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Technology Executive Committee

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Potential application of South-south and Triangular cooperation to assist countries in implementing nationally determined contributions and national adaptation plans

Cover note

I. Introduction

A. Background

1. The TEC has been working on exploring the issues of South-South cooperation (SSC) and triangular cooperation (TrC) on technologies for adaptation. At its 14th meeting the TEC agreed to undertake an analysis of potential SSC and TrC in assisting countries in implementing their nationally determined contributions (NDCs) and national adaptation plans (NAPs) starting in 2018. This work is to be undertaken jointly by TEC task forces on adaptation and mitigation.

2. At TEC 16 the TEC requested the taskforces, in undertaking this work, to explore possible collaboration with the UNOSSC exploring possible collaboration with the United Nations Office for South-South Cooperation (UNOSSC) on the possible preparation of a joint publication and engagement in regional events to raise awareness and seek feedback on South-South cooperation issues.

3. The task forces on adaptation and mitigation, in collaboration with UNOSSC and with the support of an expert and secretariat, has prepared a draft joint publication on the matter, taking into account guidance provided at TEC16 as well as key findings from two events jointly organised by the TEC and UNOSSC during the Asia Pacific Climate Week in Singapore (13 July 2018)[1] and Latin America Climate Week in Uruguay (20 August 2018).[2]

B. Scope of the note

4. The annex to this note contains a draft joint publication on potential of SSC and TrC on climate technologies for implementing NDCs and NAPs.

C. Possible action by the Technology Executive Committee

5. The TEC will be invited to provide guidance on this work and provide comments on the draft publication, with a view to finalizing it after TEC 17.

[1] http://unfccc.int/ttclear/events/2018_event4; https://www.unsouthsouth.org/2018/08/02/asia-pacific-steps-south-south-cooperation-and-technological-cooperation-for-climate-action-and-sustainable-development/

[2] http://unfccc.int/ttclear/events/2018_event6; https://www.unsouthsouth.org/2018/08/21/latin-american-and-caribbean-region-is-engaging-in-south-south-cooperation-for-climate-action/

Annex

Draft joint publication on potential of South-south and Triangular cooperation on climate technologies for implementing nationally determined contributions and national adaptation plans

Potentials of South-South and triangular cooperation on climate technologies for implementing NDCs and NAPs

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Foreword from the Executive Secretary of the United Nations Climate Change Secretariat

[Under preparation]

Foreword from the Director of the United Nations Office for South-South Cooperation

[Under preparation]

1. Highlights

- There is a growing recognition of the potential of South-South cooperation (SSC) and triangular cooperation (TrC) to facilitate technology development and transfer for climate action in developing countries under the Paris Agreement.

- Thematic areas identified as most promising for technology cooperation using South-South and triangular channels include agriculture, disaster risk reduction, renewable energy and energy efficiency, forestry, transport, water resources, and waste management.

- There is a great variety of SSC and TrC models. While commonly initiated at the national level, SSC and TrC projects mostly involve various stakeholders in the implementation, including local governments, civil society organizations, research and training institutions and the private sector.

- Several developing countries adopted national policies on SSC on climate change, integrated elements on climate change SSC in national development plans and strategies or established SSC climate change funds and other dedicated cooperation mechanisms.

- The United Nations System is increasingly coordinating its efforts on supporting SSC and TrC for climate action and individual United Nations entities are expanding their work in this area.

- Many South-South and triangular climate change technology cooperation initiatives include such components as peer-to-peer learning, endogenous capacity-building and cultural exchanges.

- A bottom-up approach that uses local practices and indigenous knowledge as a starting point for designing climate technology-related interventions is becoming a norm for SSC and TrC.

- While cooperation on climate technology may be successful at the project level, lack of financial resources may hinder the scaling-up and regional replicability of the technology as well as the sustainability of the project.

- The establishment of a centralized hub with information on completed, ongoing and planned SSC and TrC projects on climate change mitigation and adaptation technologies would increase visibility of, and promote, SSC and TrC as effective means to accelerate climate action and support the implementation of NDCs and NAPs.

- To further increase effectiveness and long-term sustainability of SSC and TrC projects on climate technology transfer and their contribution to the implementation of NDCs and NAPs, future projects could include such components as research and development; adoption of policies and regulations; and creation of local value chains.

- International financial institutions could consider establishing dedicated windows or allocating funds to support SSC projects with involvement of developing countries interested to serve as providers of technologies for climate change adaptation and mitigation.

2. Concepts and definitions

- Climate technology is any "piece of equipment, technique, practical knowledge or skills" that supports to address climate change (IPCC 2000).

- South-South cooperation is a "broad framework of collaboration among countries of the South in the political, economic, social, cultural, environmental and technical domains. Involving two or more developing countries, it can take place on a bilateral, regional, intraregional or interregional basis. Developing countries share knowledge, skills, expertise and resources to meet their development goals through concerted efforts" (UNOSSC 2018a).

- Triangular cooperation is "collaboration in which traditional donor countries and multilateral organizations facilitate South-South initiatives through the provision of funding, training, management and technological systems as well as other forms of support" (UNOSSC 2018a).

3. Introduction

Background

The Technology Executive Committee (TEC) is the policy arm of the Technology Mechanism of the United Nations Framework Convention on Climate Change and the Paris Agreement, mandated to, inter alia, promote and facilitate collaboration on the development and transfer of technologies for mitigation and adaptation between governments, the private sector, nonprofit organizations and academic and research communities (decision 1/CP.16, para 121(d)). In accordance with this mandate and acknowledging the pivotal role that collaboration between governments and relevant institutions in developing countries can play in advancing the proliferation of climate technologies, the TEC included South-South and triangular technology cooperation in its rolling work plan, considered this matter in every TEC meeting and developed related knowledge products (TEC 2016, TEC 2017a, TEC 2017b).

There is a growing recognition world-wide of the potential of SSC and TrC to accelerate climate action in developing countries. Fifteen developing countries refer directly to SSC in their NDCs (UNFCCC 2018a). Eight of these countries mention that they consider SSC a suitable complement to North-South cooperation for both mitigation and adaptation actions, in particular regarding technology transfer and innovation as well as capacity-building (UNCPGS 2017). SSC and TrC are also mentioned by thirty-two developing (UNFCCC 2018b) and five developed countries (UNFCCC 2018c) in their latest national communications to the UNFCCC as well as biennial update reports (UNFCCC 2018d) and biennial reports (UNFCCC 2018e).

