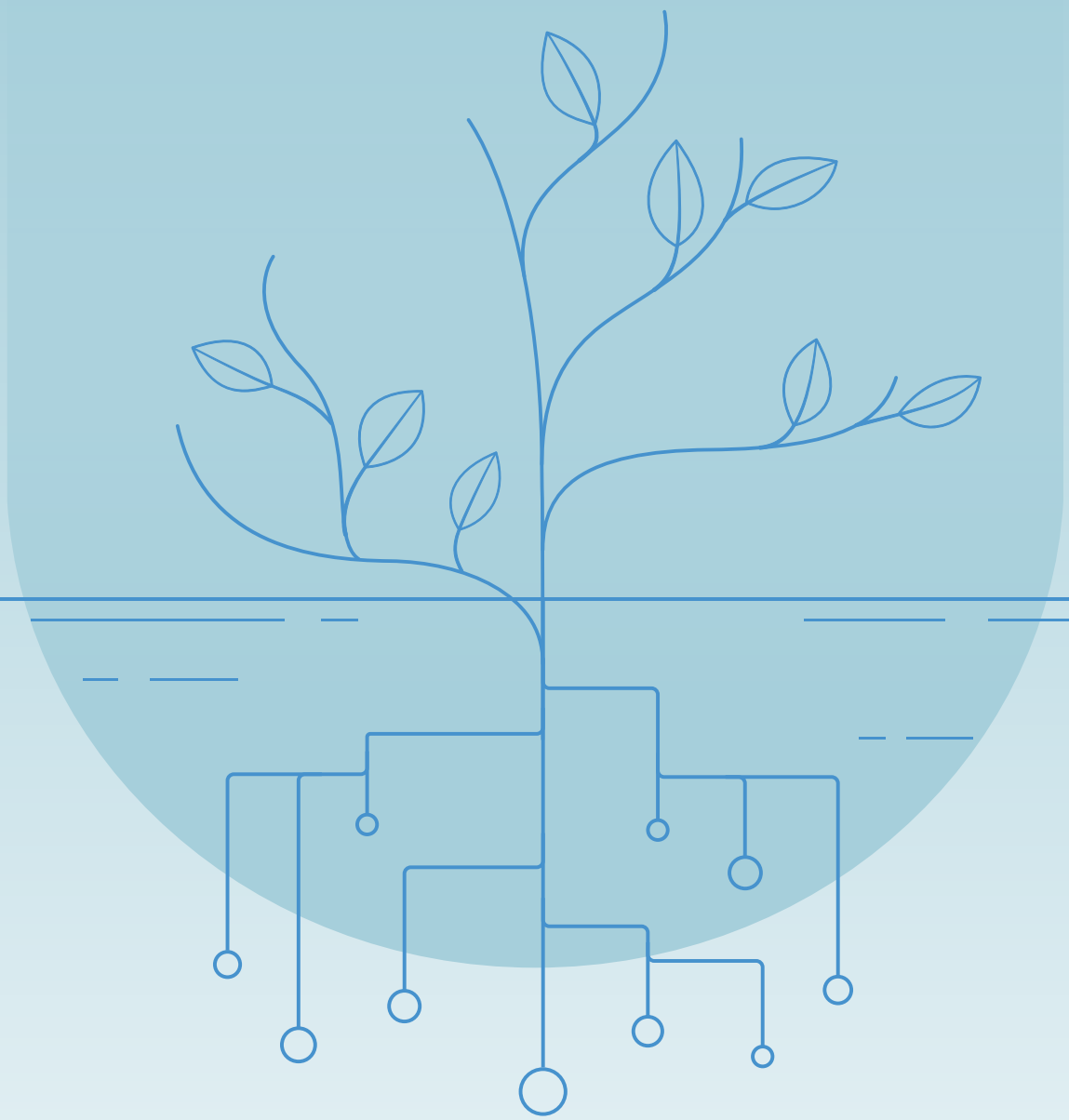


TEC practical guide

How developing countries can be supported for implementing their TAPs and TNA outcomes

United Nations Climate Change
Technology Executive Committee

UN environment programme
copenhagen climate centre

Table of Contents

Preface 3

I. About TEC's work on TNA 3
II. About this practical guide 3
III. How to use this guide 4

Context 5

I. How do TNAs and TAPs relate to the implementation of the Paris Agreement? 5
II. What does support for TNA implementation look like? 7
III. Why support for post-TNA action matters? 8
IV. What factors contribute to successful implementation of TNA outcomes such as TAPs? 10

Actors 11

I. Mapping the support ecosystem: Which actors support TAP implementation and how? 11
II. What is the strategic role of NDEs? 12

Pathways 13

Considerations 18

I. Combining and Sequencing Support: a portfolio approach 18
II. Additional guidance materials for financing and implementing TAPs 18
III. Practical considerations for effective implementation 20
IV. Practical implementation checklist 21

Cases 22

Uganda | Pathway A: National-level support for policy and institutional integration 22
Eswatini | Pathway B: Grants, readiness support and concessional finance 23
Georgia | Pathway C: Bilateral support and technology cooperation 24
Fiji | Pathway D: Technical assistance and advisory support 25
Jamaica | Pathway E: Private sector collaboration and partnerships 26

Frequently asked questions (FAQs) 27

Preface

I. About TEC's work on TNA

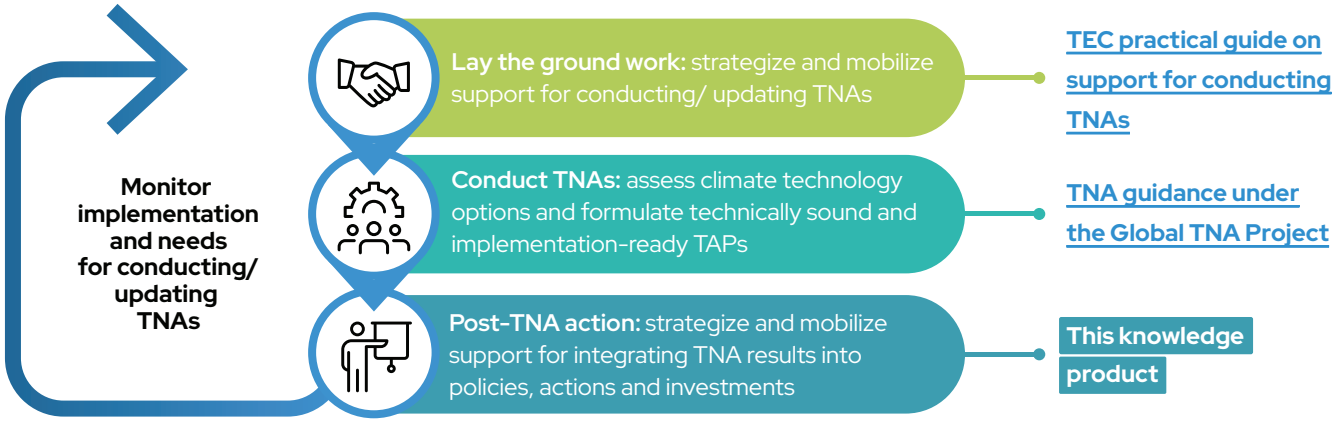
Technology needs assessment (TNA) is at the core of the technology transfer framework under the UNFCCC and the technology framework under the Paris Agreement. The Technology Executive Committee (TEC), as the policy arm of the Technology Mechanism under the UNFCCC, continually monitors the TNA process, with a view to providing policy insights and guidance to support developing countries in undertaking TNAs and the implementation of their results - namely technology action plans (TAPs). The TEC has a longstanding partnership with the UNEP Copenhagen Climate Centre (UNEP-CCC) as the executing agency of the GEF-funded Global TNA Project in this context.

II. About this practical guide

Why is it needed?

