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LESSONS LEARNED FROM PROJECT MONITORING MISSIONS (PMMs)

INFORMATION NOTE

Introduction

The Adaptation Fund (Fund) is a financing mechanism serving the Paris Agreement of the United Nations Framework Convention on Climate Change, with the mandate of financing adaptation projects and programmes in developing countries that are particularly vulnerable to the adverse impacts of climate change. Since 2010, the Fund has approved 226 projects, committing more than US$1.6 billion to adaptation action in 120 countries[1].

As the effects of climate change become ever more visible and adaptation gaps grow, it is crucial to ensure that adaptation financing is well spent, that successful approaches are identified, and that lessons learned are disseminated to facilitate replication and scale-up. This imperative is embedded in the Fund's Medium-Term Strategy 2023–2027 (MTS II) through its "Learning and Sharing" pillar, under which knowledge and evidence on effective and innovative adaptation action — including local and indigenous knowledge — is generated and shared with stakeholders for application.

Portfolio Monitoring Missions (PMMs) are one of the Fund's principal instruments for this purpose. Introduced in 2012, PMMs assess implementation progress, identify best practices and potential for sustainability and scale-up, and gather insights on challenges and response strategies. A mission generally lasts one week and combines meetings with implementing entities and government officials with site visits and interviews with executing entities and members of target communities. Projects are selected for the learning opportunities they offer, while ensuring balanced regional representation. Twenty-eight PMMs have been conducted to date. Lessons from the first thirteen were synthesized in a report published in 2018[2]; **the present report draws on the fifteen missions conducted between June 2018 and August 2025, covering seventeen projects in twenty-one countries across Africa, Asia-Pacific, Latin America and the Caribbean, and Eastern Europe**.

The findings from the fifteen missions have been synthesized into eight cross-cutting lessons related to the following themes: adaptive management; community ownership and local engagement; livelihood; inter-institutional coordination; innovation; gender, youth and social inclusion; data, evidence and knowledge systems; and sustainability, replication and scale-up. The grouping is intended to make the lessons more accessible rather than exhaustive. Each lesson is elaborated with reference to the missions that evidenced it and illustrated by one or two case studies, selected for the depth of their evidence. Taken together, the lessons point to a consistent conclusion: effective adaptation depends not only on well-designed interventions, but on what is purposefully built around them — ownership, institutions, inclusion, knowledge and financing — so that results are sustained beyond project completion. An overview of the PMMs and projects analysed is presented below.

[1] As of June 30, 2026
[2] https://www.adaptation-fund.org/document/lessons-learned-successful-approaches-captured-portfolio-monitoring-missions/

Table 1: Overview of PMMs considered in this report

	PMM Time	Country	Region	Project Title	Grant Amount	Implementing Entity	Executing Entity
1	Jun-2018	South Africa	Africa	Taking Adaptation to the Ground: A Small Grants Facility for Enabling Local Level Responses to Climate Change	$2.4m	SANBI (NIE)	SouthSouth North (NGO)
2	Nov-2018	Rwanda	Africa	Reducing Vulnerability to Climate Change in North West Rwanda through Community Based Adaptation	$10m	MINIRENA - MoE (NIE)	Rwanda Natural Resources Authority / Rwanda Water and Forestry Authority
3	May-2019	Chile	LAC	Enhancing resilience to climate change of the small agriculture in the Chilean region of O'Higgins	$10m	AGCID (NIE)	Ministry of Agriculture; Ministry of Environment
4	Jul-2019	Cook Islands	Asia-Pacific	Pa Enua Action for Resilient Livelihoods (PEARL)	$3m	MFEM (NIE)	Climate Change Cook Islands (Government entity)
	Jul-2019	Cook Islands	Asia-Pacific	Strengthening the resilience of our islands and communities to climate change	$5.4m	UNDP (MIE)	Climate Change Coordination Unit and Emergency Management (Government entity)
5	Jul-2019	Samoa	Asia-Pacific	Enhancing Resilience of Samoa's Coastal Communities to Climate Change	$8.7m	UNDP (MIE)	Ministry of Natural Resources and Environment (Government entity)
6	Aug-2020	Costa Rica	LAC	Reducing Vulnerability by Focusing on Critical Sectors (Agriculture, Water Resources and Coastlines) in order to Reduce the Negative Impacts of Climate Change and Improve the Resilience of these Sectors	$10m (Fund contribution)	Fundecooperación para el Desarrollo Sostenible (NIE)	Fundecooperación para el Desarrollo Sostenible (NIE)
7	Nov-2021	Seychelles	Africa	Ecosystem-based adaptation to climate change in Seychelles	$6.5m	UNDP (MIE)	Ministry of Agriculture, Climate Change and Environment
8	Nov-2022	Regional: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Togo	Africa	Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin	$8m	WMO (MIE)	WMO, VBA, GWP-WAF
9	Jun-2023	Indonesia	Asia-Pacific	Safekeeping-Surviving-Sustaining towards Resilience: 3S Approach to Build Coastal City Resilience to Climate Change Impacts and Natural Disasters in Pekalongan City, Central Java Province	$6m	Kemitraan (NIE)	Kemitraan
	Jun-2023	Indonesia	Asia-Pacific	Community Adaptation for Forest-Food Based Management in Saddang Watershed Ecosystem	$800k	Kemitraan (NIE)	Kapabel (NGO)

10	Oct-2023	Peru	LAC	Adaptation to the Impacts of Climate Change on Peru's Coastal Marine Ecosystem and Fisheries	$7m	Profonanpe (NIE)	Ministry of Production
11	Mar-2025	Lao PDR	Asia-Pacific	Enhancing the climate and disaster resilience of the most vulnerable rural and emerging urban human settlements in Lao PDR	$4.5m	UN-Habitat (MIE)	Various ministries and provincial authorities
12	Mar-2025	Lao PDR	Asia-Pacific	Building climate and disaster resilience capacities of vulnerable small towns in Lao PDR	$5.5m	UN-Habitat (MIE)	Various ministries and provincial authorities
13	Mar-2025	Malaysia	Asia-Pacific	Nature-based Climate Adaptation Programme for the Urban Areas of Penang Island	$10m	UN-Habitat (MIE)	MBPP, JPS (government entities), Think City
14	Jun-2025	Regional: Albania, Montenegro, North Macedonia	Eastern Europe	Integrated climate-resilient transboundary flood risk management in the Drin River Basin in the Western Balkans	$10m	UNDP (MIE)	UNDP, GWP-Med
15	Aug-2025	Bhutan	Asia-Pacific	Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan	$10m	Bhutan Trust Fund for Environmental Conservation (NIE)	Three ministry departments

1. Adaptive Management

Adaptation projects need sufficient flexibility to respond to circumstances that cannot be fully anticipated at the design stage. Implementation can be affected by changing external conditions, unexpected technical findings, institutional changes, stakeholder concerns and dependencies on other actors. The ability to adjust activities and approaches as these circumstances emerge can therefore help projects remain relevant and effective while maintaining focus on their overall adaptation objectives.