WIn this context, the TEC agreed at its 14th meeting in 2017 to undertake an analysis of the potential that SSC and TrC offer for assisting developing countries with implementing their Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs). In 2018, at its 16th meeting, the TEC considered a report by its taskforces on mitigation and adaptation on the preliminary work done on this matter, and agreed to continue these efforts. To enrich this work and align it with the broader development agenda, the TEC entered into a partnership with the United Nations Office for South-South Cooperation (UNOSSC). This publication is the first fruit of collaboration between the two entities; it benefits from deliberations at the workshops on SSC and TrC

for climate action and sustainable development jointly organized by the TEC and UNOSSC in conjunction with the Asia-Pacific and Latin American and Caribbean climate weeks 2018

Objectives

This publication aims to provide insights on trends and good practices as well as barriers to, and enablers of, SSC and TrC on climate technologies. The eight case studies offered in this publication provide concrete examples of SSC and TrC on climate change adaptation and mitigation through technology development and transfer in the areas of agriculture, coastal zones, early warning, transport, energy and waste. The publication concludes with recommendations for making better use of the potential of SSC and TrC in these areas for advancing the implementation of NDCs or NAPs.

Target audience

The publication is targeted at policy-makers and practitioners in developing and developed countries who are involved or interested in making use of SSC and TrC for advancing climate action in line with priorities contained in NDCs and NAPs.

Methodology

This publication has been developed based on a review and analysis of NDCs, NAPs and the latest national communications, biennial update reports and biennial reports of Parties to the UNFCCC, available literature on SSC and TrC on climate technologies, and insights from interviews and a survey conducted in June and July 2018.

Based on questionnaire and interview responses and desk research with a view to including cases from different thematic areas and geographic regions, while covering both adaptation and mitigation technologies. For each case study, thematic areas of SSC and TrC projects correspond to priorities of participating countries as outlined in their respective NDCs and NAPs.

In line with the SSC principle of mutual benefit, participating countries, territories and organizations have not been classified by their function (i.e. provider or recipient of support) nor by their specific contribution (e.g. funds, technology, orgware, capacity building, etc.). In the context of TrC projects, developed country partners or multilateral organizations provide support for SSC in various forms. The display of information in this manner follows the approach taken by the TEC in its last publication on SSC and TrC (TEC 2017b).

4. Case studies

4.1. South-South cooperation on climate technologies

4.1.1. Sharing the Cuban model for risk reduction management centers with other Caribbean islands

Participating countries/territories: British Virgin Islands, Dominican Republic, Guyana, Jamaica, and Trinidad and Tobago

Context

The topography, tectonic setting and location make the Caribbean region highly prone to natural hazards such as tropical cyclones, floods, volcanic and seismic activities, droughts and forest fires in addition to industrial

accidents and epidemiological threats. With the likelihood that climate change will exacerbate the frequency and intensity of the yearly extreme events and natural hazards, comprehensive measures are needed to protect at-risk communities.

Project

In response to hydro-meteorological threats, the Cuban Government has collaborated with UNDP Cuba and UNDP's Caribbean Risk Management Initiative (CRMI) since 2005 to create the Risk Reduction Management Centre (RRMC), a model of local risk reduction management. At the heart of the model is the promotion of local level decision-making that relies on coordinated early warning systems, risk and vulnerability studies, communications systems, effective database management and mapping, geographic information systems (GIS), and community preparedness (UNDP 2015a and UNDP 2015b).

The Cuban RRMC model serves as an instrument to ensure that disaster management and development practices in any given territory are informed by an analysis of risk and vulnerability. In addition, each RRMC supports isolated and far-flung communities that may not have access to information so that they can prepare for an approaching threat. Communities are provided with equipment and training to identify, reduce and communicate risk, as well as take effective protective measures.

The RRMC model has generated widespread interest in the region and led to groundbreaking SSC. Starting in 2009, the lessons learned while implementing RRMC in Cuba have been offered to other Caribbean islands. The British Virgin Islands, the Dominican Republic, Guyana, Jamaica and Trinidad and Tobago were selected as pilot countries and territories for the replication of the Cuban experience and all received support via tools, regional training workshops, technical assistance and pilot initiatives. Cuba, in collaboration with UNDP Cuba and CRMI, worked with these countries and territories to adapt the model to their respective national contexts, strengthening risk reduction practices. The long-term objective of this SSC was to strengthen local disaster management systems and planning, in the context of a changing climate.

The transfer of knowledge and practices from Cuba to the pilot countries was carried out using various approaches such as building local capacity for risk assessment at the local level, improving coordination at the national level, enhancing community-based early warning systems and practical training of personnel from recipient countries in Cuba.

Impacts and results

The initiative has proved successful and adaptable to all participating countries while taking into consideration their local contexts:

- In Jamaica, early warning points were established in two locations: Old Harbor and Linstead. In addition, a central activity of the Jamaican pilot project was the development of the Disaster Risk Information Platform in St. Catherine Parish. The user-friendly platform enables improved management of disaster risk information to be used to further community planning, development and disaster risk reduction efforts.
- In the Dominican Republic, national counterparts developed an emergency plan, a contingency plan for floods and an action plan for disaster risk reduction in community development.
- In Guyana, an awareness raising workshop was held with stakeholders from various agencies, in which pilot sites were identified to establish RRMCs. Lenny Moses, Board Chair in Villa Massara, Guyana, considers that "the project has helped us to better reduce the impact of any disaster, because we now know how to monitor, report floods, and when to inform the population and how to act."

- In the British Virgin Islands, the Anegada Zonal Disaster Management Team was established. The team's role is to roll out the disaster risk reduction programme for the island, coordinate regular general meetings and ensure close collaboration with the district officer responsible for Anegada.
- In Trinidad and Tobago, the project was largely focused on capacity-building in GIS and early warning. Training was directed at specific groups and included participatory exercises in order to both extract community information and ground the topic in the local context. According to Shelly Brandshaw, Mitigation Manager, Office of Disaster Preparedness and Management, Trinidad and Tobago "It is a bottom-up approach, ideal for disaster risk reduction. It is the right framework to build resilience at the community level."