Developing countries have made substantial investments in conducting TNAs and formulating TAPs. Strategic approaches to planning and mobilizing support for implementing TAPs and other TNA outcomes are key to enabling developing countries to translate their technology priorities into policies, actions and investments. In 2022, Parties invited the TEC to consider how developing countries can be supported in updating their TNAs and implementing their TAPs and TNA outcomes. TEC has responded to this invitation by producing two practical guides (see Figure 1).

Figure 1: Iterative process of conducting and updating TNAs



What does it contain?

It provides an overview of key pathways and considerations in planning and mobilizing support for implementing TNA results, starting from understanding the institutional context (Context section), followed by identifying relevant support providers (Actors section), and utilizing support avenues (Pathway section) for advancing implementation of priorities identified in TNAs and TAPs. Each section is accompanied by an array of country examples (Cases section) and a set of key takeaways and practical checklists (Considerations section), which are intended to serve as inspiration for pursuing post-TNA action.

What is not covered?

The practical guides on TNA support (see Figure 1) offer strategic approaches to planning and mobilizing support for conducting TNAs and advancing the implementation of their results. They complement the technical guidance produced under the GEF-funded Global TNA Project, which offers methodological direction (e.g. Guidance for Preparing a TAP), sectoral insights to developing countries that are preparing their TNAs and TAPs, as well as their financing (e.g. Finance Guide for Implementation of TAPs).

Who is the target audience?

This practical guide provides TNA Coordinators, National Designated Entities (NDEs), technology decision-makers, and implementation stakeholders with actionable guidance on how to mobilize support, foster partnerships, and secure investment to translate TAPs and TNA outcomes into real-world projects and policy implementation.

III. How to use this guide

The top-bar menu allows the user to navigate through the document with clickable menu items.

The jargon is simplified and concepts are summarized. Relevant decisions by the governing bodies of the UNFCCC and Paris Agreement and complementary readings are provided in the footnotes.

http://
Hyperlinks to external resources are highlighted across the document.

Key takeaways and considerations are highlighted to help user reflect on and digest the information in each section.

Practical checklists, though non-exhaustive, is provided to assist the user in pursuing a TNA in own context.

Context

I. How do TNAs and TAPs relate to the implementation of the Paris Agreement?*

Since its formalization under the UNFCCC in 2001, the TNA process has evolved to go beyond identification and prioritization of climate technologies and include more focus on articulating implementation pathways for prioritized technologies in line with respective national circumstances, including by analyzing barriers to and enabling conditions for technology deployment, and elaborating TAPs (see Figure 2).

Elements of a Technology Action Plan

A Technology Action Plan serves as a bridge between the analysis of prioritized technologies and their implementation. By defining concrete actions, responsibilities, timelines, resource requirements and financing arrangements, a TAP provides a practical roadmap for implementation. It helps stakeholders coordinate efforts, mobilize resources and monitor progress towards technology deployment and broader climate and development objectives. Figure 2 presents a checklist of the key elements that should be defined for each action within a TAP.

Figure 2: Check list of key TAP elements

Element	Key Questions Addressed	Typical Content
Priority action	What needs to be done?	Specific action or intervention to address identified barriers and support technology uptake
Implementation rationale	Why is the action needed?	Barrier(s) addressed, expected contribution to technology deployment, and associated co-benefits
Outputs and outcomes	What will be achieved?	Expected products, services, capacities, or impacts resulting from the action
Lead and supporting actors	Who is responsible?	Implementing institution(s), partners, stakeholders, and target beneficiaries
Timeline and milestones	When will it happen?	Implementation schedule, key milestones, and expected completion dates

* **Relevant decisions**: Decision 4/CP.7; Decision 3/CP.13; Decision 15/CMA.1; Decision 18/CMA.7.
Complementary reading: Enhancing Implementation of Technology Needs Guidance for Preparing a Technology Action Plan (2017); Policy brief on linkages between technology needs assessment process and nationally determined contributions process (2022).

Element	Key Questions Addressed	Typical Content
Resource requirements	What resources are needed?	Technical expertise, human resources, equipment, and financial needs
Financing strategy	How will it be funded?	Estimated costs, funding sources, and resource mobilization approaches
Monitoring and evaluation	How will progress be tracked?	Indicators, means of verification, reporting arrangements, and success criteria
Risks	What could affect implementation?	Costs exceed original budget estimates, implementation is delayed beyond planned timelines, technology or human resources fail to achieve expected results.

TNAs and TAPs are placed at the heart of implementation and support efforts under the technology framework of the Paris Agreement, which also guides the work of the UNFCCC Technology Mechanism - comprising the TEC and the Climate Technology Centre and Network (CTCN). Many developing country Parties also utilize TNAs to inform their NDCs and BTRs under the Paris Agreement. As of September 2026, 34 Parties referred to TNAs as a source of information for NDC formulation or an instrument for advancing NDC implementation, and a total of 31 Parties indicated in their first BTR that their identified needs for technology development and transfer support were informed by TNAs.

The adoption of the Belém Technology Implementation Programme, the first-ever implementation programme under the Paris Agreement, places renewed emphasis on TNAs as vehicles for articulating climate-related technology priorities in developing countries.

Consistent and growing attention has therefore been directed to TNAs and TAPs, as important bridges between climate technology planning and implementation on the ground, including by supporting the development of investment-ready projects. TAPs can help form a portfolio of nationally endorsed projects and programmes – in line with NDCs, NAPs and other national climate strategies and plans - that can facilitate both action and support for the implementation of prioritized climate technologies.

