

THE JOURNEY TO A CLIMATE RESILIENT CARIBBEAN:

A J-CCCP Review



Introduction

With rising sea levels, sporadic weather patterns and increasingly disastrous and unpredictable weather systems, the world can no longer ignore the very real threat of climate change.

The Caribbean, as a region that consists of small states and primarily, small island developing states (SIDS), is acutely vulnerable to the changing climate and as such, the region is taking steps to boost our resilience to the negative effects that a warming world brings.

The UN Development Programme's Japan-Caribbean Climate Change Partnership (UNDP J-CCCP) is one such step. This partnership is an initiative which strengthened the capacity of countries in the Caribbean, and was designed specifically to invest in climate change mitigation and adaptation technologies,

thanks to our generous donors – the people and Government of Japan.

Under the UNDP J-CCCP, several initiatives have been completed toward creating a more climate resilient Caribbean. This document compiles the details, facts and outcomes of ten (10) of these interventions into the following case studies to share the knowledge gained with stakeholders, communities and project developers, as we continue on our journey to a more climate resilient Caribbean.

Policy

- National Adaptation Plans (NAPs)
- Emission Modelling

Community-based Interventions

- Water Resources Management (Potable)
- Water Resources Management (Agricultural)
- Renewable Energy & Energy Efficiency
- Climate-smart Agriculture
- Climate-resilient Infrastructure

Communications & Knowledge Sharing

- Community-based Communications
- Let's ACT Communication Campaign
- Transfer of technology



Japan Caribbean
Economic Partnership

UNEP
United Nations Environment Programme

6 A



POLICY

- National Adaptation Plans (NAPs)
- Emission Modelling

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

National Adaptation Plans, The Saint Lucia Example



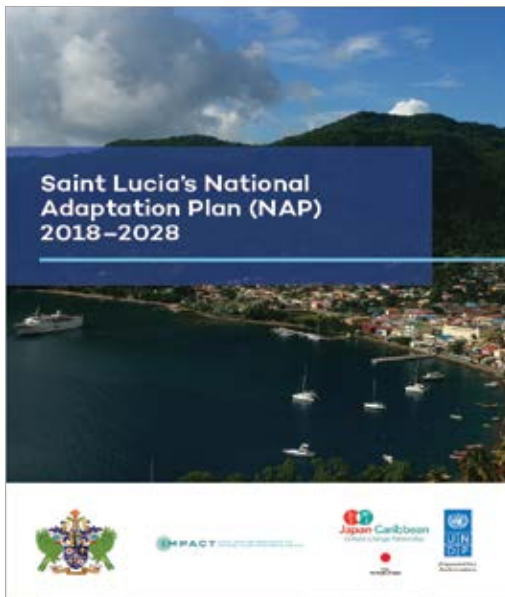
The National Adaptation Plan Process

The UN Development Programme (UNDP) through the Japan-Caribbean Climate Change Partnership (J-CCCP), supported the development of Saint Lucia's National Adaptation Plan (NAP), in line with the existing United Nations Framework Convention on Climate Change (UNFCCC) endorsed framework. Support like this assists vulnerable territories in assessing their risks and vulnerabilities to climate change and specifically

allows Saint Lucia to identify, rank, plan and implement national and sectoral measures.

Due to the extensive and robust nature of Saint Lucia's NAP, this case study has been developed to highlight the key points, takeaways and insights as it relates to the plan.

About the Saint Lucia NAP



Cover page of Saint Lucia's NAP

Saint Lucia's NAP covers a 10 year period with eight prioritized sectors as follows: water, agriculture, fisheries, infrastructure and spatial planning, natural resource management (terrestrial, coastal and marine), education, health, and tourism. In addition to the NAP, Saint Lucia has also developed four sectoral adaptation plans, which include tourism¹, water, agriculture and fisheries.

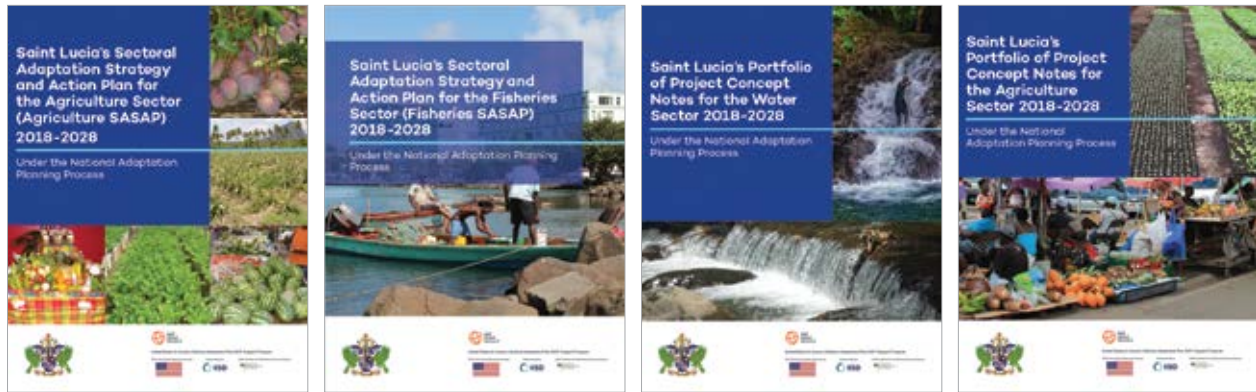
In late 2018, the country commenced work on an Adaptation Strategy and Action Plan for the natural resource management sector.

The NAP and Sectoral Adaptation Strategy and Action Plans (SASAPs) are living documents and will be reviewed during the ten-year time frame, and their implementation monitored and evaluated.