Lessons learned

To ensure the applicability of the Cuban model of RRMC in other Caribbean islands, a two-fold approach based on a thorough understanding of both demand and supply was implemented.

On the demand side, the needs of local authorities and other stakeholders for enhanced disaster risk management systems were well articulated and aligned with development priorities in the context of climate change.

On the supply side, the tools, methodologies and capacities of the provider country Cuba were evaluated and verified to ensure that the experience and knowledge can be transferred.

The Cuban model was then adapted to local contexts of recipient countries, based on the understanding of the articulated demand and the supply capacity.

This approach could be considered a good practice for a variety of SSC and TrC initiatives.

Long-term sustainability, replicability and a potential for up-scaling

To set the ground for long-term sustainability, RRMCs in recipient countries were built on existing networks and management systems with a broad involvement of stakeholders active in risk information and planning. Since a strong political commitment and country ownership are crucial for sustaining project activities beyond its duration, the emphasis was placed on empowering local governments to plan and implement disaster risk management systems and effectively interact with vulnerable communities.

The high replicability potential of the RRMC model has been proven in the six pilot countries. Lessons learned from the project implementation are well documented and the respective tools, methodologies, guidelines and practices are tested and verified. The initiative is therefore a prime candidate for world-wide scaling-up through SSC and TrC or through other channels.

"The UNDP-supported RRMC experience represents a model whose effectiveness has been proven in Cuba and the Caribbean region. It provides governments with an effective tool for Disaster Risk Reduction (DRR). However, its contributions go far beyond DRR to cover effective mechanisms that facilitate government management in other areas as well." (Claudio Tomasi, UNDP Deputy Resident Representative, Cuba).

Alignment with priorities outlined in NDC/NAP of the beneficiary countries

Due to particular vulnerability of small island developing States to weather-induced hazards, the pilot Caribbean countries identified the issues relating to early warning and disaster risk management systems among priorities in their national strategic and planning documents, including NDCs.

4.1.2. Samoa adopts agricultural practices from China

Participating countries: Samoa and China

Context

Samoa has a small and developing economy, which depends heavily on natural resources, both for the sustenance of its people and future economic expansion. Samoa's main economic sectors are agriculture and fisheries, with tourism rapidly becoming an important factor in the country's development. Higher temperatures, changing rainfall conditions, heavier winds and sea-level rise were identified as key challenges associated with climate change, which increase the vulnerability of the agricultural sector in Samoa. These climate-related stresses cause farmers significant financial hardship and disrupt food supply for local and export markets (MNRE 2010).

Project

The project, initiated at the request from the Government of Samoa to China, aims to strengthen resilience of rural communities and smallholder farmers by stabilizing food security and decreasing reliance on import and aid. Phase one of the project focused on demonstration and showcasing of Chinese technologies that could be adopted by farmers in Samoa. Phase two resulted in the construction of ten advisory centers. During phase three China assisted Samoa in restoring agricultural infrastructure damaged by cyclone Evan in 2012. The purpose of phase four, which started in June 2017 and will continue for three years, is to deploy the workable technologies for vegetable production demonstrated and tested during the previous phases of the project to other parts of Samoa.

Impacts and results

Chinese experts and extension workers transferred their knowledge to about one hundred demonstration farm households; carried out large-scale training activities aiming to equip 6,000 local technicians and farmers with know-how and skills to diversify and grow climate-resilient crops; assisted farmers in piloting organic farming; upgraded the China-Samoa Agricultural Technology Demonstration Centers[1]; and established a platform for agricultural exchange. Practical learning started with a visit of local farmers to a China-Samoa Agricultural Technology Demonstration Center, where they received hands-on training on vegetable cultivation techniques. Then farmers learned how to construct vegetable tunnel houses in their villages and benefit from continued technical support from Chinese extension services.

Long-term sustainability, replicability and a potential for up-scaling

The Embassy of China in Samoa is willing to cooperate further with the Ministry of Agriculture and Fisheries to develop long-term and sustainable training programmes for farmers in agricultural technology.

There is demand for more demonstration centers using simple agriculture technology and technical expertise in climate-resilient crops to be established in the wider Pacific. The investment in climate-resilient agriculture programming and capacity-building improves not only efficiency but productivity to ensure food security in the Pacific.

Alignment with priorities outlined in NDD of the beneficiary country

Agriculture is highlighted as one of the priority areas in Samoa's NDC.

[1] See video documentary on Chinese Agricultural Technology Demonstration Center in Samoa at: https://www.youtube.com/watch?v=71uBVU0sKyQ.

4.1.3. South-South cooperation at the city-level in India, Indonesia and South Africa

Participating countries: India, Indonesia, South Africa

Context

Exponential population growth coupled with rapid economic development of many cities in the South require smart solutions to ensure access to clean and affordable energy for all. Both Indonesia and South Africa are at a stage where national policies on climate change mitigation have been formulated, and it is time for cities to begin taking concrete action.

Project

ICLEI – Local Governments for Sustainability (ICLEI), an international association of local governments committed to sustainable development, developed a Local Renewables initiative which steers city governments to integrate energy efficiency technologies and renewable energy generation into all city activities (ICLEI 2018a). The project cities of Ekurhuleni, South Africa, and Yogyakarta, Indonesia, joined the Local Renewables network to promote knowledge exchange between the cities and increase the uptake of renewable energy and energy efficiency technologies at the local level. Municipal authorities of Ekurhuleni and Yogyakarta were guided by the city of Coimbatore in India, an established Local Renewables city (ICLEI 2018b).

The objectives of the project were to develop two model local renewables initiatives in the project cities with support from India and to facilitate the adoption of similar initiatives in other South African and Indonesian cities. Project activities included:

- Assess each project city's greenhouse gas emissions inventory to identify priority interventions;
- Develop an action plan for each city to adopt renewable energy and energy efficiency initiatives in line with national policies;
- Establish a multi-stakeholder steering committee;
- Identify financial sources for implementation and relevant demonstration projects;
- Implement a pilot project in each city and showcase the process and results to observer cities through country workshops;
- Develop a local renewable energy resource center for each city showcasing local initiatives and products;
- Develop a country-specific Solar Cities Guidebook to actively promote renewable energy proliferation.