Adaptive management is strengthened when implementation is treated as a process of learning and refinement. Rather than viewing project activities as fixed from the outset, implementation can provide opportunities to test approaches, learn from experience and adjust subsequent activities. Phased or incremental approaches can be particularly useful in this regard, allowing learning from earlier stages to inform later decisions and giving project teams and partners greater scope to refine approaches as understanding of local circumstances develops.

Monitoring, evaluation and learning need to generate information that can inform decisions during implementation. Monitoring systems are most useful for adaptive management when they provide timely evidence on progress, emerging challenges and the effectiveness of different approaches. This allows project teams to identify issues while there is still an opportunity to respond, rather than relying primarily on assessments conducted at the end of the project. Monitoring frameworks should therefore be sufficiently practical and responsive to support ongoing learning and management.

Adaptive management also requires projects to periodically reassess the assumptions underpinning their design. Where there are significant changes in the context between project

design and implementation, or where implementation reveals that a planned approach is not working as expected, projects may need to reconsider activities, sequencing or intended approaches. This requires sufficient flexibility within project arrangements to accommodate change, while maintaining appropriate accountability and ensuring that significant adjustments are transparently communicated and discussed with relevant stakeholders.

Several PMMs demonstrated the importance of adaptive management for project success including missions in the Western Balkans, Malaysia, Seychelles, Indonesia, West Africa, Bhutan, Lao PDR and Costa Rica. Adaptive management therefore emerges not as an exceptional response to implementation problems, but as an important feature of effective adaptation programming.

Western Balkans — Adaptive management in practice

The ***"Integrated Climate-Resilient Transboundary Flood Risk Management in the Drin River Basin in the Western Balkans"*** is a US$9.9 million Adaptation Fund project covering Albania, Montenegro and North Macedonia. It is implemented by the United Nations Development Programme (UNDP), with UNDP and the Global Water Partnership–Mediterranean (GWP-Med) as executing entities. The project seeks to reduce climate-induced flood risks and strengthen climate resilience in the Drin River Basin through an integrated transboundary approach, including stronger early warning, flood-risk management and regional cooperation.

Adaptive and agile management was important in enabling the project to respond to unexpected challenges during implementation. In particular, the project faced COVID-19 disruptions that resulted in unexpected delays in implementation as well as a grievance submitted in North Macedonia. The PMM found that these challenges were successfully addressed through the flexibility embedded in Adaptation Fund policies and UNDP's Environmental and Social Management System, allowing the project to adjust its approach as circumstances evolved.

The response to the North Macedonia grievance provides a particularly useful illustration of adaptive management. In 2022, a local citizens' initiative submitted a grievance regarding the environmental impact assessment associated with the project. The project subsequently commissioned a biodiversity study and initiated institutional agreements for operation and maintenance. This proactive and transparent response demonstrated how emerging concerns can be used to strengthen project implementation. It also points to the value of embedding strong safeguard systems and grievance redress mechanisms within project design so that projects have established processes for responding when new challenges arise. National stakeholders also drew broader lessons from this episode, including recognition of the value of civic activism and the need to strengthen the capacity of civil society partners — an indication that the grievance process generated institutional learning beyond the immediate case.

Overall, the Western Balkans experience shows that adaptive management is most effective when flexibility is supported by formal project systems and procedures. The ability to adjust implementation in response to unexpected events, together with functioning safeguard and grievance mechanisms, enabled the project to navigate challenges without losing sight of its broader flood-resilience objectives. The case therefore illustrates adaptive management not simply as a response to implementation difficulties, but as a means of maintaining effectiveness and accountability as conditions change.

2. Community Ownership and Local Engagement

Adaptation interventions are more likely to be sustained when communities are actively involved in their design, implementation and maintenance. Meaningful community engagement should extend beyond consultation to participation in decision-making and implementation. Involving communities in identifying needs, shaping interventions and carrying out activities can strengthen their understanding of and ownership over project results. This is most effective when communities are supported with the knowledge, skills and technical assistance needed to participate meaningfully and take on responsibilities for implementation and maintenance.

Local knowledge, priorities and governance structures can improve the relevance and acceptance of adaptation interventions. Combining community knowledge with technical expertise can help ensure that solutions reflect local conditions while providing the support needed for implementation. The PMMs also suggest that engagement is more likely to be sustained when it is reciprocal: communities should understand how their inputs have informed project decisions and should see tangible benefits from the information and knowledge they contribute. Building on existing community groups, local leadership and other locally established governance structures can further strengthen participation and ownership.

Community ownership needs to be supported by realistic arrangements for longer-term maintenance as relying on community volunteers to sustain activities independently after project closure often presents challenges for sustainability. Projects should assess whether the necessary capacities, institutional arrangements, incentives, and resources are in place to continue activities after project support ends, rather than assuming that community members will provide ongoing voluntary labour, particularly where work demands are high, perceived benefits are limited, and community members face challenging circumstances that may constrain their ability to do so. Community committees, cooperatives and other local structures can provide mechanisms for sustaining activities, but it is necessary to give these structures clear purpose, strengthen their capacity and, where necessary, establish links with government and other institutions. Clear handover arrangements, financing and ongoing technical support may also be needed to ensure that community ownership translates into sustained results.

