From needs to implementation: Stories from the technology needs assessments

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FROM NEEDS TO IMPLEMENTATION:

STORIES FROM THE TECHNOLOGY NEEDS ASSESSMENTS

TNA TECHNOLOGY NEEDS ASSESSMENT

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TNA TECHNOLOGY NEEDS ASSESSMENT

FROM NEEDS TO IMPLEMENTATION:

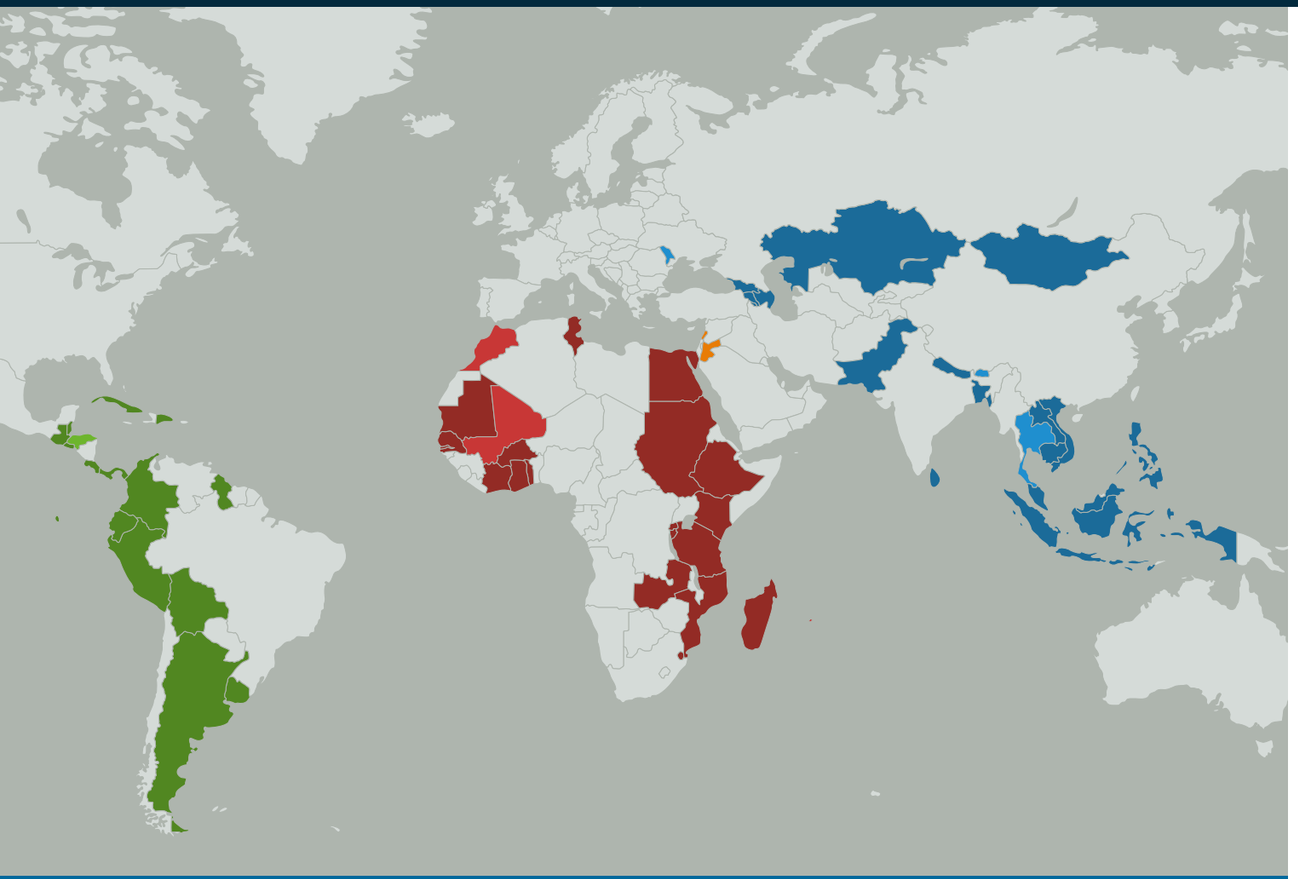
STORIES FROM THE TECHNOLOGY NEEDS ASSESSMENTS

25 years gef

UNEP DTU PARTNERSHIP

UNEP

TECHNOLOGY NEEDS ASSESSMENT



TECHNOLOGY NEEDS ASSESSMENT COUNTRIES

INTRODUCTION

TECHNOLOGY NEEDS ASSESSMENTS

Enhancing technology development, transfer, deployment and dissemination is a key pillar of the international response to climate change. As a result, and to support the implementation of the UNFCCC Paris Agreement, Parties to the UNFCCC are engaged in the elaboration of the technology framework to further promote and facilitate enhanced action on technology development and transfer, where the work on Technology Needs Assessments will play a key role in the implementation of environmentally sound technologies for mitigation and adaptation.

