechanisms, including for early warning” — section V, 36v (p. 23).
The thematic study on LITK for DRR in the Pacific compared progress, challenges and recommendations to guide future work against the above areas of the Sendai Framework.

Implementation of LITK and practices under the Sendai Framework for Disaster Risk Reduction 2015–2030 is consistent with and supported by other global frameworks including: the UNFCCC Paris Agreement on Climate Change; the SIDS Accelerated Modalities of Action (SAMOA Pathway); the World Humanitarian Summit; the Sustainable Development Agenda 2015–2030; the International Decade for Action on Water for Sustainable Development, 2018–2028; and the Convention on Biological Diversity.

3. Looking back and taking stock

Since the Sendai Framework was developed, there has been both an increase in the number of DRR and CCA frameworks, policies and plans (particularly at national levels), and a thorough inclusion of LITK elements in regional and national frameworks, policies, plans and strategies associated with DRR and CCA. Implementation initiatives of said policies, strategies and plans have been slow. Nonetheless, local communities continue to use many LITK and practices for DRR, and some NGOs and donor-funded projects have also begun to take a more people-centred approach to implementing DRR and other climate change projects by integrating aspects of LITK and practices.

The non-referenced information presented here is based on survey and interview results from the study.

3.1 Progress in risk governance and management

Integration of LITK into regional frameworks

Since the Sendai Framework (2015) was developed, there has been a relatively thorough inclusion and integration of LITK into regional and national policies and plans associated with DRR and CCA. For the PICs, this is clearly reflected in the regional FRDP and the complementary PRS. In addition, various national policies and plans, including the DRR plans, Disaster Risk Management (DRM) plans, National Climate Change policies, Joint National Action Plan (JNAP), National Adaptation Plans (NAP), and local community action plans, include LITK integration and/or considerations.

Framework for Resilient Development in the Pacific (FRDP). One of the key regional policies driving DRR work is the FRDP, which “provides high level strategic guidance to different stakeholder groups on how to enhance resilience to climate change and disasters, in ways that contribute to and are embedded in sustainable development” (SPC et al., 2016, p. 2). Recognizing the overlaps between climate change and DRM, the FRDP promotes integrated approaches to tackling climate and disaster risks. Such an approach avoids duplication and encourages synergies, resulting in more effective implementation and sustainable use of resources, including finances.

Through its priority actions and goals, the FRDP guides inclusion and integration of LITK and practices for DRR in the Pacific.

- Actions by national and sub-national governments and administrations: “Improve understanding and applications of successful strategies to increase resilience by documenting traditional, contemporary and scientific knowledge, and lessons learned, to develop and utilise appropriate awareness, communication, education and information materials for communities, media, schools, training providers and universities” — Goal 1, Priority action i), r (SPC et al., 2016, p. 16).

- Actions by national and sub-national governments and administrations: “Introduce and strengthen environmentally friendly national, territory and sector policies that promote and achieve efficient and cost-effective production and end-use of all forms of energy, both modern and traditional, with an increasing focus on using energy from local sources” — Goal 2, Priority action i), e (SPC et al., 2016, p. 20).
• Actions by civil societies and communities: “Encourage a spiritually, theologically and culturally inclusive approach that underpins personal involvement in strengthening disaster preparedness, response and recovery” — Goal 3, Priority action ii), c (SPC et al., 2016, p. 24).

Pacific Resilience Standards (PRS). The PRS, developed in 2019, is a practical tool that uses a structured approach to enhance the implementation of the FRDP’s 10 Guiding Principles at the regional, national, sector and sub-national level. It was developed with support of the Pacific Resilience Partnership (PRP) Taskforce, under the leadership of the Pacific Islands Forum Secretariat (PIFS), United Nations Development Programme (UNDP), and the Pacific Community (SPC) (PIFS, 2021).

Indigenous, local and traditional knowledge and practices, including the importance of localization for DRR and CCA work in the Pacific, are thoroughly integrated in all four of the PRS, ensuring resilience building is:

1. **Integrated**: with climate change and disaster risk considerations and mainstreamed into new and ongoing development policymaking, planning, financing, programming and implementation.

2. **Inclusive**: to protect human rights to ensure equitable access to assistance, integrate gender consideration to support equitable participation, and prioritize the most vulnerable to facilitate effective participation.

3. **Informed**: to advocate open and ready access to traditional and contemporary information, build and reinforce cultural and traditional resilience and community knowledge, acknowledge and factor in traditional worldviews and spirituality, and strengthen and develop partnerships for sharing lessons and good practice.

4. **Sustained**: to incorporate ecosystem-based services, functions, management and conservation, ensure resilience development is sustainable and alleviates poverty and hardship, promote low carbon development, and improve capacities to prepare for disasters.

Pacific Climate Change Finance Assessment Framework (PCCFAF). The PCCFAF was developed by PIFS in response to a request from the Forum Leaders for their countries to access and better manage climate change resources (PIFS, 2013). The PCCFAF is tailored towards Pacific-relevant needs to approach climate change financing. The framework guides PICs to access and manage climate change and disaster risk financing and resources through six interrelated dimensions. A seventh dimension was added in the 2019 synthesis report that carried out “an initial synthesis of the key observations and recommendations from the application of the PCCFAF across ten PICs” (PIFS, 2019, p. 2).

The third and seventh dimensions of the PCCFAF include consideration for cultural frameworks and gender and social inclusion associated with accessing finances and resources for climate change and DRM.

• Third dimension: “Institutions – The Institutional Analysis assesses the rules, organisations and social norms that facilitate progression toward a country’s climate change goals. The analysis considers issues such as organisational structure and processes; political, legal and cultural frameworks; coordination and collaboration with external stakeholders; clarity of roles and responsibilities; and infrastructure” (PIFS, 2019, p. 6).

• Seventh dimension: “Gender and Social Inclusion – This dimension considers to what extent GSI considerations have been mainstreamed through society and systems including consultation with stakeholders in the development of plans and policies as well as project design and implementation” (PIFS, 2019, p. 7).

The regional synthesis report of the Pacific Climate Change and Disaster Risk Finance Assessments emphasizes the importance of traditional knowledge on building resilience of local communities in the Pacific, stating that "traditional knowledge has shown to assist local communities in disaster preparedness and climate change adaptation" and that "women's role in mainstreaming traditional knowledge has also been identified as critical" (PIFS, 2019, p. 19). The report further highlights that “there are no established mechanisms for capturing community level data and traditional knowledge and feeding these into policies” (PIFS, 2019, p. 19).
Integration of LITK into national policies, plans and strategies

Local, Indigenous and traditional knowledge aspects have been included and integrated in various national policies, plans and strategies across the PICs. Since the Sendai Framework (2015) was developed, many of these national documents have a more thorough integration and inclusion of LITK and community-based participatory approaches. Most PICs have overarching national DRR plans, DRM plans, climate change policies, NAPs and, in some cases, integrated DRR and CCA plans, like JNAPs, which guide more detailed local community plans with a more rigorous integration and inclusion of LITK elements.

The national DRR policies, plans and strategies thoroughly integrate various elements of LITK, including but not limited to the following:

- **Strengthening engagements with community** – e.g. Tuvalu takes the local communities’ Island Strategic Plans (ISPs) approach to ensure involvement and participation of local communities. All islands have ISPs that align with national plans and policies. It is the role of the Island Council or “Kauple” to align the ISPs with the national plans and policies (Ministry of Foreign Affairs, Trade, Tourism, Environment and Labour, 2012). The Federated States of Micronesia works to "strengthen national and state governance arrangements and connections into communities through local government and local social institutions” (Office of Environment and Emergency Management, 2017, p. 3). The guiding principles for DRM of the Republic of the Marshall Islands (RMI, 2017) includes "combining traditional knowledge and scientific information in the design of risk reduction and risk management strategies and activities at all levels” (p. 22), and "empowering communities to address their risks through the development of capacity and knowledge (traditional and scientific) and through the provision of support for local involvement in developing and implementing disaster management strategies” (p. 23).

- **Working closely with traditional governing systems and involving local communities for DRR planning and decision-making** – e.g. "a broader and more people-centred prevention approach to disaster risks, and equal access to information is the first step towards equal participation” (Ministry of Disaster Management and Meteorological Services, 2018, p. 24), in recognition of "lack of effective involvement of communities in planning and decision-making of DRR" and "lack of roles of women in DRR” (Ministry of Disaster Management and Meteorological Services, 2018, p. 16).

- **Integration of LITK into early warning systems, and with science, technology and innovation and modern approaches** – e.g. plans to "set up an effective monitoring system to improve early warnings for all hazards. Research and incorporation of traditional skills on seasonal and weather forecasting” (Government of Kiribati, 2014, p. 66). Strengthening early warning systems in Vanuatu through “incorporating both modern technology and traditional methods into early warning systems” (Government of the Republic of Vanuatu, 2015, p. 24). Fiji’s NAP promotes food and nutrition security and "seeks to maintain the genetic diversity of seeds, cultivated plants, and promote the incorporation of traditional knowledge when appropriate” (Government of the Republic of Fiji, 2018, p. 14). The Papua New Guinea National Disaster Risk Reduction Framework highlights "the use of relevant traditional Indigenous and local knowledge to complement scientific knowledge in disaster risk assessment and development and implementation of policies, plans and programs of specific sectors, with a cross-sectoral approach tailored to localities and the context” (National Disaster Centre, 2017, p. 23).

- **Documentation and storage of LITK** – e.g. Samoa’s Climate Change Policy emphasizes the need to “integrate traditional knowledge into a Data Knowledge Information Facility”, with a corresponding outcome stating: "documentation and use of traditional knowledge and scientific investigation applied" (Ministry of Natural Resources and Environment, 2020, p. 15).

- **Conservation of Indigenous agricultural crops, promoting traditional agroforestry practices for food security** – e.g. Tuvalu’s Te kakeega III encourages sustainability through taking action to “increase farmer productivity: traditional crops, vegetables, biodiversity food” (Government of Tuvalu, 2016, p. 89). Use of traditional crop species and agroforestry methods for food security is highlighted in Fiji’s Climate Change Policy (Government of the Republic of Fiji, 2012).