Community ownership and local engagement featured prominently across the PMMs, with the missions in **Lao PDR, Rwanda, Seychelles, Bhutan, Samoa, Indonesia, West Africa and Peru** all documenting its contribution to the relevance and durability of adaptation results. Taken together, these experiences indicate that community ownership is not an automatic by-product of working at the local level: it is built deliberately, through genuine participation in decisions, investment in local skills and structures, and realistic arrangements that allow communities to carry results forward after project support ends.

Rwanda — Building community ownership through participation and local action

The ***"Reducing Vulnerability to Climate Change in North West Rwanda through Community Based Adaptation"*** was a US$9.9 million Adaptation Fund project implemented by Rwanda's Ministry of Environment (MoE) and executed by the Rwanda Natural Resources Authority (RNRA), later the Rwanda Water and Forestry Authority (RWFA). The project aimed to increase the adaptive capacity of natural systems and rural communities in North Western Rwanda through integrated

land and water management, diversified livelihoods and strengthened local institutional capacity. The project was implemented in the Nyabihu and Musanze districts, where communities were exposed to floods, landslides and erosion.

The PMM identifies community involvement as an important strategy for building ownership and sustaining project results. The project adopted a "come and see, go and implement" approach, involving people in decision-making and in the implementation of activities. Beneficiaries participated in construction activities, including planting trees and building terraces and channels, and were trained in green jobs.

The project established several mechanisms to support continued community involvement. These included climate-resilient groups, community animators and a cooperative bringing together farmers who owned land in the Mugogo lowland, with the purpose of maintaining the lowland after project completion. Beneficiaries also participated in *muganda*, a monthly practice of communal work. The involvement of local communities and leaders was also important in the relocation of highly vulnerable households from high-risk areas: the PMM found that the project encountered limited resistance and that keeping the new settlement close to households' existing land helped them retain the ability to cultivate their land and contributed to a sense of ownership.

The Rwanda experience demonstrates the value of **involving communities in decision-making and implementation while establishing local mechanisms to support continued maintenance and ownership**.

Lao PDR — Combining local knowledge and capacity building to strengthen ownership

The ***"Enhancing the Climate and Disaster Resilience of the Most Vulnerable Rural and Emerging Urban Human Settlements in Lao PDR"*** project was a US$4.5 million Adaptation Fund project implemented by UN-Habitat, with the Ministry of Natural Resources and Environment, Ministry of Public Works and Transport, and the Provincial Departments of Public Works and Transport of Attapeu, Sekong and Saravane serving as executing entities. The project focused on strengthening the resilience of vulnerable human settlements and infrastructure systems to climate and disaster risks. It included activities to strengthen the capacity of national and local authorities, build local community capacity and resilience strategies, and develop climate- and disaster-resilient infrastructure.

The PMM identifies community ownership and capacity building as important contributors to sustainability. The project maintained ongoing consultation with target communities from the outset, involving them in decision making. Community members were also involved in project activities, including construction. According to the PMM, this hands-on approach fostered a sense of ownership and enabled communities to become stewards of their infrastructure.

Capacity building was an integral part of this approach. District engineers, village contractors and other local stakeholders received support to develop the expertise required for system design, construction and maintenance. The project also worked directly with provincial and district government entities throughout planning, procurement and implementation. The PMM found that this strengthened institutional capacity, encouraged co-creation and leveraged existing government

infrastructure and networks, while allowing local government staff to learn through their involvement in project processes.

The project also demonstrated the value of combining scientific information with local knowledge. The PMM describes the use of the Climate Risk and Vulnerability Assessment (CRVA) model as a breakthrough in integrating scientific data with local knowledge. This approach was used alongside engagement with communities and local institutions as part of the project's work to develop community-specific climate action plans and infrastructure solutions.

3. Livelihood

Livelihood interventions can strengthen resilience when they help households diversify income sources and reduce exposure to climate risks. Alternative livelihood activities can strengthen resilience, particularly where existing livelihoods are being affected by climate and environmental change. Many Fund projects have supported diversification through new economic activities, changes to existing livelihood practices and alternative sources of income. The PMMs also highlight the importance of considering whether alternative livelihood activities are exposed to the same climate risks as the livelihoods they complement or replace. In some cases, livelihood diversification can be an important response when climate impacts make existing livelihood activities less viable. However, introducing alternative livelihoods should be viewed as a longer-term intervention, as behavioural change and adoption of new practices or technologies may extend beyond the project period.

The viability of livelihood activities depends not only on introducing new economic opportunities, but also on creating the conditions needed for them to succeed and endure. The PMMs highlight the importance of skills and training, entrepreneurship, access to markets and consumers, and connections between producers and value chains. Formalising producer groups and associations can also strengthen economic opportunities by improving access to markets, establishing direct links with consumers and enabling beneficiaries to obtain better prices for their products. Uptake of new livelihood activities cannot be assumed: some communities or livelihood groups initially resist or hesitate to adopt new practices, while others are early adopters. This suggests that livelihood interventions may require sustained capacity building, support for behavioural change and sufficient time for new activities and technologies to become established.

Beyond creating new income opportunities, livelihood diversification can generate important social benefits by strengthening skills, confidence, social relationships and women's economic participation. Across the PMMs, livelihood activities were associated not only with additional income and economic opportunities but also with improvements in skills, confidence, social relationships and women's participation in economic activities. The Indonesia PMM, for example, found that livelihood interventions such as urban farming and aquaculture helped raise participants' self-confidence, particularly among people whose previous livelihoods had been disrupted by climate change and other environmental changes. In Peru, women participating in land-based livelihood activities reported significant economic contributions to their households.

Livelihood interventions featured across much of the PMM portfolio, with the missions in **Peru, Indonesia, Rwanda, Cook Islands, Costa Rica, Malaysia, West Africa and Seychelles** all recording their contribution to household resilience. The consistent message across these experiences is that introducing an alternative economic activity is only the starting point: livelihoods

endure where projects also build skills and market connections, allow time for adoption and behavioural change, and recognise the social gains — in confidence, organisation and women's economic participation — that often prove as significant as the income itself.