Below are snapshots of the cover pages of these documents:



¹ In 2015, prior to the NAP process being officially undertaken in Saint Lucia, the GoSL developed an Impact Assessment and National Adaptation Strategy and Action Plan for the Tourism Sector.



The vision of the NAP is that “Saint Lucia and its people, their livelihoods, and the country’s social systems and environment are resilient to the risks and impacts of climate change through continuous, coordinated and effective adaptation efforts.”

Snapshot of Saint Lucia’s National Adaptation Plan (NAP) 2018 - 2028, pg 2.

Laying the Groundwork and Addressing Gaps.

Includes stocktaking of needs, opportunities, entry points, and key resources for adaptation in the country. Frequently, it also means establishing an institutional home for the NAP process within government and a legal or administrative mandate to legitimise the process.

Reporting, Monitoring and Review.

Planners set up systems to track their NAP’s progress. This often means choosing effectiveness criteria, setting up a review timeline, and establishing a reporting and outreach plan.



Preparatory Elements.

Includes analytic activities to fill information gaps identified in the previous stocktaking effort. For example, planners might commission a national climate vulnerability assessment or develop a set of future climate scenarios if these did not yet exist. They also might synthesise existing adaptation plans from line ministries or sub-national governments and set procedures for integrating adaptation into key economic sectors.

Implementation Strategies.

This element focuses more concretely on who will do what, and how. Planners use information and criteria from Element B to set priorities and decide on the sequence of activities. They also might focus on how to finance adaptation, build needed capacities, and establish roles and responsibilities for coordinated implementation.

Source: Saint Lucia’s National Adaptation Plan Stocktaking, Climate Risk and Vulnerability Assessment Report, pg 16

Insights & Takeaways

To date, Saint Lucia's NAP has evolved into one of the most comprehensive documents of its nature. The success of the territory's NAP development process was significantly dependent on a variety of key factors, as outlined below.

Engagement and Partnerships

The Saint Lucian Government

Saint Lucia's NAP process benefitted greatly from active stakeholder engagement at all levels. Most significant was the support and engagement from the Saint Lucian Government, whose commitment to readying its country for climate change is highly commendable.

The government's support and buy-in, strong in-country team leadership, and continuous representation and engagement from key in-country technical experts truly made a difference as they provided valuable inputs and guidance throughout the process. A range of other stakeholders were also involved, for example, fishermen. It also meant that the NAP was seen as a matter of national priority which advanced the national approval process and enabled the NAP to be reviewed and considered an official national policy document through rapid endorsement by the Cabinet of Ministers.

Saint Lucia's NAP process benefitted greatly from **active stakeholder engagement** at all levels.

Collaborations and Partnerships

In addition to J-CCCP's support, technical and financial assistance was also provided by these partners and this led to a well coordinated and successfully developed NAP in a condensed time frame:

- The United States In-Country Support Program (managed by the Institute for Sustainable Development [IISD], host to the NAP Global Network Secretariat)
- IMPACT project, funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) as part of the International Climate Initiative (IKI)

Time

Although the document needed to be completed within an ambitious timeframe, key stakeholders prioritised NAP development and dedicated their time to ensure that the reviews were adequately addressed to provide a sound and robust National Adaptation Plan.



Saint Lucia's Department of Sustainable Development, including the Hon. Minister Gale Rigobert, present their NAP to regional donors

Providing Collaborative Spaces

As mentioned previously, the development of effective, strategic partnerships was key to the success of this initiative. Moving forward, NAP programmes should consider providing a space or outlet in which countries can discuss key aspects of the NAP with potential donors. Facilitating these open conversations, gives countries the opportunity for early consideration of next steps and of the costs of implementing adaptation actions. Knowing that they will be afforded the opportunity to engage with potential donors can encourage countries to think of how the NAP and supporting summary reports should be developed to attract financing for the projects. Developing the document with this frame of mind, decreases the likelihood of the NAP simply becoming a document on the shelf rather than an actual guide on climate action.

Using Existing Building Blocks

The NAP process built on past policies, plans, strategies and initiatives. The national counterparts therefore did not need to reinvent the wheel in the measures being proposed, but drew from them as necessary. In addition to this, the Department of Sustainable Development (SDED) also helped streamline the NAP by providing support from the inception.

A Sectoral Adaptation Strategy and Action Plan (SASAP) requires:



Further Considerations

Capacity Development for Understanding the NAP Process

To obtain clear national direction and stakeholder engagement, all stakeholders need to understand why the NAP process is important for their work. While the lead focal agency may understand, many stakeholders may not fully grasp the NAP process and its benefits which is essential for stakeholder buy-in.

Including Gender Considerations

Moving forward, a greater understanding of the need to view the effects of climate change through a gender lens will help create an even more robust plan. There should be a comprehensive understanding of the gender disparity communicated to key actors in the climate change space in order for there to be

a willingness to view gender as a key aspect of the NAP development and implementation process. In climate change adaptation, it is important that gender considerations be applied and where possible, key personnel benefit from gender training.

