FROM NEEDS TO IMPLEMENTATION:

STORIES FROM THE TECHNOLOGY NEEDS ASSESSMENTS

2021

TNA TECHNOLOGY NEEDS ASSESSMENT

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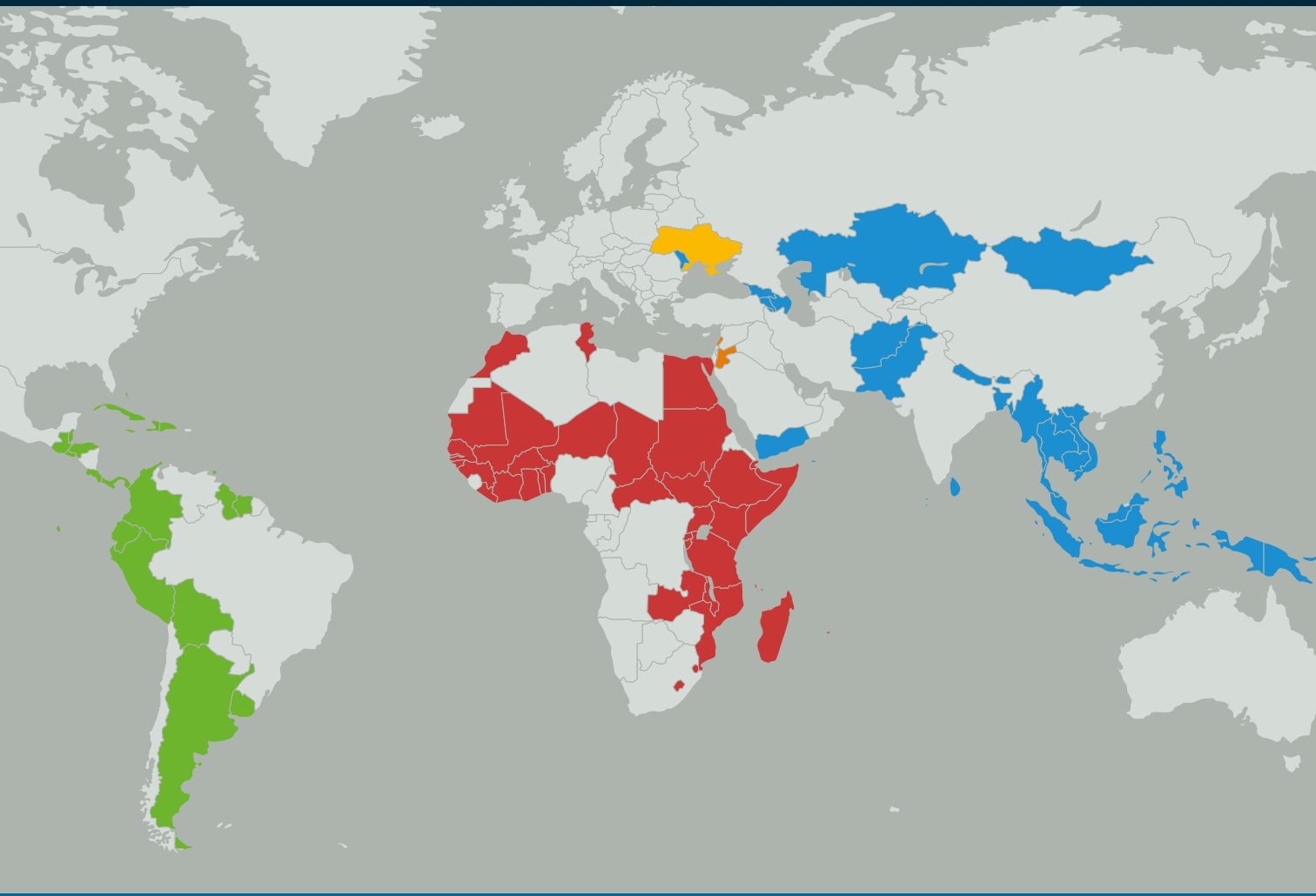
TNA TECHNOLOGY NEEDS ASSESSMENT



TECHNOLOGY NEEDS ASSESSMENT COUNTRIES

INTRODUCTION

Innovative climate technologies are critical for our response to the climate crisis, and climate technologies play an integral part in national climate plans. Within the United Nations Framework Convention on Climate Change (UNFCCC), the role and importance of technologies has received clear and consistent support from Parties to the Convention for over 20 years. Under the Paris Agreement, this is articulated in the Technology Framework under Article 10, with its five key themes of innovation; implementation; enabling environment and capacity building; collaboration and stakeholder engagement; and support.