Peru — Diversifying livelihoods and strengthening economic opportunities

The ***"Adaptation to the Impacts of Climate Change on Peru's Coastal Marine Ecosystem and Fisheries"*** project was a US$6.9 million Adaptation Fund project implemented by Profonanpe, Peru's national environmental fund, and executed by the Ministry of Production. The project aimed to reduce the vulnerability of coastal communities, ecosystems and resources to the adverse impacts of climate change. Its primary beneficiaries were fishing communities in the pilot areas of Máncora and Huacho.

Along Peru's coast, **fishermen were actively diversifying their income sources in response to diminishing fish stocks and the impacts of climate change**, including ocean warming and associated changes in the availability and migration of fish species. The project supported this diversification through activities including sustainable tourism, improved fisheries commercialisation, sustainable shell cultivation**, aquaponics, biofertiliser production** and the development of other livelihood activities.

However, there were several challenges to the successful scaleup of these alternatives - biofertiliser producers faced distance to markets, transport challenges and insecure production premises dependent on local government commitment; aquaponic products competed against a traditional channel offering far lower prices; and administrative processes, such as marine concessions, extended well beyond project timelines. These findings underscored that introducing a new activity is only the first step toward a viable livelihood.

The project focused on measures to strengthen the economic viability of livelihood activities. In fisheries, cameras installed on fishing vessels generated QR codes providing consumers with information on the origin and hygiene of fish products. The resulting traceability system enabled fishermen to bypass intermediaries and enhance profitability. The project supported marketing workshops and the formalisation of fishing activities, establishing formal chains between artisanal fishermen and end consumers.

These livelihood activities generated important economic opportunities for women who were the primary beneficiaries of several land-based activities, including biofertilisation, aquaponics and handicrafts.

4. Inter-Institutional Coordination

Clear institutional roles and responsibilities are important for effective implementation. Adaptation projects are more effective when responsibilities, decision-making authority and coordination processes are clearly defined. Where these arrangements are unclear, implementation can be slowed by uncertainty over roles and decision-making and opportunities for collaboration or complementary action can be missed. Thus, appropriately structured governance arrangements, including steering committees and technical working groups, with clearly defined roles and decision-making processes are valuable. At the same time, governance arrangements need to

balance broad stakeholder participation with efficient decision-making: overly complex implementation structures and multiple layers of decision-making can increase costs and slow implementation.

Coordination needs to connect different levels of governance rather than operate only within a single institutional layer. Collaboration between regional, national, subnational and local actors, as well as across sectors and ministries is required for success. Involving subnational institutions directly in planning and implementation can strengthen institutional capacity and make use of existing government networks, while coordination between regional and national actors can help ensure that expertise and approaches developed at the regional level contribute to national policy and implementation. It is also important to ensure regional initiatives generate ownership and engagement at the country level, rather than remaining primarily within regional institutions.

Existing coordination mechanisms can provide an important foundation for adaptation, but may need to be strengthened, formalised and adequately resourced. Building on existing institutions and coordination structures can provide a strong foundation for collaboration, particularly where these structures already have legitimacy and established relationships. Existing mechanisms can be strengthened to incorporate new adaptation priorities and clarify roles and processes. Where coordination arrangements develop during implementation, formalising these arrangements can help establish clearer processes and provide a foundation for subsequent adaptation initiatives. However, sufficient institutional capacity and resources to sustain coordination need to be allocated, including where regional mechanisms need to maintain engagement with national agencies. Local authorities and organisations can also play an important role in connecting project activities with local needs and broader institutional systems, while collaboration with other programmes and partners can create additional synergies and support continuity.

The importance of inter-institutional coordination emerged across the breadth of the PMM portfolio, with the missions in **West Africa, Costa Rica, the Western Balkans, Indonesia, Peru, South Africa, Lao PDR, Bhutan and Samoa** all documenting how coordination arrangements shaped implementation — whether through the effectiveness of well-structured governance mechanisms or through the delays and missed opportunities that followed where roles and processes were unclear. Taken together, these experiences indicate that coordination should be treated as a substantive component of adaptation programming in its own right: one that is deliberately designed, adequately resourced and anchored in existing institutions, rather than assumed to arise from the presence of multiple actors around a project.

West Africa — Regional coordination with national engagement

The ***"Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin"*** project was a US$7.9 million regional Adaptation Fund project covering the six Volta Basin countries of Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo. It is implemented by the World Meteorological Organization (WMO) and executed by WMO, the Volta Basin Authority (VBA) and the Global Water Partnership West Africa (GWP-WAF)**.** The project seeks to establish a large-scale, transboundary approach to integrated flood and drought management, including strengthening capacity and institutional frameworks at local, national and regional levels and developing a transboundary early warning system.

The project focused on a **basin-level regional approach** that was operationalized through a common transboundary flood and drought management framework across the six riparian countries which enabled economies of scale, provided a platform for regional actors to collaborate around shared flood and drought management challenges, and developed the shared VOLTALARM early warning system. The PMM noted a gap between national authorities and WMO and recommended greater involvement of national institutions and stronger integration of monitoring systems. Regional workshops helped bring national agencies together and improved coordination between them, although some agencies were not fully involved because of budget limitations and organisational challenges.

The experience with the VOLTALARM early warning system further illustrated the importance of institutional arrangements and resources for sustaining regional coordination. The PMM identified gaps in arrangements for sharing hydrometeorological data and noted that data collection was often not a government priority and lacked dedicated budgets. Participants recommended that data collection and investment in the durability of systems should be integrated into government policy rather than remain project based. The project also highlighted the importance of regional political and economic support in facilitating data sharing.

The West Africa experience demonstrates that **regional approaches can bring institutions together and generate economies of scale, but their effectiveness depends on strong connections between regional and national institutions, clear arrangements for coordination and data sharing, and sufficient institutional and financial support**.

Costa Rica — Building partnerships across sectors and institutions

The ***"Reducing the Vulnerability by Focusing on Critical Sectors (Agriculture, Water Resources and Coastlines) in order to Reduce the Negative Impacts of Climate Change and Improve the Resilience of these Sectors"*** programme was a US$10 million Adaptation Fund programme, implemented by Fundecooperación para el Desarrollo Sostenible, a National Implementing Entity. The programme focused on water resources, agriculture and coastal areas, working directly with local stakeholders and beneficiaries through adaptation projects across different geographical areas of Costa Rica.

