United Nations
Office for South-South Cooperation

United Nations
Framework Convention on
Climate Change

TECHNOLOGY
EXECUTIVE
COMMITTEE

# POTENTIAL OF South-South and triangular cooperation

## on climate technologies for advancing implementation of nationally determined contributions and national adaptation plans


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# Foreword from the UNFCCC Executive Secretary

The immediate impacts of climate change are clear when we consider the destruction that extreme weather brings to families, communities, economies and infrastructure. The long-term impacts of climate change, however, are much more extensive and are connected to almost all significant challenges that humanity faces.

The Paris Agreement and the 2030 Agenda for Sustainable Development are designed to address those challenges. Adopted in 2015, they provide a clear direction, outline a path forward and focus on an endpoint in the second half of this century when we will have achieved success. Both are ambitious in scope, but necessary for the long-term health and well-being of all people.

To achieve success, we must have broad-based concerted action at all levels of society. This includes the public and private sectors, various coalitions and the cooperation of several other key actors. One factor that is vital to success includes South–South and triangular cooperation. Complementary to more traditional North–South cooperation, this is an exciting way forward.

These innovative ways of cooperation have already proven instrumental in equipping developing countries with the knowledge and skills to develop, deploy and diffuse climate change mitigation and adaptation technologies, helping to advance implementation of their nationally determined contributions under the Paris Agreement and achievement of the Sustainable Development Goals.

I welcome the joint efforts of the UNFCCC Technology Executive Committee and the United Nations Office for South–South Cooperation to showcase good practices in climate technology cooperation. Their work also highlights viable models of South–South and triangular cooperation for replication and scaling up at the global level.

We know that we need all segments of society to pull together in combating climate change. We must learn from each other, listen to each other and explore new opportunities. Most of all, we need to take concerted, scalable climate action together.

Let's continue working together to build a future that is cleaner, greener and more prosperous for all.

**Patricia Espinosa**
**UNFCCC Executive Secretary**

# Foreword from the Director of the United Nations Office for South–South Cooperation

With the adoption of the Paris Agreement and the 2030 Agenda for Sustainable Development, including the 17 Sustainable Development Goals, we have visionary and overarching blueprints for bending the emission curve, building climate resilience, keeping temperature rise well below 2 °C and, ultimately, charting a path towards a sustainable world of safety, prosperity and dignity for all.

There is clear evidence that progress in the achievement of the Sustainable Development Goals is inextricably linked to the implementation of the Paris Agreement and vice versa. It is also clear that realizing these two agendas will require new partnerships across the political spectrum and among all stakeholders. Sharing development experience among developing countries through South–South and triangular cooperation, as well as broadening and scaling up such cooperation, are critical means of implementation that complement North–South cooperation.

The rich and positive experience that South–South cooperation has generated over the past decades is critical to building the world we want. This year marks the 40th anniversary of the adoption of the Buenos Aires Plan of Action. In this context, the Second High-level United Nations Conference on South–South Cooperation will be held in Buenos Aires from 20 to 22 March 2019. The conference will provide an important occasion to review how South–South cooperation can contribute to the implementation of the global agenda. I encourage the broad engagement of all stakeholders in the preparatory process for the conference, of which the United Nations Office for South–South Cooperation is the secretariat.

Recognizing the great potential of South–South cooperation, the United Nations recently released its first Action Plan on South–South Climate Cooperation. Under the mandate of the action plan, I am very pleased to cooperate with the UNFCCC Technology Executive Committee and the UNFCCC secretariat to launch this publication as one of the first results of our collaboration. This joint publication by the Technology Executive Committee and the United Nations Office for South–South Cooperation clearly demonstrates the tremendous potential of South–South and triangular cooperation on climate-friendly technologies for advancing developing countries' achievement of their priorities under the Paris Agreement. It is inspiring to see the emerging trends and good practices in this area through the broad range of case studies highlighted in this insightful report.

I look forward to continuing this fruitful collaboration with the Technology Executive Committee and the secretariat. I remain committed to providing full support for advancing South–South and triangular cooperation on climate action.

**Jorge Chediek**
**Director of the United Nations Office for South–South Cooperation**
**Envoy of the United Nations Secretary-General on South–South Cooperation**