With funding from the Global Environment Facility, UN Environment, through UNEP DTU Partnership, supports developing countries to determine their technology priorities for the mitigation of greenhouse gas emissions and adaptation to climate change through the global Technology Needs Assessment project. The Technology Needs Assessments were directly referenced in the Paris agreement, requesting that the new technology framework should facilitate:

(a) The undertaking and updating of technology needs assessments, as well as the enhanced implementation of their results, particularly technology action plans and project ideas, through the preparation of bankable projects

(b) The provision of enhanced financial and technical support for the implementation of the results of the technology needs assessments[1]

[1] Decision 1/CP.21, para 67

The Technology Needs Assessment process is organized around three main activities:

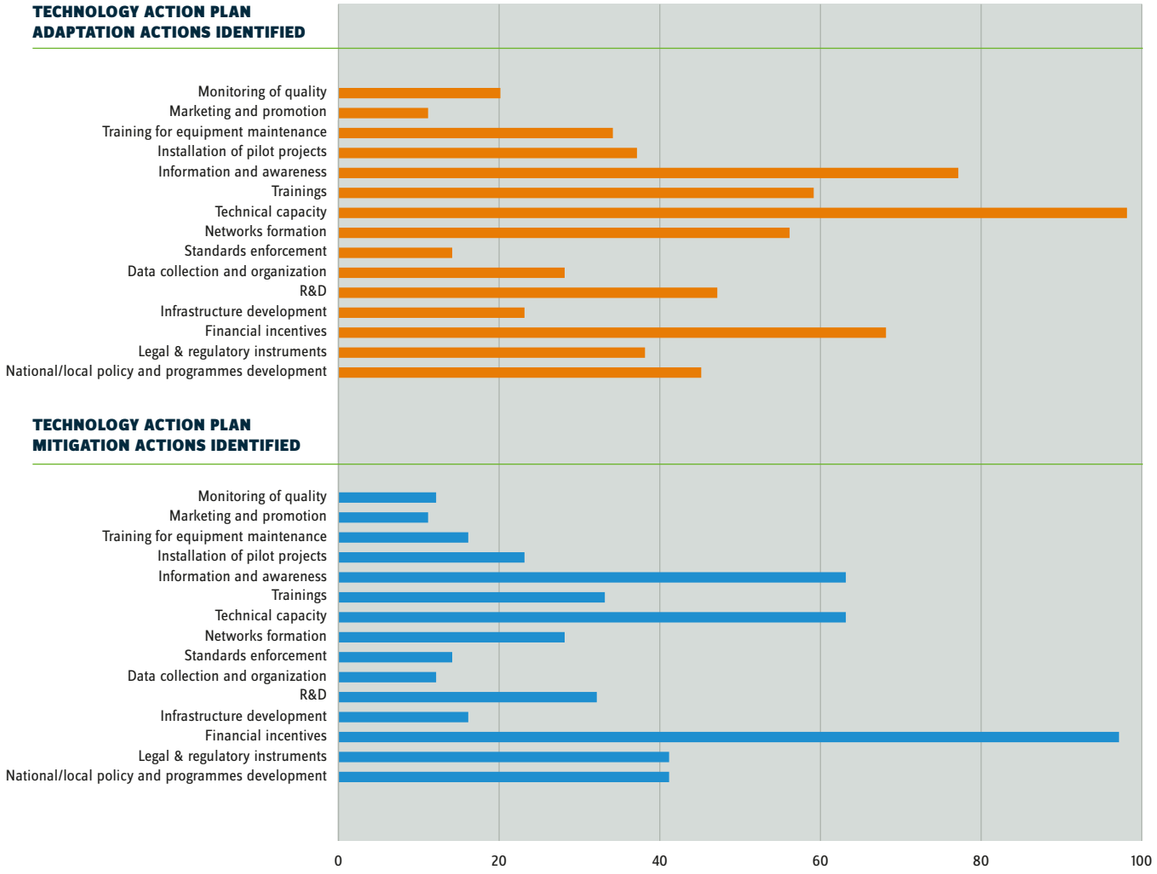
a) To identify and prioritise mitigation and adaptation technologies for selected sectors;
b) To identify, analyse and address barriers hindering the deployment and diffusion of the prioritised technologies, including the enabling framework for said technologies;
c) To conduct, based on the inputs obtained from the previous two steps, a Technology Action Plan, which is a medium/long term plan for increasing the implementation of identified technologies. The Technology Action Plan outlines actions to be undertaken, which are further elaborated as project concept notes.