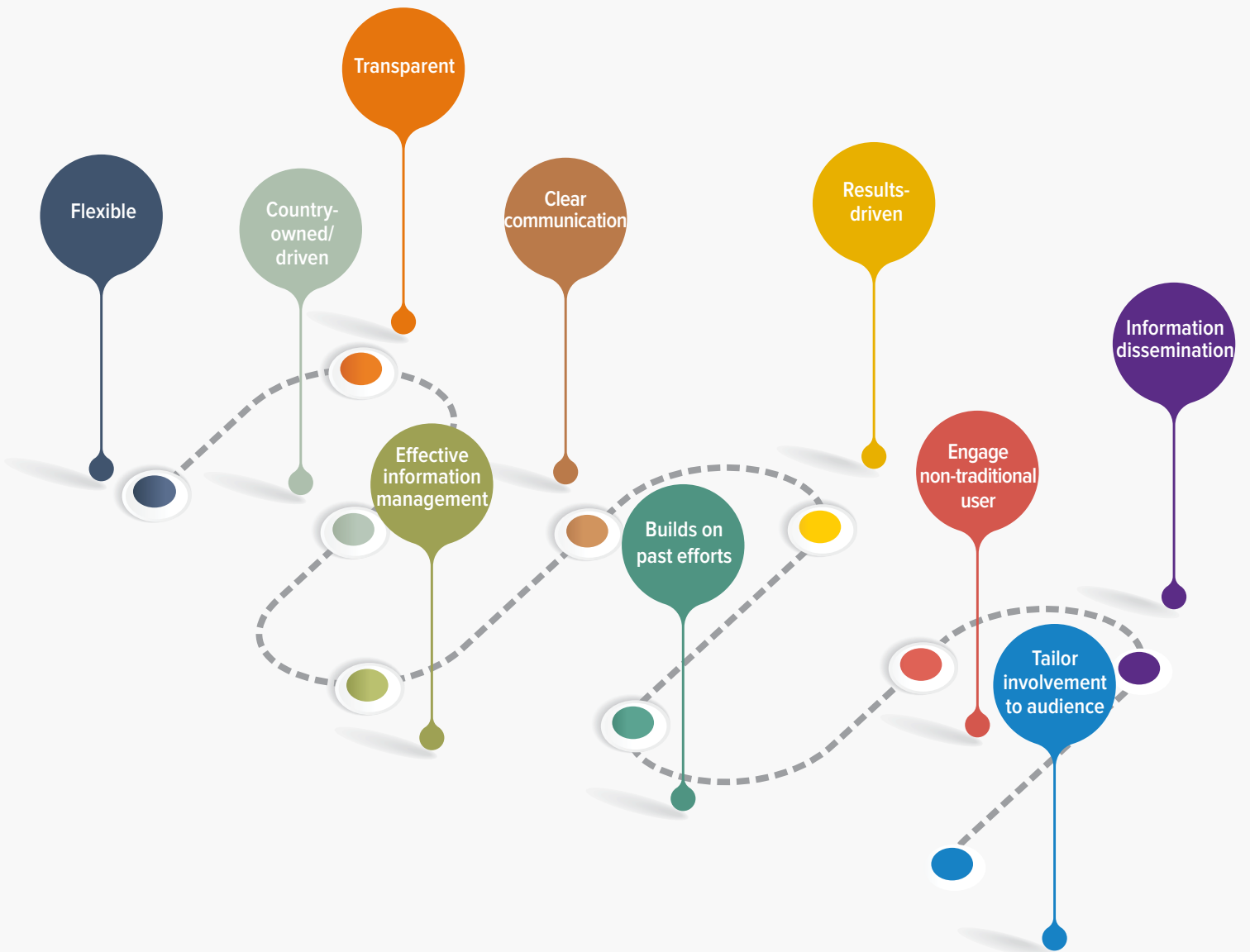
Actions towards this include:

- Conducting a national climate vulnerability assessment to inform decision-making processes on human groups and geographic areas to be prioritised for targeted adaptation action.
- Conducting a climate vulnerability study to determine the populations and groups most vulnerable to climate impacts.

Final Thoughts

Saint Lucia's successful completion of their NAP, its subsequent adoption by the Cabinet of Ministers and its [submission to the UNFCCC Secretariat](#) is demonstrative of the country's commitment to climate change action and represents a positive shift for the region. Saint Lucia's NAP document is intended to be a living document and will be revisited after the 10 year period. The document will undoubtedly serve as a guide for the island's key vulnerable sectors.

What should a NAP look like?







Japan-Caribbean
Climate Change Partnership



From
the People of Japan



Empowered lives.
Resilient nations.

Rain Water Harvesting System

Supported by the Government of Japan under the
Japan-Caribbean Climate Change Partnership
with implementation by UNDP

The Japan-Caribbean Connection

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

Understanding the Present; Improving the Future

Case Study: Pilot Project for Emission Modelling in the Caribbean
The St. Vincent and the Grenadines, and Jamaica Examples

Carlos Ruíz Garvia (UNFCCC Team Lead) presents on the impacts of rising global temperatures.



Background

In 2015, the 21st Conference of the Parties (COP 21) of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement requires all parties to put forward their best efforts through “nationally determined contributions” (NDCs). The NDC reflects the country’s ambition and proposed steps for reducing emissions, taking into account the country’s domestic circumstances and capabilities. These various NDCs allow those involved to determine whether the world achieves the long-term goal of the Paris Agreement - a sustainable low carbon future.

While the Caribbean contributes minimally to global emissions, the region is one of the most impacted by the negative effects. As such, Caribbean governments have decided to lead by example and have begun the process to reduce their emissions. In aid of this effort, the UNDP Japan-Caribbean Climate Change Partnership (J-CCCP) has provided support for the development of Nationally Appropriate Mitigation Actions (NAMAs*) in 7 Caribbean countries from 2017 to 2019 as one of the tools to implement countries’ NDCs.

*** NAMAs**
Nationally Appropriate Mitigation Actions (NAMAs) refers to a set of policies and actions that countries undertake as part of a commitment to reduce greenhouse gas emissions.



Participants at the SBL training in Kingston, Jamaica.



Eduardo Cardoso Filho (Associate Programme Officer at UNFCCC based in Bonn, Germany) presenting a certificate of completion to workshop participant.