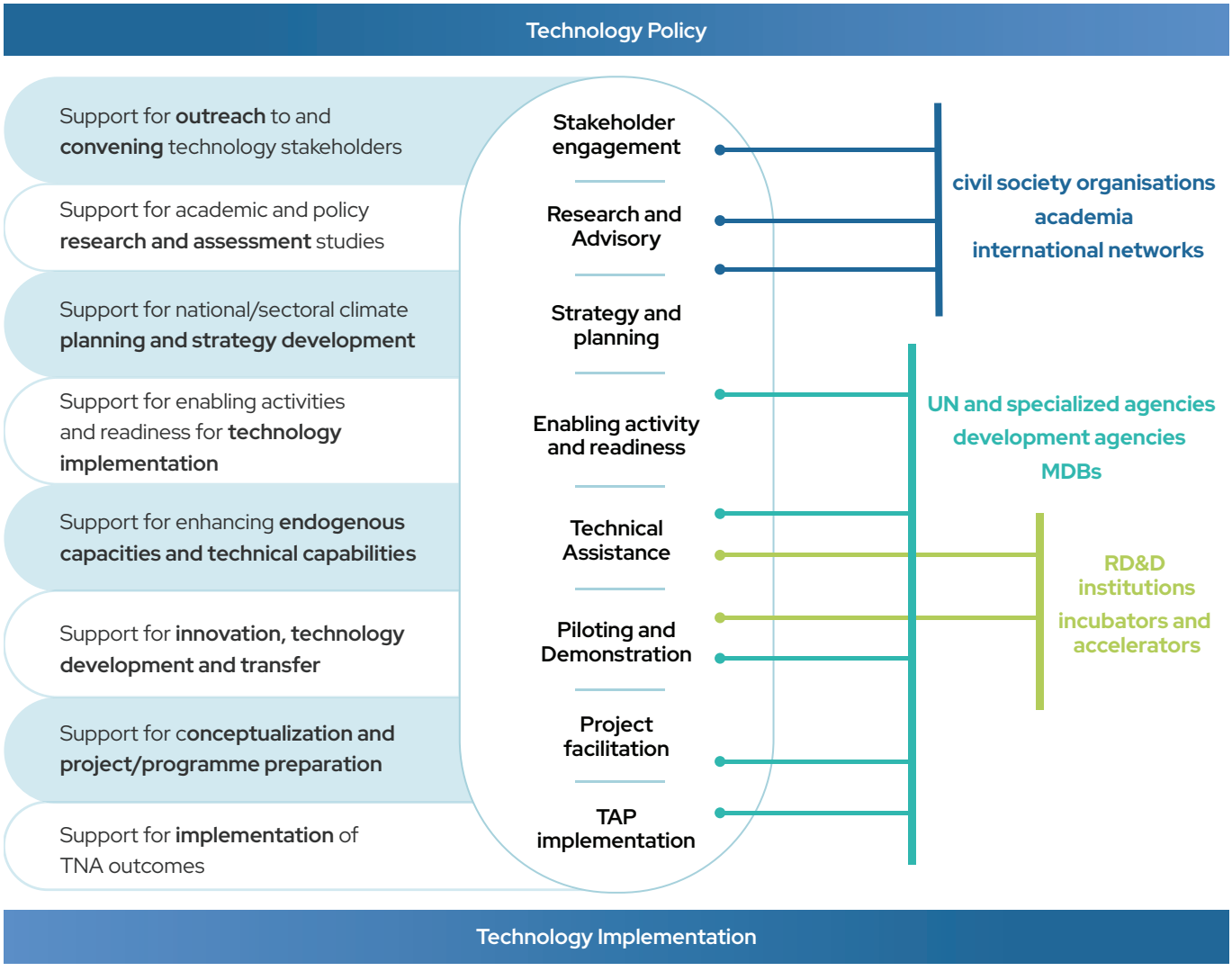


Image: Earth day by Igor Yaruta. Adobe stock

II. What does support for TNA implementation look like?*

Follow-on support to implement TNAs and TAPs can take different forms from strengthening institutional arrangements and policy integration, to coordinating stakeholders, monitoring progress and learning over time, building implementation and management capabilities, developing technology-inclusive climate programmes and project pipelines, accessing specialized technical expertise, piloting and demonstrating existing and emerging technologies, and technology deployment at scale. A diverse range of domestic and international actors may be the provider of such support (see Figure 3).

Figure 3: Examples of TNA-related types of support modalities and support providers across the value chain of technology planning and implementation (non-exhaustive)



The mix of support options utilized by a developing country to advance its TNA outcomes depends on evolving national circumstances, technology maturity, and implementation readiness.

* **Relevant decisions**: 15/CMA.1.
Complementary reading:
Scaling up investment in climate technologies: Pathways to realising technology development and transfer in support of the Paris Agreement (2021);
How developing countries can be supported for conducting and updating their technology needs assessments (2026).

III. Why support for post-TNA action matters?*

Nearly all developing countries have completed at least one round of TNAs, with a number of countries having undertaken successive rounds, and about 80 countries have elaborated TAPs that set out implementation pathways for their prioritized technologies. The next step is to translate these priorities into implementable policies, programmes and projects, drawing on available support for follow-on implementation efforts.

The first global stocktake under the Paris Agreement pointed to the importance of ensuring the availability of and access to enhanced financial and capacity-building support for developing countries to implement and scale up prioritized technology measures, including those identified in TNAs and TAPs, towards achieving their nationally determined climate and sustainable development goals.

TNAs and TAPs have considerable potential and utility as strategic entry points for financing and implementation. A 2025 analysis showed that approved projects informed by TNAs and TAPs have mobilized nearly 3 billion USD through the GEF, the Global Climate Fund (GCF) and the Adaptation Fund (AF). The total volume of support mobilized is likely even higher, as developing countries also draw on bilateral cooperation and multilateral banks and other funding sources to advance their climate technology priorities.

Implementation of TAPs helps countries move from identifying technology priorities to achieving tangible development, climate and investment outcomes by strengthening institutions, mobilizing finance, building capacity, enabling innovation and delivering mitigation, adaptation and sustainable development benefits. For example, the institutional set-up and stakeholder engagement for TNA could enhance in-country coordination capacities and institutional linkages. Prioritized technologies in TNAs may trigger action by domestic actors within national and sectoral innovation systems (see examples in Figure 4).



Image: Irrigation system in function by NDAB CREATIVITY. Adobe stock

* **Relevant decisions**: Decision 1/CMA.5.
Useful links: https://unfccc.int/ttclear/tna/reports.html
Complementary reading: TNA success stories and addendum on implementation tracking (2025)

Figure 4: Overview of national benefits from TNAs and TAP implementation (non-exhaustive)

Area of national benefit	How TNAs and TAP implementation contributes to national objectives	Examples of outcomes
Climate mitigation	Accelerates deployment of mitigation technologies and measures.	Reduced greenhouse gas emissions, progress toward NDC targets.
Climate resilience and adaptation	Accelerates the deployment of adaptation technologies that reduce climate vulnerability and strengthen resilience.	Enhanced resilience through improved water security, climate-smart agriculture, disaster preparedness and resilient infrastructure. Progress toward NAP targets.
Access to climate finance	Translates technology priorities into actionable, investment-ready projects and programmes.	Strengthens the quality of investment-ready projects and proposals, helping mobilize grants, concessional finance, private investment and blended finance.
Stronger policy coherence	Integrates technology priorities into climate, development, sectoral and investment planning processes.	Alignment between NDCs, NAPs, LT-LEDS, sector plans, national budgets and investment frameworks.
Institutional strengthening	Clarifies roles and responsibilities among ministries, agencies and stakeholders involved in technology implementation.	Improved cross-government coordination, stronger implementation oversight and more effective use of resources.
Technology transfer and innovation	Facilitates access to technologies, expertise, knowledge networks and international cooperation.	Increased technology uptake, innovation, local adoption of technologies endogenous technologies and strengthened R&D ecosystems.
Capacity development	Strengthens technical, institutional and managerial capabilities needed for implementation and scaling.	Enhanced skills, stronger institutions, improved project preparation and programme management.
Private sector engagement	Creates enabling conditions for commercial investment, market creation and technology deployment.	New business opportunities, public-private partnerships, growth of green industries and job creation.
Sustainable development co-benefits	Supports broader economic, social and environmental objectives beyond climate action.	Improved energy access, food security, water security, health outcomes, environmental protection and livelihoods.
Transparency, monitoring	Establishes a basis for tracking implementation progress and support needs over time.	Better reporting through BTRs, evidence-based decision-making, continuous improvement and scaling-up of successful interventions.
National ownership	Anchors technology priorities within national institutions and development agendas.	Greater self-reliance, sustained implementation beyond individual projects and long-term low-emission, climate-resilient development.

IV. What factors contribute to successful implementation of TNA outcomes such as TAPs?*

In a 2024 analysis, drawing on evidence and insights from tracking the implementation of TNAs, the TEC and UNEP-CCC compiled a non-exhaustive list of elements that may contribute to the successful implementation of TNAs and TAPs, across four stages of planning, formulation, stakeholder engagement and implementation of TNAs/TAPs, and support long-term deployment, operation, maintenance and scaling of prioritized technologies.

Points highlighted for implementation include:

- **Developing** pilots to demonstrate the viability of a technology option;
- **Embedding** TNA outcomes in proposals submitted to the GCF, GEF and AF;
- **Tracking** TNA implementation results to strengthen transparency and facilitate monitoring, evaluation and learning;
- **Utilizing** technical assistance, readiness support and PPFs to advance TNA implementation;
- **Conducting** continued and/or recurring work with implementing agencies active in a country to utilize their cumulative knowledge of the context and know-how in a specific sector or region;
- **Utilizing** bilateral support and resources available through ongoing projects or activities to integrate, disseminate, follow-up and elaborate on their TNA results;
- **Utilizing** regional, multi-country and umbrella projects and programmes to advance sectoral goals;
- **Using** direct-access funding windows, small-grant programmes, and demonstration projects to enhance the ownership of domestic actors in technology implementation;
- **Utilizing** and strengthening domestic resources (including from the private and financial sectors and at the sub-national and local levels) and capacities (e.g. research and R&D institutions) to support the deployment, adoption and scaling of prioritized technologies;
- **Strengthening** the ecosystem of support and investment infrastructure for climate action in the country.