# 1. Highlights

- There is 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.
- There are evidence-based examples of successful SSC and TrC on technologies for adaptation and mitigation within and between all regions.
- The thematic areas identified as most promising for technology cooperation via South–South and triangular channels include agriculture, disaster risk reduction, renewable energy and energy efficiency, forestry, transport, water resources and waste management.
- There are various SSC and TrC models. While commonly initiated at the national level, SSC and TrC projects usually involve various stakeholders in implementation, including local government, civil society organizations, research and training institutions and the private sector.
- Several developing countries have adopted national policies on SSC on climate change, integrated elements of climate change SSC into 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 to support SSC and TrC on 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 exchange.
- A bottom-up approach that uses local practices and indigenous knowledge as the starting point for designing climate technology related interventions is becoming the norm for SSC and TrC.
- While cooperation on climate technology may be successful at the project level, lack of financial resources may hinder the upscaling and regional replicability of the technology as well as the sustainability of the project.
- Enhancing web-based platforms that already partially include information on SSC and TrC projects on climate change mitigation and adaptation technologies would increase the visibility of, and promote, SSC and TrC as effective means of accelerating climate action and supporting the implementation of nationally determined contributions (NDCs) and national adaptation plans (NAPs).
- To further increase the effectiveness and long-term sustainability of SSC and TrC projects to facilitate climate technology development and 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.
- Countries and multilateral organizations could consider increasing their engagement in TrC on climate technologies to support developing countries to expand the sharing of knowledge, practices, technologies and know-how in this area.

# 2. Concepts and definitions

- **Climate technology** is any "piece of equipment, technique, practical knowledge or skill" that supports addressing climate change (Intergovernmental Panel on Climate Change, 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".[1]

- **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".[2]

1 Source: https://www.unsouthsouth.org/about/about-sstc
2 As footnote 1 above.

# 3. Introduction

## Background

The Technology Executive Committee (TEC) is the policy arm of the Technology Mechanism of the Convention 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, non-profit organizations and academic and research communities.[3] In accordance with its 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 has included South–South and triangular technology cooperation in its rolling workplan, considered the matter at each of its meetings and developed related knowledge products (e.g. TEC, 2016; TEC, 2017a; TEC, 2017b).

There is growing recognition worldwide of the potential of SSC and TrC to accelerate climate action in developing countries. Fifteen developing countries referred directly to SSC in their NDCs,[4] with eight mentioning that they consider SSC to be a suitable complement to North–South cooperation for both mitigation and adaptation action, in particular regarding technology transfer and innovation and capacity-building (United Nations Climate Partnerships for the Global South (UNCPGS), 2017). SSC and TrC were also mentioned by 32 developing and 5 developed countries in their latest national communications,[5] biennial update reports[6] and biennial reports.[7]

In this context, the TEC agreed in 2017, to undertake an analysis of the potential that SSC and TrC offer for assisting developing countries with implementing their NDCs and NAPs. To enrich the work and align it with the broader development agenda, in 2018 the TEC entered into a collaboration with the United Nations Office for South–South Cooperation (UNOSSC). This publication is the first fruit of the collaboration between the two entities and draws on the deliberations that took place at the workshops on SSC and TrC for climate action and sustainable development jointly organized by the TEC and UNOSSC in conjunction with the 2018 Asia-Pacific Climate Week and Latin America and Caribbean Climate Week.

## Objectives

This publication aims to provide insights into trends and good practices in, as well as barriers to and enablers of, SSC and TrC on climate technologies. The eight case studies presented 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 and NAPs.

## Target audience

This publication is targeted at policymakers and practitioners in developing and developed countries that are involved or interested in making use of SSC and TrC for advancing climate action in line with priorities contained in NDCs and NAPs.

3 UNFCCC decision 1/CP.16, paragraph 121(d).

4 NDCs are available at http://www4.unfccc.int/ndcregistry/Pages/Home.aspx.

5 Developing countries' national communications are available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-update-reports-non-annex-i-parties/national-communication-submissions-from-non-annex-i-parties. Developed countries' seventh national communications are available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/seventh-national-communications-annex-i.

6 Available at https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/biennial-update-reports-and-international-consultation-and-analysis-non-annex-i-parties/biennial-update-reports.

7 Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/third-biennial-reports-annex-i.

## Methodology

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

The case studies were selected on the basis of questionnaire and interview responses and desk research with a view to including cases from different thematic areas and geographical regions and covering both adaptation and mitigation technologies. For each case study, the thematic areas of the SSC and TrC projects correspond to the priorities of the participating countries outlined in their 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) or by their specific contribution (e.g. funds, technology, orgware, capacity-building, etc.). In the context of TrC projects, developed country partners and 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 most recent publication on SSC and TrC (see TEC, 2017b).

# 4. Case studies

## 4.1. South–South cooperation on climate technologies

### 4.1.1 Sharing the Cuban model for risk reduction management centres with other Caribbean islands

*"The project has helped us to better reduce the impact of any disaster, because we now know how to monitor and report floods, and when to inform the population and how to act." Lenny Moses, Board Chair in Villa Massara, Guyana*

*"A bottom-up approach is ideal for disaster risk reduction and the right framework for building resilience at the community level" Shelly Brandshaw, Mitigation Manager, Office of Disaster Preparedness and Management, Trinidad and Tobago*

*"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. However, its contributions go far beyond, to cover effective mechanisms that facilitate government management in other areas as well." Claudio Tomasi, UNDP Deputy Resident Representative, Cuba*

#### Participating countries and territories

British Virgin Islands, Dominican Republic, Guyana, Jamaica, and Trinidad and Tobago

#### Context

Its topography, tectonic setting and location make the Caribbean region highly prone to natural hazards such as tropical cyclones, floods, volcanic and seismic activities, drought 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 hydrometeorological threats, the Cuban Government has been collaborating with the United Nations Development Programme (UNDP) in Cuba and the UNDP Caribbean Risk Management Initiative since 2005 to create a 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, communication systems, effective database management and mapping, geographic information systems and community preparedness (UNDP, 2014a).[8]

8 See http://www.undp.org/content/undp/en/home/presscenter/articles/2015/02/25/a-cuban-model-for-a-resilient-caribbean.

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 to take effective protective measures.