Baseline Calculations and Emission Modelling in St. Vincent and the Grenadines, and Jamaica

In order to determine emission levels and to support emission tracking, it was decided to apply standardised baselines. A standardised baseline allows countries to have a universally comparable metric by adopting generally accepted procedure(s) to enable objective comparison or judgment. The standardised baselines are created by the implementation of any project to accurately measure the reduction of the prescribed initiatives under the NAMAs. The standardised baselines are created by partnering with the UNFCCC to utilise the most applicable Clean Development Mechanism (CDM) methodologies to determine the current emission levels in St. Vincent and the Grenadines (SVG) and Jamaica. To support the data requirements for the calculation for the transport sector in SVG the J-CCCP partnered with GIZ to utilise the TRIGGER tool. This tool was designed to calculate the total fuel consumption as well as CO₂, CH₄ and N₂O emissions for five transport subsectors (aviation, road, railways, maritime, inland shipping) for one year.

The J-CCCP supported both countries in their data collection to support Standardised Baseline calculations for the water sector in Jamaica and emission modeling for the transport sector St. Vincent. This case study highlights the main challenges and lessons learned in establishing the baselines, which could be applicable for other Small Island Developing States (SIDS).

St. Vincent and the Grenadines

In St. Vincent and the Grenadines, the NDC declared an unconditional, economy-wide reduction in greenhouse gas (GHG) emissions of 22 per cent compared to its current scenario by 2025. The NDC identifies the transport sector as one of the fastest growing sources of emissions and as such the Government of St. Vincent and the Grenadines decided to focus on this sector for their NAMA.

In St. Vincent and the Grenadines, the TRIGGER was utilised as insufficient data was available to support emission calculations for the transport sector. The tool allows for calculations based on assumptions to cover the current gaps in the data. It is a comprehensive

but simple model which allows users to see the data and the model assumptions behind the calculations. It further allows for calculations to be improved over time because additional data can be added to the model when it becomes available. This methodology was applied in the first Small Island Developing State in the Caribbean for emissions calculations. The J-CCCP organized a workshop in St. Vincent and the Grenadines in May 2019 where GIZ was invited to provide some introduction to the departments with responsibility for emission tracking to sensitise participants on the applications of the model for emissions tracking and future calculations.

Applying the Model

The model was originally created for Vietnam in 2018. The assumptions, such as, fuel specifications and average fuel consumptions, were values based on Europe (and other developed countries) and were not specific to the topography, vehicle composition and fuel consumption patterns for developing countries and specifically small island developing states. This presented a challenge as the model particularly could not account for the predominantly hilly terrain of St. Vincent and the Grenadines.

This raised the very important observation that models designed for large developed/developing countries may not meet the needs of SIDS.

There was limited accurate data for the transport sector in St Vincent and the Grenadines and the J-CCCP supported the project in collecting relevant data which was not available from secondary sources. Information was collected on vehicles within the government fleet including age, vehicle model, fuel consumption, mileage and country of origin from several government agencies, (which are assigned vehicles within the government fleet) including Customs and Excise, Ministry of Finance and Planning and Ministry of Transport. Information was also collected on the quantity and quality of fuel supplied from Sol and Rubis, the major fuel distributors on the island.



Janak Shrestha (Programme Officer at Sustainable Development Mechanism Programme, UNFCCC) guiding workshop participants through the steps of the calculations required to establish the standardized baseline in the Water Sector.

The collected data was inputted, and the model allowed for assumptions to be applied, to adjust for the various data gaps. This tool allowed for the establishment of an inventory for a subset of vehicles in St. Vincent and the Grenadines and supported the identification of the scope of the interventions under the NAMA and the boundaries of the calculations for the standardised baseline using the approved CDM methodology.

Jamaica

As part of the Government of Jamaica's commitment to reduce its emissions, the water sector was selected as an area of focus within their Nationally Appropriate Mitigation Action (NAMA), covering renewable energy and energy efficiency solutions and technologies. The water sector in Jamaica comprises of three sub-sectors: water supply, wastewater and irrigation, and there is substantial energy output required to run these three areas. As such, the plan proactively seeks to implement mitigation measures to reduce the country's carbon footprint, which is to be addressed primarily through reduced energy consumption in the water sector.

Calculating Standardised Baseline in Jamaica

At the international level, under the Clean Development Mechanism, tools and guidelines were developed to create robust methodologies for determining

baseline emissions. For the work in Jamaica, the CDM methodology AM0020 "Baseline methodology for water pumping efficiency improvements" was identified as most applicable considering the proposed scope of the NAMA interventions one of which targets the distribution of potable water. In assessing the methodology and its possible application to the calculation of the standardised baseline for Jamaica, several challenges were identified. The existing scope of the calculations addressed segments of larger countries and data collection requirements were too broad for application to the Jamaican context. To address this, recommendations were made to expand the scope of calculations to cover the entire country, as this is more applicable for SIDS where smaller country divisions would not be representative of the national emissions profile for the sector. Additionally, proposed data collection guidance was provided, to ensure more targeted and accurate data collection.

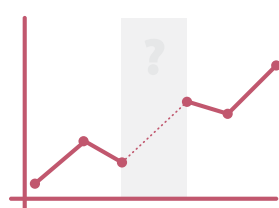
To address some of the challenges identified, Jamaica will submit a request to the UNFCCC Methodology Panel with recommendations for adjustments toward improvements to the methodology. Recommendations currently consider a 12-month data collection regime to determine pre-project/intervention efficiency ratios which consider daily/seasonal variations should these variations be significant. This is one of the first such requests to be made to the UNFCCC panel from a Caribbean state and the results will set the precedent for applying international models to SIDS.