TECHNOLOGY ACTION PLANS

Technology Action Plans provide a solid foundation towards the further development and implementation of the Technology Needs Assessment process, and are helpful in bridging the needs of developing countries and global support options.

The work on enhanced guidance for preparing Technology Action Plans was mandated to the Technology Executive Committee by the COP-20. The COP-20 recognized the need for the Technology Needs Assessment process to be improved in order to facilitate the implementation of the project ideas emanating from it, and requested guidance on how the results of the Technology Needs

TECHNOLOGY NEEDS ASSESSMENT



INTRODUCTION

Assessments could be developed into implementable projects. As a result of the work by the Technology Executive Committee, the Conference of Parties 21 in Paris welcomed the work on the Technology Action Plan guidance. The guidance was made available to developing countries and Technology Needs Assessment stakeholders for their use in early 2016[2].

Developing countries have already conducted more than 250 Technology Action Plans within the Technology Needs Assessment project (115 for mitigation and 149 for adaptation), which shared common elements among all action plans. These Technology Action Plans have been analyzed by the UNFCCC in order to provide comparable regional overviews (see Figure on page 4)[3]. The analyses were also undertaken to assess the implementation potential of Technology Action Plans, and to allow potential investors to consider what further effort is required to make Technology Action Plans fundable.

The Technology Action Plans for developing countries provide opportunities to use them for a range of different functions, including: using them as the basis for possible investment portfolios, facilitating further development through project preparation tools. The Technology Action Plans also provide opportunities for capitalizing on them by using their adaptation and mitigation benefits, and making other adaptation and mitigation processes, such as Nationally Determined Contributions and National Adaptation Plans, aware of their technology added value for national climate actions. Specifically, Technology Action Plans can be considered as a platform for Nationally Determined Contributions implementation.

This publication provides examples of how countries have used their Technology Needs Assessments, and specifically their Technology Action Plans, to advance implementation for environmentally sound technologies for mitigation and adaptation. It provides country-based examples from different regions and covers a range of sectors for both adaptation and mitigation.

This publication seeks to highlight how Technology Needs Assessments and Action Plans have been brought forward by countries, from developing Nationally Appropriate Mitigation Actions, to implementing hardware, such as rainwater harvesting, on the ground. What becomes clear from all of the examples, however, is that Technology Needs Assessments have provided an effective and solid foundation upon which countries can both scale-up and implement action on environmentally sound technologies for mitigation and adaptation.