The RRMC model has generated widespread interest in the region and led to groundbreaking SSC. Since 2009 the lessons learned in implementing RRMC in Cuba have been shared with 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 the Caribbean Risk Management Initiative, worked with those countries and territories to adapt the model to their respective national contexts, strengthening risk reduction practices. The long-term objective was to strengthen local disaster management systems and planning in the context of the changing climate.

The transfer of knowledge and practices from Cuba to the pilot countries was carried out using various approaches, such as building 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 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 Harbour and Linstead. In addition, a central activity of the Jamaican pilot project was the development of a disaster risk information platform in Saint 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, at which pilot sites were identified to establish RRMCs.;

- In the British Virgin Islands, the Anegada zonal disaster management team was established, whose role is to roll out the disaster risk reduction programme for the islands, 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 for using geographic information systems and early warning. Training was directed at specific groups and included participatory exercises to both extract community information and ground the topic in the local context.

## Lessons learned

To ensure the applicability of the Cuban RRMC model to 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 could be transferred.

The Cuban model was then adapted to the local contexts of the recipient countries on the basis of 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 potential for scaling up

To lay the foundation for long-term sustainability, RRMCs in recipient countries were built on existing networks and management systems with the broad involvement of stakeholders active in risk information and planning. Since strong political commitment and country ownership are crucial for sustaining activities beyond the project duration, 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 project implementation are well documented and the respective tools, methodologies, guidelines and practices have been tested and verified. The initiative is therefore a prime candidate for scaling up worldwide through SSC and TrC or other channels.

## Alignment with priorities outlined in the NDCs and NAPs of the beneficiary countries

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

## 4.1.2. Samoa adopts agricultural practices from China



### Participating countries
China and Samoa

### Context
Samoa has a small and developing economy that depends heavily on natural resources, both for the sustenance of its people and for 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, stronger winds and sea level rise were identified as key challenges associated with climate change that are increasing the vulnerability of the agriculture sector in Samoa. These climate-related stresses cause farmers significant financial hardship and disrupt food supply to local and export markets.[9]

### Project
The project, initiated at the request of the Government of Samoa to China, aims to strengthen the 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 demonstrating and showcasing Chinese technologies that could be adopted by farmers in Samoa. Phase two resulted in the construction of 10 advisory centres. 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 in other parts of Samoa.

### Impacts and results
Chinese experts and extension workers transferred their knowledge to about 100 demonstration farm households; carried out large-scale training activities aiming to equip 6,000 local technicians and farmers with the know-how and skills to diversify and grow climate-resilient crops; assisted farmers in piloting organic farming; upgraded the China–Samoa agricultural technology demonstration centres;[10] and established a platform for agricultural exchange. Practical learning started with a visit by local farmers to a China–Samoa agricultural technology demonstration centre, where they received hands-on training in vegetable cultivation techniques. The farmers learned how to construct vegetable tunnel houses in their villages and benefited from the continued technical support of the Chinese extension services.

9 See Samoa's second national communication, available at http://unfccc.int/resource/docs/natc/samnc2.pdf.
10 See a video documentary on the Chinese agricultural technology demonstration centre in Samoa at https://www.youtube.com/watch?v=71uBVUosKyQ.

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

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 centres using simple agricultural technology and with technical expertise in climate-resilient crops to be established in the wider Pacific. Investing in climate-resilient agricultural programming and capacity-building improves not only efficiency but also productivity with a view to ensuring food security in the Pacific.

## Alignment with priorities outlined in the NDC of the beneficiary country

Agriculture is highlighted as a priority area in Samoa's NDC.

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

*"Space has been allotted for the Resource Centre in one of the main city halls where electricity bills are paid to ensure good visibility" Dr. H. Haryadi Suyuti, Mayor of Yogyakarta*

### Participating countries
India, Indonesia and South Africa

### Context
Exponential population growth coupled with rapid economic development in many cities in the South necessitates 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; it is now 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 that steers city governments to integrate energy efficiency technologies and renewable energy generation into all city activities.[11] 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. The municipal authorities of Ekurhuleni and Yogyakarta were guided by the city of Coimbatore in India, an established local renewables city.[12]

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:

- Assessing each project city's greenhouse gas emissions inventory to identify priority interventions;
- Developing an action plan for each city to adopt renewable energy and energy efficiency initiatives in line with national policies;
- Establishing a multi-stakeholder steering committee;
- Identifying financial sources for implementation and relevant demonstration projects;

11 See http://archive.iclei.org/index.php?id=11690.
12 See http://southasia.iclei.org/our-activities/our-pathways/low-emission-development/local-renewables-south-south-cooperation-between-cities-in-india-indonesia-and-south-africa.html.