Impacts and results

Upon the completion of the three-year project:

- Starting impetus was provided for major cities in South Africa and Indonesia to work towards national and international energy efficiency and emission reduction targets;
- Long-term action plans were put in place following an analysis of opportunities to reduce energy use and related CO2 emissions;
- Potentials were identified for renewable energy and energy efficiency technologies to improve delivery of municipal services;
- Communities were catalyzed into adopting renewable energy and energy efficiency initiatives at the household level thanks to resource centers showcasing case studies.

The inauguration of the "Yogyakarta Renewable Energy and Energy Efficiency Resource Centre" marked one of the milestones achieved by the city. "Space has been allotted for the Resource Centre in one of the main city halls where electricity bills are paid to ensure good visibility" commented Dr. H. Haryadi Suyuti, Mayor of Yogyakarta, emphasizing the importance of disseminate information on benefits of renewable energy and energy efficiency to the general public.

Lessons learned

The SSC approach ensured a shortened learning curve for participating municipal authorities through practical guidance and experience exchange with the Indian "resource city" of Coimbatore.

Long-term sustainability, replicability and a potential for up-scaling

The engagement of local governments and the integration of renewable energy and energy efficiency solutions in local development plans were the means to ensure long-term sustainability of the project impacts.
The next steps for South Africa and Indonesia are to promote the Solar City Guidebooks, developed under the project, at the national and local level. Possibilities will also be explored for the two project cities to transform into "Solar Cities" following a model developed and implemented in India with support from the Ministry of New and Renewable Energy of India (ICLEI 2918b).

Results and lessons learned from the project were presented and discussed at the closing workshop with the participation of municipal authorities from other cities from Indonesia and South Africa to encourage its replication.

As an important outcome of the project, ICLEI's capacity was strengthened to roll out similar initiatives on a wider scale.

Alignment with priorities outlined in the NDCs of the beneficiary countries

Renewable energy and energy efficiency are identified among the priorities in NDCs of Indonesia and South Africa.

4.1.4. Advancing low-emission transportation in Ethiopia

Participating countries: China, Djibouti and Ethiopia

Context

Ethiopia's NDC (UNFCCC 2018f) is based on the country's national Climate-Resilient Green Economy strategy (CRGE) (Ethiopia 2018), which has been pursued since 2011 and includes a target of ten per cent in emission reductions from the transport sector by 2030. In order to achieve this CRGE and NDC target, Ethiopia has been embarking on ambitious actions to reduce transport emissions by increasingly moving passenger and freight transportation from road to rail.

Projects

Ethiopia entered in a SSC partnership with China for the realization of two major railway projects, namely, the electrified standard gauge railway line from its capital, Addis Ababa, to Djibouti and the Addis Ababa Light Rail Transit (LRT). The Ethiopia-Djibouti railway now connects landlocked Ethiopia via a 759km route from Addis Ababa to the Port of Doraleh in Djibouti, which handles about 95 per cent of Ethiopia's international trade. This USD 5.1 billion railway project was co-financed by China and Ethiopia and built from 2012 to 2016 by two

of China's largest railway construction companies, the China Railway Group and China Civil Engineering Construction Corporation. The USD 400 million Addis Ababa LRT project with a total length of 31km and 39 stations was also co-financed by China and Ethiopia and built by the China Railway Group from 2011 to 2015. When the line opened in 2015, it became the first urban light rail scheme in a Sub-Saharan Africa outside of South Africa. Today the LRT moves 15,000 passengers an hour through the capital city and has significantly increased mobility (ERC 2017). Both projects did not only include the construction, but also the training on operation and maintenance of the railway lines and rolling stock.

Impacts and results

Emission reductions from moving freight and passengers from road to rail are estimated at 9 million tons of CO_2 equivalent per year given that electricity for the railway is mainly generated from renewable sources. The train lines also allow for shorter travel times and as such increase economic productivity and provide a strong incentive for people within the country to choose low-emission transportation over polluting vehicles (UNFCCC 2018).

Long-term sustainability, replicability and a potential for up-scaling

The project's long-term sustainability is ensured through the development of a robust financial model and building of the local capacity throughout the project to guarantee the independent operation and maintenance after the end of the service contracts with the Chinese partners. Both projects have significant potential for up-scaling. This potential is already partially being realized through the construction of further railway lines that will connect to the Addis Ababa-Djibouti line.

Alignment with priorities outlined in the NDC of the beneficiary country

The projects are in line with Ethiopia's NDC mitigation target in the transport sector and are making a significant contribution towards achieving this target.

4.2. Triangular cooperation on climate technologies

4.2.1. The Middle East-North Africa Water and Livelihoods Initiative

Participating countries: Egypt, Iraq, Jordan, Lebanon, Palestine, Tunisia and Yemen

Partner entities: Ministries of Agriculture, Irrigation and Water of Egypt, Iraq, Jordan, Lebanon, Palestine, Tunisia and Yemen, International Center for Agricultural Research in Dry Areas (ICARDA), regional and US universities, United States Agency for International Development, Arab Fund for Economic and Social Development, International Fund for Agricultural Development, Kuwait Fund for Arab Economic Development, OPEC Fund for International Development and the Islamic Development Bank

Context

Many countries in the Middle East and North Africa face similar challenges posed by climate change regarding water and food security. The Water and Livelihoods Initiative (WLI) (ICARDA 2018a) brings together seven of these countries to share local, regional and international knowledge and practical approaches on how to address these challenges. WLI countries jointly identify, develop and deploy locally appropriate adaptation technologies.

Project

Knowledge sharing and peer-to-peer learning take place through the regular exchange of latest research on, and the development and deployment of, adaptation technologies within thematic working groups that include representatives from all WLI countries. Each WLI country hosts, on a rotational basis, the annual meeting, including field visits, with all WLI partners. Exchanges also take place online throughout the year. WLI serves as a regional and international platform for research collaboration and knowledge sharing as it includes national centers for research and extension services, national universities as well as universities and research institutes from the United States.