No One-size Fits All: Challenges and Considerations Revealed

These two projects were pivotal in understanding the needs of SIDS when it comes to emission modelling. It revealed the scope of the data requirements to support national emission calculations and the level of multi-agency coordination that is needed for future efforts. It also highlighted that a blanket methodology cannot be applied to all territories and that special care must be taken when considering the national circumstances in smaller islands and methodology design. The usefulness of models and the way in which

they can support countries in estimating emissions toward selection of the most appropriate interventions was a useful lesson coming out of the work with the two target countries. In the case of St. Vincent and the Grenadines, the TRIGGER tool allowed country actions to be supported and improvements in calculations as data collection processes are improved. Here are a few challenges and considerations for contemplation, prior to recording baseline calculations in SIDS:

Challenges:



Several data gaps were identified in existing data and specific information required for the model was challenging to collect (SVG)

Vehicle efficiency factors were based on European data and did not account for differences in terrain which is mountainous (SVG)



Data collection was challenging as required information was spread across several departments with responsibilities for various aspects of the national water portfolio e.g. National Water Commission, National Irrigation Commission etc. (JAM)



Elements of the most appropriate CDM methodology posed challenges when assessed for its suitability to be used. Sampling regimes were too general and the current boundaries for the calculations too granular for SIDS (municipal vs. national) (JAM)

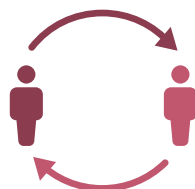
Considerations:

Emission models are valuable tools for countries challenged with data gaps in facilitating emission estimations/ calculations (SVG)



The current TRIGGER tool is a simple but effective tool allowing countries to improve accuracy and robustness of calculations as more data is collected (SVG)

Despite the robust and sound nature of CDM methodologies, in some cases there may be room for improvement and channels exists for countries to request recommendations for changes to improve calculations (JAM)



SIDS may need to collaborate to develop specific models given their unique situation (SVG/JAM)



A one-size fits all model may not work for all territories and are often built on data from larger developed countries. Efficiency factors and emission calculations need to adequately consider the country context (JAM/SVG)



The Way Forward: Best Practices and Lessons Learnt

The following best practices were highlighted from the St. Vincent and the Grenadines and Jamaica examples:

St. Vincent & the Grenadines

Due to the novelty of the TrIGGER Tool used in SIDS, St. Vincent and the Grenadines became the first island within the region to adopt this model. It serves as the current best practice on applying the model to a state, which has data gaps.

The lessons learnt are that:

- Substantial data is still required to support emission modelling even if assumptions are utilised to address some gaps
- The model is a useful tool for initiating a national vehicle inventory to support emission calculations and the selection of the most appropriate interventions under the NAMA
- A multiagency effort is needed to support data collection, management and future emissions tracking which may also include the development of a central repository for the collection and assessment of data

Jamaica

Jamaica recognised and acknowledged the challenges of international methodologies and went a step further to provide recommendations for amendment. As the first Caribbean SIDS to do this, the island has set a precedent and provides an excellent example for the region on the importance of assessing existing methodologies and providing feedback to support improvements for the benefits of other territories, particularly SIDS.

The lessons learnt are that:

- Blanket use of a methodology is not always the best approach particularly for SIDS
- Caribbean territories can advocate for themselves and other SIDS



UNFCCC Facilitators, Janak Shrestha, Eduardo Pentead, Cardoso Filho and Daniel Galvan Perez and workshop participants for the SBL Training for the Transport Sector in Kingstown, St. Vincent after successful completion of the training event. Several agencies were represented at this event including BRAGSA, the Ministries of Transport, Trade and Finance, the RSVG Police Force, Customs Inland Revenue and VINLEC.

Final Thoughts

While there were several challenges in emission and standardised baseline calculations for these two countries, these setbacks were essential to pave the way forward for establishing accurate baselines in the Caribbean.

These baselines are crucial for an understanding of the national contribution of SIDS to international GHG emissions and support the work of regional territories in their efforts to combat climate change.



POTABLE WATER
Provided with s...



From
the P...ople of Japan

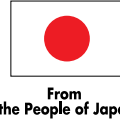
The logo for the Japan-Caribbean Climate Change Partnership features a red circle with a white wind turbine icon and a blue circle with a white palm tree icon.
Japan-Caribbean
Climate Change Partnership



COMMUNITY-BASED INTERVENTIONS

- Water Resources Management (Potable)
- Water Resources Management (Agricultural)
- Renewable Energy & Energy Efficiency
- Climate-smart Agriculture
- Climate-resilient Infrastructure

CASE STUDY



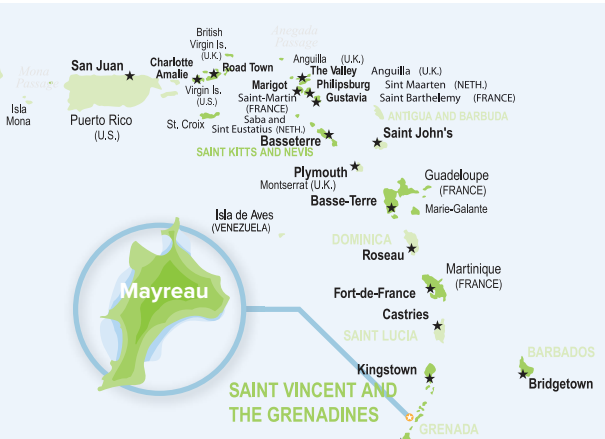
Creating an Oasis

Case Study: The Potable Water Resources Management Project
(The Case of Jamaica and St. Vincent and the Grenadines)



Background

Water, known to many as the elixir of life, is one of our most precious resources. However, for many islands in the Caribbean, a clean reliable supply of drinking water is not a given. Several territories within the region battle with water scarcity, drought and limited access to potable water. One such territory is Mayreau, a Grenadine Isle of St. Vincent and the Grenadines. Rainwater is the island’s only natural source of water and, during the dry season or droughts, water must be shipped from the mainland at a cost to residents. The current situation is unsustainable and is further exacerbated by researchers’ predictions of an increase in the average frequency of hot days and nights, attributed to climate change. It is expected that the mean annual temperature will continue to rise, resulting in longer dry seasons and increased instances of drought, which in turn will result in the Mayreau community suffering from further water scarcity in the future.