- **Natural resource conservation and management** – e.g. the Adaptation Communication of the Republic of the Marshall Islands emphasizes RMI’s Reimaanlok Framework on community-based conservation, and its “underpinning objective of merging conservation practices from the biophysical sciences with
traditional community-based atoll practices and processes to achieve mutually agreed outcomes” (Climate Directorate, 2020, p. 21). The National Biodiversity Strategy and Action Plan (NBSAP) of Timor-Leste places emphasis on the documentation and promotion of Indigenous and traditional knowledge and practices for biodiversity conservation and environmental protection (Secretariat of State for Environment, Coordinating Minister for Economic Affairs, 2020).

- **Gender and social inclusion considerations for DRR** – e.g. “the involvement of women in arrangements at all levels is essential for effective disaster management”, “the needs of vulnerable and marginalised groups including those in remote atolls, persons with disabilities and the elderly” and “recognises community and individual rights and is based on a concern for equity and fairness” (Office of Environment and Emergency Management, 2017, p. 6).

- **Addressing capacity development needs of local communities to empower them to deal with disasters, and people-centred approaches for DRR** – e.g. Palau’s National Disaster Risk Management Framework highlights “empowering communities to address their risks through the development of capacity and knowledge (traditional and scientific) and through the provision of support for local involvement in developing and implementing disaster management strategies” (Government of Palau, 2016, p. 18). The National Disaster Risk Management Arrangements of the Republic of the Marshall Islands emphasizes “empowering communities to address their risks through the development of capacity and knowledge (traditional and scientific) and through the provision of support for local involvement in developing and implementing disaster management strategies” (RMI, 2017, p. 23).

Listed below are selected prominent national DRR policies, plans and strategies of the PICs that integrate these LITK elements:

- Federated States of Micronesia National Disaster Response Plan 2016
- Federated States of Micronesia Nation Wide Integrated Disaster Risk Management and Climate Change Policy
- The Republic of Fiji National Disaster Risk Reduction Policy 2018–2030
- Republic of Fiji National Adaptation Plan
- Fiji Climate Change Policy
- Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (KJIP) 2014–2023
- Kiribati Climate Change Policy
- Republic of Nauru Framework for Climate Change Adaptation and Disaster Risk Reduction
- Nauru Strategic Roadmap for Emergency Management 2021–2023
- Palau National Disaster Risk Management Framework 2010 (Amended in 2016)
- Palau Climate Change Policy: for climate and disaster resilience low emissions and development
- Papua New Guinea National Disaster Risk Reduction Framework 2017–2030
- Papua New Guinea National Climate Compatible Development Management Policy
- Republic of the Marshall Islands National Disaster Risk Management Arrangements
- Republic of the Marshall Islands Adaptation Communication
- Samoa National Disaster Management Plan 2017–2020
- Samoa Climate Change Policy 2020
- Solomon Islands National Disaster Management Plan 2018
- Solomon Islands National Climate Change Policy 2012–2017
- Timor-Leste National Disaster Risk Management Policy
- Timor-Leste National Adaptation Plan Addressing Climate Risks and Building Climate Resilience
- Tonga Strategic Roadmap for Emergency and Disaster Risk Management 2021–2023
- Tonga National Emergency Management Plan
- Tonga Joint National Action Plan 2 on Climate Change and Disaster Risk Management 2018–2028
National and traditional governing systems

National governments of the PICs follow Western governance systems, while their local communities are governed by customary laws and regulations. Understanding and working through traditional governing systems are crucial for effective DRR in the Pacific. Survey findings indicate that when it comes to local community management, the traditional governance systems are more powerful than national governments. The significance of localizing and contextualizing, and understanding the traditional governing systems, are recognized by many NGOs, regional agencies and national governments that implement DRR and CCA programmes. Working with the traditional governing systems and aligning DRR and CCA projects with local needs, results in the village community taking ownership, and thus ensuring sustainability of the actions. Some examples of traditional governance in PICs include:

- **Samoa**: The four islands of Samoa have over 250 villages, and every single village has a Village Council. The Village Councils are extremely powerful and manage most village issues. Unless the Village Council is not able to handle a situation, it is not referred to the national government. **Matais** or chiefs in Samoa have different hierarchies and different roles. Families have chiefs in the Village Councils and at the district level. There are Matais/chiefs who lead government ministries, and it is crucial to know and understand the traditional communication protocols when communicating with chiefly titles at different levels. When implementing a programme in Samoa one needs to go to each village, understand the culture and have a strong understanding of the village politics to be able to successfully implement projects.

Staff of Fiji Meteorological Service conducting survey with sugar industry stakeholders as part of the Climate and Oceans Support Program in the Pacific (COSPPac). Photograph: Fiji Meteorological Service.
- **FSM**: A Western governing system is practised at the national level, including national government, state government, and local government (municipality). The traditional governing systems govern island communities across FSM's four states, and work differently in each state. Under the traditional governing systems, a Head of Island or chief is elected. There are traditional sector experts who oversee key sectors; e.g. Master of Seas, or Master of Agriculture. In the State of Pohnpei, as a result of limited economic resources, struggling health care systems, inadequate education institutions and limited job opportunities (Naylor et al., 2002; Pobutsky et al., 2005), over the last 50 years the younger sector leaders have chosen Western professions and delegate the traditional sector expert positions to other people in the community. However, they neglect to follow traditional protocols when transferring these responsibilities. As such, the new traditional sector expert may not be an expert of that sector. As a result, the effectiveness of the present traditional governing system is lower.

- **Tuvalu**: Local communities of Tuvalu are governed by a traditional governing system through the *Falekaupule Act 1997*. The Cultural *Falekaupule*, which is the dominant, more powerful institution, is chaired by the *Ulufenua* (Head Chief). Administrative powers for local community governance are through the *Kaupules* (previously known as Island Councils), the executive arm of the *Falekaupule* (Government of Tuvalu, 2016). Inshore fisheries resource management is governed through the *Kaupules*. Fisheries activities in villages are managed by Master Fishermen or *Tautai*, which is a traditional position that manages fishing activities, including trawling, net fishers, bottom fishers, conservation of resources and fishing decisions at local levels, including pre-disaster plans for food preparation. Customary tenure closures known as *kogatapu* are practised through the local governing system, where sections of inshore fishing grounds are subjected to temporary closures following traditional calendars. These are practised during fish spawning periods, such as for groupers.

- **Fiji**: There are three major types of land ownership in Fiji: traditional land ownership inherited through kinship and relations, private ownership through purchases as freehold, and crown land owned by government and state for public use and other purposes. The sea is owned by the state (government), while the exclusive fishing and use rights are vested in the Indigenous communities that live along the coast, who belong to the same kinship group. Every member has the same rights in the group, while in practice there may be local village rules set by the village resource management committee on use and access. The customary fishing rights are inclusive of use of major ecosystems including mangroves, coral reefs, and access to food fish. Usually there are localized rules in many of the villages that regulate access to these resources. The traditional regulations indirectly limit the use of fishing gear, technology and equipment, which in turn regulates the fishing pressure. People within the fishing communities must seek village approval when they introduce new methods and technologies. This indirectly regulates fishing pressure.

**Land tenure systems**

Customary law systems, where land is owned by Indigenous communities, and administered with respect to their customs, are prevalent in all PICs, which have a history of colonization and have Western law systems in the present times (Mondragon, 2018). Although there are both state (government) owned land, and land and sea under customary tenure in the PICs, about 80% of the land and sea and the resources it contains are subject to customary tenure (Tobin, 2013).

The customary land tenure systems vary greatly across the PICs, and the context differs country-to-country. Although generalizing customary land tenure across the PICs will not be appropriate, it is useful to understand the common features that they share. Access to land in the PICs mostly comes from groups that are based on kinship or another relationship that one might have with the custodians of the land (Juswanto & Kelkar, 2019). Examples of land tenure systems from Melanesia (Fiji), Micronesia (RMI), and Polynesia (Tonga) include:

- There are three types of land in Fiji, crown land is state (government) owned, *iTaukei* land is communal or Indigenous-owned, and freehold land is privately owned. The *iTaukei* or customary land in Fiji is protected under the 2013 Constitution. The current customary tenure system recognizes the *yavusa* (tribe) comprising several *mataqali* (clans), and a *mataqali* comprising several *tokatoka* (family units). Exclusive ownership of the land belongs to the *mataqali*, who have the authority to approve land-related decisions. Some decisions may require final approvals from the iTaukei Land Trust Board.
• In RMI, all Marshallese have certain rights and obligations to the land, which is acquired by lineage. As such, most of the lands in RMI are under customary tenure. Therefore, it is important to consult and receive consent from traditional landowners to carry out any DRR initiatives in RMI. The Government of RMI continues to explore options “aimed at building consensus, balancing traditional and desired (future) land tenure, and implementing sound land management practices” (Climate Change Directorate, 2020, p. 28).

• Unlike other PICs, Tonga does not have a customary property law system that runs alongside statutory land laws. Tonga has crown land that is state (government) owned and governed through the Land Act. There are no relocation laws, and governing principles for relocations are resolved on a case-by-case basis in conjunction with donor and/or funding agencies.

Customary land tenure is one of the most pressing issues for local communities facing disaster displacement in the Pacific region. Prominent challenges identified for communities that went through planned relocations in Fiji and Solomon Islands included: lack of access to customary land in government-led relocation efforts, customary land tenure regimes are restrictive, concerns about hazard exposure in new sites that were low-lying, concerns in relation to village fragmentation, distance to origin, lack of resources and housing costs in new locations (Bower & Weerasinghe, 2021).

When relocating beyond the boundaries of one's community, land tenure is a critical factor and requires difficult consultation and negotiations with the destination community. National governments and local communities need to work together to find adequate solutions for land tenure issues to resolve problems surrounding human mobility and relocation.