Since 2009, UNEP DTU Partnership and UNEP, in close collaboration with the UNFCCC Secretariat, have led the implementation of the Global Environment Facility (GEF)-funded Global Technology Needs Assessments (TNA) project in close to 100, predominantly developing, countries. Through the TNA project, countries teams develop their TNAs and Technology Action Plans (TAPs) for selected priority sectors, guiding them towards implementation of Nationally Determined Contributions (NDCs) to the Paris Agreement and achievement of the Sustainable Development Goals (SDGs). As a new addition within the TNA project, countries also develop project concept notes targeted to approach financial and technical support institutions, with the aim to bridge TAPs to implementation on the ground.

In recent years, there has been an increase in the implementation of TNAs and TAPs and of the use of the information they generate. Many developing countries have developed project proposals that were later turned into implementation. In this fourth edition of the 'TNA Stories' we are therefore happy to bring to you another set of implemented projects, building upon TNAs and TAPs, that receive funding from the Green Climate Fund (GCF), the GEF and other supporting institutions.

The stories presented in the following pages highlight how TNAs and TAPs are used by countries as a highly practical tool that provides an effective and solid foundation upon which they can both scale-up and implement action on climate technologies in order to pursue their Paris Agreement targets, as well as in achieving their national SDGs.

ADAPTATION AGRICULTURE FORESTRY LAND-USE

Climate-resilient livelihoods in rice-farming communities

Photo: Alejandro Rugama (Unsplash.com)

ASIA

MYANMAR

Myanmar is the largest country in mainland Southeast Asia, with more than 70% of the population living in rural areas. Despite being a Least Developed Country, the economy is rapidly growing, paving the way for widespread socioeconomic development throughout the country. However, this economic growth depends largely on climate-sensitive sectors, in particular on agriculture, which makes up about 30 percent of Gross Domestic Product (GDP).

In the agricultural sector, rice is the predominant crop, covering almost two-thirds of the area of cultivated land. The increasing frequency of extreme weather events is having a particularly devastating impact on rice yields, resulting in heavy economic losses. This often affects low-income smallholders without the means to adapt to the new climatic conditions.

Given the importance that rice plays in the country's economy, the improvement of salinity-resistant rice varieties in coastal and inland areas was one of the priorities listed in the country's TNA from 2020. Linked directly with the priorities set out in Myanmar's adaptation TNAs, the RICE-Adapt project will invest close to 50 million USD in promoting climate-resilient livelihoods in rice-farming communities in the lower Ayeyarwady and Sittaung River Basin. One major component of the project is to establish a Climate Change Education Center and a capacity-building program. Complemented by farmer field schools and demonstrations, as well as field implementation support, local farmers will be supported directly in taking up innovative climate-resilient practices and technologies for rice-farming.

Implemented by the Ministry of Natural Resources and the Food and Agriculture Organization (FAO), the project is being funded by a 9 million USD GEF grant and 40 million USD in co-financing from Myanmar's Ministry of Agriculture, Livestock and Irrigation. It will also deliver an enhanced enabling environment for climate change adaptation in priority sectors through integrated policies and planning, thus strengthening local farmers more widely and putting Myanmar on the pathway to sustainable and resilient development.

MITIGATION

ENERGY

Sustainable Biomass Energy Technologies

Photo: Marcus Kauffman (Flickr. com)

ASIA

PAKISTAN

Pakistan is facing several challenges in achieving its sustainable development goals. As the world's fifth most populous country, with a relatively young and growing population, its changing climate conditions, which impact on the predominantly agrarian economy in a variety of ways, makes meeting the country's socio-economic development needs even harder.