* **Complementary reading**: Analysis of success stories from implemented TAPs (2024).
Useful links: https://unfccc.int/ttclear/tna/outcomes.html#sstories

Actors

I. Mapping the support ecosystem: Which actors support TAP implementation and how?*

The governing and subsidiary bodies under the UNFCCC and the Paris Agreement have underscored the importance of providing support for the implementation of TAPs and TNA outcomes and have issued recommendations and guidance on the role of various actors in this context. These actors include Parties to the process, the TEC and the CTCN, as well as the GEF and the GCF under the UNFCCC. They also include support providers beyond the UNFCCC, such as multilateral development banks and other financial institutions, United Nations entities, private-sector entities, and philanthropic organizations.

Figure 5: Key actors and their roles in supporting implementation of TAPs and TNA outcomes.

Who?	What is their role?	How do they contribute?
NDEs and national climate change coordination authorities	Coordinate stakeholders and integrate TAP priorities into national frameworks.	Link TAP priorities with NDCs, NAPs, sector plans, and national coordination mechanisms.
Climate funds	Provide grants, readiness support, project preparation, and other forms of climate finance.	Support TAP implementation through national focal points and implementing/accredited entities.
Line ministries and government agencies	Connect TAP priorities with national budgets, investment planning and climate finance.	Integrate priorities into public investment, budgeting, and country programming.
Climate Technology Centre and Network CTCN & technical assistance providers	Provide technical assistance for feasibility, project preparation, policy development, and capacity-building.	Respond to NDE requests and support technical assistance programmes and project preparation.
MDBs & DFIs	Provide concessional finance, advisory support, and risk-mitigation instruments.	Work with finance ministries, sector ministries and country programmes to mobilize and structure support.
Bilateral partners	Provide technical cooperation, pilots, capacity-building, and financing.	Contribute through government and development-cooperation channels.
Private sector & financial institutions	Invest, commercialize technologies, develop supply chains, and provide technical services.	Participate through public-private partnerships (PPPs) and sustainable-finance instruments.
Research & knowledge institutions	Provide research, technical expertise, innovation, and capacity development.	Contribute through national, regional and international research partnerships.

* Useful links: https://unfccc.int/ttclear/negotiations/decisions.html; https://unfccc.int/ttclear/negotiations/conclusions.html

National and local technology experts, practitioners, and stakeholders, for example climate change focal points for the UNFCCC process and across line ministries, academia, and the private sector, remain central to the nationally driven TNA process, including ensuring national ownership and sustainability of implementation outcomes.

National team(s) responsible for technology planning and implementation in the country, for example NDEs (see the next section), play a foundational role for strategizing a nationally coordinated portfolio of support involving international and domestic actors (see Figure 5). This includes identifying, mobilizing, and combining support options to implement TNA outcomes, taking into account context-specific implementation priorities and readiness across various sectors, technologies, and geographies.

II. What is the strategic role of NDEs?

NDEs serve as a key national interface for translating climate technology priorities into implementation, connecting domestic needs with relevant institutions, partners, finance, and international support mechanisms. In collaboration with TNA coordinators, relevant ministries, technology decision-makers and implementation stakeholders.

NDEs can play several interconnected roles:

- **Convene & coordinate:** Bring stakeholders together to align priorities and coordinate action.
- **Translate & mobilize support:** Turn TAP priorities into actionable projects and connect them with technical and financial support.
- **Build partnerships & mobilize investment:** Build partnerships and identify financing pathways for implementation.
- **Align policy, planning & finance:** Integrate technology priorities into national planning and financing processes.
- **Support institutionalization:** Work with relevant authorities to assign and embed responsibility for advancing TAP priorities within appropriate institutions.
- **Track, learn & scale:** Track progress, capture lessons, and inform future planning and scale-up.

Pathways

Advancing TAPs towards implementation can draw on non-exclusive complementary support pathways, five of which are highlighted in this practical guide. Depending on national circumstances and the stage of implementation, these pathways can help embed technology priorities in national planning, address early-stage implementation barriers, mobilize international cooperation and technical expertise, and create conditions for public and private investment. The actions, actors, and entry points presented under each pathway are illustrative and non-exhaustive.

Pathway A: National-level support for policy and institutional integration

- **What it involves:** Integrating TAP priorities into national climate and development frameworks (e.g. NDCs, NAPs, LT-LEDS, sectoral plans, and BTRs) and linking TAPs to budgeting, investment planning, and climate finance programming
- **Why it matters:** Strong policy coherence, institutional coordination, and integrated planning help align technology priorities with national climate and development objectives, improve visibility and fundability, and strengthen access to domestic and international finance.
- **Who leads:** National and sub-national government institutions, including ministries of finance, planning, environment, and sectoral ministries, climate coordination bodies, public investment planning institutions, and actors supporting climate planning and finance.
- **How to use this pathway:** Embed TAPs and TNA outcomes into climate and development plans, public investment programmes, budget frameworks, and climate finance strategies; strengthening in-country coordination (e.g. across line ministries and between technology, finance, and climate focal points); and using reporting frameworks such as BTRs to articulate technology support needs and track implementation progress.

Uganda

Successive TNAs have helped Uganda refine its climate technology priorities and translate them into implementation roadmaps. TNA outcomes are reflected in sectoral and national planning, including agriculture adaptation planning and successive National Development Plans. The TNA process has also strengthened domestic capacity and supported subsequent project preparation. Read more in the Cases section.

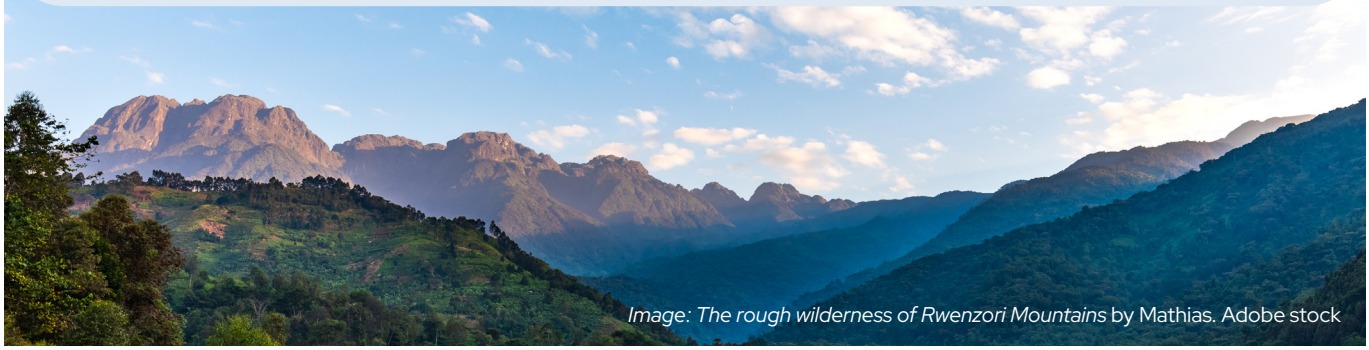


Image: The rough wilderness of Rwenzori Mountains by Mathias. Adobe stock

Pathway B: Grants, readiness support and concessional finance

- **What it involves:** Using grants, readiness support, and concessional finance to support feasibility studies, project preparation, technology pilots, capacity-building, institutional strengthening, programme design and management, stakeholder coordination, technical and advisory services, climate finance planning, and early technology deployment.
- **Why it matters:** These instruments help address early-stage implementation barriers, strengthen institutional and advisory capacities, support programme development and delivery, enhance coordination among implementing institutions, support project pipeline development, and create the conditions needed to attract larger-scale financing and technology deployment. They are particularly important for adaptation technologies and measures that generate substantial public benefits but may offer limited opportunities for direct cost recovery, making grant-based support, readiness funding and public finance critical for implementation and scale-up.
- **Who provides support:** Climate funds and their readiness programmes, multilateral and bilateral development partners, UN and specialized agencies, technical cooperation and assistance providers, research institutions, and philanthropic organizations.
- **How to use this pathway:** Utilize grants and readiness support to strengthen enabling conditions, institutional capacity, programme management, technical advisory functions, stakeholder coordination, and project preparation, and combining or sequencing them with concessional finance to support infrastructure investment, early deployment, and technology scale-up. The appropriate mix of financing instruments will depend on the technology and context.