A short-term donor-funded project in the Solomon Islands, USAID's Strengthening Competitiveness, Agriculture, Livelihoods and Environment (SCALE), supports traditional governing structures in the Pacific. One of the activities of the SCALE project is Indigenous terrain mapping (ITM) planned for Malaita Province, which includes social assessment of land ownership and tenancy with consultations on genealogy and neighbours. The terms of relocation of low-lying communities are negotiated based on family relation with the destination communities. The ITM is working towards lasting success in customary land contexts, resolving land conflicts and disputes, particularly for relocation purposes. Land and resources in Malaita are associated with traditional tribes, who require to be consulted and informed of all activities. The ITM approach is tailored to cater for challenges associated with Solomon Islands’ local land tenure and ownership complexities and traditional cultural context.

3.2 Progress in implementation of LITK initiatives

The use of LITK and practices for DRR in the Pacific are mostly through existing local community practices, supported through NGO and donor-funded programmes, and to a lesser extent through national government initiatives, and with almost no intervention from the private sector. Information on the use of LITK and practices for DRR are presented under the following categories: housing and infrastructure, food security and resources, water security and resources, energy security and resources, health and sanitation, natural resources, ecosystem services and sustainability, natural hazards, youth and LITK, and transmission of LITK.

Housing and infrastructure

Although most communities in the PICs have modern concrete houses, a large number of local communities, including those in remote locations and outer islands, still have traditional houses. The traditional houses are usually made of wooden poles and thatched roofs, and depending on climate and weather conditions, can last 5–10 years. It is traditional practice to build houses with consideration of the dominant wind directions; for example, the northeast and southeast trade winds. Today only selected members of local communities have thorough traditional knowledge of the techniques of building traditional houses.

From the local community perspectives in the PICs, traditional houses are safer during disasters such as tropical cyclones, as they do not use corrugated iron and nails that can cause accidents in windy conditions. In strong wind conditions the thatched roof of a traditional house falls in, creating a hollow that people can use for shelter during tropical cyclones. Traditional mitigation measures to prepare houses for tropical
Cyclones include installing bamboo reinforcements to push up against the house. Local communities in Fiji integrate modern approaches when building traditional Fijian houses (bure). The bure poles decompose easily due to floods and rain. To address this, new bures incorporate modern approaches where poles are strengthened by using concrete reinforcements. Nails are also used for constructing bures in present times.

Food security and resources

Local communities in the Pacific have been using traditional ways of ensuring food availability and food preservation techniques for generations. Burying root crops and post-harvest processing of seafood are the two most common traditional methods of food preservation.

In the Yasawa Islands in Fiji lololo, a traditional food storage system where root crops are harvested and buried in pits or in cool dark places, e.g. food storage huts, is used in preparation for disasters. As part of the preparations for tropical cyclones, Fijian communities harvest root crops in bulk and store for later use and for barter. The tops of cassava plants are usually cut off before tropical cyclones, and the cassava is harvested after the disaster has passed. Communities in Fiji’s Moturiki Island plant native yam species that are more resilient than the modern varieties. Yams are planted using the Indigenous seasonal calendar, and harvested and stored in underground facilities just before the cyclone season. Cassava is usually planted after the cyclone season, since it is fast growing and can be harvested in a shorter time than yams. Depending on the variety, yams can take 3–6 months or at most a year to be ready for harvest.

In many PICs, the younger generations in local communities close to and influenced by urban centres do not have knowledge on traditional practices for ensuring food availability and/or food preservation techniques. Out of necessity, the young generations in remote, outer island communities still practise the traditional methods of fishing, growing and preserving food. Local village communities close to urban centres mostly depend on imported and/or processed seafood, and do not have the traditional knowledge on the appropriate fish species to fish before and after tropical cyclones. In the remote islands of Tuvalu, traditional canoes are used for inshore fishing activities. Due to their isolated location, it is crucial for the young
generation to learn from their elders the traditional techniques of securing food, which includes being able to build, maintain and use traditional canoes for fishing. Furthermore, traditional canoes do not use fuel, which enables savings and promotes a green economy.

A few programmes on LITK associated with food security were implemented by donor-funded projects and the local government. For example, a USAID project in Palau supported training and pilot projects on using local and traditional methods for strengthening agricultural practices for taro cultivation. In Tonga the Live and Learn Australian programme supported a project on traditional methods for hot composting fakapopo to support subsistence gardening, including the pilot project and training programme. In Solomon Islands, the Malaita Provincial Government carried out an awareness programme to encourage people to use traditional methods to work their land to increase food productivity, as a response to increased expenses and unemployment related to the COVID-19 pandemic.

Water security and resources

Most local communities in the present day have access to piped water supplies. However, remote and outer island communities of the PICs still depend on traditional methods of meeting their water needs. Common traditional sources used by local village communities include water from natural river systems, spring water, well water and rainwater. Often women are responsible for managing the water needs of their households. In Palau, traditional water management includes each village having a spring water source that is managed by the village chiefs. Planting around the water source is not permitted. Although these spring water sources are still available, they are rarely used in present times. In times of natural disasters such as tropical cyclones, floods and droughts, people are mostly dependent on bottled water and water tanks. In the Solomon Islands, to access clean water after disasters, people rely on family and traditional relationships. Therefore, it is important to build on this network of families and friends to get immediate assistance in disaster situations.

Short-term donor-funded projects frequently support local communities in the PICs to improve their traditional water management systems. In Tonga, the Water Access, Sanitation and Hygiene (WASH) programme provided local communities with tanks for harvesting and storing rainwater, which is one of the traditional methods of acquiring water in the country. In addition to the water tanks, the WASH project, funded through Plan Australia, provided training on maintenance of the water tanks. Similar projects that provided water tanks for local communities and schools in various PICs were supported by a number of donor-funded projects, including the EU Pacific Adaptation to Climate Change and Resilience Building (PACRES), EU Scaling Up Pacific Adaptations (SUPA), EU-GIZ Adapting to Climate Change and Sustainable Energy (ACSE), and EU Global Climate Change Alliance (GCCA) programmes.

Energy security and resources

Burning firewood for fuel is the most common traditional energy source for local communities, although in present times most households meet their domestic energy requirements through energy companies for electricity, and kerosene and bottled gas for cooking. However, some remote and outer island communities still depend on traditional energy sources (fuel wood and charcoal, coconut shell and husk). Additionally, traditional energy sources are particularly relevant after disasters such as tropical cyclones and floods that damage the energy company infrastructure. When preparing for disasters it was common practice for some communities and households to prepare and store firewood in a dry place. Today after disasters, local communities rely mostly on kerosene lanterns and stoves, but some in remote areas still rely on traditional resources. Traditional firewood stoves are mostly still used by the older generation, but increasing fuel prices may result in people falling back on traditional resources for cooking fuel. Burning firewood for cooking is not reported as contributing to carbon emissions.

Traditional energy currently used in Tuvalu and Vanuatu is not sustainable in the long-term. The rate of harvesting mangroves and trees is rapid. Surveys in Vanuatu and Tuvalu indicate the harvesting rate of fuel wood could surpass the growth rate if the local communities continue using firewood in an unsustainable way. Coconut charcoal stoves are highly efficient, but awareness on the use of charcoal is lacking (Hemstock and Singh, 2013; Hemstock et al., 2020).
In addition, there are health implications of using charcoal and kerosene stoves. Women are responsible for preparing meals for their families, and inhale thick smoke and fumes from these stoves for hours, which cause severe respiratory illnesses. Similar to women, the children, elderly and other vulnerable groups spend more time in homes than men, and they also suffer disproportionately from this method of cooking (WHO, 2016). Choi et al. (2015) suggests using liquefied petroleum gas (LPG) to be less health hazardous than burning charcoal and kerosene, while WHO (2016) emphasizes the use of biogas as a cleaner energy source than charcoal, kerosene and LPG.

**Health and sanitation**

The local communities in the Pacific have traditional practices for handling their food and water to ensure good hygiene. A common practice for handling water resources, particularly during disasters, is to boil drinking water before consumption. Earth ovens (*lovo, umu*) and firewood stoves (*kaitunu*) are traditional methods of food preparation. Good hygiene practices for handling food include wrapping food in leaves before cooking it, using clean banana leaves to lay out food, and covering serving surfaces with layers of coconut fronds and banana leaves.

Indigenous peoples across the Pacific have various herbal remedies to treat minor injuries and ailments. These include using mile-a-minute leaves to treat minor cuts, using mangrove shoots for detoxification, steam baths for fever and cold, guava shoots for treating diarrhoea, lemongrass roots to treat colds, aloe vera for treating burns, and using noni leaves for detoxification, lowering blood pressure and blood sugar levels. Many of these practices are shared within the communities. The knowledge of Indigenous and traditional herbal medicines in RMI was published as a book in collaboration with USP (Taafaki et al., 2006).

National government and NGOs run awareness programmes on health and sanitation issues and good practices in local communities in the Pacific. A number of these programs are carried out in collaboration with water, sanitation and hygiene initiatives. The programmes include, but are not limited to:

- Training and workshops with local communities to encourage community-based actions to address health and sanitation issues.
- Local health and environment officers and communities trained on proper health and sanitation practices.
- Training and awareness workshops on producing healthy food locally using local and traditional knowledge and practices integrated with modern methods.
- Health and sanitation awareness and training delivered in local languages.

The national governments also engage with local communities when developing health and sanitation policies. The local communities and relevant stakeholders are consulted to develop and implement health and sanitation plans and activities. The consultations with local communities and relevant stakeholders are carried out in local languages.