An increasing population and the target of economic growth also means a higher demand for energy and rising consumption of energy resources. Often, these are climate-damaging conventional energy sources that increase greenhouse gas (GHG) emissions.

In response to this, Pakistan's TNA prioritizes a greater use of renewable energy sources. The country stresses that the local environmental and health impacts of unsustainable and inefficient traditional biomass fuels and GHG emissions need to be largely circumvented through clean, renewable alternatives.

Against this background, in 2020, Pakistan's Ministry of Climate Change, together with the United Nations Development Program (UNDP), jointly developed the Promotion and Application of Sustainable Biomass Energy Technologies in Pakistan (PASBET) project. This project considers the potential for woody biomass in advancing Pakistan's transition to renewable energy, while also being of productive use for agricultural wastes and finding synergies with the afforestation programs the country has been promoting.

PASBET will be funded by a 3.5 million USD project grant from the GEF and a total of 24 million USD in co-financing from multiple ministerial bodies, government departments, UNDP and the private sector. The project has been informed by the findings of Pakistan's TNA and TAPs. It will pave the way for emissions reductions and help Pakistan meet both its NDC targets and its socio-economic goals, such as providing enhanced access to energy for all its citizens.

ADAPTATION AGRICULTURE FORESTRY LAND-USE

Climate smart land-use approaches and practices

Photo: Anna Hoch-Kenney (Unsplash.com)

ASIA

LAOS

In Laos, the agricultural sector accounts for 29.9% of the country's GDP, and approximately 70-80% of the population is dependent on the sector for its livelihoods. The importance of agriculture to both the people and the economy makes the sector a decisively vulnerable one. Flooding disasters in particular are responsible for yearly losses in agricultural production of hundreds of millions of USD. As climate change is gaining pace and disastrous natural events increase in frequency, putting the country's main economic sector at greater risk, farmers need to adapt to the changing conditions and build resilience fast.

Laos' TNA recognizes this urgency by prioritizing the agricultural sector and the need to support and expand technologies for integrated cropping and agroforestry to help farmers adapt. In 2021, the Climate Smart Agriculture project, directly linking with TNA objectives, was approved by the GEF for implementation, with a focus on strengthening the enabling environment to promote and integrate climate smart land-use approaches and practices into the land-use planning of Laos northern uplands.

By investing in climate smart approaches and technologies for inter-cropping, crop rotation, agroforestry, innovative forest restoration and non-timber forest products, combined with capacity building at the community level, the project will help farmers and local communities to build a more resilient agriculture sector.

The project grant amounts to 3.5 million USD and the co-financing amounts to 15 million USD. The co-financing comes from government bodies, the International Fund for Agricultural Development (IFAD), the World Food Program, the World Bank, the FAO, the Swiss NGO Helvetas and the German Corporation for International Cooperation. The project will be implemented by the Ministry of Agriculture and Forestry in conjunction with the FAO.

ADAPTATION MITIGATION AGRICULTURE CITIES

Sustainable livestock management

Photo: Bolatbek Gabiden (Unsplash.com)

ASIA

MONGOLIA

Mongolia is highly impacted by climate change, with average temperatures in the country that have risen by 2.1°C over the past seventy years. In addition, average rainfall is declining, and extreme weather events are becoming more frequent. This poses challenges to livestock production and managing the country's vast pasturelands – a large and traditional part of the Mongolian economy – an environment that is already fragile due to decades of often unsustainable herding practices leading to overgrazing.

In response to this, part of Mongolia's TNA prioritized the agricultural sector, with special attention being given to the husbandry sector and livestock production. Prioritized practices include selective livestock-breeding and sustainable pasture management.

Mongolia's Aimags and Soums Green Regional Development Investment Program addresses these technological needs as a priority. Designed as a comprehensive investment program, the project aims at improving Mongolia's rangeland degradation and overgrazing by promoting low-carbon, climate-resilient territorial development, and more efficient urban-rural linkages. The Program also directly supports herder groups to manage the rangelands sustainably by limiting the number of grazing animals and strengthening agribusiness value chains. The project has an initial focus on Mongolia's western province, but the climate finance and private sector investment mechanisms that it promotes are designed for sustainability and replicability across the country.