Pictured above is a map of Mayreau, St. Vincent and the Grenadines

But Mayreau is not alone. In Jamaica, the communities of Richmond Park and Victoria in the parish of Clarendon also face several water woes. Some of these communities are not connected to the municipal water supply provided by the National Water Commission, and rainwater serves as the primary source of potable water. Without a reliable supply, residents are at the mercy of unpredictable weather patterns, which result in droughts as well as floods. During drought, water shortages cause numerous school closures and residents have to travel in excess of four miles for access to water, oftentimes visiting local rivers such as

the Peace River. However, when the weather reverses, drought can quickly turn to flood – but this is not a blessing as the floods can cause an increase in cases of water-borne illnesses.

To remedy these situations, The United Nations Development Programme’s Japan-Caribbean Climate Change Partnership (UNDP J-CCCP) executed two projects to assist these territories. The projects were designed to provide the affected communities with access to more reliable and sustainable potable water supplies and improved water management solutions.



Pictured above is a map of Clarendon, Jamaica

Project Overview

The United Nations Development Programme’s Japan-Caribbean Climate Change Partnership (UNDP J-CCCP) conducted two projects in St. Vincent and the Grenadines, and Jamaica. Although addressing different problems, both projects increased the affected communities’ potable water capacity.

[The St Vincent and the Grenadines Example](#)

Mayreau, the smallest inhabited island of the Grenadines, with an area of 1.5 sq. miles and a population of approximately 271, suffered from drought and water scarcity. The potable water resource management project, titled “Adapting to the Effects of Drought through Increasing Water Storage Capacity to address Climate Change on Mayreau”, aims to increase the island’s water storage capacity by providing sixty 1,000-gallon water tanks for households and public entities with the greatest need. In addition to this, the project included the refurbishment of an existing but derelict system by repairing the 10,000-gallon cistern located at the Mayreau Primary School allowing for a boost in the community’s water management capacity.

The Union Island Environmental Attackers, a local NGO, implemented the project supported by the J-CCCP in the amount of US \$77,918.52. The project further equipped the residents with hands-on knowledge of the maintenance and operation of water storage tanks to enable them to maintain high quality water for drinking and utilise it in a sustainable manner.



A refurbished water tank on the Grenadine island of Mayreau

[The Jamaica Example](#)

Victoria and Richmond Park, two communities in Clarendon, Jamaica’s third largest parish, are plagued by fluctuating rainfall that affect their water availability and quality. The potable water resource management project, titled “Improving the Adaptive Capacity to Climate Change through Rehabilitation and Construction of Water Harvesting Infrastructure in Upper Clarendon”, was designed to increase the communities’ water storage capacity and stabilise the parish’s water supply. J-CCCP partnered with the Clarendon Parish Development Committee Benevolent Society (CPDCBS), a local community-based organisation (CBO), to refurbish existing water storage systems which have been in disrepair for many years in order to boost the community’s water supply capacity.

Students and residents are both affected by frequent water shortages due to the limited availability of water from the municipal sources. The communities had access to two concrete catchment areas, known locally as “barbeques” which are connected to two underground concrete water storage tanks. These tanks have been derelict and out of service for years. Under the J-CCCP Pilot Project, these were rehabilitated to facilitate an increase of 292,000 litres of water storage. In Victoria, three 1,000-gallon above ground tanks were installed as well as a Solar PV pumping system to fill the secondary storage tanks. More than two thousand community members will benefit from repairs to the large concrete water tank.



The refurbished ‘barbeque’ water tank in Clarendon, Jamaica

Additionally, with an aim of building the knowledge/ technical capacity of the community, over 400 persons (252 females and 157 males) were trained in adaptation technologies and practices related to climate change. To create a strong foundation for the training, the first goal was to raise the community's awareness as it related to climate change. With an improved understanding of climate change, the facilitators focused on educating the residents in disaster risk management techniques as well as the use and care of water harvesting systems and solar powered pumps.



Students sharing about their climate change training

Because youth play such an important role in any society, special care was taken to involve them in the project. At least 100 students from each community were involved in an awareness-raising climate adaptation quiz competition to ensure the knowledge would be shared across all generations.

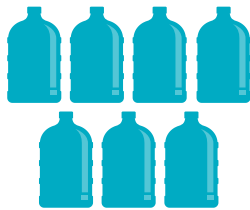
With respect to the sustainable maintenance of the upgraded systems, a draft manual for the maintenance and upkeep of the water storage system has also been developed including roles and responsibilities of community personnel after project handover.

Reducing Water Woes: Impact of the Projects

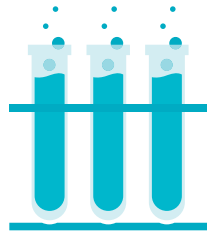
Although the two projects were implemented in different environments, they both made a substantive impact on the livelihoods of the local communities.