**Natural resource, ecosystem services and sustainability**

Nature-based solutions are the most prominent traditional practice for natural resource management in the Pacific, practised through *tabu* or *bul* systems. Commonly used for marine resource management, *tabu* or *bul* is a temporary marine reserve. Local communities of Palau set up a *bul* for managing fisheries and marine resources, where an area of the sea is subjected to temporary closure using coconut stems as markers. Traditionally, seasonal closures are 3–6 months long, and the common fauna that have fishing bans include sea cucumbers and reef fishes. Melanesian countries, including Fiji, have a similar practice of marine resource management known as *tabu*. *Tabu* or temporary closures and fishing restrictions in selected areas of the sea are associated with funerals and feasts. In other instances, seasonal closures are based on spawning seasons. In Yadua Island, west of Vanua Levu, Fiji, open fishing season for the golden herring is only when sea birds are seen flocking in the lagoons. As per traditional practice, fishermen are not allowed to approach the school themselves, but wait for the fish to come close to shore for them to begin fishing. Using the traditional technique, two people have their feet tied together, and staying beside each other they scoop

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2 For example, see [https://www.unicef.org/pacificislands/what-we-do/water-sanitation-hygiene](https://www.unicef.org/pacificislands/what-we-do/water-sanitation-hygiene)
the fish out with fishing nets. The belief is that there would be abundant fish the following year if this ritual is followed. The fishing methods and temporary closures are governed by customary systems and enforced by village elders. In Solomon Islands, protected areas or reserves to conserve natural resources are a traditional practice to sustainably manage forest and sea resources. Timor-Leste’s tara bandu associated with fishing restrictions in lakes is a similar practice.

The Government of Palau passed the Palau National Marine Sanctuary Act on 28 October 2015, a modern-day ‘bul’. Using an integrated approach to marine reserves, traditional bul systems and modern Marine Protected Areas, the 16 States of Palau have implemented a full protected marine sanctuary (no extractive activities such as fishing or mining can take place), covering about 80% of the nation’s maritime territory. With an area of 500,000 square kilometres, Palau’s ocean reserve is one of the largest in the world. Sustainability of the system is through an eco-tax system, whereby an eco-tax is collected from visitors into Palau. The tax contributes to maintaining the marine reserve.

NGOs and donor-funded projects also work to strengthen LITK and practices for natural resource management. The Wildlife Conservation Society in Fiji has worked extensively on ecosystem and community-based approaches to set up marine reserves; using existing traditional marine tabu systems and strengthening it with scientific knowledge to set up long-term marine reserves. It is easier for local communities to comprehend and accept modern-day resource management approaches when they are able to link it with their traditional practices. Marine closures under traditional systems were short, typically 3–6 months long. After inclusion of scientific knowledge in some places around Fiji, the marine closures are for longer periods, typically 3–5 years, and some communities even have permanent closures. Local community consultations are conducted to understand which traditional practices work effectively, so progress can be taken forward. For example, planting mangroves for coastal protection without considering coastal geology, mangrove biology and ecosystem interactions, is very often not successful.

At the Suva Municipal Market, Fiji. How to secure food supply chains is an important consideration in DRR and CCA. Photograph: Australia Pacific Climate Partnership.
In Solomon Islands, the REDD+ project, using the payment for ecosystem services approach, promoted traditional methods of setting up reserves by engaging four communities in Malaita Province to set up a 15,000-hectare natural forest reserve.

Natural hazard management

Since 2015, there is a slight increase in using LITK to inform weather and climate STI. In Tuvalu, LITK is integrated in the education curricula for DRR to address disasters. The Cook Islands made a documentary with the elders sharing their LITK and practices for weather prediction. The Meteorological Office in Vanuatu collected information from local communities on traditional early warning knowledge.

All sectors/themes discussed above contribute to managing natural hazards in the Pacific region. Effective governance systems are required to guide and manage communities and to build relevant capacities across the various sectors: food, water, health and sanitation, energy, housing and infrastructure, and natural ecosystems, to prepare for and recover promptly from the impacts of natural hazards.

In addition to the above LITK and practices associated with the various sectors, low-lying coastal and atoll island communities of Malaita Province in Solomon Islands, who are frequently affected by storm surges and inundation and have limited space and resources, build wave breakers using rocks to protect their homes. People who own land at higher elevations relocate to higher ground. In some cases when small coastal communities are completely damaged by cyclonic waves, the communities trace their genealogy to identify their ancestral/traditional land on higher elevations, and relocate.

Traditional and local practices used in FSM to predict bad weather include the use of environmental indicators, such as when spiders capture their web and disappear, and fishermen using cloud patterns at sunset and sunrise to predict weather conditions suitable for going out to the sea.

National governments through their National Disaster Management Offices (NDMOs) (or equivalent) run awareness programmes on DRR to enable local communities to prepare for disasters. The Emergency Management Department of FSM runs awareness programmes on DRR and preparedness in local communities. During DRR preparedness and awareness workshops, local communities are included in consultations and meetings, and information on traditional practices to address DRR is collected during community visits. To ensure participatory approaches, focus group discussions are carried out since cultural protocols prevent people from participating freely in public spaces. The Emergency Management Department also supports awareness raising and training activities for youth to use traditional methods of food preservation in village communities, including: preserving breadfruit by wrapping it in plastic and storing in air-tight conditions; post-harvest processing of fish by smoking it (tuna can be preserved for months); preserving pork by cooking it until it is hard and preserved in its oil; and identifying edible plants in post-disaster periods. The awareness programmes also include preparing communities to use traditional methods of water management: protecting water catchment areas; wells (traditional wells with rocks for reinforcements); and boiling water before drinking.

To support local and remote communities to prepare for and recover from disasters, the national government in FSM set up early warning systems, including radio communication and health care training in outer islands (where there are no doctors). The Disaster Officers in each state are trained to use and repair radio communications equipment. The Disaster Officers train others in their area on using/repairing radio communications.

Donor-funded projects through local NGOs also support LITK for DRR to prepare and recover from natural hazards. The Climate and Oceans Support Program in the Pacific (COSPPac) is one of the prominent projects in the Pacific region that is using LITK and practices to develop early warning systems across 14 PICs. The Australian Government-funded project is implemented by National Meteorological Offices with support from SPREP and the Pacific Community (SPREP, n.d.). The Meteorological Offices recognized the need for people to be able to understand and act upon the weather forecasts and disaster warnings released by their offices. Climate science is complicated for local communities to comprehend, particularly since

3 Apart from FSM, none of the other Sendai Framework PIC government focal points responded to the request for an interview.
scientific terminologies do not exist in Indigenous languages. Therefore, through COSPPac, the National Meteorological Offices aim to relay information in a language that local people understand. COSPPac collected LITK on early warning systems from Pacific island countries, including Palau, Vanuatu, Solomon Islands, Tonga, Samoa and Niue.

A database for traditional knowledge associated with early warning systems was developed through COSPPac; however, due to intellectual property issues associated with traditional knowledge, the database is offline and not accessible to the public. Designated personnel at National Meteorological Offices manage the database information. Based on the information gathered, LITK was combined with the scientific information to prepare weather bulletins for the local communities. To set up community-based early warning systems, the National Meteorological Offices collaborated with NDMO offices and the Red Cross to integrate climate science with the traditional systems in the most effective way possible. COSPPac worked with local communities to map their traditional warning systems to the national systems to enable a clear flow of early warning messaging from the National Meteorological Centres to the local communities. Placing LITK and practices into a systematic frame has helped some communities to realize that some indicators used for traditional early warning systems are no longer reliable. For example, local communities have been able to identify indicators that have changed drastically, such as trees flowering and fruiting throughout the year, which now need to be excluded from the traditional warning system.

In Solomon Islands, Live and Learn, together with the World Fish Centre, supported a mangrove restoration programme to address coastal erosion issues in Malaita Province. SPREP supports awareness programmes on LITK that are nationally-led and facilitated by SPREP, NDMOs, and Red Cross offices. During these awareness sessions, communities share their knowledge, tools and systems, for preparedness for disasters. The National Meteorological Offices, in collaboration with SPREP, support: community-based disaster-related awareness; village response plans; understanding the risks; how the messaging and warnings for disasters are communicated; and ways in which local communities can provide feedback on the communication products.

Other hazards

Local, Indigenous and traditional knowledge and practices are also employed to manage hazards caused by anthropogenic activities, including polluted air, soil degradation and deforestation (described as hazards by UNDRR, 2021). Traditional outdoor earth ovens are used for cooking in many PICs, which reduces the harmful impacts of household air pollution from indoor traditional cook stoves (WHO, 2016). Some places in Fiji use hot springs as a traditional means for cooking to save costs and avoid using gas and fuel (Silaitoga, 2022).

Deforestation and soil degradation as a result of harvesting trees for housing and firewood, and logging activities, are prominent in many PICs (Begg et al., 2022; Allen et al., 2021; Cameron et al., 2021; Wairiu, 2017). Planting mangroves, coastal vegetation and terrestrial trees (including native trees), and traditional agroforestry practices are common traditional, nature-based practices to restore these natural systems (Friday et al., 2021; Cornelio, 2020; Gilman & Ellison, 2007; Abbott & Leakey, 2006). In Tuvalu, traditional composting methods are used to address soil degradation issues. The pulaka or swamp taros of Tuvalu are grown in alkaline soil. A traditional accelerated compost made from fish bones and blood, and leaves and tree trunks, is added to enrich the pulaka pit soil with organic matter (Lyons et al., 2020).

Youth and LITK

A common view expressed by most of the interviewees across the various sectors was the present generation's lack of interest in using LITK and practices for DRR. To gauge the Pacific youth perception and knowledge of LITK and practices, an additional online survey was carried out via emails and Google forms.

Findings from the surveys indicate that Pacific youth have some awareness of LITK and practices associated with early warning systems for natural disasters, and medicines and herbs for treating common ailments. Youth are familiar with the traditional indicators of bad weather, including excessive fruiting of breadfruit,
beehives close to the ground, and ants migrating into homes. The most common traditional knowledge on medicinal herbs among youth is using mile-a-minute leaves to treat minor cuts. Other LITK about herbs included: using mangrove shoots for detoxification; steam baths for fever and cold; guava shoots for treating diarrhoea; lemongrass roots to treat colds; aloe vera for treating burns, and using noni leaves for detoxification, lowering blood pressure and blood sugar levels. Youth in the northern Pacific refer to a publication on herbal medication in RMI for treating common ailments (Taafaki et al., 2006).