Impacts and results

WLI facilitated the introduction of raised-bed farming in Egypt. Piloting this technology for growing wheat, berseem clover, faba beans, maize and cotton in the Egyptian Delta resulted in substantial improvements in agricultural productivity and irrigation management, including a 30 per cent increase in grain yield, 25 per cent savings in irrigation water and 74 per cent increase in water use efficiency (ICARDA 2018b). The project also led to the development of an affordable multi-crop raised-bed machine for small and medium sized farms, which was successfully deployed in Egypt and later adjusted to local conditions in Iraq, where it also found successful deployment. Following the joint piloting of the technology with WLI project partners in Egypt, the Egyptian side replicated the approach successfully in other areas of the country.

Long-term sustainability, replicability and a potential for up-scaling

WLI primarily targets specific benchmark sites in each country that typify the full spectrum of livelihood and watershed constraints. The sites also represent the three main agro-ecological systems in the Middle East and North African region, namely irrigated, rain-fed, and rangeland. Research technologies and strategies developed in the benchmark sites can thus be disseminated in the region by 'scaling-out' the lessons learned and the results obtained at the benchmark sites as it has been demonstrated in the case of the raised-bed technology.

Alignment with priorities outlined in the NDC of the beneficiary country

Egypt's intended actions to promote climate-resilience as listed in its NDC include agriculture as a priority area.

4.2.2. Programme of South-South Cooperation for Sustainable Development in Benin, Bhutan and Costa Rica

Participating countries: Benin, Bhutan, Costa Rica, and the Netherlands

Partner organizations: Centre de Partenariat et d'Expertise pour le Développement Durable (Benin), Sustainable Development Secretariat (Bhutan), Fundecooperacion para el Desarrollo Sostenible (Costa Rica), and the Royal Tropical Institute (Netherlands)

Context

Despite their location in three different continents with very different geo-political, climatic, cultural and social circumstances, Benin, Bhutan and Costa Rica share a common drive to work towards advancing low-emission climate-resilient development and improving livelihoods of their citizens.

Project

The Programme for South-South Cooperation between Benin, Bhutan, Costa Rica and the Netherlands (PSC) grew out of Bilateral Sustainable Development Agreements signed in 1994 between the Netherlands and each

individual country. In 2005, based on the priorities agreed at the Johannesburg World Summit on Sustainable Development, Costa Rica, Benin and Bhutan came under the umbrella of SSC, with a USD13.2 million grant from the Netherlands. A trust fund called "Fidecomiso Cooperación Sur-Sur" was established in Costa Rica under a local bank to handle the funds. The foreign policy and national plans of each partner country incorporated SSC into their international relations agendas. PSC strived to function as a political, administrative and financial framework to develop SSC with the intention of making this a replicable model (United Nations 2018a).

The PSC executed projects of common interest between 2007 and 2011, guided by the following objectives:

- Develop reciprocal projects that would generate knowledge and empower stakeholders. The results of these projects would be used as inputs for sector strategies and policy making;
- Mobilize national governments, the civil society, and the academic and private sectors in partner countries to renew and reinforce commitment to sustainable development;
- Contribute to sustainable development and poverty reduction in partner countries, taking into account environmental, economic and cultural idiosyncrasies;
- Explore the potential of South-South partnership to promote international commitments and mutual cooperation for sustainable development and experiment with a new North-SSC model.

PSC activities focused on four thematic areas: (1) sustainable tourism, (2) sustainable production and consumption, (3) conservation and sustainable use of biodiversity, and (4) access to sustainable energy and efficient energy use. Gender equity and women empowerment was a cross-cutting theme emphasized in all PSC projects.

Projects under PSC were designed to generate results that would both empower local communities and provide inputs for national policies. PSC initiated and supported grassroots and micro-level projects; facilitated multi-stakeholder policy dialogues in the three partner countries as well as streamlined and systematized transfer of knowledge and good practices to beneficiaries and stakeholders within and outside of the projects.

PSC often stepped in to complement or facilitate initiatives that the government alone could not accomplish. For example, under a solar energy project, affordable electricity was brought to a remote village that was located too far away from the main grid constructed by the government in Benin. To supplement the government's efforts, the Costa Rican team trained technicians in Benin on the use, installation and management of solar panels and batteries.

Impacts and results

The value of empowering the Southern partners to take ownership is reflected in the results achieved by PSC during its 5 years of operation:

- 180 local organizations involved;
- 26,706 direct beneficiaries;
- 3,575 people trained in sustainable technologies;
- 477 communities benefited;
- 1,533 indigenous people trained;
- 1,160 women involved in decision-making;
- More than 2,500 new jobs created.

The reciprocal knowledge exchange and mutual learning strengthened academic institutions, governmental and non-governmental organizations, private sector and civil society, and at the same time increased cost effectiveness, promoted transfer of appropriate technologies and ensured local ownership, leadership and capacity-building.

Lessons learned

The idea of a partnership between countries in three different continents with distinct languages, cultures and geographical settings raised many concerns during the initial phase of PSC operation, but over the time PSC demonstrated that with the right kind of planning, commitment, partners, and reciprocal respect this sort of SSC can produce impressive results on a very small budget. Language and cultural difference ceased to matter when collaborators shared their technologies, skills and knowledge in a reciprocal setting. In addition, PSC project beneficiaries were eager to learn about the culture of their partners and most of the projects involved cultural learning along with technology and skills transfer.

While SSC is an innovative and viable approach to international collaboration, the role of the North in PSC success cannot be underestimated. Traditional North-South cooperation, while commonly criticized for its problems, developed essential tools of project management, organization and accounting that PSC effectively applied in the SSC context. PSC's experience indicates that a triangular North-SSC based on mutual respect, reciprocity, participation and the willingness to teach and be taught can provide a new and improved path towards achieving global development goals.

Long-term sustainability, replicability and a potential for up-scaling

PSC recognized that the participation of local and community organizations and the private sector ensures project continuation in the medium and long run by creating a strong sense of ownership among stakeholders. In order to be eligible for PSC funding, the projects had to establish their sustainability in three ways:

- Organizational: each project described the organizational structure in place when the contractual relationship between PSC and the executing organization would end. Roles and responsibilities, and the authority and control that would be exercised over the operations in each participating country were clarified at the onset;
- Economic: each project was expected to develop mechanisms that allowed actions to continue once the funding from PSC ended. These mechanisms included the development of new commercial products and services, income generation, new jobs options, improvement of efficiency in micro enterprises, and development of new micro enterprises;
- Environmental: each of the projects intended to efficiently manage water resources, energy, solid and liquid waste, and reduce CO2 emissions during the project implementation.