[2] Enhancing Implementation of Technology Needs Assessments (2016), available at http://www.tech-action.org/Publications/TNA-Guidebooks and http://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TEC_column_M/33933c6ccb7744bc8fd643feb0f8032a/82af010d04f14a84b9d24c5379514053.pdf

[3] Implementation of Technology Action Plans of Developing Countries (2016), available at http://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TNA_HAB_info-box_2/3ff7e92c99774c2a91bc79052d2fa135/c7df29418ed74f638f54bb136d6cc968.pdf

ADAPTATION

WATER

TECHNOLOGY: Rainwater harvesting from greenhouse tops

THE MIDDLE EAST

LEBANON

Pumped water from artesian wells is a common source of irrigation and water for Lebanese farmers. However, in previous years the negative impacts of climate change have hit farmers hard, with the wettest months of the year not receiving the bulk of precipitation they used to. Subsequently, with the decrease in rainfall and snow quantities, artesian wells have not been recharged. As a result, farmers have to pump even deeper, exposing groundwater to the risk of salinization due to sea water intrusion, and over-exploiting water at a rate faster than its renewal.

Harvesting rainwater from greenhouse tops is one of the key technologies for adaptation identified through the Technology Needs Assessment process in Lebanon and recommended in its Technology Action Plan. However, the Technology Action Plan identified reduced cost-effectiveness of the technology when it is affected by limited rainfall as one of the key barriers for dissemination and scale up of the technology. On this basis, the United Nations Development Programme in Lebanon and the Lebanese Ministry of Environment have gathered the lessons learned from the installations in the three pilot sites of Choueifat, Kfarmashoun and Damour and documented them in guidelines targeted at all Lebanese farmers interested in replicating this rainwater harvesting technology. During one rainy season, the total amount of rainwater harvested from the top of the 14 greenhouses in the three pilot sites reached 999,981.91 m^3.

ADAPTATION AGRICULTURE

TECHNOLOGY: Adapting livestock systems through traditional rangeland management

THE MIDDLE EAST

JORDAN

Grazing rangelands cover 90% of Jordan's land area. While livestock management in one of the driest countries in the world has always been a challenge, recent climatic change is worsening the situation: not only are the rainfall patterns less predictable, but total volumes are decreasing. Previous mismanagement is adding to the issue, leading to desertification and depletion of ground water. When coupled with the fact that Jordan's population has almost doubled due to the refugee crisis in neighboring Syria, the issue of livestock feeding has turned into an acute crisis.

Accordingly, the Technology Needs Assessment identified grassland management as one of the agricultural priority sectors for adaptation. Jordan has a long tradition of community based grazing management, called "Hima", which had been abandoned and only recently revived in a GEF founded pilot project managed by International Union for Conservation of Nature and UN Environment.

Based on the Technology Action Plan proposed for the Agriculture Sector in Jordan, the Ministry of Environment is now developing a Concept Note for the Green Climate Fund to scale up this successful pilot project nationwide. This is one out of five GCF Concept Notes that Jordan is now developing with a project development capacity building support project from Climate Technology Centre and Network through UNEP DTU Partnership – all of which are based on the Technology Needs Assessment outcomes.

ADAPTATION AGRICULTURE **TECHNOLOGY:** Farmland contours

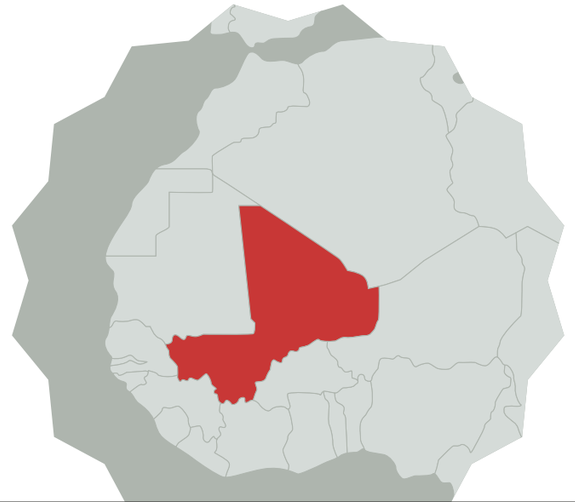
MALI

Dry years resulting in drought in the Sahel have had a large impact in Mali, particularly in the country's agricultural lands. The drought has resulted in a narrowing of the rainy season, as well as a decrease in the intensity of water volumes during the rainy season itself. The rainfall situation has both drained farmers' water dams, as well as contributed to the erosion of arable land.