In addition to the above LITK and practices on early warning systems and medicinal herbs, most youth in the Pacific have some LITK and skills when preparing for disaster situations. Most of the respondents had knowledge and skills on using traditional methods to prepare and store clean water and preserve food. Some youth also have knowledge of community-based management of natural resources and preparing and securing houses to prepare for storms and tropical cyclones.

The limited LITK and skills of youth have mostly been transferred to the present generation from their families and community elders. The younger generation recognizes key challenges and barriers that prevent them from learning LITK and practices for DRR, including: being unable to learn from their communities and elders since traditional methods are no long practised; limited opportunities for transfer of LITK and skills due to modern and formal education systems; and limited interest from the present generation.

Despite the challenges and barriers, youth acknowledge the value of learning and integrating LITK and practices with modern approaches. Indigenous, local, and traditional knowledge and practices will allow future generations to prepare themselves better for impacts of hazards and climate change. Remote and outer island locations in the Pacific are away from hospitals and modern medical care. Therefore, during and immediately after disaster situations these communities are dependent on their LITK and practices for their immediate needs – including food, water and energy resources, and treatment for ailments and injuries, until official help arrives.
Capacity development/knowledge transfer of LITK for DRR

There have been limited “official” actions on the transfer of LITK in the Pacific. Nonetheless, knowledge transfer on LITK occurs in local village communities through traditional systems, and in some instances through formal and informal training supported by donor-funded projects and national government programmes.

The common method of knowledge transfer in local village communities and traditional settings is by word of mouth and practice, from the older to the younger generations. Local village communities in Fiji have a traditional system of transferring LITK and practices to the younger generations. Traditional groups known as solesolevaki, lala or duadua consist of a small group of men and/or women in Fijian communities that provide a space for youth to gain LITK and skills. The solesolevaki, lala or duadua is made up of young and old community members, and is a platform that allows youth to gain traditional knowledge and skills from their elders. For example, this includes LITK and skills on agricultural practices for groups of men, and mat weaving skills for women's groups.

The evolution of LITK and practices is reliant on the way LITK is transferred. Most traditional practices are developed through trial-and-error methods. The good practices are passed on, and the things that do not work are used as examples to teach the younger generations about things that should not be done. It is observed that the older generation in local communities have much more information on LITK and practices than the younger generation. As a result of modernization and the influence of modern education and technology, members of the younger generation from urban areas are not aware of the benefits of LITK for DRR; however, those from remote outer areas and islands continue to value and use it in their daily lives.

National governments in some PICs support the transfer of LITK and practices to the Indigenous communities. The Ministry of iTaukei Affairs in Fiji funds a national training centre, the Centre for Appropriate Technology and Development (CATD). This is a Charitable Trust Organization that supports various training programmes for Indigenous people, including training programmes for youth and Turaga-ni-Koros (village heads) from the 14 provinces in Fiji on: basic carpentry skills, including for traditional housing; disaster preparedness; and biodiversity conservation. In 2015, CATD trained Indigenous communities from Lautoka to build bures. The processes of constructing traditional bures were documented and CATD has plans to publish it as a manual for building traditional houses in Fiji.

FSM saw that it was challenging to transfer LITK and practices. Previously, elders passed on their LITK to an apprentice in their respective families. However, today youth are no longer interested in LITK, due to modern career paths and technology. Therefore, the State Disaster Coordinators, who support the Emergency Management Department, have been tasked with gathering and documenting LITK in their respective states.

In some cases, lessons on climate change and DRR were integrated in the school curricula. For example, in Fiji, the education curricula incorporated climate change education in the primary school curriculum. Students from Year 2 (seven-year-old and older) learn DRR and climate change concepts in schools. However, there is lack of capacity (teachers) to deliver the DRR and climate change curriculum. If the school teachers were supported through recurrent training programmes on climate change and DRR, the delivery of these curricula would be more effective. For Fiji, the last CCA/DRR teacher training events were in 2013–2015 as part of the GIZ Coping with Climate Change in the Pacific Islands Region initiative. In Yap, FSM, cultural and traditional practices are integrated in the education curricula of the elementary schools (until Grade 10), including traditional knowledge on food preservation and indicators for weather predictions. The College of Micronesia has a course on navigation that includes traditional knowledge and practices on navigation. In RMI, training is available on constructing traditional sea transport as part of a sustainable sea transport initiative.

In recent years, a few donor-funded projects supported the delivery of training programmes on LITK and practices. The EU Pacific Technical and Vocational Education and Training (EU PacTVET) was the first to include unit standards on LITK in the accredited regional Resilience Certificates I, II, III and IV, which it developed. Through support from the EU PacTVET project, the Vanuatu Institute of Technology delivered
Resilience Certificates I and III in Vanuatu, and the USP Pacific delivered the same in Fiji. The Vanuatu participants continue to use the LITK and skills gained from the training in remote locations of their country to address impacts of disasters such as tropical cyclones and COVID-19. In 2020, when Vanuatu was hit by the Category 5 Tropical Cyclone Harold, participants of the Resilience Certificate programmes were able to use their LITK and skills to manage post-disaster recovery in the aftermath of the cyclone. Since the training, participants have joined local NGOs; returned to support their communities; expanded on fishing businesses; and are preparing their own aquaculture pond. The PACRES and the Pacific-European Union Partnership (PEUMP) programmes continue to support delivery of the Resilience Certificates in collaboration with USP across the PICs.

Traditional canoes are still very much a part of local communities in the Pacific. To transfer LITK and skills of canoe building and uses, the PEUMP programme supported canoe building training for the youth in village communities of Beqa, Fiji. A similar training programme on canoe building and its uses was supported by a Food and Agriculture Organization of the United Nations (FAO) project in Tuvalu. The youth from local communities of Tuvalu were taught how to build canoes and use them for fishing. A total of 40 traditional canoes were built as part of this project.

Habitat for Humanity carried out informal training programmes in local communities in Fiji, Navala, Nakoroboya and Ra areas, after Tropical Cyclone Winston. The training programmes demonstrated cyclone safe housing in local communities, and trained community carpenters and builders. The youth who were trained through these programmes were able to provide housing reinforcement support to their communities. Habitat for Humanity supported house constructions to cater for disability and village elders’ needs.

Gender equality and social inclusion

Among other thematic studies for the Sendai Framework Midterm Review, the UNDRR is supporting the development of thematic reports on gender equality and social inclusion, and climate and disaster-resilient infrastructure in the Pacific (UNDRR, 2023a; UNDRR 2023b). Emerging findings related to gender equality and social inclusion show increasing involvement of women in DRR activities at community levels, including “women's leadership in early action and resilience building at community level is demonstrated across multiple initiatives”, “evidence of women's formal and informal leadership and participation in resilience building activities”, and “initiatives supporting women in leadership positions contributing to shifts in traditional views of women's roles” with “male community leaders voicing pride in women's achievements” (Gero et al., 2022, p. 1). In addition, one of the FSM interviewees from this study emphasized that, compared to about 30 years ago, present activities on DRR ensure gender equality and social inclusion. The current DRR outreach programmes are inclusive, including people with disabilities, women, youth, elders, and traditional governing systems.

4. Context shifts, new and emerging issues and challenges

4.1 Context shifts and new issues – retrospective 2015–2022

There is increasing recognition of the value of integrating LITK and modern approaches for DRR in the Pacific region. Tremendous efforts have been made to include and integrate LITK into regional, national and local plans, policies and strategies. Prominent regional frameworks and national plans, polices and strategies that thoroughly integrate LITK include the FRDP, the PRS that support the implementation of FRDP, numerous national DRR and DRM plans, climate change policies and NAPs. Despite the progress with integration of LITK in frameworks, plans, policies and strategies, there are limited initiatives that support the implementation of integration. The next phase for LITK and DRR in the Pacific should focus on execution of the LITK policies and plans for DRR.
The integration of LITK and practices with modern approaches and STI is challenging for the Pacific region, considering the limited financial, human and technical resources. Nonetheless, one of the most prominent examples of LITK and practices integrated with STI is the integration of Palau’s traditional bul system to develop the Palau National Marine Sanctuary Act (signed into law in 2015) (Office of the President, 2015). This is one of the world’s largest marine reserves encompassing an area of 500,000 square kilometres. Another successful venture associated with the traditional tabu practice of the Pacific region is the Locally Managed Marine Area (LMMA) Network, which began its work on bottom-up approaches for community-based marine reserves in the mid-1990s, and was able to register the LMMA Network as a legal entity in 2017 (LMMA Network, n.d.).

Donor-funded projects, such as the Australian Government-funded COSPPac is working with the National Meteorology Offices across 14 PICs to develop early warning systems by integrating LITK and practices with climate STI (SPREP, n.d.). The need for integration of LITK and practices remains in other sectors such as agriculture, fisheries, and housing and infrastructure.

Considering the overlaps and close links between DRR and CCA, coordination and collaboration between DRR and CCA actions will enable improved synergies. Local communities and Indigenous people will also benefit from these collaborations. The majority of the participants from the present study revealed that due to language and cultural barriers, it is challenging for local communities to comprehend the specifics of climate science and associated terminologies. Treating two similar concepts in silos when carrying out awareness programmes creates further confusion. When DRR and CCA are presented in the same frame, as components of a whole, it would be easier for local communities to relate. NGOs and regional agencies in the Pacific often collaborate and coordinate activities on DRR and CCA for improved integration. However, most government ministries in the Pacific have separate departments for DRR and CCA and these remain siloed, despite best efforts. In most cases, no government agency has the responsibility for disaster risk reduction. Government actors tend to be targeted towards response and recovery and these are managed by NDMOs (or equivalent). Building resilience to climate change impacts tends to be managed by climate change departments, usually hosted by ministries of finance. The Department of Climate Change, Environment and Emergency Management of FSM is one of the rare cases where both the DRR and CCA departments operate under the same section, identifying synergies and working in collaboration to carry out DRR and CCA work.