St. Vincent and the Grenadines

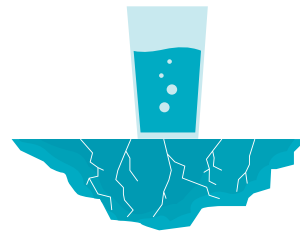
Outcomes of the Project



Increased residential and commercial water storage capacity by approximately 70,000 gallons of water



Increased capacity in system maintenance, on site water treatment and water quality testing



Reduced water shortages during drought



Reduced cost to import water from the mainland



Increased knowledge base of community members

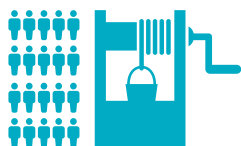
Jamaica

Outcomes of the Project



Increased access to clean water

(reduced cases of water-borne illnesses)



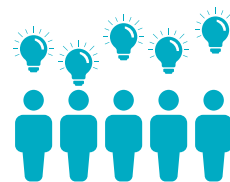
More than two thousand community members benefit from reliable water supply



Less school closures due to water shortages



Access to a more convenient, safe water supply



Increased knowledge base of community members

The projects achieved J-CCCP's Outcome 2, the adoption and implementation of mitigation and adaptation technologies, as it relates to water resources management, and also addressed some of the Sustainable Development Goals (SDGs) as outlined below:



Goal 6:

Clean Water and Sanitation

- Increased population using safely managed drinking water services
- Reduced water stress to communities
- Both projects focused on educating communities on proper water hygiene (in the St. Vincent and the Grenadines example) and youth (in the Jamaica example)



Goal 13:

Climate Action

- The projects boosted the water capacity of the two communities which strengthened their resilience and adaptive capacity to climate-related hazards (e.g. drought and water shortages)

Insights and Take-aways

NGOs can assist with the implementation of community projects.

Generally, NGOs across the region maintain community-minded mandates and have the capacity to manage and execute various projects to strengthen their communities. This allows greater capacity to implement projects throughout the region if these organisations are considered as partners.

Collaboration with direct beneficiaries allows for faster solutions.

The projects bring together policy makers, experts and representatives of affected communities to encourage policy innovation for climate technology, incubation and diffusion. Having key stakeholders involved

reduces delays and increases buy-in and successful implementation of the project.

Adequate maintenance of water facilities can reduce dependence on unreliable water sources and improve water scarcity.

In both communities, derelict storage systems exacerbated the water woes. Adequate maintenance can reduce the need for replacement and maintain the water capacity of the community more effectively. To ensure the upkeep of these updated systems, both projects also trained community members in maintenance techniques. Additionally, in Jamaica, a maintenance manual was created to ensure that the community would be able to sustainably manage the upgraded facilities.

Best Practices

Several best practices have been identified in the two projects as outlined to the right:

Local/ community-based NGO involvement	Increased skill set of the community	Maintenance and 'ownership' by community
<ul style="list-style-type: none"> ■ Community-based organisation involvement in Jamaica ■ The involvement of NGOs was also a success for the project. The two groups were familiar with the needs of their communities and were better able to manage and execute the projects. 	<ul style="list-style-type: none"> ■ Training in water resource management of both communities ■ Education of female-led households in Mayreau ■ Education of the youth in Jamaica (via school quizzes) 	<ul style="list-style-type: none"> ■ The communities were educated on climate change and trained in the maintenance of the updated water systems ■ Training allowed the community to sustainably maintain the new system



A resident of Clarendon sharing the benefits of the refurbished 'Barbeque'

Final Thoughts

Through the involvement of community-based organisations, both J-CCCP projects were executed and resulted in increased potable water storage capacity. They also bolstered local capacities through training and education, and improved the self-sufficiency of the two communities.

As we have witnessed across the region, climate change is recognised as one of the most serious

challenges compounding vulnerabilities inherent to the Caribbean (e.g. water scarcity and unreliable potable water supplies).

However, with the interventions and measures executed in the two projects, the communities are now more resilient to the impacts of climate change.





Understanding
The Present;
Improving The
Future

CASE STUDY



Irrigating 'Eden'

Case Study: The Agricultural Water Resource Management Project
(The case of Grenada, and St. Vincent and the Grenadines)



Background

The Caribbean is known for its lush tropical landscapes, fertile lands and abundance of crops. However, this rich 'Eden' is adversely affected by climate change; droughts, floods and increasingly severe storms are the primary causes of decreased farming output and negatively impact the region's ability to provide food for its people.

This sentiment was reinforced at the seventy-third session of the United Nations General Assembly in 2018. Speaking for the Caribbean Community (CARICOM), Guyana's delegate underlined the urgent need to build resilience to shocks through climate sensitive agriculture, and highlighted the importance of water management schemes.

As it relates to water management and agricultural water sources, the Japan-Caribbean Climate Change Partnership (J-CCCP) implemented 16 projects to improve community-based water capacity and irrigation systems to test their ability to raise agricultural productivity. This case study will highlight two projects in Grenada, and in St. Vincent and the Grenadines respectively to mitigate some of the negative effects of the changing climate.



Audrey Butler-Walters, J-CCCP beneficiary, stands on her farm which is now flourishing following installation of technical inputs

Project Overview

The Grenada Example

Mirabeau, a town in the region of Saint Andrew, Grenada, is known for its fertile soil and agricultural prowess. Home to the agricultural wing of the TA Marryshow Community College (Farm School), this area contributes vastly to the agricultural sector on a national level. Although it is an agricultural mecca, Mirabeau is still adversely affected by harsh climate changes. The community was plagued by severe droughts which increased competition for water, with famers being disproportionately disadvantaged. The Mirabeau Propagation Station, which provides agricultural water to the area, is supplied by a dam. This dam, while principally used by the station, is also utilised by the National Water and Sewerage Authority (NAWASA) during drought. During periods of water scarcity all available water is reallocated for potable purposes resulting in reduced irrigation and losses for farmers.