- Implementing a pilot project in each city and showcasing the process and results to observer cities at country workshops;
- Developing a local renewable energy resource centre for each city, showcasing local initiatives and products;
- Developing a country-specific solar cities guidebook to actively promote the proliferation of renewable energy.

## Impacts and results

Upon completion of the three-year project:

- Impetus was provided for major cities in South Africa and Indonesia to work towards meeting national and international energy efficiency and emission reduction targets;
- Long-term action plans were put in place following analysis of opportunities to reduce energy use and related carbon dioxide emissions;
- Potential was identified for renewable energy and energy efficiency technologies to improve the delivery of municipal services;
- Communities were catalysed to adopt renewable energy and energy efficiency initiatives at the household level thanks to resource centres showcasing case studies.

The inauguration of the Yogyakarta Renewable Energy and Energy Efficiency Resource Centre was one milestone reached by the city. To emphasize the importance of disseminating information on the benefits of renewable energy and energy efficiency to the general public, space was allotted for the resource centre in one of the main city halls where people come to pay their electricity bills in order to ensure its visibility.

## Lessons learned

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

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

The engagement of local governments and the integration of renewable energy and energy efficiency solutions into local development plans ensure the long-term sustainability of the project's impacts.

The next step for South Africa and Indonesia is to promote the solar city guidebooks, developed under the project, at the national and local level. Also, the possibility will be explored of the two project cities transforming into 'solar cities', following a model developed and implemented in India with support from its Ministry of New and Renewable Energy.[13]

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

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

## Alignment with priorities outlined in the NDCs of the beneficiary countries

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

13 As footnote 12 above.

## 4.1.4. Advancing low-emission transportation in Ethiopia


Ethiopian Railways Corporation

Ethiopian Railways Corporation

### Participating countries
China, Djibouti and Ethiopia

### Context
Ethiopia's NDC[14] is based on the country's national Climate Resilient Green Economy strategy,[15] which has been pursued since 2011 and includes a target of reducing emissions from the transport sector by 10 per cent by 2030. In order to achieve its strategy and NDC target, Ethiopia has been embarking on ambitious action to reduce transport emissions by increasingly moving passenger and freight transportation from road to rail.

### Projects
Ethiopia entered into an SSC partnership with China for the realization of two major railway projects, namely the electrified standard gauge railway line from the capital, Addis Ababa, to Djibouti, and the Addis Ababa Light Rail Transit (LRT).[16] The Ethiopia–Djibouti railway now connects landlocked Ethiopia via a 759 km 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 31 km 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 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 (Ethiopia Railways Corporation, 2017). Both projects not only included construction, but also training on the operation and maintenance of the railway lines and rolling stock.

### Impacts and results
Emission reductions resulting from moving freight and passengers from road to rail are estimated at 9 million tonnes of carbon dioxide 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

14 Available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/Ethiopia%20First/INDC-Ethiopia-100615.pdf.
15 See http://www.ethcrge.info/crge.php.
16 See http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaForRecognition.aspx?ID=108&viewOnly=1

increase economic productivity and provide a strong incentive for people in the country to choose low-emission transportation over polluting vehicles.

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

The project's long-term sustainability is ensured through the development of a robust financial model and local capacity-building throughout the project to guarantee independent operation and maintenance after the end of the service contracts with the Chinese partners. Both projects have significant potential for upscaling; in fact, further railway lines that will connect to the Addis Ababa–Djibouti line are already being constructed.

## Alignment with priorities outlined in the NDC of the beneficiary country

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

## 4.2. Triangular cooperation on climate technologies

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

#### Participating countries
Egypt, Iraq, Jordan, Lebanon, State of Palestine, Tunisia and Yemen

#### Partner entities
Ministries of Agriculture, Irrigation and Water of Egypt, Iraq, Jordan, Lebanon, State of Palestine, Tunisia and Yemen, International Center for Agricultural Research in Dry Areas (ICARDA), regional and United States 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, Organization of the Petroleum Exporting Countries Fund for International Development, and Islamic Development Bank

#### Context
Many countries in the Middle East and North Africa face similar challenges regarding water and food security in the face of climate change. The Water and Livelihoods Initiative (WLI)[17] brings together seven countries to share local, regional and international knowledge on and practical approaches to addressing those challenges. WLI countries jointly identify, develop and deploy locally appropriate adaptation technologies.

#### Project
Knowledge-sharing and peer-to-peer learning take place through regular exchange of the latest research on, and the development and deployment of, adaptation technologies within thematic working groups that include representatives of 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 centres for research and extension services, national universities, and United States universities and research institutes.