The PMM identified Fundecooperación's role in bringing together and coordinating national and local entities as an important feature of implementation. Supported by local alliances, the programme covered initiatives across the country and worked with stakeholders at different levels. The programme also contributed to facilitating partnerships among public, private, national and local entities**,** creating connections across the different institutions involved in adaptation.

The programme also brought together institutions working across different sectors involving the Ministry of Environment and Energy and the Ministry of Agriculture and Livestock, alongside other public, private and local partners. Knowledge generated through the programme contributed to Costa Rica's adaptation policy, including the updating of adaptation components of the Nationally Determined Contribution (NDC) and implementation of its Decarbonization Plan.

The Costa Rica experience demonstrates how **coordination across sectors and institutions can support adaptation programmes addressing interconnected climate risks**. Bringing national and

local entities together and building partnerships among public, private and local actors enabled adaptation activities to be implemented across different sectors and geographical areas while also contributing to broader policy progress.

5. Innovation

Innovation is most effective when it is suited to local needs and can be operated and maintained within the local context. Adaptation innovation does not necessarily require complex or high-cost technology. Simple, low-cost solutions can be effective when they are appropriate to local geographical and socioeconomic conditions and respond to specific adaptation needs. Innovation also needs to take account of existing practices and user familiarity. This suggests that the value of an innovation depends not only on its technological sophistication, but also on how well it fits the context in which it will be used.

The suitability of an innovation needs to be considered alongside its practical requirements for operation and maintenance. The PMMs highlight the importance of solutions that can be operated and maintained using available local capacity and resources. Building the capacity of local stakeholders to design, construct, operate and maintain innovative solutions can reduce dependence on external support and strengthen their sustainability. Practical considerations such as operational and maintenance requirements, local technical capacity and the availability of appropriate resources therefore need to be considered alongside the technical characteristics of an innovation.

Incremental approaches can help test, refine and strengthen innovative solutions before wider application. Often it is helpful to start with smaller-scale interventions, monitor their implementation and refine approaches based on experience before expanding them. Such approaches can help ensure that solutions remain appropriate to local conditions while allowing project partners to learn by doing. Innovation can also extend beyond technology to include new methods of engagement and awareness-raising that help communities understand adaptation options and identify appropriate solutions.

The role of innovation in effective adaptation was documented across much of the PMM portfolio, with the missions in **Lao PDR, Bhutan, Cook Islands, Malaysia, the Western Balkans, Costa Rica, Peru and Chile** all recording innovative solutions — technological and otherwise — whose value derived from their fit with local needs, conditions and capacities. Viewed together, these experiences suggest that the measure of adaptation innovation is not novelty or sophistication but appropriateness: solutions succeed where they respond to a clearly identified climate risk, can be operated and maintained with the capacity and resources available locally, and are refined through implementation experience before being applied more widely.

Cook Islands — Selecting adaptation solutions for local circumstances

The Cook Islands Portfolio Monitoring Mission examined two Adaptation Fund interventions: the completed ***"Strengthening the Resilience of our Islands and Communities to Climate Change (SRICC)"*** project, a US$5.4 million project implemented by UNDP and executed by the Government's Climate Change Coordination Unit and Emergency Management Cook Islands, and the ***"Pa Enua Action for Resilient Livelihoods (PEARL)"*** project, a **US$3 million** project

implemented by the **Ministry of Finance and Economic Management — a National Implementing Entity of the Fund — and executed by Climate Change Cook Islands.** Together, the projects covered integrated water security management, coastal management, disaster risk reduction, community-based adaptation and climate-resilient infrastructure across the country, including the outer islands of Aitutaki and Mangaia visited by the mission.

The mission found that the country's unique circumstances give rise to unique adaptation challenges and solutions, **making it difficult to determine an optimal solution in advance**. The choice between concrete and plastic water tanks illustrated this clearly. The project identified a range of considerations affecting the relative advantages of each option — cost, ease of transportation, ease or feasibility of repair, durability, the resilience of the tank itself to extreme weather events, disposal and potential alternative uses. Plastic tanks, for example, are light enough to be displaced and damaged by strong winds, while concrete tanks can double as shelters during disasters. Rather than assuming a single optimal choice, the project implemented a range of solutions and methodically captured the knowledge and innovation emerging from these experiences.

The mission's findings highlight that the suitability of a solution depends on whether it can be operated and maintained within the local context. Human capacity is a constraining factor in the Cook Islands and the lack of local specialists meant that water expertise had to be sourced from New Zealand. Also limited shipping connections meant that materials could be procured only a few times a year. The projects responded by developing local arrangements for infrastructure upkeep: alongside the installation and repair of water tanks, trainings and sensitization on water security and tank maintenance were provided to residents and island governments. Each island maintained an asset management plan and the island governments were responsible for maintaining repaired tanks.

The projects also illustrate refinement through implementation experience. Coconut trees planted for coastal protection on Aitutaki were initially placed too close to the sea, leaving roots submerged; the project and the island council now monitor the plantings every three months, fallen trees are left in place to build protective sand barriers, and subsequent plantings followed a zigzag formation so that rear rows are sheltered. The Cook Islands experience thus demonstrates that adaptation solutions must be weighed against the practical realities of cost, transport, repair, durability and local capacity; a range of locally appropriate options can be preferable to a single presumed optimum; and systematic learning from implementation is what converts these choices into knowledge for future interventions.

6. Gender, Youth and Social Inclusion

Projects achieve stronger social outcomes when gender, youth and inclusion considerations are deliberately integrated into implementation rather than treated as standalone requirements.

Meaningful inclusion requires deliberate approaches to reach groups that may otherwise be underrepresented. Participation cannot always be assumed to be equitable through conventional consultation processes, particularly where social norms, responsibilities or other barriers affect who participates. Projects can therefore use targeted outreach, participation targets and adapted engagement methods to ensure that the perspectives of women, youth and other vulnerable or

marginalized groups are reflected in project design and implementation. The PMM evidence illustrates the value of such deliberate mechanisms for reaching and engaging groups that may otherwise be missed.