Eswatini

Following its 2016–2018 TNA, Eswatini used GCF readiness support to deepen assessments of prioritized technologies in the water and agriculture sectors. This helped identify technology, capacity, policy, and financing gaps, improving the targeting of climate finance and readiness for larger-scale investment. Read more in the Cases section.



Image: Dirt road approaching Ngwavuma River in Eswatini, Swaziland by Jürgen Bochynek. Adobe stock.

Pathway C: Bilateral support and technology cooperation

- **What it involves:** Leveraging bilateral cooperation, including North-South and South-South cooperation, to advance TAP priorities through technical assistance, capacity-building, policy support, pilot and demonstration projects, technology partnerships, and, where relevant, cooperation under Article 6 of the Paris Agreement.
- **Why it matters:** Bilateral cooperation provides flexible, targeted support that can respond directly to national technology priorities and implementation barriers, while facilitating technology transfer, knowledge-sharing, innovation, and investment, including through long-term partnerships that could complement and strengthen domestic initiatives.
- **Who provides support:** Bilateral donor agencies, development cooperation partners, finance institutions, research and technology partners, and entities involved in Article 6 cooperation.
- **How to use this pathway:** Engage bilateral partners at an early stage to align support with national technology priorities, and to develop project concepts for technical assistance, capacity-building, pilot activities, and technology partnerships. Where appropriate, explore Article 6 cooperation as a complementary mechanism for advancing selected TAPs.

Georgia

Following its TNA and subsequent updates of technology priorities and roadmaps, Georgia used bilateral cooperation to advance energy-sector priorities in line with its TNAs. An EU-funded twinning arrangement supported regulatory development for energy efficiency and renewable energy, while KfW policy-based lending supported broader energy-sector reform. Read more in the Cases section.



Image: Wind panels in georgia and its integrated location with nature by emerald media. Adobe stock

Pathway D: Technical assistance and advisory support

- **What it involves:** Support for technical and economic assessments, implementation road mapping, technology matchmaking, project concept development, financing and implementation planning, policy and regulatory development, institutional capacity-building, and knowledge transfer.
- **Why it matters:** Technical assistance and advisory support helps transform TAP priorities into implementable projects by providing the expertise, advisory services, and institutional support needed to address implementation barriers and strengthen enabling conditions for technology deployment.
- **Who provides support:** Multilateral organizations, bilateral development partners, UN agencies, CTCN and other technical assistance facilities, project preparation facilities, research institutions, technical experts, and global and regional knowledge networks.
- **How to use this pathway:** Utilize technical assistance and advisory support to develop implementation pathways, prepare projects for financing and implementation, strengthen policy and institutional frameworks, improve coordination mechanisms, enhance climate finance access, and build long-term institutional capabilities. These types of support are often utilized simultaneously across various sectors, or as part of broader processes and programming efforts.

Fiji

Fiji's 2024 TAP identified priority technologies across adaptation and mitigation sectors that are also reflected in national climate planning. Technical assistance from international and regional partners has supported NDC implementation, investment planning and access to climate finance, strengthening the capacity and enabling conditions needed to advance these priorities. Read more in the Cases section.



Image: Mangrove Nursery by Ryan & Nada, CC BY-NC-ND 2.0

Pathway E: Private-sector collaboration and partnerships

- **What it involves:** Private-sector support for technology implementation through investment, technology development and transfer, provision of goods and services, technical expertise, innovation, market development, and technology scaling, as well as the mobilization of private capital and other forms of private-sector participation.
- **Why it matters:** The private sector plays an increasingly important role in climate action and is essential for scaling up the implementation of climate technologies identified through TAPs. While public finance and international support can catalyze initial actions, long-term deployment and sustainability depend on increased private-sector participation and investment.
- **Who leads:** Domestic enterprises and businesses, multinational corporations and technology providers, financial institutions, investors, project developers, industry associations and business networks, as well as relevant government ministries.
- **How to use this pathway:** Address market and policy barriers, including regulatory uncertainty, high investment risks, limited access to finance, and limited project pipelines, to support increased private-sector participation and investment. Strengthen enabling policies and regulatory frameworks, engage private-sector actors early in the implementation process, and consider measures that facilitate technology deployment, innovation, market development, and the mobilization of private capital, including fiscal, financial, and risk-mitigation measures where appropriate.

Jamaica

Jamaica's 2020–2023 TNA informed national climate planning, with TAP outcomes reflected in its long-term climate strategy. Building on readiness support for private-sector engagement and green finance, a partnership between United Nations Development Programme and the Jamaica Stock Exchange is helping create conditions to attract investment in renewable energy, climate-smart infrastructure and green industries. Read more in the Cases section.



Image: Solar panel 2 by Mike Baker, CC BY-NC-SA 2.0

Considerations

I. Combining and Sequencing Support: a portfolio approach*

Implementation of TAPs does not proceed through a single mechanism but rather emerges from the interaction of multiple enabling factors, pursued through various support avenues involving a diverse array of implementation partners, and often takes place over several years.

Adopting a portfolio approach that combines and periodically rebalances several support options, responding to the evolving institutional capacity, sectoral priorities, and access to finance in a given country, is therefore more effective for implementing TAPs and TNA outcomes. National governments are central to fostering policy coherence, coordinating implementation, and aligning support avenues with national priorities.

Support pathways can be combined or sequenced as priorities progress towards implementation. Policy integration and technical assistance can strengthen enabling conditions, while grants, readiness support and bilateral cooperation can address implementation gaps and support project development. Public and concessional finance, and, where appropriate, other forms of investment, can then support deployment and scale.

The appropriate mix of support pathways will differ across technologies and countries. Different priorities within the same country's portfolio may therefore follow different implementation pathways. A commercially viable mitigation technology may progress towards concessional or private investment, while an adaptation technology with limited cost-recovery potential may rely primarily on grants, public expenditure, and technical support. Similarly, some priorities may first require policy reform, institutional capacity-building, or local demonstration before larger-scale finance becomes feasible.

As priorities, institutional capacity and financing opportunities evolve, countries can revisit and rebalance their support portfolio. Where several providers are involved, effective in-country coordination helps ensure that activities reinforce rather than duplicate one another and keep support aligned with nationally identified priorities.