Noting the need for localization, which means there is no “one size fits all” solution, normalizing the integration of LITK and practices into DRR actions via a general method or guide (that can be adapted to local situations), will enable the Pacific to better integrate LITK and practices with DRR actions. The Pacific Community's PLANET principles, developed by the Human Rights and Social Development and the Climate Change and Environmental Sustainability programme, is a people-centred approach that places human rights, gender and social inclusion, Pacific culture, and environmental sustainability at its core. “PLANET is a set of guiding principles for implementing a people-centred approach to development, including food security and emergency response. The application of this framework helps to maximise social and environmental outcomes.” (SPC, n.d.) Donor-funded projects in the Pacific Community and USP are employing the PLANET principles to better engage with the local communities they are working with. Initiatives like PLANET, which take a wholistic approach to development – acknowledging and incorporating individual needs and motivations and group behaviours – promote participation, inclusive decision-making, ownership and sustainability of community actions.

Although the younger generation from urban areas no longer consider LITK and practices to be beneficial as a result of modernization, those living in outer remote islands are more open to embracing it. As a result of the COVID-19 pandemic, additional people in the Pacific became unemployed. Many of the unemployed returned to their villages and islands and used their traditional knowledge and skills on farming and fishing to secure their families’ needs. The survey on youth and LITK found that despite the challenges and barriers associated with the transmission of LITK, the respondents saw value in learning and integrating LITK with modern approaches. LITK and practices will allow the future generations to prepare themselves better for impacts of disasters and climate change. Remote and outer island locations in the Pacific are away from hospitals and modern medical care. The LITK and skills on medicinal herbs will help to treat ailments and injuries post-disaster, until help arrives. Local and traditional food preservation and cooking methods are extremely helpful in the Pacific region, especially immediately after disasters.
4.2 Emerging issues and future contexts – prospective (to 2030 and beyond)

Localization is crucial for implementation of DRR work. People learn and understand situations and concepts best when it has relevance in their lives and is placed in a meaningful context. In most PICs, the governing structure consists of three general levels: the national government, sub-national government (includes provincial, district, and municipality offices), and local village communities. The national and sub-national levels follow Western governing systems, while local village communities are governed by customary laws and regulations. There is limited influence of Western governing systems in local village communities. Therefore, it is crucial to understand and work through traditional governance mechanisms for effective DRR actions at local village community levels in the Pacific.

The global context does not align well with the local Pacific context. Interactions and communication by external parties (government representatives, NGOs, donor agencies, and international organizations) with local village communities should be practiced carefully, with full understanding of and attention to context. Interpretations need to be made with care, using the right choice of words so that communities do not misunderstand. Terminologies, such as DRR, climate action, Sustainable Development Goals (SDGs), and Sendai Framework, may be seen as Western systems trying to take over the traditional ways.

To address language and cultural barriers, it is important to use words that people can understand in context when communicating with local communities, and to put everything through a local filter. Working through a local/Indigenous person who is familiar with the challenges and realities of working in a traditional setting will ensure effective implementation of DRR work. The significance of localizing and contextualizing, and understanding the traditional governing systems, are recognized by many local NGOs, regional agencies and national governments that implement DRR programmes. Working with the traditional governing systems and aligning DRR projects with local needs, results in the village community taking ownership, and thus ensuring sustainability of the actions.

To further strengthen the sustainability of DRR actions, in addition to working with NDMOs, climate change departments and sector ministries, engagement with ministries associated with internal affairs, finance and planning will ensure continuous support from the national governments. The ministries for internal affairs, finance and planning can help to strengthen the links between national and sub-national governments and local communities, thereby allowing both top-down and bottom-up exchanges to take place. The exchange between national governments and local communities will not only enhance collaborations between the national governments and the traditional governing systems of local communities, but also provide a platform for sharing lessons learned and best practices that will further strengthen DRR plans, strategies and polices. This approach was employed by recent donor-funded projects, such as the USP EU GCCA, PACRES and SUPA programmes.

National governments and decision-makers in the local communities need to work together to find adequate solutions for land tenure and land use issues to resolve problems surrounding human mobility and relocation, and natural resource management. Although there are both state (government) owned land, and land and sea under customary tenure in the PICs, the vast majority of the land and sea are subject to customary tenure. When relocating beyond the boundaries of one's community, land tenure is a critical factor and requires high-level consultation and negotiations with the destination community. National governments can support the negotiation process. Local and Indigenous communities in the Pacific practise various forms of natural resource management, including community-based land and marine reserves (tabu, bul, and mo) that are governed by customary regulations. Therefore, to set up successful resource management systems, it is crucial for decision-makers in local communities and national governments to engage constructively.

Capacity development is key to support the integration of LITK and practices with modern approaches for DRR in the Pacific. A number of capacity constraints were highlighted by the study, including capacity associated with integration of LITK and STI, proper documentation of LITK for DRR so that LITK is not “lost”, integration of LITK for DRR into policies and translating polices into action. In addition, youth today no longer have the same opportunities as older generations to frequently interact with their elders to enable the transfer of LITK and practices. To support both the present and future generations to strengthen resilience through integration of LITK and practices with modern approaches, this study recommends the following:
Inclusion and integration of LITK and practices for DRR into formal education systems, in schools and tertiary levels. Some countries such as Fiji, Tonga and FSM have begun the processes of integrating LITK and practices in elementary school education.

Supporting interactive capacity development programmes on LITK and practices for DRR. Informal training and formal micro-qualifications with targeted LITK elements can be developed and delivered in local communities, based on the localized needs.

Supporting traditional mechanisms of knowledge and skills transfer in local communities. Working with traditional practices, such as the solesolevaki in Fiji, which is a form of active learning in small groups consisting of youths and elders, whereby elders transfer knowledge and train their younger generation on Indigenous, local and traditional practices. Young people can also engage in the traditional culture of talanoa or informal dialogues in village communities, which can be used as a platform for youth to learn from their communities and elders.

Awareness programmes on LITK and practices for DRR should complement and support capacity development actions associated with LITK. In addition to the traditional face-to-face method of awareness programmes, social networking service platforms should be employed for greater reach and to adapt to the modern technology.

Development partners need to be made aware of these identified capacity development needs, and take steps to ensure these needs are met by integration into programmatic support for DRR actions.
4.3 Challenges in using LITK for DRR in the Pacific

Prominent challenges and barriers in integrating LITK and practices for DRR are presented according to the priority areas of the Sendai Framework (UNDRR, 2015).

Use of LITK and practices to complement DRR and inform polices, plans and strategies (IV, 24(i), p. 15)

- Integration of LITK and practices with modern approaches and STI is challenging, given that LITK is based on anecdotal observations, and not validated. For example, traditional houses/bures in Fiji lack quantitative practices, as actual measurements are not made when bures are constructed; constructions are based on estimates. This also makes it difficult to standardize the construction of traditional houses. To strengthen integration, STI needs to make efforts at broadening its parameters to capitalize on LITK.
- Standardization of local and traditional practices is difficult since the specifics of the traditional methods differ in each locality.
- Cultural barriers exist between Pacific cultures and Western methods, and accepting LITK and practices is difficult for the scientific community, as LITK is usually not scientifically validated, and in some cases local communities are reluctant to share their LITK since it is believed to be sacred culturally.
- It must be acknowledged and recognized that some local and traditional practices are not good. For example, taking sand from the beach to a private yard to prevent the yard from getting muddy will cause beach erosion. It is important to recognize and integrate the good local and traditional practices with the modern-day approaches as a way forward. Caution should also be exercised to prevent gender and other social inequalities.
- LITK and practices can be challenging sometimes, considering the practices developed over decades and centuries and the world is changing rapidly. Now LITK requires ways to be aligned and integrated with the changing STI.
- It is difficult to integrate LITK for DRR in the energy sector as it is difficult to show benefits over modern energy sources, especially with regard to efficiency, but also noting that if traditional energy resources are used sustainably they are carbon neutral.
- Findings from the present study identified barriers for women that are consistent with the barriers reported by the emerging findings of the team developing the thematic report on gender equality and social inclusion as part of the Midterm Review of the Sendai Framework (Gero et al., 2022). There is insufficient funding allocated for GESI elements in DRR and CCA programmes. Since disasters affect men, women, children, people with disabilities and other social groups differently, gender-responsive funding is necessary to accommodate for the relevant needs of the different social groups. Furthermore, community governance in PICs is predominantly through traditional governing systems, which are managed by male leaders. Cultural protocols demand that women and other social groups not interact directly during community meetings involving the higher ranks of the traditional governing body. As such, these structural barriers restrict women from fully participating in decision-making processes.
- According to some interview participants, apart from women, other social groups are mostly left out when it comes to DRR activities, which is particularly obvious in post-disaster situations. The action plans for and implementation for DRR are not properly managed to include all social groups.

A number of challenges and barriers were highlighted for the transmission of LITK and practices. These include:

- The present modern/Western ways of life no longer support the practice of traditional systems. Employment and modern livelihoods do not require traditional methods, and as such traditional knowledge and practices are lost, particularly since the key way of transferring LITK is by word of mouth, from generation-to-generation.
- In urban settings, as a result of modernization and technology, the younger generation do not have opportunities to learn LITK for DRR. In many cases, they solely rely on modern technology and climate applications to obtain weather reports.
• There is no funding dedicated specifically for LITK for DRR in the current education system. Resources for delivering courses in schools are limited. Teachers and students indicate that they do not have the resources to deliver LITK, climate change and resilience courses at all levels of primary and secondary schools, and tertiary institutions.  
• In the case of the recent EU PacTVET accredited Resilience Certificates that deliver a section on LITK for resilience in the Pacific, there was a decline in the number of enrolments as a result of lack of funding and teaching resources. The first cohorts for this training saw high numbers of participants, as they were funded through external donors.  
• There is limited capacity for appropriate documentation, and to identify the relevance and integration of LITK and traditional techniques for DRR.  