Inclusion should extend beyond participation to the benefits and opportunities created through adaptation activities. Projects can create opportunities for women and other underrepresented groups to strengthen their skills, access economic opportunities and participate more actively in decision-making and implementation. Similarly, youth can be engaged not only as beneficiaries but also as contributors to adaptation activities, building relevant skills and practical experience.

Gender and social inclusion considerations should also be reflected in monitoring and learning. Tracking participation and outcomes for different groups can help projects understand whether adaptation interventions are reaching women, men, youth and other vulnerable groups in different ways. This provides a basis for identifying gaps and adapting implementation where necessary, while also generating evidence that can inform the design of future interventions.

Inclusive adaptation should consider how interventions interact with existing social roles and responsibilities. Expanding women's participation in economic activities or decision-making can generate important benefits, but these gains do not necessarily alter the distribution of other responsibilities within households and communities. Considering these dynamics throughout the project cycle can help identify barriers and differences in how benefits are experienced, allowing interventions to be better tailored to the circumstances of different groups.

Gender, youth and social inclusion considerations were among the most widely documented themes in the PMM portfolio, with the missions in **Indonesia, Malaysia, Chile, Peru, Lao PDR, Bhutan, the Western Balkans, Rwanda, Samoa and West Africa** all recording deliberate inclusion measures, their results, or the barriers that persist where such measures are absent. Across these experiences, a consistent picture emerges: **inclusion outcomes reflect the effort invested in them**. Where projects set explicit targets, adapted their engagement methods and tracked who benefited, women, youth and marginalized groups moved from being consulted to being contributors and decision-makers; where such measures were not deliberate, prevailing social norms tended to reassert themselves.

Malaysia — Creating deliberate mechanisms for women's participation

"Nature-based Climate Adaptation Programme for the Urban Areas of Penang Island" is a US$10 million Adaptation Fund project in Malaysia, implemented by UN-Habitat, with Majlis Bandaraya Pulau Pinang (MBPP), Jabatan Pengairan Dan Saliran (JPS) and Think City as executing entities. The project is being implemented in George Town and Bayan Lepas, areas characterized by high urbanization, inadequate drainage infrastructure and high exposure to flooding and urban heat, with a concentration of ethnically diverse urban poor. It uses nature-based solutions to strengthen urban resilience, including urban greening, stormwater and flood management, while also strengthening social resilience and institutional capacity. The project is expected to directly benefit 343,739 people and indirectly benefit a further 311,257 people.

The project provides a clear example of how participation by women can be deliberately built into project processes rather than assumed to occur through general community engagement.

Its Gender Responsive Participatory Process established a benchmark of 40 percent women's representation on the Penang Climate Board committee, while at least 30 percent of beneficiary surveys were required to reflect women's views in the design and implementation of the project. This goal was supported through targeted engagement, including door-to-door surveys that reached people who would typically be excluded from public surveys. The project also used a multi-criteria framework to focus interventions on high-risk and socio-economically disadvantaged areas, with the intention of directing benefits towards those most in need.

The approach extended beyond consultation to creating opportunities for beneficiaries to participate in adaptation activities. Through Think City's Urban Greening Grants Programme, more than 100 stakeholders were engaged and nearly 25 applications received to support community involvement in urban greening, including vertical green structures and green roofs intended to reduce temperatures and mitigate the urban heat island effect.

The project highlights the role of community participation and knowledge transfer as contributing to the longer-term sustainability and potential replication of the approach. Together, these mechanisms illustrate how targeted participation can help ensure that women and other groups who may otherwise be less visible in conventional consultation processes have opportunities to shape adaptation activities and contribute to their implementation.

The PMM also noted strong community interest in the project's ability to address flooding and urban heat, alongside government commitment to maintaining and adopting successful solutions after project completion. This provides a practical illustration of how deliberate inclusion can be incorporated into both project decision-making and implementation, helping to connect participation with the broader social resilience objectives of adaptation.

Indonesia — Enabling youth to contribute to adaptation

The Adaptation Fund Portfolio Monitoring Mission in Indonesia examined two projects implemented by the Partnership for Governance Reform (Kemitraan): the US$5.9 million ***"Safekeeping-Surviving-Sustaining towards Resilience: 3S Approach to Build Coastal City Resilience to Climate Change Impacts and Natural Disasters in Pekalongan City, Central Java Province"***, executed by Kemitraan; and the US$835,465 ***"Community Adaptation for Forest-Food Based Management in Saddang Watershed Ecosystem"***, implemented by Kemitraan and executed by the Environmental and Climate Change Adaptation Consortium (Kapabel). The projects addressed different but interconnected dimensions of climate vulnerability, with the Pekalongan project combining coastal protection, community adaptation planning, livelihoods and sanitation, while the Saddang project focused on social forestry, forest-food diversification, coastal governance and livelihood alternatives. The PMM identified the targeting of vulnerable communities, capacity building and the involvement of local organisations as important features of both projects.

The Indonesia experience demonstrates how youth can contribute to adaptation when they are engaged not only as beneficiaries but as actors in implementation, outreach and knowledge sharing. In the consortium executing the Saddang project, members of the lead organisation were all under age 32. The high proportion of young people helped the project reach a wide audience through social media, while also building the capacity of young professionals to implement adaptation interventions, including mangrove planting and youth social forestry groups. The project

also received recognition from the Ministry of Environment and Forestry for its approach to student community services, including adaptive coffee growing and climate-smart villages.

The role of youth also extended into awareness raising and knowledge transfer. In Pekalongan, youth groups established a community, COBAR Pekalongan, and used social media, including TikTok, Instagram and Twitter/X to communicate information on climate change and adaptation solutions to a wider young audience. Their activities included mangrove planting, urban farming and waste management. A working group was specifically dedicated to transferring project knowledge to youth groups and this approach was considered an effective method of sustaining the knowledge generated by the project.

This Indonesia experience therefore illustrates the value of creating specific roles through which young people can contribute to adaptation, rather than treating youth solely as a beneficiary category. In the Indonesia projects, young people contributed through implementation, peer outreach, social media communication and knowledge sharing, while also developing their own adaptation-related capacities**.** At the same time, youth groups in Pekalongan continued to call for additional awareness-raising activities on climate change impacts and adaptation solutions, suggesting that opportunities for youth engagement and capacity development may need to continue beyond individual project activities.