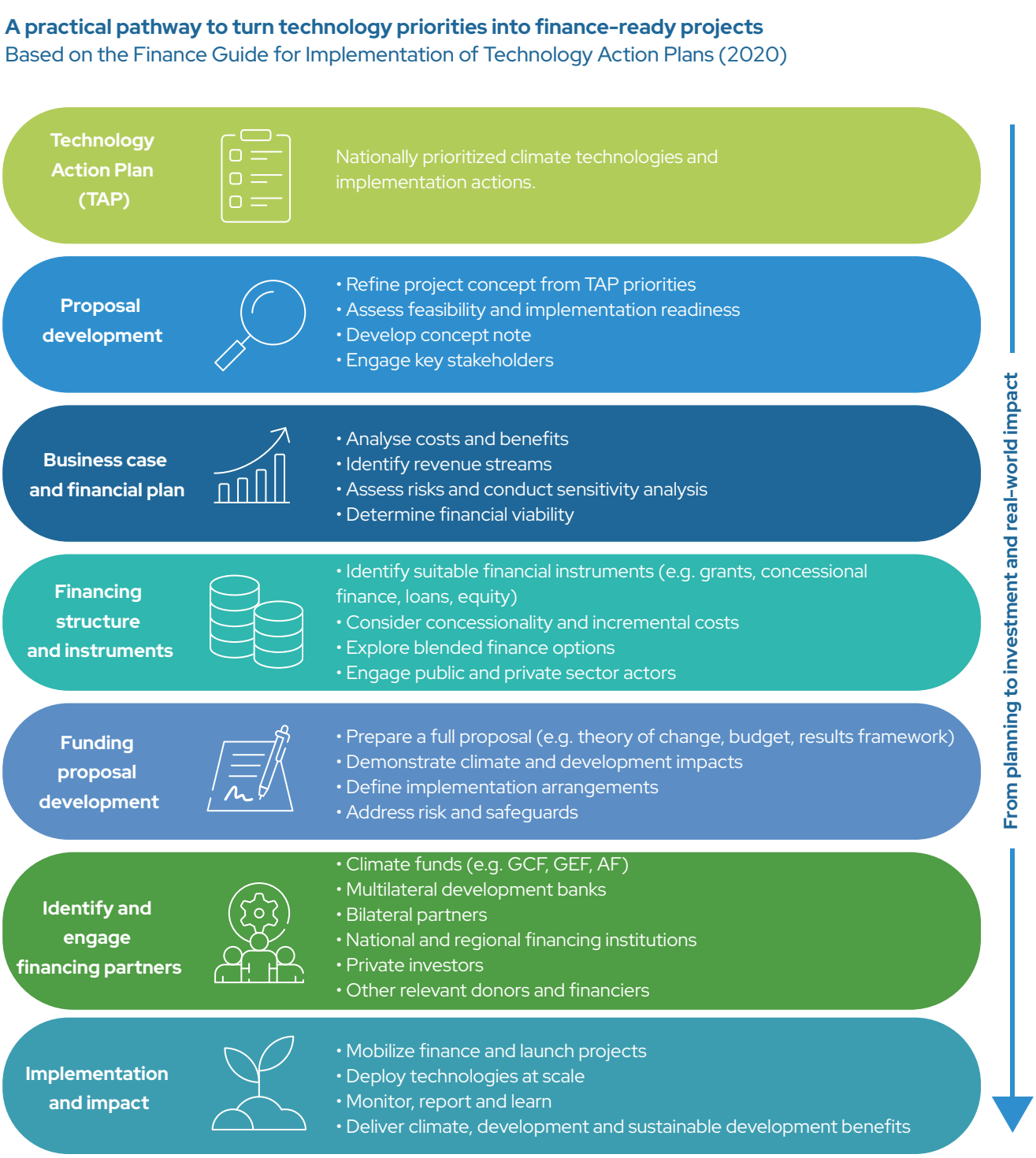
II. Additional guidance materials for financing and implementing TAPs

The available guidance on the TNA process under the UNFCCC provides an overarching methodology for conducting a TNA and formulating TAPs, as well as guidance materials with sectoral and implementation focus. The guidance is primarily developed (and updated) under the GEF-funded Global TNA project by UNEP-CCC, at times in collaboration with the TEC, based on lessons and feedback from stakeholders and in response to Parties' mandate.

This includes a 2020 guidebook 'Finance Guide for Implementation of Technology Action Plans', developed under the Global TNA Project, which provides information on how to develop a business case for interventions that are inclusive of climate change mitigation and adaptation technologies. The guide offers useful information on sources of climate finance and a tool for selecting appropriate financing partners. For example, it includes considerations for financing some adaptation interventions that may be more dependent on grants and public finance compared to prioritized technologies that can generate commercial returns and therefore more likely to attract private investments (see Figure 6).

* **Complementary reading**: System Change: A Guidebook for Adopting Portfolio Approaches (2022).
Useful links: https://unfccc.int/ttclear/tna/guidance.html

Figure 6: From TAP to Financing and Implementation



The Climate Finance Explorer, made available by the NDC Partnership, is a practical tool that can be used for the identification of appropriate climate finance providers, providing the user with the ability to quickly identify providers of financing services based on their specific needs and profiles, for example in specific sectors or at the national or sub-national levels.

III. Practical considerations for effective implementation

1. **Anchor technology priorities nationally:** Integrate TAP results into relevant climate and development frameworks, and reflect TAP results in investment planning, budgets and climate-finance strategies.
2. **Strengthen coordination and institutional ownership for implementation:** Clarify institutional roles for advancing TAP results and strengthen coordination among NDEs, National TNA Entities, line ministries, finance and planning ministries, climate-finance focal points, local stakeholders and implementation partners.
3. **Match support to the needs of each priority:** Develop implementation and investment pipelines from TAPs, identify the main implementation needs and match prioritized technologies with appropriate technical, financial and capacity-building support.
4. **Engage providers and combine support coherently:** Align national, multilateral, bilateral, technical and private-sector support with TAP priorities, combining different sources and instruments where appropriate while avoiding duplication and gaps.
5. **Build and retain domestic implementation capacity:** Use domestic expertise to advance prioritized technologies and strengthen the institutional, technical, advisory and programme-management capabilities needed to carry TAP results forward beyond individual projects. This can include strengthening stakeholder coordination, including with key stakeholder groups such as youth, women, Indigenous People and Local Communities, as well as project development, and implementation management functions within responsible institutions.
6. **Track implementation, learn and revisit priorities:** Monitor TAP implementation and support received, connect TAP results with relevant reporting processes, capture lessons and revisit priorities and support pathways as technologies, national circumstances and available support evolve.

IV. Practical implementation checklist

National alignment & coordination

- Are TAPs results reflected in relevant national climate and development frameworks?
- Have TAP priorities received sufficient political or institutional endorsement for responsible ministries and agencies to act?
- Are institutional responsibilities for implementation clearly assigned?
- Is responsibility for follow-up embedded in a standing institutional function so that implementation can continue beyond individual projects?
- Are NDEs, line ministries, finance and planning ministries and climate-finance focal points coordinating?
- Are technology priorities reflected in relevant national financing and support programming?

Implementation readiness

- Is there a clear pipeline of priority technologies and implementation actions?
- Have technical, policy, institutional, market and financing barriers been identified?
- Are priorities matched with appropriate forms of finance and support?
- Is technical assistance or readiness support needed to strengthen implementation pathways or project preparation?
- Have relevant environmental, social, gender and development considerations been addressed?

Mobilizing & coordinating support

- Have potential support providers been matched with implementation needs?
- Are eligibility criteria and provider requirements understood early?
- Are different support pathways and financing sources being combined coherently?
- Is support across providers coordinated to identify synergies, gaps and duplication?
- Is domestic expertise being used and strengthened?
- Have institutional, advisory and programme-management capacity needs been identified and addressed?

Tracking, learning & updating

- Is TAP implementation and support received, and contribution of technology implementation to climate and development goals being tracked?
- Are technology priorities and support needs connected, and actions taken with relevant national reporting processes, including BTRs where appropriate?
- Are lessons captured and used to improve subsequent implementation?
- Is the mix of support periodically reviewed as needs and opportunities evolve?
- Are TAPs revisited as technologies, national circumstances and available support change?

Cases

Uganda | Pathway A: National-level support for policy and institutional integration

Uganda's experience in conducting TNAs and integrating their results into national policies provides a successful example of placing technology priorities at the heart of climate and development agendas. Uganda concluded its first TNA in 2006 for climate change mitigation, with support from the GEF and UNDP. Between 2019-2021, a TNA for both mitigation (focusing on the energy sector) and adaptation (focusing on agriculture, forestry and water sectors) was conducted as part of the GEF-funded Global TNA Project, implemented by UNEP-CCC. The country has also utilized support from the UN Technology Bank for LDCs in 2020 to conduct TNAs for its broader STI and sustainable development agenda. Another TNA process was launched in 2026 and is underway. The various rounds of TNAs, with differing scopes, demonstrate both continuity and evolution in technology needs and priorities of Uganda. In the agriculture and forestry sectors, for instance, the later TNA focuses on priority technologies that were identified but not included in the priority technologies of the first TNAs, such as those relating to forest conservation and restoration. There has also been greater emphasis placed on translating identified priority technologies into implementation roadmaps, bringing together technical know-how and innovation capacities with actionable recommendations for policy and programming, project identification and development, partnerships, indicative investment needs and engagement with budgeting and planning authorities.