This Asian Development Bank project, which was approved in 2021, includes a 45 million USD grant and a 130 million USD loan from the GCF. Due to its cross-sectoral nature and inclusive design, it is estimated that it will benefit the whole of Mongolia's population of more than three million people and avoid more than 100 million tonnes of CO_2-equivalent emissions.

ADAPTATION AGRICULTURE

Sustainable land management

Photo: Karel Prinsloo/Arete/Rockefeller Foundation/AGRA (Flickr.com)

AFRICA

BURKINA FASO

Burkina Faso is struggling with the increased frequency and intensity of floods and droughts, as West Africa has gradually become a climate-change hotspot. In combination with higher temperatures, the negative effect on humans and economies of all countries in the region is growing. This is also the case in Burkina Faso, where climate-sensitive sectors such as agriculture and livestock play a large role in the economy and employment. While adapting to the new climatic conditions, Burkina Faso faces a fundamental need for climate services to safeguard its population's livelihoods.

Burkina Faso's adaptation TNA and TAP from 2017 focus on the agriculture and forestry sector. The TNA includes a detailed assessment of the cost-effectiveness of a range of adaptation technologies for the two sectors. As part of the TNA process, Burkina Faso developed TAPs for its priority technologies. For adaptation, one TAP focused on combining a traditional land rehabilitation practice invented by farmers in Burkina Faso, the so-called zai method, which uses stone barriers and assisted natural regeneration to limit soil erosion and manage water resources. A second TAP focused on using a special plough for the rehabilitation of pastures. Both of these TAPs are included in a new project funded by the Least Developed Country Fund (LDCF) under the GEF.

The project, which was approved in 2020 with the FAO as the implementing agency, is being funded through a 9 million USD grant and has acquired a total of 40 million USD in co-financing from Burkina Faso's Ministry of Agriculture and Hydro-Agricultural Development, IFAD, UNDP and the Climate Investment Fund. Among multiple components, the project will introduce climate-smart, locally adopted technologies, such as the Delfino plough, on 15,000 hectares of pasture and forested land to support the climate resilience of agro-sylvo-pastoral production systems by sustainably intensifying production.

ADAPTATION AGRICULTURE WATER

Water use efficient technologies

Photo: ssilberman (Flickr.com)

AFRICA

TANZANIA

In Tanzania, the agriculture and water sectors are being severely impacted by climate change, with rising temperatures and erratic rainfall patterns causing increasing droughts, floods, soil degradation and the spread of pests and diseases. In 2018, Tanzania completed its TNA and TAPs, where it identified agriculture and water as key priority sectors in order to build resilience to climate change. Improved seed varieties, water-saving technologies, drip irrigation and rainwater harvesting were among the priority technologies identified.

In June 2020, the GEF approved a project from Tanzania with a total value of 45 million USD, consisting of a grant of 4 million USD and co-financing of 41 million USD from the Government of Tanzania, the European Union, the FAO, the National Microfinance Bank Foundation, the Tanzania Forest Service Agency and several ministries. The project includes a focus on technologies prioritized in Tanzania's TAPs and aims to address the identified barriers to the transfer and diffusion of improved seed varieties and water-saving technologies.

One of the components of the project will introduce, test and promote water use-efficient technologies such as rainwater catchment, water tanks or small-scale irrigation systems for the agricultural sector. The target audience is forest and farm facilities, farmer field schools and producers' plots, which will also benefit from increased capacity and awareness through learning forums and training courses. Other components aim at improving the enabling environment for the uptake of adaptation technologies by enhancing the national and subnational capacities for the coordination, planning and implementation of projects, and for mainstreaming climate-change adaptation into the country's integrated landscape planning efforts.

The project will be implemented by the FAO, and the lead implementing entities will be the Vice President's Office and the Tanzania Forest Service Agency under the Ministry of Natural Resources and Tourism.