#### Impacts and results
WLI facilitated the introduction of raised-bed farming in Egypt. Piloting the technology for growing wheat, berseem clover, fava 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

17 See http://wli.icarda.org.

(ICARDA, 2016). The project also led to the development of an affordable multicrop raised-bed machine for small and medium-sized farms, which was successfully deployed in Egypt and later adjusted to local conditions and successfully deployed in Iraq. Following the joint piloting of the technology with WLI project partners, Egypt replicated the approach successfully in other areas of the country.

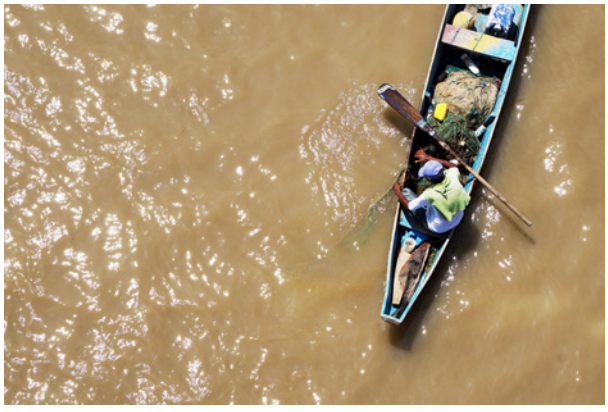
## Long-term sustainability, replicability and potential for scaling up

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

## Alignment with priorities outlined in the NDC of the beneficiary country

Egypt's intended actions to promote climate resilience identified 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 Netherlands

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

### Context
Despite their location in three different continents with very different geopolitical, 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 the livelihoods of their citizens.

### Project
The programme (PSC) originated from bilateral sustainable development agreements signed in 1994 between the Netherlands and each of Benin, Bhutan and Costa Rica. In 2005, on the basis of the priorities agreed at the Johannesburg World Summit on Sustainable Development, Costa Rica, Benin and Bhutan came under the umbrella of SSC, with a USD 13.2 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 becoming a replicable model.[18]

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

- Developing reciprocal projects that would generate knowledge and empower stakeholders. The results were used as inputs to sector strategies and policymaking;
- Mobilizing national governments, civil society, academia and the private sector in partner countries to renew and reinforce their commitment to sustainable development;

18 See https://sustainabledevelopment.un.org/partnership/?p=1634.

- Contributing to sustainable development and poverty reduction in partner countries, taking into account environmental, economic and cultural idiosyncrasies;

- Exploring the potential of South–South partnership to promote international commitments and mutual cooperation on sustainable development and experimenting with a new North–South–South cooperation model.

PSC activities focused on four thematic areas: sustainable tourism; sustainable production and consumption; conservation and sustainable use of biodiversity; and access to sustainable energy and efficient energy use. Gender equity and women's 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 to national policies. PSC initiated and supported grass-roots and microlevel projects; facilitated multi-stakeholder policy dialogues in the three partner countries; and streamlined and systematized transfer of knowledge and good practices to beneficiaries and stakeholders within and outside the projects.

PSC often stepped in to complement or facilitate initiatives that the government alone could not accomplish. For example, in 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 in the use, installation and management of solar panels and batteries.

## Impacts and results

The value of empowering Southern partners to take ownership is reflected in the results achieved by PSC during its five 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, the 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 operation, but over 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 differences 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 the success of PSC cannot be underestimated. Traditional North–South cooperation, while commonly criticized, led to the development of essential tools for project management, organization and accounting that PSC effectively applied in the SSC context. The PSC experience indicates that triangular North–South–South cooperation 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 potential for scaling up

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 that would be in place when the contractual relationship between PSC and the executing organization ended. Roles and responsibilities, and the authority and control that would be exercised over the operations in each participating country, were clarified at the outset;

- Economic: each project was expected to develop mechanisms that allowed action to continue once the funding from PSC ended, which included the development of new commercial products and services, income generation, creation of new job options, improvement of efficiency in micro enterprises and development of new micro enterprises;

- Environmental: each project was intended to efficiently manage water resources, energy and solid and liquid waste, and to reduce carbon dioxide emissions during implementation.

PSC catalysed 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 a United Nations South–South cooperation global award in the ‘partnership’ and ‘climate change solutions’ categories.

One objective of PSC was to explore the potential of SSC to facilitate the implementation of international commitments of 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 upscaling to assist developing countries worldwide in meeting their obligations under the Paris Agreement by implementing their NDCs.