The iterative approach to TNAs in Uganda has contributed to strengthening the capacity of domestic actors, including government institutions and national universities, to coordinate and conduct such assessments, as well as to articulate the associated implementation needs and pathways. The same team involved in the TNA process under the Global TNA Project later utilized the technical assistance of the CTCN to prepare a GCF project proposal based on Uganda's TNA outcomes.

Beyond TNAs themselves, a review of key climate and development policy documents in Uganda shows a coherent approach in embedding technology priorities of the country across various policy and planning instruments, with STI recognized as a cross-cutting driver of climate action and sustainable development. For example, technologies highlighted in Uganda's sectoral NAP for agriculture (developed with support from the government of Germany, through UNDP and FAO) are informed by the 2006 TNA and provide the basis for the prioritized technologies in the TNA conducted in 2019. The National Development Plans (2020/21-2024/25 and 2025/26-2029/30), released by the National Planning Authority, reflect the combined outcomes of the TNAs conducted into a comprehensive set of priorities that aligns the climate, development and innovation agendas, for example, by promoting innovation and entrepreneurship in the agriculture sector towards advancing sustainable development goals.

Image: The rough wilderness of Rwenzori Mountains by Mathias. Adobe stock

Eswatini | Pathway B: Grants, readiness support and concessional finance

Eswatini conducted a TNA with support from the Global TNA Project between 2016-2018, covering both mitigation (in energy, waste, forestry and biodiversity sectors) and adaptation (in water, agriculture, forestry and biodiversity sectors). In 2021, the country mobilized the GCF readiness support to conduct a more in-depth assessment of its prioritized technologies in the water sector (supported through the Global Water Partnership) and the agriculture sector (supported through the FAO). These efforts were aimed at identifying technology, capacity, policy and financing gaps before project design, thereby improving targeting of climate finance towards the most critical technology and capacity gaps in these sectors, and strengthening readiness for larger-scale GCF investments. The Eswatini Country Programme under the GCF (2024) showcases the integration of the country's climate technology priorities in its climate finance programming.

Image: Dirt road approaching Ngwavuma River in Eswatini, Swaziland by Jürgen Bochynek. Adobe stock

Georgia | Pathway C: Bilateral support and technology cooperation

Georgia completed its TNA under the GEF-funded Global TNA Project in 2012. In 2021-2023, with readiness support from the GCF and technical assistance from the CTCN, the TNAs were updated across four sectors (electricity generation and transmission, buildings, transport and agriculture), and technology roadmaps were developed for each priority technology. Georgia's transparency report under the Paris Agreement (biennial transparency report 2024) includes successful examples of support received through bilateral channels that has helped advance its technology priorities, in line with its TNAs. To advance its technology priorities in the energy sector, Georgia utilized a twinning arrangement with the Austrian regulatory authority for energy, funded through the Eastern Partnership of the European Union, to strengthen legislative and regulatory frameworks in the sector. This project was focused on the development of network tariff setting methodologies, energy efficiency, and renewable energy regulatory strategy and creating a regulatory framework for enabling demand-side participation. Georgia also mobilized concessional loans for energy sector reform, in line with its NDC targets, through policy-based lending from the Kreditanstalt für Wiederaufbau (KfW) through the German Federal Ministry for Economic Cooperation and Development.



Image: Wind panels in georgia and its integrated location with nature by emerald media. Adobe stock

Fiji | Pathway D: Technical assistance and advisory support

Fiji completed its TNA under the GEF-funded Global TNA Project in 2024, focusing on the agriculture sector and costal zones for climate change adaptation, and the transport (domestic maritime shipping) and energy sectors (rural electrification) for climate change mitigation, which are also reflected in the country's NDC 3.0. Fiji has utilized technical assistance and advisory support from the NDC Partnership in developing its NDCs and the associated investment plans.

In addition to global support for NDC development and implementation, Fiji has tapped into regional support avenues, for example the Regional Pacific NDC Hub to receive technical support for the implementation of its NDC targets and boost its capacity to access climate finance from the GCF and the AF. The Regional Pacific NDC Hub operates through a partnership between the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the Global Green Growth Institute (GGGI), the Pacific Community and the Secretariat of the Pacific Regional Environment Programme (SPREP) with financial support from the governments of Australia, Germany, New Zealand and the United Kingdom.

Beyond these umbrella programmes, Fiji has benefitted from technical assistance and cooperation with individual support providers in such consortiums. For example, the Pacific Community has provided multiple technical assistance projects in the agriculture sector and is the implementing entity for a project funded by the AF with a value of over USD 5 million that is aimed at strengthening the adaptive capacity of coastal communities of Fiji to climate change through nature-based seawalls.