PSC catalyzed the transition to sustainability by supporting innovation, seeding initiatives, replicating successes, establishing new partnerships with civil society organizations between the partner countries, and disseminating information.

In 2010, PSC received the United Nations South-South Cooperation Global Award in the categories 'Partnership' and 'Climate Change Solutions'.

One of the PSC objectives was to explore the potential of SSC to facilitate the implementation of international commitments of the partner countries and to experiment with a new North-South-South model of development cooperation. This objective was achieved and the PSC model is ready for replication and scaling-

up to assist developing countries world-wide in meeting their obligations under the Paris Agreement through implementing their NDCs.

Alignment with priorities outlined in the NDC of the beneficiary countries

Proliferation of renewable energy and energy efficiency technologies, introduction of climate-resilient and organic agriculture practices and conservation of ecosystems are among the priorities outlines in NDCs of many developing countries, including Benin, Bhutan and Costa Rica.

4.2.3 China-Ghana-UNDP Triangular Cooperation on Renewable Energy Technology Transfer

Participating countries: China, Ghana and Denmark

Partner organizations: Ministry of Science and Technology of China, Energy Commission of Ghana, Danish International Development Agency, UNDP country offices in China and Ghana

Context

Ghana's largest sources of greenhouse gas emissions are land-use change and forestry (53 per cent), mainly due to deforestation, and energy (25 per cent), largely due to the combustion of fossil fuels (WRI 2018). As deforestation is driven by the increased demand for wood and wood products for energy, the proliferation of renewable energy technologies is a key component for achieving Ghana's NDC emission reduction targets.

Project

China, Ghana and UNDP are pioneering a new model of SSC for addressing climate change through an innovative triangular project on renewable energy technology transfer. This new approach is defined through the project's institutional arrangements, which ensure that China and Ghana are leading the substantive work, UNDP providing support on donor relations, project management and facilitation through its country offices, and Denmark offering the full project funding.

The project supports the creation of an enabling environment for renewable energy technology transfer in Ghana by building the institutional framework and capacity required to facilitate the local absorption, production and regulation of such technologies. The project also includes the actual transfer and demonstration of technologies with potential for up-scaling by the private sector. In China, the project supports the review and update of SSC policies and guidelines and the building of capacity for engaging more systematically in cooperation with other developing countries in this area in future. A partner project, also funded by Denmark, is being carried out by China, Zambia and UNDP (UNDP 2018a) in parallel and both projects include cross-project learning activities and regular exchanges between project stakeholders in Ghana and Zambia (UNDP 2018b).

Impacts and results

The project has significantly contributed to creating an enabling environment for renewable energy technology transfer in Ghana, including through the development of the Ghana Renewable Energy Master Plan (REMP)[2], a baseline study on the status of renewable energy technologies as well as a comprehensive assessment of barriers for renewable energy technology transfer and a roadmap for removing or reducing these barriers. The project also developed criteria for technology selection within the Ghana's priority areas of solar, wind and

[2] Chinese experts shared insights from China's REMP development process, engaged in technical discussions with Ghanaian experts and provided feedback on various draft versions of the Ghana REMP.

hydro power as well as biogas technologies. Based on the identified technology solutions (solar photovoltaic, solar thermal, solar-powered water pumping, small scale wind and hydro power solutions, and biogas digesters), feasibility studies on renewable energy technology demonstration projects were carried out in collaboration between Ghanaian and Chinese experts and demonstration projects are starting to be implemented.

To benefit from insights of a wide range of stakeholders, including local governments, the private sector, research institutions and end-users, the project created a community of practice that provides inputs to various project activities and facilitates continued cooperation beyond the termination of the project. The community of practice will remain engaged with Chinese counterparts through a China-Ghana expert community established under the project.

China's Ministry of Science and Technology benefited from the project by strengthening its project management capacity and refining its approach to SSC on renewable energy technology.

Through the project's activities on demonstrating the productive use of renewable energy, farmers benefit from solar powered irrigation technologies that improve their agricultural production and productivity and small rural businesses increase their income and employment by being able to operate before sunrise and after sundown. Furthermore, the introduced biogas technologies provide an alternative to biomass for cooking, which translates into health benefits and reduces deforestation.

Lessons learned

Investing time and resources in team and trust-building in the beginning of a new project or project activity can greatly facilitate effective communication and collaboration throughout the project or project activity leading to better results. Ideally, project activities are designed by engaging different stakeholders to ensure local ownership and uptake of the activity and its outcomes, including with a focus on cultural differences in working and learning approaches.

Working across continents on a multi-year project requires a reliable communication and knowledge management system that is equally accessible by all partners.

Ensuring that project activities are driven by the needs and priorities of Ghana in line with its local circumstances as well as utilizing competitive advantages of Chinese partners have been key ingredients for the success of this project

A neutral facilitator of SSC such as UNDP in this project, who is familiar with both country contexts through its country offices and hosts a wealth of experience in project management and stakeholder engagement processes, is of great value.

Long-term sustainability, replicability and a potential for up-scaling

The project is sustainable in the long term as it created an enabling environment for renewable energy technology transfer, including concrete business models that will persist beyond the project duration. Another important component of the project's sustainability is the set-up of coordination mechanisms, such as the community of practice in Ghana and the China-Ghana expert group that will continue operating after the

project ends. For Ghana, the project has created a renewable energy technology transfer model that can subsequently be adjusted, replicated and scaled-up with other partner countries willing to contribute to technological innovation in the Ghana's renewable energy sector.

Alignment with priorities outlined in NDC of the beneficiary country

The project activities are well aligned with targets of Ghana's NDC, including on scaling up renewable energy penetration by 10 per cent by 2030 through small sized flood-proof hydro power installations, solar powered mini-grids and solar home systems as well as reducing emissions from waste by using organic waste for biogas generation.

4.2.4 Reducing GHG Emissions from Transport in Bhutan by Improving Public Transport Systems through Capacity Building and Use of Technology

Participating countries: Thailand and Bhutan

Partner organizations

Thailand: National Science Technology and Innovation Policy Office (STI), Ministry of Science and Technology;
Bhutan: Road Safety and Transport Authority (main counterpart), Ministry of Information and Communications, Private Bus Operators, Traffic Police, Department of Roads
Climate Technology Centre and Network (CTCN)

Context

The objective of the SSC through the CTCN assistance was to improve the capacities of officials within the Road Safety and Transport Authority of Bhutan in the knowledge and application of Intelligent Transport Systems (ITS) and also enable them to access climate financing for implementing the ITS systems.