## Alignment with priorities outlined in the NDCs of the beneficiary countries

Proliferation of renewable energy and energy efficiency technologies, introduction of climate-resilient and organic agricultural practices and conservation of ecosystems are among the priorities outlined in the 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, Denmark and Ghana

### Partner organizations
Ministry of Science and Technology of China, Energy Commission of Ghana, International Development Agency of Denmark, and 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.[19] As deforestation is driven by increased demand for wood and wood products for energy, the proliferation of renewable energy technologies is key to Ghana achieving its 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. The new approach is defined through the project's institutional arrangements: China and Ghana are leading the substantive work, UNDP is providing support on donor relations, project management and facilitation through its country offices, and Denmark is providing 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 upscaling by the private sector. In China the project supports the review and update of SSC policies and guidelines and capacity-building for engaging more systematically in cooperation with other developing countries in this area in the future. A partner project, also funded by Denmark, is being carried out by China, Zambia and UNDP (UNDP, 2014b) in parallel and both projects include cross-project learning activities and regular exchanges between project stakeholders in Ghana and Zambia.[20]

19 Source: World Resources Institute CAIT Climate Data Explorer, available at http://cait.wri.org/.
20 See http://www.cn.undp.org/content/china/en/home/operations/projects/south-south-cooperation/overview-trilateral-cooperation-projects/china--zambia-undp-trilateral-cooperation.html.

## 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),[21] a baseline study on the status of renewable energy technologies as well as a comprehensive assessment of barriers to renewable energy technology transfer and a road map for removing or reducing those barriers. The project developed criteria for technology selection within Ghana's priority areas of solar, wind and hydropower and biogas technologies. On the basis of the identified technology solutions (solar photovoltaic, solar thermal, solar-powered water pumping, small-scale wind and hydropower solutions, and biogas digesters), feasibility studies on renewable energy technology demonstration projects were carried out collaboratively by Ghanaian and Chinese experts, and demonstration projects are starting to be implemented.

To benefit from the insights of a wide range of stakeholders, including local government, the private sector, research institutions and end users, the project created a community of practice that provides inputs to various project activities and will facilitate 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.

As a result of the project, China's Ministry of Science and Technology has strengthened its project management capacity and refined its approach to SSC on renewable energy technology.

As a result of the project's activities to demonstrate the productive use of renewable energy, farmers are benefiting from solar powered irrigation technologies that improve their agricultural production and productivity, and small rural businesses are increasing their income and employment due to 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 reduced deforestation.

## Lessons learned

Investing time and resources in team- and trust-building at 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 different stakeholders should be engaged in the design of project activities to ensure local ownership and uptake of the activity and its outcomes, taking into account 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 the competitive advantages of the Chinese partners have been key ingredients for the success of the project.

A neutral facilitator of SSC, such as UNDP in this project, that 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 potential for scaling up

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.

21 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 Ghanaian REMP.

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 Ghana's renewable energy sector.

## Alignment with priorities outlined in the NDC of the beneficiary country

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

## 4.2.4. Reducing greenhouse gas emissions from transport in Bhutan by improving public transport systems through capacity-building and technology


### Participating countries
Bhutan and Thailand

### Partner organizations
National Science Technology and Innovation Policy Office and Ministry of Science and Technology of Thailand; Road Safety and Transport Authority (main counterpart), Ministry of Information and Communications, private bus operators, traffic police and Department of Roads of Bhutan; and CTCN

### Context
The objective of this SSC through CTCN assistance was to improve the knowledge and application of intelligent transport systems (ITS) by officials in the Road Safety and Transport Authority of Bhutan and also to enable them to access climate financing for implementing ITS.[22]

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

### Project
The assistance provided supported building the soft skills of the participants in terms of their knowledge and application of ITS and low-carbon mobility planning. This was prioritized in Bhutan's technology needs assessment.

Actions undertaken or planned include: training and field visits, providing Bhutan's participants with an overview of the Thai experience with ITS and public transport systems; a workshop on sustainable and environmentally friendly transport: Thai experts provided knowledge and lesson learned on improving awareness of ITS; and a study tour for representatives of the Bhutan mass transit authorities of Bangkok's mass transit management systems and infrastructure (this activity focused on administrative systems, automated control and traffic control infrastructure and procedures, smart cards, token payments and other fare-collection methods, as well as revenue and advertising models).

22 See https://www.ctc-n.org/technical-assistance/projects/reducing-ghg-emissions-transport-improving-public-transport-systems.

There was a broad group of stakeholders in the project, including transport policymakers, transport operators, non-governmental organizations and transport users. The main focus was on improving awareness of ITS among stakeholders.

In terms of the gender responsiveness of the project, female team members benefited from the capacity-building programme in Bangkok and female participants attended the workshop in Bhutan.

## Impacts and results

Bhutan's transport sector contributes 44 per cent of its emissions, with growth in emissions being due to the rapid motorization in the country. The number of vehicles has increased by more than 10 per cent annually, in large part private vehicles, contributing to congestion and air pollution as well as emissions. A proven way of addressing this challenge is by promoting public transport, but sound management is required for a good public transport system, which can be facilitated by ITS. Therefore, by complementing public transport, ITS can deliver substantial reductions in carbon dioxide emissions because the emission intensity of public transport modes is much lower than that of private.