7. Data, Evidence and Knowledge Systems

Reliable data and knowledge systems strengthen adaptation by improving understanding of risks, supporting decisions and enabling learning. Monitoring systems need indicators and data that are practical and useful for understanding progress and results. The PMMs highlight the importance of developing indicators that provide a meaningful picture of project progress and outcomes without creating unnecessarily complex monitoring frameworks. In some cases, indicators needed to be refined during implementation when they were found to be too broad or insufficiently useful for assessing results. The PMMs also demonstrate the value of involving local organisations and communities in monitoring, including developing indicators jointly with local organisations and using decentralised approaches that can support real-time tracking, adaptive management and continued monitoring when project teams cannot undertake site visits.

Connecting data across different levels and systems can strengthen adaptation decision-making and early warning. Local information can complement national and regional systems, while sharing data between institutions can help ensure that information is available to those responsible for forecasting, planning and responding to climate risks. It is also necessary to establish clear, long-term data sharing and governance protocols providing clarity on who can access and use data and for what purposes. Such systems also require sufficient organisational capacity and resources for data collection and may need to be integrated into government policies and institutional processes to support their long-term sustainability. Data-collection mechanisms should also be practical for those providing information, with appropriate incentives and benefits to support continued participation.

Knowledge generated through projects needs to be captured, communicated, applied and retained so that it can continue to inform adaptation beyond the project period. Effective knowledge management goes beyond documenting lessons: project experience needs to be disseminated through appropriate channels, translated into practical knowledge and made

accessible to relevant stakeholders and communities through tools such as knowledge products, training and repositories. Communities are also more likely to remain engaged when they understand how the information they provide is used and can see tangible benefits from it. At the institutional level, mechanisms such as operational manuals and stakeholder networks can help preserve knowledge during staff change and reduce the loss of institutional memory after a project ends.

The importance of data, evidence and knowledge systems was documented across virtually all PMMs, with the missions in **Seychelles, Chile, West Africa, Lao PDR, Peru, Indonesia, Costa Rica, South Africa, Bhutan and the Western Balkans** all recording how the quality of indicators, the arrangements governing data, and the management of knowledge shaped both project performance and what endures after implementation. The consistent thread across these experiences is that data and knowledge systems should be treated as adaptation infrastructure in their own right: designed for the people who must use and maintain them, governed by clear and durable arrangements, and anchored in institutions and policy.

Seychelles — Refining monitoring and preserving knowledge for adaptation

The ***"Ecosystem-Based Adaptation to Climate Change in Seychelles"*** project, implemented by the United Nations Development Programme (UNDP) and executed by the Ministry of Agriculture, Climate Change and Environment, sought to reduce Seychelles' vulnerability to climate change, focusing on water scarcity and flooding in seven catchment areas. The project received an Adaptation Fund grant of US$6.5 million. The project generated information to support adaptation activities, including watershed mapping created to inform agricultural services and knowledge generated through research and community engagement.

The project also illustrates the value of refining monitoring frameworks during implementation. The mid-term evaluation acknowledged the difficulty the implementation team faced in meeting the targets of certain indicators in the project's logical framework and recommended a series of "shadow indicators." In response, SMART shadow indicators were devised to capture project results with greater sensitivity and were monitored alongside the original indicators, enabling the team to track the project's real impact on the ground.

The project further demonstrated the value of combining technical information with local knowledge and community participation. The University of Seychelles used project sites for long-term research and student field studies, including measuring water quality and pollution, and created a plant database to support vegetation studies. The NGO TRASS involved irn project implementation developed a rehabilitation handbook and the EcoResto database on plant production and site planning, while a wetlands enhancement manual was prepared by the project. In classifying wetlands for rehabilitation, the project team consulted both the local population and historical archives, and watershed committee members received training in plant identification, bookkeeping and nursery management.

The project also highlighted the importance of communicating knowledge to communities and other stakeholders. It used meetings with local authorities, district councils, and schools along with surveys, media campaigns and other awareness activities. Farmers in Baie Lazare who were initially hesitant became invested in watershed restoration after seeing results: 99 percent of the rehabilitation was completed with local farmer involvement, and farmers benefited from increased

year-round water availability in this predominantly agricultural district. The manuals developed through the project were to be handed over to the Government and partners at the project's end.

The Seychelles experience highlights the value of practical, sensitive monitoring combined with project-generated data, research, local knowledge and community engagement — and of documenting and communicating knowledge through mechanisms that can be used by communities and institutions beyond the immediate project activities.

Chile — Connecting climate information across institutions

The ***"Enhancing Resilience to Climate Change of the Small Agriculture in the Chilean Region of O'Higgins"*** project was implemented by the Agencia de Cooperación Internacional y Desarrollo (AGCID) and executed by the Ministry of Agriculture and Ministry of Environment. The project received an Adaptation Fund grant of US$9.9 million and sought to increase the resilience of rural farming communities in the coastal and inner drylands of the O'Higgins Region to current climate variability and future climate change.

The project implemented an agro-climatic indicator system and strengthened the agricultural-meteorological network, supported by an agroclimatic committee comprising technical experts and relevant stakeholders. Local INIA staff, farmer advisers and farmers were trained to understand agro-climatic information and integrate it into farm management and climate change adaptation decisions. The project also developed bulletins on climate forecasts and alerts and strengthened local institutional capacity in climate data sampling, processing and analysis.

A key feature of the approach was connecting national climate information with local agricultural conditions. Since the national forecasts were not sufficiently detailed for local farmers, the agro-climatic stations helped fill this gap by providing information on local weather conditions relevant to planting and harvesting. The project also used existing communication platforms and allowed stakeholders to select platforms that worked for them, supporting a bottom-up approach to communication.

The Chilean experience highlights the importance of connecting climate data with appropriate communication, capacity building and decision-making processes. By linking the agro-climatic information system with local institutions, farmers and existing communication channels, the project helped make climate information more relevant and accessible for local agricultural decision-making.