The primary modality of the assistance was through the capacity building workshop in Thailand, where the participants were provided training in key pertinent modules such as 'Intelligent Transport Systems: The Thai experience', and 'Low carbon mobility planning for Thimpu'. To complement theoretical training, the capacity building workshop was interspersed by two field visits to observe the real-time application of the relevant technologies in Thailand. The capacity building program provided the participants with good understanding of ITS and related aspects, which help to contextualize the applications of ITS in Bhutan.

Project

Climate technology used: The primary technology supported through this assistance was building the soft skills of the participants in the knowledge and application of Intelligent Transport Systems and low carbon mobility planning. This particular technology has already been prioritized in the Technological Needs Assessment conducted for Bhutan.

Actions undertaken or planned: Training and Field Visits providing Bhutan's participants with an overview of the Thai experiences on intelligent transport systems (ITS) and public transport systems by Thai experts; Workshop on sustainable and environmental friendly transport: Thai experts provided the knowledge and lesson learnt for improving the awareness of ITS system in the workshop; Study tour on Bangkok's mass transit management systems and infrastructure: Representatives from the Bhutan mass transit authorities requested visit to Bangkok, focusing on Bangkok's mass transit management systems and infrastructure. This activity

focused on administration systems, automated control and traffic control infrastructures/ procedures, Smart cards, token payments, and other fare-collection methods, as well as revenue and advertising models.

Mechanisms or approaches for local stakeholders engagement, knowledge transfer and endogenous capacity-building; Stakeholder for this project were a wider group including transport policy makers, transport operators, NGOs and users. The main thrust would be on improving the awareness of ITS system among stakeholder.

Gender responsiveness of the project: The participants in this project include the female team member that benefit from the capacity building program in Bangkok and the female participants attended the workshop in Bhutan.

Impacts and results

Transport sector contributes to 44% of GHG emissions and the growth of emissions has been on the back of rapid motorization in Bhutan. The number of vehicles has grown at more than 10% annually which a large part being private vehicles which besides climate change result in congestion and air pollution. A proven way of addressing this challenge is by promoting public transport however a good public transport system has to be completed by a sound management which can be facilitated by ITS system. Therefore, ITS by complementing public transport can deliver substantial reduction in CO2 emissions because emissions intensity of public transport modes is much lower than private.

ITS system could help in promotion of public transport which would improving mobility especially for socially and economically weaker sections. It could help in mitigation of local pollution which would improve air quality and health of city populations.

Lessons learned

- This project based on the request or demand from Bhutan that the ownership created from the demand is one of the key success factors.
- Technology transfer from Thailand (South) to Bhutan (South) was not only the SSC by itself but it was another model of TrC since Thailand obtained the technology from developed countries and localized them before transferred to Bhutan.
- Absorptive capacity of the recipient is very crucial for technology transfer process.

Long-term sustainability, replicability and a potential for up-scaling

The replication was the main objective for this project.

Alignment with priorities outlined in NDC of the beneficiary country

In Bhutan's NDC, the strategies, plans and actions for low GHG emission development indicated the promotion of low carbon transport system by:

• Improving mass transit and demand side management of personal modes of transport
• Exploring alternative modes of transport to road transport such as rail, water and gravity ropeways
• Improving efficiency in freight transport
• Promoting non-motorized transport and non-fossil fuel powered transport such as electric and fuel cell vehicles
• Improving efficiency and emissions from existing vehicles through standards and capacity building
• Promoting use of appropriate intelligent transport systems

The project is in line with Cambodia's NDC targets to reduce GHG emissions from waste.

5. Key findings

Trends

- **Technologies originating from developing countries are likely to be more suitable and cost-effective** for other developing countries as they are well attuned to similar geo-climatic, cultural or socio-economic conditions (UNFCCC 2016).

- **SSC and TrC on climate technologies is taking place in, and between, all geographic regions and covers all priority area outlined in developing countries' NDCs and NAPs** (UNCPGS 2017). The following thematic areas are the most promising for technology cooperation using SSC and TrC channels: agriculture, disaster risk reduction, renewable energy and energy efficiency, forestry, transport, water resources and waste management (TEC Questionnaire and Interviews 2018).

- The case studies in chapter 4 have shown that **there is a great variety of SSC and TrC models ranging from the exchange of good practices through field trips and workshops the construction of large-scale low-emission infrastructure projects to the establishment of institutions and policies**. While commonly initiated at the national level, SSC and TrC projects mostly involve various stakeholders in the implementation, including local governments, civil society organization, research and training institutions or the private sector.

- **Several developing countries adopted national policies[3] or programmes[4] on climate change SSC, integrated climate change SSC elements in national development plans and strategies or established climate change SSC funds[5]** and other dedicated cooperation mechanisms. On the other hand, it appears that developed countries mostly engage in TrC on an ad hoc basis without having respective national policies in place (TEC Questionnaire and Interviews 2018). In many cases developed countries opt for channeling resources to support South-South initiatives through international organizations, in particular the United Nations entities, and multilateral development banks as seen in the case studies in chapter 4. **The United Nations System is increasingly coordinating its efforts on supporting SSC and TrC for climate action** through the establishment of the United Nations Climate Partnerships for the Global South initiative (United Nations 2018b) and the recent adoption of the United Nations' first Action Plan on South-South Climate Cooperation (2017-2021).

Good Practices

- SSC and TrC are proven to serve as an **effective tool for mobilizing and engaging a broad range of stakeholders** such as civil society, the private sector, academia and local communities in climate action, including climate technology cooperation. Such engagement is **crucial for the effective implementation of NDCs and NAPs**.

[3] For examples, China's Africa Policy includes provisions on South-South cooperation on climate change through increasing scientific and technological cooperation (IOSC 2006).

[4] For example, Brazil's Ministry of Environment adopted the Brazilian "Program for South-South Cooperation in Climate Change and Forests" in November 2017 (Brazil 2017).