ADAPTATION AGRICULTURE FORESTRY LAND-USE

Resilient, productive and sustainable landscapes

Photo: P.Casier/CGIAR (Flickr.com)

AFRICA

MALI

While only about 14% of Mali's land area is suitable for agriculture, about 75% of the Malian population lives in rural areas and depends directly or indirectly on a productive agriculture. At the same time, Mali lacks much of the adaptive capacity to tackle current and future negative impacts of climate change. Increased demographic pressure from a poor and vulnerable growing rural population and the negative effects of climate change on the productivity of soils used for food production means that conflicts over scarcer natural resources are growing. The result is a rising threat to the food security of the Malian population.

Production and productivity of the agricultural sector, which consists mostly of rain-fed, small-scale family farming, is extremely vulnerable to changing climate conditions. On this basis, from 2012 Mali's TNA has recognized, addressed and prioritized appropriate technologies and developed TAPs to help cover some of the agricultural sector's technological needs. Among the priority technologies to be identified were fodder culture practices, land-management to prevent erosion due to surface run-off and the adoption of climate-resilient crops.

In 2019, the Malian Ministry of Agriculture, with the FAO and the Multi Trust Fund, received approval of a GEF project grant of 6.8 million USD, which includes a total co-financing of 28 million USD from the Islamic Development Bank, the Contrat Plan État-ADRS-Producteurs, the Land Development and Irrigation Water Supply Agency and the FAO. The project focuses on the Kayes region, including among others the priority technologies identified in the TNA and TAPs.

The project will include strengthened governance for climate-adapted agro-sylvo-pastoral food systems and sustainably managed productive landscapes by establishing a regional platform to engage multiple stakeholders. Another core aspect is the development of over twenty sustainable landscape management plans for demonstration sites. These will put local farmers in the position to adapt and build resilience to changing climatic conditions.

ADAPTATION AGRICULTURE FORESTRY LAND-USE

Forest and agricultural mosaic landscapes

Photo: Joe Nkadaani/CIFOR (Flickr.com)

AFRICA

ZAMBIA

Zambia struggles with high levels of food insecurity. Although being ideally situated to produce a wide range of crops, livestock and fish, given the diversity of the country's agroecological zones, crop outputs are generally low. In 2017, it was estimated that more than 350,000 people did not have regular access to food supplies. Small-scale farming of less than two hectares per household is widespread, leaving a substantial part of the Zambian population very vulnerable to temperature increase and droughts, both of which are exacerbated by climate change. While many also depend on forests to make a living, forest degradation and deforestation are also on the rise.

A conglomerate of organizations, including World Wildlife Fund (WWF) Zambia, the FAO and the LDCF, are combating these problems with a large-scale project, 'Climate Change Adaptation in Forests and Agricultural Mosaic Landscapes'. The project addresses the identified barriers for the transfer and diffusion of adaptation technologies in the agriculture and food-security sectors. For example, one component builds on the TAP to promote crop diversification, partly through the capacity-building and strengthening of stakeholder organizations.

The project targets households and forest and farm producer organizations to adopt climate-smart agriculture and forest management and develop environmentally sustainable business opportunities based on forest and farm products. Through the project, climate-resilient agriculture and forest-product value chains are identified and selected, and bankable business plans for climate-resilient technologies are developed.

In 2021 the project received approval from the GEF for a project grant of 7 million USD, together with an additional 33 million USD in co-financing from the Ministry of Agriculture, the Ministry of Lands and Natural Resources, and the FAO.

MITIGATION ENERGY

Solar PVs

Photo: Susana Ortega (Shutterstock.com)

LATIN AMERICA & THE CARIBBEAN

CUBA

Cuba aims to scale up its use and development of renewable energy sources in an effort to reduce both GHG emissions and its dependence on fossil-fuel imports for power generation. The Government of Cuba aims to install 700MWp in PV parks by 2030, thus contributing to the goal of having 24% of electricity generated from renewable energy sources by 2030, as stated in its NDC. Since 2012, fourteen grid-connected solar-power plants have been installed, but the share of renewable energy sources in the energy mix remains low, at only 5%.

In 2013, Cuba conducted a TNA, through which it identified grid-connected solar PVs as one of its eight priority technologies. In the TNA, Cuba specifically highlighted the need to strengthen awareness and capacity at the government level when it comes to the potential and benefits of renewable energy, with the goal to foster investments in the sector. In order to create awareness and capacity, and in line with the work carried out in the TNA, the Unión Eléctrica de Cuba and the United Nations Industrial Development Organization (UNIDO) collaborated on a GEF grant application in 2016. In 2018, the GEF approved the project for implementation with a total grant of 5.7 million USD.