To address this growing problem, field contouring was identified as a suitable technological solution. Field contouring helps prevent rainwater runoff and soil erosion.

Based on the recommendation from the Technology Action Plan, field contouring technology has been applied in Mali's rural Koutiala, with technical assistance from the Climate Technology Centre and Network. As an agricultural management technique, field contouring has reduced water runoff from 20 to 50%, depending on the soil type, with around a 30% increase in crop yields. However, the Technology Action Plan highlighted technology awareness as an essential barrier, and additional training is needed before technology uptake can increase.

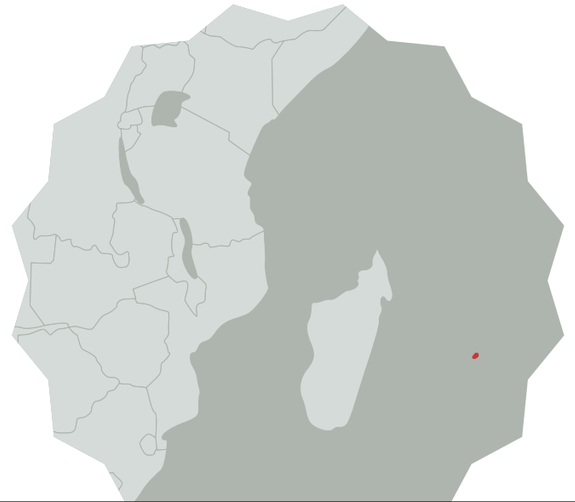
The Institute of Rural Economy, Mali, is working towards alleviating this barrier by collecting data on technology uptake, and offering staff trainings.



MITIGATION ENERGY **TECHNOLOGY:** Energy efficient boilers

MAURITIUS

The dependence of Mauritius on imported fossil fuel is around 84%, and depending on the price of fuels, the share of its energy bill for total importation has varied between 14% and 21% over the past five years. Furthermore, energy efficiency targets for the combustion of fossil fuels in stationary applications do not exist. To address these issues, Mauritius prioritised energy efficient boilers using waste heat recovery for climate change mitigation as part of their Technology Needs Assessment process, with the annual CO_2 emission reduction calculated at 17.9 $ktCO_2$ for retrofitted boilers.



However, during the Technology Needs Assessment process, high upfront capital costs were identified as a main impediment for the widespread diffusion of boiler economizers, in addition to low awareness of the technology and lack of technical expertise. In order to overcome these barriers, the Technology Action Plan supports the uptake of boiler economizers through measures such as the provision of energy audits, a rebate scheme on capital investment, and training of energy managers, as well as the provision of financial and banking services, energy efficiency promotion services, and consulting services.

Based on the recommendations from the Technology Action Plan, boiler economizers are the technology focus for a Global Environment Facility climate change mitigation project, as part of a broader project design addressing energy efficiency in industries. The Technology Action Plan provides a sound basis for justifying the focus on the improved energy efficiency of boilers using waste heat recovery, and will act as a source of useful baseline data for the project.

MITIGATION ENERGY **TECHNOLOGY:** Solar photovoltaic

MOROCCO

AFRICA

Morocco has focused its mitigation efforts on the energy sector, with the goal of reaching over 50% installed electricity production capacity from renewable sources by 2025. Moreover, 42% of electrical power should come from renewable sources, of which 14 % should be from solar energy. Under the national Technology Needs Assessment process, solar technologies were thus prioritized and analyzed as a priority group of technologies.