Empowering local authorities to work with Indigenous people for DRM (IV, 27(h), p. 18)  
• There is limited networking to address interconnections across the various government ministries and national and local governments that prevent effective collaborations, synergies and implementation of overlapping DRR and CCA projects. This can be overcome by recognizing and working with local traditional governance structures.  
• There is limited funding and human capacity in sub-national provincial, district, and municipality offices to connect with local civil society organizations (CSOs) and communities to implement DRR and CCA work.  
• There is limited encouragement and support from national governments to integrate LITK for DRR in local plans. Although LITK features prominently in regional and national polices and plans, there is limited effort towards integrating it in local and community plans, and limited resources (funding and capacity) to implement policies and plans.  

Support protection of cultural institutions and sites of historical, cultural heritage (IV, 30(d), p. 19)  
• There is limited documentation in written form and videos capturing details of the traditional techniques, such as for housing, food production and preservation.  
• For documentation and accessibility, there are limited efforts by the national governments to document and store LITK and practices. Currently information on LITK is collected in pieces by different government departments, NGOs and agencies. It is difficult to access existing information on LITK and techniques, as it is considered sacred. For example, iTaukei Affairs in Fiji has collected a lot of information on traditional housing; however, the information is confidential and not accessible to public. To address this issue, there is a need for coordinated, collective documentation and storage of LITK and practices.  
• There are numerous challenges associated with the transfer and documentation of LITK and practices. Language barrier is one of the most common issues. In many cases the elders in local communities who have information on LITK and techniques only speak their native tongue. The Indigenous people also have difficulties in understanding DRR/CCA terminologies, mostly since said terminologies do not exist in their languages. In some cases, the Indigenous people are unwilling to share their traditional knowledge and techniques as these are believed to be sacred. Depending on the type of knowledge and the communities, the Indigenous people can be open or secretive with their LITK and practices. For example, fishing and sea navigation knowledge in Fiji is very secretive. The Indigenous people of Vanuatu are open to their own people when it comes to sharing LITK and practices, but not with people from outside. LITK on weather is quite accessible in most countries. In most cases, LITK and practices were transferred to the younger generation of the same tribe and/or families. Migration of the younger generation out of Pacific islands makes it difficult to transfer the traditional knowledge and practices.  

Development of people-centred approach for early warning systems including social and cultural requirements (IV, 33(b), p. 21)  
• There is limited visibility on ongoing LITK for DRR and CCA programmes, particularly those associated with early warning systems that have integrated LITK and practices. The COSPPac project, in collaboration with the Meteorological Offices of seven PICs, developed community-based early warning systems that integrate LITK and practices. However, there is not much awareness in the Pacific communities on the early warning products available through this project.
Communications must be relevant to the local context and contextualized to those receiving information. LITK is very useful for providing context to communications, as reflected in the COSPPac project in Samoa.

Indigenous people through their experience and LITK provide support for development and implementation of plans and policies, including early warning (V, 36(v), p. 23)

- There is limited awareness on clearly understanding the importance of LITK for DRR.
- Development of national DRR plans mostly includes consultations with national governments. Local communities are not included in the development phase.
- For challenges with traditional governing systems, it must be noted that local communities in the Pacific are driven by traditional governing systems. Integration of the modern, Western and traditional governing systems is challenging, particularly when it comes to enforcing national polices and plans based on modern approaches. Terminologies associated with climate change and science do not exist in local languages, and may be challenging for the Indigenous people to comprehend. If not explained carefully, interpretations of terminologies and jargon can be easily misunderstood and seen as a threat to the traditional systems.
- There are also challenges associated with land tenure systems and human mobility and relocation, and natural resource management in the Pacific. Up to 80% of the land and sea and its resources in the PICs are subjected to customary tenure systems (Tobin, 2013). Identifying new land for relocation due to disaster impacts, and planning and protection of natural resources such as water catchments and groundwater lenses, and setting up natural reserves to build more resilient ecosystems, requires resolving land tenure issues and balancing traditional customary rights to the land and sea (Carpenter & Jones, 2004).
• For challenges with collaboration, partnership and cooperation, there is limited coordination and collaboration to implement DRR and CCA initiatives. Despite having an integrated regional policy (FRDP) and national policies, most government ministries have separate departments for disaster management and CCA working in silos. DRR, in most cases, is not specifically mandated, with NDMOs (or equivalent) targeting response and recovery. Building resilience and preparedness for climate change impacts (including disasters) are managed by climate change departments. The Department of Climate Change, Environment and Emergency Management of FSM is one of the rare cases where both the DRR and CCA departments operate under the same section, identifying synergies and working in collaboration to carry out DRR and CCA work.

Challenges associated with accessing finances for using LITK to address DRR in the Pacific include:

• Development partners are not aware of the importance and the role of LITK and practices for DRR in the Pacific.
• There are limited funds and resources for capacity development for LITK for DRR in the Pacific.
• In small island states, such as FSM, the national budget for DRR work is limited, particularly for awareness and preparedness activities. Additional funds need to be secured to travel to remotely situated communities. Transportation to outer islands is expensive, and it is the outer islands that are most reliant on LITK and most need awareness on DRR.
• Funding mechanisms are complex and it is very challenging for communities to access available funding. There is limited capacity to translate local needs into donor language, and the short donor timeframes to submit funding proposals make it even more challenging for local communities to submit grant proposals.

5. Prospective review and recommendations

Based on the progress and challenges associated with the implementation of the Sendai Framework in the context of integration of LITK for DRR in the Pacific, the following recommendations are made. The recommendations are presented according to relevant priorities of the Sendai Framework (UNDRR, 2015).

Use of LITK and practices to complement DRR and inform policies, plans and strategies (IV, 24(i), p. 15), and programme implementation and monitoring

• The present study identifies the following key threats to LITK in the PICs: lack of proper documentation, storage and accessibility to LITK, the older generation who possess LITK are disappearing and there are limited opportunities for the younger generation to learn from their elders, and there are limited instances where traditional learning systems are used to pass on LITK. To address these issues, the following measures are recommended: proper documentation and storage of LITK through consultations and interactions with the older generation, and awareness, education and capacity development associated with LITK. Further details and discussions on these recommendations are presented under various subheadings of this section.
• There is a need for more initiatives, including standards, guides and/or tools to translate LITK policies into action plans that align with local community needs, the traditional governing systems, and include provisions for those more vulnerable to disasters, to support execution of regional and national LITK policies, plans and strategies. For effective and lasting outcomes, LITK and practices need to be integrated programmatically, rather than as stand-alone projects.
• Research on the integration of LITK, STI and modern approaches for DRR are needed to provide an evidence-based approach to integrating LITK with modern methods.
• There is a need to support research and baseline studies on integration of LITK and practices with STI. For example, when the traditional houses in the Pacific, such as the bure, are claimed to be cooler than concrete houses, this is based on feelings and observations — experimental research is needed to validate these claims. Local, Indigenous and traditional knowledge requires alignment and integration with climate STI, considering LITK and practices have existed over decades and centuries, and the world is now facing comparatively rapid environmental change. Therefore, LITK climatic and environmental signs need realignment with post-industrial climatic and environmental change.

• To address language and cultural barriers, it is important to put everything through a local filter; working through a local/Indigenous person who is familiar with the challenges and realities of working in a traditional setting will ensure effective implementation of DRR work. Contextualization is key to implementing DRR work, otherwise there will be community pushback. The global context does not align with the local context. Communication with local communities needs to be delicately handled. Care needs to be taken in the choice of words so that the communities do not take it the wrong way. Translations need to be prepared properly, since terminologies, DRR, climate action, SDGs, and the Sendai Framework, may be seen as Western systems trying to take over the traditional ways.

• Considering the high value Indigenous people place on traditional housing, ways ahead with respect to adopting and adapting with traditional and modern housing should be further explored. Two ideas that may be considered include using eco-friendly materials (from traditional housing techniques) to build modern housing structures, and developing building codes for traditional housing structures (security elements from modern housing). Currently, most PIC building codes that have been accepted do not stop traditional housing and do not cover building on land under customary tenure systems.

• To understand and work with the good practices associated with LITK, the lessons learned from LITK and practices for DRR should be documented. Furthermore, the documentation of LITK and practices should be carried out by or in collaboration with Indigenous people to allow for a free, comfortable and ease of information transfer. Interviewees and survey respondents in the present study indicated that Indigenous people are often hesitant to share their wisdom with outsiders. In addition, accessibility considerations should also be given to people with disabilities and those without access to technology.

• Use of Indigenous and native plants for reforestation using LITK and techniques should be encouraged, as opposed to using introduced plants. In addition to sustaining LITK and practices, this will also ensure conservation of native plant species.

• Considering the limited funding and technology in the Pacific, ecosystem-based adaptation (EBA) or nature-based solutions should be encouraged and supported for DRR work. Local communities are familiar with traditional practices for natural resource management, including the practice of natural reserves (tabu, bul, and mo), shoreline protection by planting mangroves, and agroforestry and, as such, using EBA and NBS to build resilience will work well with community-based adaptation.

• There is a need for awareness programmes on LITK and its importance for DRR at all levels—national, sub-national and local. Awareness programmes should also aim to emphasize the importance of LITK in remote areas where aid programmes may be delayed, especially after disasters. For example, traditional early warning signs for tropical cyclones are still used in remote outer islands of Fiji and Tonga (Johnston, 2015). Limited awareness on actions to be taken during disaster situations was evident in the recent tsunami in Tonga, triggered by the Hunga Tonga–Hunga Ha’apai volcano eruption on 15 January 2022. The Tongan people were unprepared for the impact of the tsunami wave. The COSPPac project (discussed above), is working on integrating LITK in early warning systems in the Pacific. The project works on various elements of LITK for DRR and CCA, including a database on traditional knowledge for weather forecasting (Chambers et al., 2017), protocols for engaging with local communities in the Pacific to collect traditional climate knowledge (Malsale et al., 2018), traditional weather forecasts (Chambers et al., 2019), and traditional seasonal calendars (Chambers et al., 2021).