The project aims to bridge the existing gaps in capacity to facilitate a greater and more effective uptake of international investments in grid-connected solar PV. In order to reach this goal, the project will deliver an assessment of the regulatory framework conditions for the admission of foreign capital for renewable energy projects and will develop targeted recommendations to facilitate foreign investments in renewable energy sources. In addition, a compilation of operational experience and best practices from solar PV investments will be made, together with a communication and dissemination plan to interact with the public on the topic of renewable energy investments. The project will also include a training component and will develop programs to enhance capacity and delivery skills for solar PV investments.

ADAPTATION MITIGATION MONITORING

Integrated Monitoring System
of Climate Change

Photo: Vivid imagery (Shutterstock.com)

LATIN AMERICA & THE CARIBBEAN

HONDURAS

Honduras is one of the most vulnerable countries to climate change, with a high exposure to climate-related hazards such as floods, droughts, landslides, tropical storms and hurricanes. The challenges associated with climate change are further magnified by social and economic inequalities as well as budgetary restrictions in the country. Honduras recognizes the importance of overcoming the impacts of climate change, necessary for the realization of its development goals and national security.

The country has therefore set, as a national priority, a target to increase its capacity to adapt to the adverse effects of climate change as well as to make a transformation towards sustainable development. To meet this target, the Government of Honduras represented by the Secretariat of Energy, Natural Resources and Environment and Mines (Mi-Ambiente), together with UNEP, developed a project with several components aiming at establishing an integrated monitoring system of climate change in Honduras.

This monitoring system also includes initiatives to improve data access and information, establishing country specific climate change indicators, a national financial mechanism and a programme to strengthen capacities and information exchange. The project builds upon the Honduras TNA as well as other national initiatives, and further states that it will 'support the implementation of prioritized strategies set out in the Honduras TNA'.

In 2020, the project was approved for implementation, and granted USD 1,050,000 under the GEF Capacity-building Initiative for Transparency (CBIT).

TECHNOLOGY NEEDS ASSESSMENT

Photo: Aaron Santelices (Unsplash.com)

Technology Needs Assessments and enhancement of institutional and organizational capacity

In TNAs, insufficient institutional and organizational capacity has been identified as one of the key challenges to the development, transfer and uptake of 52% of the prioritized technologies for both mitigation and adaptation. To tackle this challenge, countries often report the need to enhance efficiency in government procedures and processes and to foster capacity-building for government agencies and institutions through training programs.

In order to reinforce institutional and organizational capacities, countries such as Bhutan and Myanmar have recently used the outcomes of their TNAs in preparing the Capacity-building Initiative for Transparency (CBIT) proposals they have submitted to the GEF. CBIT was created to help strengthen the institutional and technical capacities of non-Annex I countries to meet the enhanced transparency requirements defined in Article 13 of the Paris Agreement.

In its TAP, Bhutan reported a need to strengthen coordination and communication between government bodies, especially when it comes to planning and decision-making to attract investment for adaptation technologies. In February 2021, the GEF accepted Bhutan's CBIT project concept, to be funded through a GEF project grant of 1.7 million USD and co-financing of 1.8 million USD from the Green Climate Fund, the FAO, the National Environment Commission and government agencies. Through the CBIT, the country aims to enhance its institutional frameworks, knowledge and capacities for the preparation, reporting and use of transparent information and to foster the enabling framework identified in the TNA.

Myanmar listed the need to strengthen coordination among stakeholders, including public and international organizations, especially with regard to information-sharing and joint resource mobilization, as a key enabler for technological development and deployment in its TAPs. To illustrate, in one of its TAPs the country reported that the weak coordination of activities among the relevant institutions was a barrier hindering the deployment of LED technologies. In 2019, Myanmar applied for a 1.5 million USD GEF grant with the goal of strengthening its institutional capacity. The CBIT project concept was approved by the GEF in July 2020. The CBIT project will be executed by Myanmar's Environment Conservation Department, which is also the TNA entity, and outputs from the TNA and TAPs will be continuously integrated into the CBIT process.