Based on the outcomes of the Technology Needs Assessment process, a Nationally Appropriate Mitigation Action on photovoltaic technology in the household sector was developed under the Facilitating Implementation and Readiness for Mitigation project. The purpose of this project is to encourage the implementation of the national solar pumping programme, while also expanding its scope. Between 2015 and 2025, 30,000 pumps will be installed, helping to develop a structured and professional solar pumping supply sector in the country. Furthermore, Morocco has developed an ambitious Energy Strategy where mitigation and the promotion of renewable energies are considered high priority.

This case demonstrates how Technology Action Plans can act as a basic building block for enhanced mitigation action, giving countries the foundation necessary to scale up prioritised technologies.

ADAPTATION HEALTH

TECHNOLOGY: Medical emergency care and rehabilitation

ASIA AND CIS

MOLDOVA

The Government of Moldova implemented key elements of the country's Technology Action Plan for climate change adaptation in the health sector, following the extreme heat experienced during the summer of 2016. Daytime temperatures peaked above 35 degrees in late July, far above the seasonal average, prompting Prime Minister Pavel Filip to call a meeting of the heads of the country's emergency services to decide how best to respond to the crisis brought on by the extreme heat.

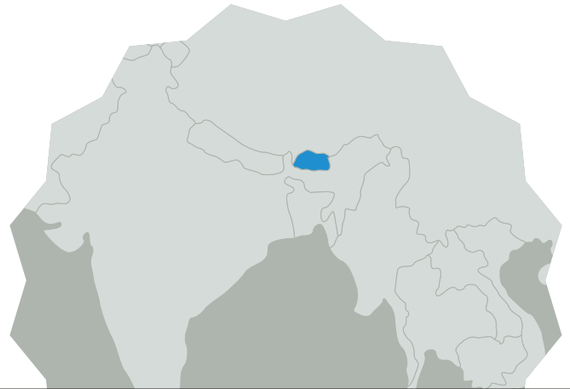
Given the increased likelihood of extreme weather events in future, the Prime Minister instructed the Ministries of Health, Education, Interior and local authorities to put in place more medical emergency care and rehabilitation measures, including public information campaigns and education for school children about the risks associated with extreme weather. All of these measures were detailed in the country's Technology Action Plan for the health sector, which was finalized in 2013.

This experience shows how the information generated through the Technology Needs Assessment process can lead to practical, life-saving, solutions. In particular, it shows how simple, clear and low-cost technologies can be implemented rapidly to address short-term issues while building longer-term resilience to climate change.

MITIGATION TRANSPORT **TECHNOLOGY:** Intelligent Transport Systems

BHUTAN

In recent years, the Kingdom of Bhutan has experienced increasing population growth and migration into urban areas. This growth has had a major impact on the transport sector and mobility needs of its citizens, and has resulted in more private and public vehicles on the roads, leading to an increase in congestion, air pollutants, noise pollution, traffic accidents and greenhouse gas emissions. Greenhouse gas emissions from the transport sector were identified as the highest (44%) in energy related greenhouse gas emissions in Bhutan and are mainly due to fuel combustion. Moreover, the number of vehicles registered in Bhutan is increasing at an average of 10% annually, leading to further greenhouse gas emissions growth from this sector in future.



To address this growing problem, Bhutan's Technology Action Plan identified Intelligent Transport Systems as a priority technology. Intelligent Transport Systems are designed to improve the operational and managerial efficiency of transport systems in general, and public transport in particular, leading to a reduction in associated greenhouse gas emissions. Bhutan's Technology Action Plan sets specific targets for the period 2013-2018, with the goal of implementing Intelligent Transport System technologies in the existing Regional Transport Offices.

Bhutan was able to use the Technology Action Plan as the basis for its application to the Climate Technology Centre and Network for supporting the implementation of Intelligent Transport Systems. The Climate Technology Centre and Network supported Bhutan through training and field visits on Intelligent Transport Systems, as well as with additional training on developing a Nationally Appropriate Mitigation Action for furthering Intelligent Transport System implementation.

ADAPTATION AGRICULTURE **TECHNOLOGY:** Decision support system freeware

ASIA AND CIS

THAILAND

Thailand's Technology Needs Assessment was incorporated into the Thailand Climate Change National Plan for 2015-2050.