• It is important to learn from the past, and there is a need to analyse which local and traditional practices worked and which did not, taking the good practices, adding new ideas, sharing best practices, and moving forward with these.
Recommendations for capacity development associated with LITK and practices for DRR include:

- Local, Indigenous and traditional knowledge and practices need to be integrated in school and tertiary education curricula to encourage the younger generation to understand and embrace LITK for DRR and CCA. There should be training for the teachers responsible for delivering curricula on LITK and DRR in schools – including delivery/transmission by knowledge holders in local contexts.
- National governments need to support national universities to deliver LITK and resilience programmes. This should be included in the national education budgets.
- There is a need for human resources and capacity development on LITK integration for DRR and CCA, including capacity enhancement on integration of LITK into national and local plans and traditional food preservation methods.
- There is a need for both awareness and capacity development at grassroots levels to enable implementation of integrated plans for DRR.
- Empowering women through capacity development training is essential, considering their role as first responders in times of disasters; particularly in terms of leadership so they are able to take charge of situations before, during and after disasters and influence change.

Empowering local authorities to work with Indigenous people for DRM (IV, 27(h), p. 18)

- There is a need for awareness, education, collaboration and networking among the various government departments, national and sub-national governments, and local communities, NGOs, private sector and academic institutions, to integrate and implement LITK and practices for DRR actions.
- People-centred approaches, such as the PLANET principle (SPC, n.d.), are needed for inclusive and participatory involvement of local communities and Indigenous people when developing policies, plans, and particularly local strategies on DRR.
- There is a need to support capacity building of local government employees and NGOs to better support LITK for DRR in local communities.

Support protection of cultural institutions and sites of historical, cultural heritage (IV, 30(d), p. 19)

- National governments in the Pacific should make efforts at documenting and storing LITK and practices in both local languages and English.
- It is necessary to engage local and Indigenous people to collect and document LITK and practices for DRR. This will ensure more effective documentation of LITK and limit losses in translations. Communicating with a local person will also make it easier for the community elders to share LITK and information more freely.
- Local and Indigenous people who are tasked with collection and documentation of LITK and practices should be trained on the methods for collecting and documenting LITK and practices. Queries and questions should be asked in local languages, so the elders who hold the knowledge do not get confused with foreign terminologies.
- National governments should consider investing in databases for proper storage of information on LITK and practices for DRR. This will also help to access LITK for integration with modern approaches when designing DRR and other projects. The information should be sourced from a diverse pool of people, and the database should be accessible to those who provide the information.

Development of people-centred approach for early warning systems including social and cultural requirements (IV, 33(b), p. 21)

- There needs to be more awareness and visibility on LITK programmes associated with early warning systems. Products from such programmes require translation into local languages and to be shared with local communities, including those situated in remote outer islands. University of the South Pacific has great expertise in distance and remote learning provision, and the EU PacTVET project (Hemstock et el., 2016) demonstrated how accredited qualifications could be developed, accredited and delivered regionally. These were the first ever qualifications on “Resilience” and contained elements of LITK in all relevant areas.
Indigenous people through their experience and LITK provide support for development and implementation of plans and policies, including early warning (V, 36(v), p. 23)

- When integrating LITK for DRR in action plans and designing projects, it is important to keep localization in mind. Considering DRR and climate change issues are very much localized, specific LITK plans should be included in local community plans that complement the broader LITK elements enshrined in national plans and policies.

- Localization and contextualization are important when working with traditional governance systems. For effective integration of LITK and practices for DRR, governance needs to be strengthened, both at the national and local levels. The Western governing system at national levels needs to improve communication with local communities, and communicate effectively to ensure local communities’ engagement and understanding, while working closely with the traditional governing systems to enable sustainability of DRR actions.

- Localization is crucial when working with DRR and other climate change programmes in local communities across the Pacific region. Although the communities are impacted by similar disaster situations, each location is unique in its geological and cultural setting. Therefore, it is important to understand the local context to effectively address DRR and CCA issues.

- National governments and decision-makers in the local communities need to work together to find adequate solutions for land tenure issues to resolve problems surrounding human mobility and relocation, and natural resource management.

- There is a need to coordinate DRR and CCA efforts associated with LITK and practices in the Pacific for better synergies and to avoid duplication. This will also strengthen relationships and networks with local communities, who will be able to better comprehend the DRR and CCA concepts when presented in the same frame. For effective integration of DRR and CCA actions, the following should be considered: there is a need for increased communication and collaboration among the government ministries for better synergies to address the cross-cutting DRR and CCA issues; the first responders during and immediately after any disaster are traditional networks of friends and family (through local community networks), who are able to help with the immediate requirements of clean water and food. These community connections should be strengthened, recorded and kept updated. Traditional sharing systems should be documented through beneficiary mapping exercises.

Funding considerations for LITK, and gender equality and social inclusion for DRR, have been increasing in recent years. The following recommendations are presented to strengthen further investment for LITK and social inclusion for DRR in the Pacific.

- For capacity development activities when mainstreaming LITK for DRR, it is crucial to consider socially-inclusive approaches, especially since the type of local and traditional knowledge that one can access from women, men and the elders are different. Women, men and the elderly play different roles to support their household and community needs. For example, they go to different places for fishing, gleaning and farming, and when constructing traditional housing men are involved with building houses, while women are responsible for providing nourishment. As such, their observations, knowledge and practices are different. For example, men would have knowledge on agricultural practices, women would have knowledge on edible invertebrates, techniques in basket weaving and water sources, while the elders would have a mix of different knowledge, including traditional early warning systems. Therefore, as highlighted in PIFS (2019), the role of women and other social groups in mainstreaming LITK is critical.

- The national governments, development partners, and external donors should support projects on traditional methods of food production, particularly considering the high costs of imported food, and the rising expenses linked with the COVID-19 pandemic and the war in Ukraine.

- The Pacific needs more resources and funding support for capacity development and community-based projects to be able to integrate and use LITK and practices for DRR, including integration of LITK in local policies and plans aligned with national, regional and global goals.

- External donors and national governments should allocate budgets for integration of LITK into DRR activities, policies and plans. Development partners and donors need to include integration of LITK in their project requirements to encourage LITK and practices for DRR.
• Development partners and external donors should strategically select their regional and national implementing partners, such as CSOs and NGOs involved in the LITK area, to align their programmes with the needs on the ground. Local NGOs and CSOs already work more closely with local communities. In addition to governments, development partners and donors should also work with local networks to maximize their reach and achieve desired results.

6. Impact stories

6.1 Gaining traditional knowledge and skills through accredited Resilience Certificates, Vanuatu

The EU PacTVET programme supported the delivery of Resilience Certificates I and III that encompass a unit standard on Traditional Knowledge. Participants from this training were able to apply the knowledge and skills gained from the training to set up a local conservation area in a remote setting. Vanuatu was hit by the Category 5 Tropical Cyclone Harold in 2020, when the country was in a State of Emergency due to COVID-19 pandemic and Tanna was struggling with major ashfalls. In light of the pandemic, Vanuatu’s National Disaster Management Office banned entry of foreign aid workers and decided to proceed with localized responses. Participants from the Resilience Certificate training were able to apply the skills gained from the training to gather local communities and encourage them to use their local and traditional knowledge, such as repair damaged housing using traditional techniques, manage food resources preserved using traditional methods, and apply inter- and intra-community cooperation, to survive the impacts of Tropical Cyclone Harold (Pierce & Hemstock, 2022).

6.2 Traditional canoe building training, Fiji

A total of 25 youths, including five women and 20 men, from nine villages on Beqa Island, which is situated about 10 kilometres south of Viti Levu, were trained in traditional canoe building and sailing techniques in 2021. The training programme was through a joint partnership with the Uto Ni Yalo Trust (UNYT) and the Pacific-European Union Marine Partnership (PEUMP) programme implemented by USP. The training reintroduced traditional canoes, the druа, into everyday village life. Traditional canoes have multiple economic and social benefits, including food security, fisheries livelihood and marine resource conservation and management. Since the training, the communities and youth of Beqa have increased their use of the druа for reef fishing and recreational activities. Communities also use the druа for removal of the crown-of-
thorns starfish from the reef systems of Beqa. The crown-of-thorns starfish is a major predator of corals and has been known to cause severe reef degradation in the Pacific. Since the training, the youths from Beqa participated in an information exchange session with high school students to share their traditional canoe building experiences.

6.3 Damage from king tides, Federated States of Micronesia

In December 2021, king tides caused severe salt water intrusion in many parts of FSM. The salt water intrusion damaged a lot of taro patches, a staple root crop for most of the PICs. The National Emergency Department supported affected communities by sending food rations, rice, and flour. Communities in remote outer islands were unable to receive immediate support from the main island, and fell back on their local and traditional skills to secure food. They depended on preserved breadfruit and taro to meet their carbohydrate needs. In addition, they used traditional methods to pull out and replant the taro in other locations, and preserved coconut seeds for replanting.

6.4 Traditional houses for shelter during cyclones

Local communities in the Pacific are known to depend on traditional houses made of grass, vines and wooden and bamboo poles to survive the strong winds of tropical cyclones. It is the perspective of local communities that traditional houses are safer in tropical cyclones, as they do not use corrugated iron and nails that can cause accidents in windy conditions. During strong wind conditions, the thatched roof of a traditional house falls in, creating a hollow that people can use for shelter during tropical cyclones. Traditional measures taken to prepare houses for tropical cyclones include the installation of bamboo reinforcements to push against the walls of the traditional housing structures. There are many stories from across the Pacific, including Vanuatu, Fiji, Solomon Islands and Kiribati, of traditional houses being able to withstand strong cyclonic winds. An example is the Category 5 Tropical Cyclone Pam in Vanuatu; concrete buildings in Vanuatu collapsed, but there was no loss of life in the traditional houses/saeklon haos of Vanuatu.
7. References


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