TNA TECHNOLOGY NEEDS ASSESSMENT

Photo: Lynn Friedman (Flickr.com)

Technology Needs Assessments and Nationally Determined Contributions

The information that TNAs provide about the potential, ability and scale of climate-change technologies can play a unique role in the formulation and implementation of NDCs through technology transfers. Actions identified in TAPs highlight what needs to be done to activate robust market systems and the enabling conditions for the transfer, diffusion and uptake of key technologies.

These actions can in turn strengthen longer-term strategies elaborated in NDCs and national adaptation plans (NAPs), as well as potentially increase ambitions by making the means of implementation more concrete. Some countries have already directly scaled results from the TNA or TAP through policy. To illustrate, over the past year, 20 out of 22 countries in the ongoing TNA Phase III project responded that their TNAs are already directly linked to their NDCs.

For Suriname, the eight technologies and actions within the water, infrastructure and housing, and agricultural sectors identified in their TNA are directly linked to how they intend to implement their NDC commitments. For Fiji, TNAs are listed as one of the processes that informed their NDC update from 2020. In Ukraine, the TNA project was used as one of the inputs in developing the new and more ambitious economy-wide emissions reduction target, which they will update in their upcoming NDC.

Furthermore, Dominica specified that its TNA results will appear directly in the country's Biennial Update Report and National Adaptation Plans. Nauru has stated that the TNA results will 'be used to inform the 3rd National communications'. In addition to the processes mentioned above, countries specify their national climate strategies and national plans and policies as key to the TNA process both in taking these as starting points and in using the TNA and TAP to feed into strategic planning and implementation.

Other countries that have completed their TNAs and TAPs or that are about to start them, and that have presented their TNAs as part of their updated NDCs, include Cambodia, the Dominican Republic, Moldova, Mongolia and Papua New Guinea.

TNA TECHNOLOGY NEEDS ASSESSMENT

THE GLOBAL TECHNOLOGY NEEDS ASSESSMENTS PROJECT, PARTICIPATING COUNTRIES

2009-2013

34 COUNTRIES

Africa and Middle East: Ivory Coast, Ghana, Kenya, Lebanon, Mali, Mauritius, Morocco, Rwanda, Senegal, Sudan, Zambia

Asia and CIS: Azerbaijan, Bangladesh, Bhutan, Cambodia, Georgia, Indonesia, Kazakhstan, Lao PDR, Moldova, Mongolia, Nepal, Sri Lanka, Thailand, Vietnam

Latin America and Caribbean: Argentina, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Peru

2015-2018

24 COUNTRIES

Africa and Middle East: Burkina Faso, Burundi, Egypt, Eswatini, Gambia, Jordan, Madagascar, Mauritania, Mozambique, Seychelles, Tanzania, Togo, Tunisia

Asia and CIS: Armenia, Kazakhstan, Lao PDR, Pakistan, Philippines

Latin America and Caribbean: Belize, Grenada, Guyana, Honduras, Panama, Uruguay

2018-2022

22 COUNTRIES

Africa: Benin, Central African Republic, Chad, Djibouti, Guinea, Niger, Liberia, Malawi, São Tome and Principe, Uganda

Eastern Europe: Ukraine

Asia and Pacific: Afghanistan, Fiji, Myanmar, Nauru, Vanuatu

Caribbean: Antigua & Barbuda, Dominica, Haiti, Jamaica, Suriname, Trinidad & Tobago

2020-2023

17 COUNTRIES

Africa: Comoros Union, Ethiopia, Guinea-Bissau, Lesotho, Somalia, South Sudan

Asia and Pacific: Kiribati, Maldives, Niue, Papua New Guinea, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Yemen

Caribbean: Bahamas, St. Kitts & Nevis

This is the fourth set of country stories from the TNA project. Learn more by reading previous stories, which are available on the TNA website.

More information about the global Technology Needs Assessment Project can be found at: www.tech-action.org/

More information about the global Technology Needs Assessment process under the UNFCCC can be found at: www.unfccc.int/ttclear/

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