8. Sustainability, Replication and Scale-up

Successful adaptation interventions are more likely to be sustained, replicated or expanded when institutional, technical, financial and ownership conditions are in place.

Replication and scale-up require more than demonstrating that an intervention works at the project level. Institutional capacity, technical skills, financing, partnerships, policy support and arrangements for continued implementation all influence whether an approach can be taken to a wider scale. Opportunities for scale-up need to be considered from the outset where relevant, including identifying potential financing sources and pathways for expansion during project design.

Building capacity among stakeholders beyond the immediate project area can further strengthen their ability to apply successful approaches elsewhere. Local contributions can also strengthen ownership and accountability, while demonstrating commitment to sustaining and expanding project results.

Approaches need to be adapted when they are transferred to new locations or contexts. Differences in environmental, socioeconomic, institutional and community conditions mean that successful interventions may need to be modified rather than replicated in exactly the same form. The PMMs illustrate the value of demonstrating successful approaches and allowing potential adopters to understand how they can be adapted to their own circumstances. Replication can therefore involve transferring the underlying approach, knowledge or principles while adjusting implementation to local conditions.

Sustainability arrangements need to be considered as part of the pathway to scale-up. Clear responsibilities for maintenance and continuation, sustainability strategies, and adequate financing for operation and maintenance (O&M) can help prevent successful project interventions from ending when project financing ends. Longer-term institutional ownership and appropriate financing arrangements are also important for maintaining project outcomes. Follow-on projects, complementary programmes and additional government or climate finance can provide pathways for continuing or expanding successful interventions. Establishing these arrangements before project completion can help maintain momentum and build on project results.

Projects can create a stronger basis for scale-up when they connect project-level learning with wider policies, programmes and institutions. Embedding successful approaches in government systems, building capacity beyond the immediate project area and establishing links with complementary initiatives can create pathways for wider application. Demonstrations, knowledge-sharing and partnerships with institutions outside the original target area can also support adoption, while alignment with government policies and programmes can enable successful approaches to be incorporated into broader adaptation efforts.

Sustainability, replication and scale-up were addressed in nearly every mission, most substantively in **Bhutan, Samoa, Seychelles, the Western Balkans, Malaysia, Lao PDR, Rwanda, Chile, Indonesia and Costa Rica**, with further evidence from **West Africa, Cook Islands and South Africa**. Taken together, these experiences point to a common conclusion: what endures and expands is rarely the intervention alone, but the surrounding architecture built alongside it — capable institutions, secured financing, clear arrangements for operation and maintenance, and approaches embedded in policy — and projects that begin constructing this architecture well before completion are the ones whose results outlast and outgrow them.

Bhutan — Building sustainability and pathways to scale

The ***"Adaptation to Climate-induced Water Stresses through Integrated Landscape Management in Bhutan"*** project is a US$10 million project implemented by the Bhutan Trust Fund for Environmental Conservation (BTFEC), a National Implementing Entity. The executing entities are the Department of Agriculture and Department of Forests and Park Services, Ministry of Agriculture and Forests; the Department of Engineering Services, Ministry of Works and Human Settlement; and the Department of Local Governance, Ministry of Home and Cultural Affairs. The project focuses on

climate-resilient water infrastructure and integrated landscape management in Paro, Dagana and Tsirang.

Strong community and government engagement from the onset of implementation strengthened long-term ownership, stakeholder participation and financial planning. The project provided sub-districts and communities with financial packages to support both cash and in-kind contributions for the construction of reservoirs, water catch pits and slope stabilisation works, alongside technical guidance on climate-resilient water infrastructure. The project also used 30 years of hydrometeorological data to inform infrastructure design and ensure that investments could cope with climate change-related risks.

Sustainability arrangements were incorporated into the management of the infrastructure. The project began handing over completed infrastructure to district administrations, which incorporated operation and maintenance costs into their annual budgets. District and sub-district authorities also constructed complementary infrastructure alongside Fund-financed investments, creating shared ownership. At the community level, Water User Associations were being revitalised and formalised and were expected to play a central role in the planning, operation and maintenance of water infrastructure. The PMM also reported strong momentum for replication and expansion of Fund investments at district/sub-district and national levels, including significant interest from local authorities in the integrated watershed management approach piloted in Dagana.

The Bhutan experience demonstrates how **early community and government engagement, shared investment, financial planning and clear arrangements for operation and maintenance can strengthen the sustainability of adaptation investments while creating conditions for their replication and expansion**.

Samoa — Preserving institutional capacity and building pathways for continuity

The ***"Enhancing Resilience of Samoa's Coastal Communities to Climate Change"*** project is an US$8.7 million project implemented by UNDP and executed by the Ministry of Natural Resources and Environment (MNRE). The project aimed to reduce vulnerability at local and national levels and increase adaptive capacity through community engagement in coastal vulnerability assessment, adaptation planning and awareness; integrated community-based coastal adaptation and disaster risk management measures; and institutional strengthening to support climate-resilient coastal management policy frameworks.

The project supported the review and updating of Community Integrated Management (CIM) Plans, together with the World Bank's Pilot Programme for Climate Resilience. The updated CIM-2 Plans incorporated existing village and watershed planning instruments into comprehensive local-level planning frameworks and identified priorities informed by community development needs. The plans were linked to Samoa's national development strategy and relevant ministry sector plans and were intended to provide a roadmap for climate change interventions across development sectors.

The PMM identified institutional capacity and knowledge retention as important considerations for sustaining adaptation efforts. Staff turnover was reported to be high, particularly at MNRE, and was identified as an impediment to retaining knowledge after projects were finalised. The mission

suggested creating operational manuals for projects, while noting that these should not substitute for the networks and people that are equally important for knowledge retention. Priorities identified through the CIM Plans were implemented through other climate finance initiatives, including a Green Climate Fund project and Global Environment Facility activities. The CIM model could be considered for replication by Tonga through South-South cooperation.

The Samoa experience highlights the importance of retaining institutional knowledge and maintaining the planning systems and stakeholder networks that support adaptation beyond the project period. It also demonstrates how project-generated planning frameworks can continue to inform subsequent climate investments and provide a basis for replication in other contexts.