ITS could help to promote the use of public transport, which would particularly improve mobility of women and children which is generally limited. It could also help to mitigate local pollution, which would improve air quality and the health of city populations.

## Lessons learned

- Country ownership is one of the key success factors of this project, which enhanced the knowledge of public transport officials and managers about ITS and low-carbon mobility planning.
- The South–South technology transfer from Thailand to Bhutan was not only SSC in itself but also another model of TrC since Thailand obtained the technology from developed countries and localized it before the transfer to Bhutan.
- The absorptive capacity of the recipient is crucial for technology transfer.

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

Replication was the main objective of the project.

## Alignment with priorities outlined in the NDC of the beneficiary country

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

- Improving mass transit and demand-side management of personal modes of transport;
- Exploring alternative modes to road transport such as by rail, water and gravity ropeway;
- Improving efficiency of freight transport;
- Promoting non-motorized transport and transport not powered by fossil fuels, such as electric and fuel cell vehicles;
- Improving efficiency of and emissions from existing vehicles through standards and capacity-building;
- Promoting the use of appropriate ITS.

The project is also in line with Bhutan's NDC target 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 attuned to similar geoclimatic, cultural or socioeconomic conditions (TEC, 2016).

- **SSC and TrC on climate technologies are taking place in and between all geographical regions and cover all priority areas outlined in developing countries' NDCs and NAPs** (UNCPGS, 2017). According to the TEC questionnaire and interviews conducted in 2018,[23] the following thematic areas offer the most promise for technology cooperation via SSC and TrC channels: agriculture, disaster risk reduction, renewable energy and energy efficiency, forestry, transport, water resources and waste management.

- The case studies show that **there is a wide variety of SSC and TrC models, ranging from the exchange of good practices, through field trips and workshops and 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 usually involve various stakeholders in implementation, including local government, civil society organizations, research and training institutions and the private sector.

- **Several developing countries have adopted national policies[24] or programmes[25] on climate change SSC, integrated climate change SSC elements into national development plans and strategies or established climate change SSC funds[26]** and other dedicated cooperation mechanisms. On the other hand, it appears from the TEC questionnaire and interviews that developed countries mostly engage in TrC on an ad hoc basis without having respective national policies in place. In many cases developed countries opt for channeling resources to support South–South initiatives through international organizations, in particular United Nations entities and multilateral development banks. **The United Nations system is increasingly coordinating its efforts in supporting SSC and TrC for climate action** through the establishment of the United Nations Climate Partnerships for the Global South initiative[27] and the recent adoption of the first United Nations Action Plan on South–South Climate Cooperation (2017–2021).[28]

23 The UNFCCC secretariat in cooperation with the TEC task forces on adaptation and mitigation developed a questionnaire to learn from countries' views on, and experiences with, SSC and TrC. The TEC Chair and Vice-Chair reached out to the 16 developing countries that had mentioned SSC or TrC in their NDCs and NAPs as well as to the five developed countries that had made reference to TrC in their latest national communications. Six developing and one developed country responded to the questionnaire. Three other developed countries responded that there was only limited information available on the matter. In support of the findings from the questionnaire responses, six interviews were conducted with developing and developed countries that had received the questionnaire or were participating in the TEC–UNOSSC workshop on SSC and TrC for climate action held in Singapore on 13 July 2018. Two interviews were also conducted with international organizations taking part in the workshop.

24 For example, China's African Policy includes provisions on South–South cooperation on climate change by increasing scientific and technological cooperation; see http://en.people.cn/200601/12/eng20060112_234894.html.

25 For example, Brazil's Ministry of Environment adopted the Brazilian "Program for South-South Cooperation in Climate Change and Forests" in November 2017; see http://redd.mma.gov.br/images/conaredd/programforsscinclimatechangeandforests-executivesummary-EN-Nov17-COP23-RP.pdf.

26 For example, China established a dedicated South–South Cooperation Climate Fund in 2015 (Weigel, 2016). India established the India–UN Development Partnership Fund in 2017, which also provides support for climate technology related projects; see https://www.unsouthsouth.org/partner-with-us/india-un-fund/.

27 See https://www.un.org/sustainabledevelopment/scpi.

28 See https://www.unsouthsouth.org/south-south-cooperation-action-plan-for-climate-change-engagement-strategy-2017-2021.

## Good practices

- SSC and TrC are proven **effective tools 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**.

- The case studies show 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 to 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 grass-roots initiatives as the starting point for designing climate technology related interventions is **becoming the** norm for SSC and TrC (TEC, 2017b).