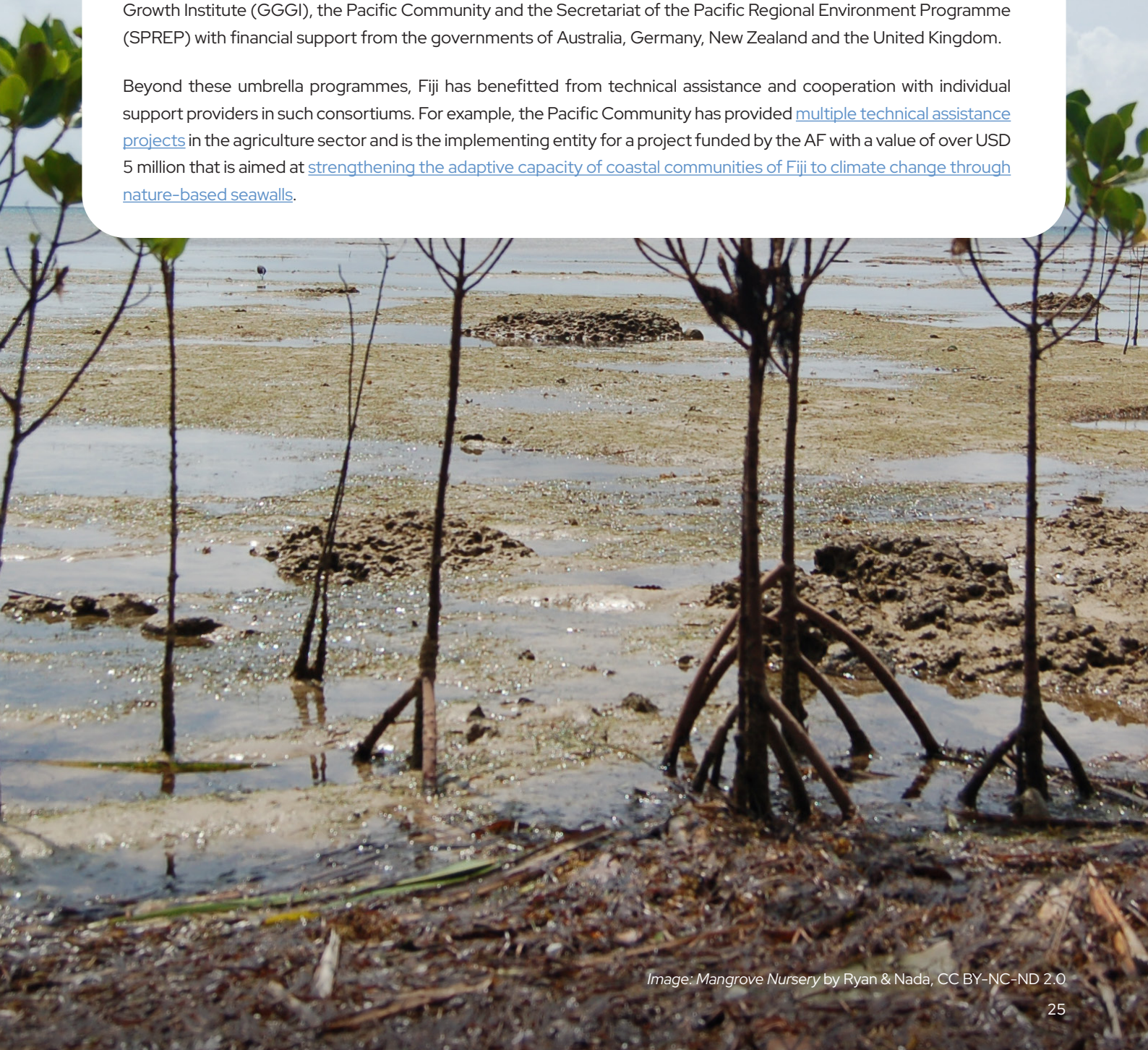


Image: Mangrove Nursery by Ryan & Nada, CC BY-NC-ND 2.0

Jamaica | Pathway E: Private sector collaboration and partnerships

Jamaica conducted its first TNA in 2004, supported by the GEF, through UNDP. In 2009, the country adopted its National Development Plan for Jamaica - Vision 2030, committing to building a "Technology Enabled Society" by deepening the application of science, technology, and innovation. In 2015, the Intended NDC of Jamaica was submitted, which later became the country's first official NDC when the Paris Agreement was ratified in 2017. In 2017, Jamaica with support from the Commonwealth Climate Finance Access Hub through the placement of a national climate finance adviser, initiated the implementation of a GCF readiness grant project to mobilize the private sector to support low carbon and climate-resilient development in Jamaica and other Caribbean countries. In 2019, through another GCF readiness grant, Jamaica received support to assess the enabling environment for the listing of Caribbean green bond on the Jamaica Stock Exchange, including to foster the adoption of green technologies by local companies. These steps helped connect national technology and climate priorities with the financial-market conditions needed to attract investment.

Between 2020-2023, Jamaica conducted a new TNA under the Global TNA Project. Several outcomes of the TNA process were embedded in Nationally Appropriate Mitigation Actions (NAMAs) for the water sector of 2019, and its 2050 Long-term Emission Reduction and Climate Resilient Strategy (LTS), released in 2025. The LTS recognizes the role of private-sector actors in supporting technology development and implementation in pursuit of national development and climate objectives. Following earlier preparatory work, in 2024, UNDP and the Jamaica Stock Exchange entered a strategic partnership under the Climate Promise project. The aim of this partnership was to advance sustainable finance and green growth through capacity-building opportunities to attract domestic and international investment, including private-sector investment, in renewable energy, climate-smart infrastructure and green industries through Green Bonds. This partnership provides a concrete example of how capital-market platforms can be used to help translate TNA-informed priorities into bankable opportunities for private investors, while creating incentives for companies and project developers to adopt and scale climate technologies.

Jamaica's experience shows that private-sector engagement in TAP and TNA implementation can be strengthened when technology priorities are embedded in national climate strategies, supported by public-sector readiness measures and linked to domestic financial-market institutions. Rather than treating private-sector participation as a standalone activity, the case demonstrates the importance of sequencing: aligning policy priorities and creating an enabling environment, assessing market readiness, building institutional partnerships and using financial instruments to create the conditions for private capital to contribute to the commercialization and deployment of prioritized climate technologies.

Image: Solar panel 2 by Mike Baker, CC BY-NC-SA 2.0

Frequently asked questions (FAQs)

Q1: Our country has completed TAP. What is our immediate next step?

Answer: Establish institutional leadership and policy alignment. Ensure your NDE coordinates with national authorities (e.g. those tasked with planning and finance) and climate fund focal points to review TAP priorities. Assess which projects require immediate policy/regulatory action, which need technical assistance for feasibility work, and which are ready for proposal packaging.

Q2: How can TAPs support our access to climate finance from climate funds?

Answer: A well-formulated TAP provides structured baseline data, barrier analyses, cost estimates, and stakeholder endorsement. E.g. TAPs can be referenced directly in GCF Country Programmes and funding proposals to demonstrate country ownership and justify investment rationales.

Q3: What specific support can the CTCN provide for TAP implementation?

Answer: CTCN provides technical assistance in response to requests submitted through NDEs. Depending on the identified need, this can support areas such as technology roadmaps, policy and regulatory development, feasibility and technical assessments, project preparation and capacity-building. Countries should consult current CTCN guidance when developing a request to understand applicable scope, procedures and requirements.

Q4: How can readiness support be used to advance TAP priorities?

Answer: Readiness support (e.g., via the GCF Readiness Programme) can fund capacity-building, stakeholder consultations, institutional strengthening, pipeline development, and concept note formulation. Using readiness grants to refine TAP project ideas into full proposals bridges the gap between planning and investment.

Q5: How should TAP implementation be reflected in our Biennial Transparency Report (BTR)?

Answer: Developing countries report on "support needed and received" In their BTRs under the Paris Agreement. TAPs provide structured information on technology priorities and resource requirements that can be directly included under support needed, while implementation progress can be recorded under support received and technology transfer tracking.

Q6: When and how should TAPs be updated?

Answer: TAPs should be revisited as technologies, national circumstances, priorities and available support evolve. Where appropriate, updates can be coordinated with the revision cycles of the national climate and development frameworks into which TAP results feed, including NDCs and NAPs. Implementation experience and lessons learned should also inform subsequent updates to ensure that technology priorities and support needs remain relevant.

United Nations Climate Change
Technology Executive Committee

UN environment programme | copenhagen climate centre

About the Technology Executive Committee

The Technology Executive Committee is the policy component of the Technology Mechanism, which was established by the Conference of the Parties in 2010 to facilitate the implementation of enhanced action on climate technology development and transfer. The Paris Agreement established a technology framework to provide overarching guidance to the Technology Mechanism and mandated the TEC and CTCN to serve the Paris Agreement. The TEC analyses climate technology issues and develops policies that can accelerate the development and transfer of technologies for climate change mitigation and adaptation.

About the UNEP Copenhagen Climate Centre

UNEP Copenhagen Climate Centre is a leading international advisory institution on energy, climate and sustainable development. Its work focuses on assisting developing countries and emerging economies transition towards more low carbon development paths and supports integration of climate-resilience in national development.

Contact Details

The Technology Executive Committee may be contacted through the United Nations Climate Change Secretariat

Platz der Vereinten Nationen 1

53113 Bonn, Germany

Email: tec@unfccc.int

Website: https://unfccc.int/ttclear/tec

UNEP Copenhagen Climate Centre

Marmorvej 51

2100 Copenhagen Ø, Denmark

Email: unep-ccc@un.org

Website: https://unepccc.org/

© UNFCCC and UNEP-CCC November 2026

United Nations Framework Convention on Climate Change (UNFCCC) and UNEP Copenhagen Climate Centre (UNEP-CCC).
All rights reserved.

This publication is issued solely for public information purposes, including any references to the Convention, the Kyoto Protocol and the Paris Agreement, and any relevant decisions with respect thereto. No liability is assumed for the accuracy or uses of information provided. All images remain the sole property of their source and may not be used for any purpose without written permission of the source.

Creative Commons License

This publication is licensed under a Creative Commons Attribution-Non-Commercial-ShareAlike 4.0 International License. Excerpts from this publication may be freely quoted and reproduced provided that 1. the source is acknowledged, 2. the material is not used for commercial purposes, and 3. any adaptations of the material are distributed under the same license.

Downloads

A digital copy of this report can be downloaded from:
https://unfccc.int/ttclear/tec/support.html#Practicalguide