The National Science Technology and Innovation Policy Office, in cooperation with the National Centre for Genetic Engineering and Biotechnology, identified agriculture as the most vulnerable and important sector during the development of the Technology Action Plan. The Technology Action Plan identified precision farming as a priority technology for the agricultural sector, with decision support systems and training being key components for technology transfer. The Technology Action Plan was thus opened to consultation by various stakeholders, in order to assess policy feasibility and recommendations for identifying specific first-step actions for the Thai government.

These stakeholder consultations and the subsequent policy recommendations that emerged from the Technology Action Plan were adopted by the National Committee on Climate Change in October 2016, and resulted in the development of a pilot project to develop decision support system freeware for farmers. The pilot project is due to be officially launched in 2017 by the National Science Technology and Innovation Policy Office.

MITIGATION AGRICULTURE **TECHNOLOGY:** Sustainable livestock production

LATIN AMERICA

HONDURAS

Honduras prioritised sustainable livestock production as part of its Technology Needs Assessment for the agricultural sector. This was in response to the country's policy to increase the cattle population, which has seen a decline in the past two decades following a series of hurricanes and the growing trend of converting pasture into palm tree plantations. However, in order to scale up the livestock sub-sector sustainably and in line with greenhouse gas emissions targets, Honduras included the ambition to develop a Sustainable Livestock Nationally Appropriate Mitigation Action as one of the actions in its Technology Action Plan, which should include different practices considered important for greenhouse gas emission reductions.

The Nationally Appropriate Mitigation Action for livestock in Honduras is now in the process of being designed. It focuses on the improvement of animal feed through pastures and fodder banks, genetic improvement, veterinary programs, and improved farming systems that include the production of incentives in finance and marketing structures as strategies for livestock repopulation. These strategies were initially identified in the Technology Needs Assessment for Honduras, which was still under development as work began on the Nationally Appropriate Mitigation Action.

This example demonstrates not only how the Technology Needs Assessment can inform other planning tools, but how planning tools can develop in tandem, with feedback from each other.

TECHNOLOGY NEEDS ASSESSMENT

TECHNOLOGY NEEDS ASSESSMENTS PROJECT, PHASE I

The Technology Needs Assessments project supported 36 countries between 2009 and 2013. Technology Needs Assessments reports were submitted by 11 countries in Africa and Middle East, 13 countries in Asia and Eastern Europe, and 8 in Latin America and Caribbean. These countries were:

Africa & Middle East: Cote d'Ivoire, Ghana, Kenya, Lebanon, Mali, Mauritius, Morocco, Rwanda, Senegal, Sudan, Zambia, Ethiopia
Asia & CIS: Azerbaijan, Bangladesh, Bhutan, Cambodia, Georgia, Indonesia, Kazakhstan, Lao PDR, Moldova, Mongolia, Nepal, Sri Lanka, Thailand, Vietnam
Latin America & Caribbean: Argentina, Bolivia, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Peru

TECHNOLOGY NEEDS ASSESSMENTS PROJECT, PHASE II

The Technology Needs Assessments project, Phase II, was launched in November 2014 and will support the preparation of Technology Needs Assessments in 26 countries. Two additional countries that participated in TNA Phase I will be supported in concluding their Technology Action Plans. The Phase II countries are:

Africa & Middle East: Burkina Faso, Burundi, Egypt, Gambia, Jordan, Madagascar, Mauritania, Mozambique, Seychelles, Swaziland, Tanzania, Togo, Tunisia
Asia & CIS: Armenia, Malaysia, Philippines, Pakistan, Kazakhstan, Lao PDR
Latin America & Caribbean: Belize, Bolivia, Grenada, Guyana, Honduras, Panamá, Uruguay

TECHNOLOGY NEEDS ASSESSMENTS PROJECT, PHASE III

Phase III of the Technology Needs Assessment project has been approved by the Global Environment Facility and will include 20 countries. The participating countries are Least Developed Countries and Small Island Developing States.

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

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

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