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

## Challenges and lessons learned

- Despite **many fruitful SSC initiatives** involving the development and transfer of climate technologies being carried out in all parts of the world, **information on the initiatives, including on the approaches, mechanisms and tools used to initiate, design and implement them, still remains overall limited and inaccessible. Information on TrC projects is more readily available**, especially on initiatives coordinated by international organizations. Some United Nations entities have established dedicated SSC platforms, including information on climate projects, such as South–South World, hosted by UNDP,[29] and the Food and Agriculture Organization of the United Nations (FAO) South–South Cooperation Gateway.[30] 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 (e.g. Weigel, 2016; UNDP, 2017a; UNDP, 2017b; UNDP, 2017c; UNDP, 2017d). The Organisation for Economic Cooperation and Development hosts a triangular cooperation repository of projects,[31] which includes a limited number of climate projects. Furthermore, UNOSSC in collaboration with the South Centre has recently published a global overview of climate partnerships for a sustainable future (see UNCPGS, 2017). However, there is no dedicated platform for SSC and TrC on climate technologies.

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

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

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

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

29 See http://www.southsouthworld.org/about.
30 See http://www.fao.org/south-south-gateway/en.
31 Available at http://www.oecd.org/dac/dac-global-relations/triangular-co-operation-repository.htm.

# 6. Recommendations

## Enhancement of knowledge-sharing on SSC and TrC on climate technologies

- The availability of public information on completed, ongoing and planned SSC and TrC projects on climate technologies should be increased by building on existing web-based platforms that already partially include such information, such as the CTCN website,[32] the FAO South–South Cooperation Gateway, the UNOSSC website[33] and South–South World.

- Consider to enhance knowledge-sharing on SSC and TrC on climate technologies via the aforementioned or similar platforms by:

    - Ensuring easy accessibility to all interested countries and organizations, including by making them compatible with mobile devices;

    - Complementing them with a platform for exchange between countries interested in engaging in SSC and TrC, on both the demand and supply sides;

    - Adding documentation on implemented models for SSC and TrC on climate technology projects;

    - Providing information on lessons learned and on initiatives and approaches that did not lead to the expected results to ensure learning from mistakes and avoidance of ineffective practices.

- United Nations entities, in particular those already involved in the management of the above-mentioned web-based platforms, could consider taking the lead on enhancing knowledge-sharing on SSC and TrC on climate technologies, in line with the United Nations Action Plan on South–South Climate Cooperation.

## Identification of suitable technologies and initiation of SSC and TrC projects

- While SSC and TrC projects present the most direct and effective means of 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 way to learn about proven Southern technologies and replicable measures and to identify potential partners for future collaborative efforts.

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

- Another effective avenue for launching SSC could be to connect non-governmental and research institutions in prospective partner countries (TEC, 2017b). The establishment of a network of Southern actors could help to facilitate this process.

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

- To further increase the effectiveness and long-term sustainability of SSC and TrC projects to facilitate climate technology development and transfer and their contribution to the implementation of NDCs and NAPs, future projects could include such components as research

32 https://www.ctc-n.org.
33 https://www.unsouthsouth.org.

and development; adoption of policies and regulations; and creation of local value chains, as for example pursued in the China–Ghana–UNDP project on renewable energy technology transfer.

- 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 challenges

- To support developing countries to expand the sharing of knowledge, practices, technologies and know-how through SSC on climate technologies, countries and multilateral organizations could consider enhancing their engagement in TrC on climate technologies, for example by allocating dedicated funds to such projects or drawing on multilateral funding sources and technical support.

- In addition, governing bodies of international financial institutions, in particular the Green Climate Fund and the Global Environment Facility, could consider how elements of South–South knowledge-sharing or peer-to-peer learning could be promoted in their projects and programmes. They could also help countries to systematically document and monitor the success of sharing climate change knowledge and practices to facilitate the replication and scaling up of those practices.

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TEC

United Nations
Office for South-South Cooperation

## About the Technology Executive Committee

The Technology Executive Committee is the policy component of the Technology Mechanism, which was established by the Conference of the Parties in 2010 to facilitate the implementation of enhanced action on climate technology development and transfer. Along with the other component of the Technology Mechanism, the Climate Technology Centre and Network, the committee is mandated to facilitate the effective implementation of the Technology Mechanism.

## About the United Nations Office for South-South Cooperation

The United Nations Office for South-South Cooperation (UNOSSC) was established by the UN General Assembly to promote, coordinate and support South-South and triangular cooperation globally and within the United Nations system. The Office works to advance policy choices for South-South and triangular cooperation. It facilitates coordinated United Nations system support to countries' efforts to manage, design and implement South-South cooperation policies and initiatives through the identification, sharing and transfer of successful Southern-generated development solutions. It works to support capacity development through the sharing of knowledge and experiences. It also forges strategic South-South and triangular partnerships to support demand-driven programmes.

## Contact Details

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

Platz der Vereinten Nationen 1, 53113 Bonn, Germany

Email: tec@unfccc.int

Website: www.unfccc.int/ttclear/tec

## Contact Details

United Nations Office for South-South Cooperation, 304 East 45th Street, FF-11th Floor New York, NY 10017 USA

Email: southsouth@unossc.org

Website: www.unsouthsouth.org



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