[5] For example, China established a dedicated South–South Cooperation Climate Fund in 2015 (Weigel 2016). And India established the India–UN Development Partnership Fund in 2017, which also provides support for climate technology related project (UNOSSC 2018b).

- The case studies in chapter 4 have shown that in addition to transfer of technology, many South-South and triangular climate change initiatives include such components as peer-to-peer learning, endogenous capacity-building and cultural exchange. These activities help build trust, understanding and a spirit of cooperation between stakeholders of countries involved, thereby enhancing mutual accountability and effective communication.

- A bottom-up approach that uses local practices, indigenous knowledge and grassroots initiatives as a starting point for designing climate technology-related interventions is becoming a norm for South-South and TrC (TEC 2017b).

- The engagement of research and academic institutions in partner countries helps ensure a strong science-based rationale for planned SSC and TrC climate technology initiatives and align technology research with national climate change and development priorities.

Barriers and enablers

- In some cases, the implementation of SSC and TrC initiatives involving countries not located in the same geo-political region may be hindered by differences in time zones, languages, traditions, cultural patterns and business practices. These potential constraints can be removed or reduced as the project design stage by transparent discussion on modalities of operation, effective planning, convening of a specialized training on cultural specifics of participating countries and informal social and cultural exchanges, as some of the case studies in this publication have shown.

- While cooperation on climate technology may be successful at the project level, lack of financial resources for up-scaling, and in some case even for the continued use, operation and maintenance of such technologies remains a barrier to the large-scale diffusion of these technologies and the sustainability of a project. Some developing countries become increasingly hesitant to engage in SSC if the sustainability of the project is not guaranteed to avoid raising expectations from local communities that cannot be sustained. Integrating sustainability from the outset of the project and securing additional financial sources through TrC can be effective ways to overcome this barrier.

- Despite many fruitful SSC initiatives involving development and transfer of climate technologies being carried out in all parts of the world, information on these initiatives, including on the approaches, mechanisms and tools used to initiate, design and implement them, still remain overall limited and inaccessible. At the same time, information on TrC projects is more readily available, especially for initiatives coordinated by international organizations. Some United Nations entities have established dedicated SSC platforms, including information on climate projects, such as the South-South World (UNDP 2018c) hosted by UNDP and the FAO South-South Cooperation Gateway (FAO 2018). There is an increasing number of reports on SSC and TrC by United Nations entities, some of which also highlight projects in the area of climate technologies (Weigel 2016, UNDP 2017a, UNDP 2017b, UNDP 2017c, UNDP 2017d). The Organization for Economic Cooperation and Development hosts a Triangular Cooperation Repository of Projects, which includes a limited number of climate projects (OECD 2018). Furthermore, UNOSSC in collaboration with the South Centre has recently published a global overview on “Climate Partnerships for a Sustainable Future” (UNCPGS 2017).

- The disconnect and lack of coordination between the national government and municipal authorities hinders transfer of Southern technologies for climate action at a city level. This barrier can be overcome by direct collaboration between cities in partner countries, facilitated by international organizations, as shown in some case studies in section 4.

6. Recommendations

Creation of an information hub on SSC and TrC on climate technologies

- The establishment of a centralized web-based and phone-compatible hub with information on completed, ongoing and planned SSC and TrC projects on climate change mitigation and adaptation technologies would increase visibility of, and promote, SSC and TrC as effective means to accelerate climate action and support the implementation of NDCs and NAPs.

- Such an information hub could be complemented by a platform for exchange between countries interested to engage in SSC and TrC, both on demand and supply sides.

- Tested and proven viable models for SSC and TrC on climate change technology projects should be analyzed, documented and made available on the information hub.

- Lessons learned and Information on initiatives and approaches that did not lead to expected results should also be made available to ensure learning from mistakes and avoidance of ineffective practices.

- The information hub should be easily accessible by all interested countries and organizations to facilitate the replication, adaptation and scaling up of successful approaches.

- An United Nations entity could consider establishing such information hub in line with the United Nations Action Plan on South-South Cooperation and in partnership with the South-South World, which already has in place a well-functioning platform for this purpose. In addition to hosting the information hub, this entity could take a lead to bringing potential Southern and Northern actors together and incentivizing their engagement in SSC and TrC initiatives through, for example, awards, competitions and recognition schemes.

Identification of suitable technologies and initiation of SSC and TrC projects

- While South-South and triangular cooperation projects present the most direct and effective means for climate technology exchange between developing countries, regional climate change networks, online information management platforms hosted by developing countries and other knowledge-sharing arrangements offer an additional avenue to learn about proven Southern technologies and replicable measures and identify potential partners for future collaborative efforts.

- Once potentially suitable practices and technologies are identified, a first step to initiate a South-South cooperation project to transfer these technologies could be contacting an embassy of a prospective South partner.

- Another effective avenue to launch South–South cooperation could be to connect non-governmental and/or research institutions in prospective partner countries (TEC 2017b). The establishment of a network of Southern actors could help facilitate this process.

Increase of effectiveness and long-term sustainability of SSC and TrC projects

- To further increase effectiveness and long-term sustainability of SSC and TrC projects on climate technology transfer and their contribution to the implementation of NDCs and NAPs, future projects could include such components as research and development; adoption of policies and regulations; and creation of local value chains as for example pursued under the China-Ghana-UNDP project on renewable energy technology transfer (Case study 4.2.3).

- A transparent monitoring and evaluation framework should also be an integral part of every SSC and TrC project to facilitate the collection of lessons learned, good practices and viable models of cooperation.

Addressing financial barriers

- Many developing countries have knowledge, practices and know-how that could be of use for other countries; developed appropriate climate technologies; and are willing to share their experiences with other developing countries. However, scarce financial resources remain a barrier for these countries to engage in SSC.

- To help overcome this barrier, developed countries or international financial institutions could consider allocating dedicated funds to support climate change SSC projects with involvement of developing countries interested to serve as providers of technologies for climate change adaptation and mitigation.

- In addition Governing bodies of international financial institutions, in particular the Green Climate Fund (GCF) and the Global Environment Facility (GEF), could consider devising simplified submission and approval procedures for projects containing elements of South–South knowledge-sharing or peer-to-peer learning. They also could help countries to document and monitor the success of shared climate change knowledge and practices systematically to facilitate the replication and upscaling of these practices.

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