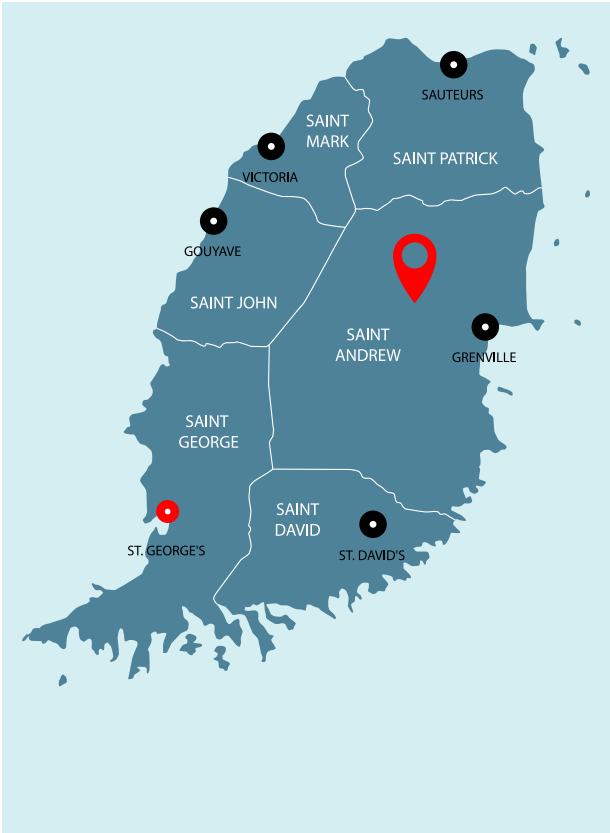
The station had a 20,000-gallon storage capacity but this was insufficient to support the needs of the station (approximately 70 acres of land) especially during the dry season generally experienced from January until May. Irrigation is critical for the short cycle crops as these are propagated during the dry season and farmers are dependent on the station for planting material. Water shortages in 2017 substantially impacted the station’s ability to meet quotas for distribution to farmers. The station supplies approximately 750 – 1000 farmers across the island with seedlings/planting material. During this period of drought the station lost 10% of its tree crops and suffered substantial losses of short-term crops including corn, cassava and sweet potatoes. Due to these and other devastating effects, drastic measures needed to be taken to secure a reliable supply of agricultural water resources.

To mitigate some of these negative impacts, the J-CCCP funded the “Building Resilience to Climate Change and Weather Variations at Mirabeau Propagation Station” project. The project was designed to increase production and productivity of the Mirabeau Propagation Station by introducing and

mainstreaming climate smart practices and disaster risk management systems into the Mirabeau Propagation work programme.

The project was designed to improve water availability for irrigation through the construction of a rainwater harvesting and storage system for irrigation with the increased water storage capacity of 33,000 gallons. In addition to the improved capacity, the station will be installing more efficient irrigation systems on their own including micro sprinklers and drip systems which further reduce their water needs.

The project was also designed to improve protective



Pictured above is a map of Grenada highlighting the town of Mirabeau

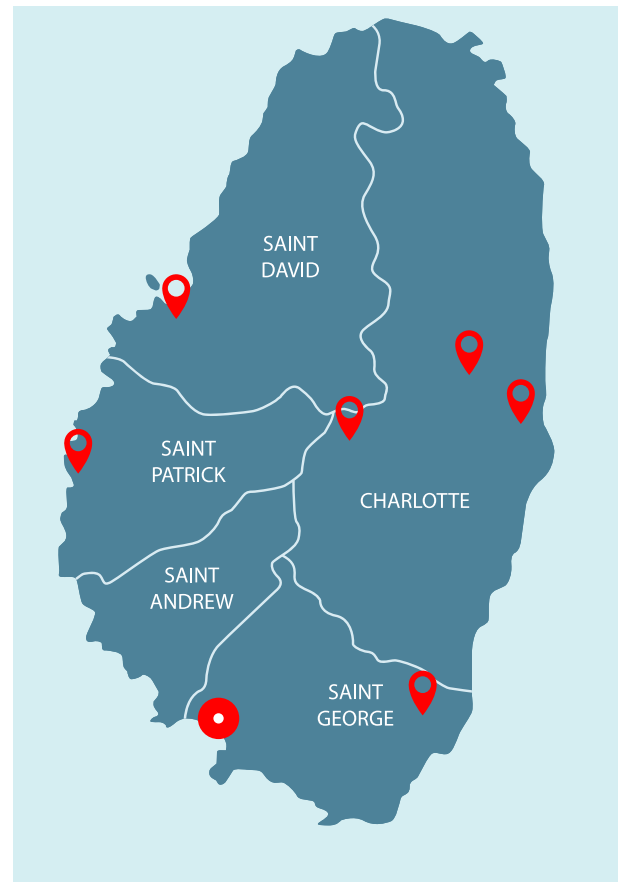
agriculture capacity through the construction and application of two new greenhouse management systems. But physical improvements were not the only benefits of the project – the J-CCCP, with the support of the Ministry of Agriculture also facilitated training programmes to increase the capacity development and project management skills of farmers and members of the community.

[The St. Vincent and the Grenadines Example](#)

St. Vincent and the Grenadines, known for its active volcano and fertile soil, is truly a paradise. But like the other territories of the Caribbean it still suffers from the devastating effects of climate change. Although the main island of St Vincent has a plentiful supply of ground water through rivers and streams, steady drying of rivers, streams and degrading water quality resulting from climate change is predicted to become a problem in the near future.

To bolster mitigation efforts and increase the island’s resilience to the negative impacts of climate change, The J-CCCP funded the “Irrigation Capacity Improvement to Improve Climate Resilience among Small Farmers” project. The project was designed to enhance farmers’ capacity to improve their climate resilience through the adoption of climate smart strategies, and to meet their economic needs through installation of irrigation capacities on and off farm. Spanning six communities (Langley Park, Grand Sable, San Souci, Barrouallie, Chateaubelair and Calder) the project provided individual water harvesting and irrigation systems designed and established to improve farm productivity. Farmers in these communities were also trained to reduce disaster-induced losses through the adoption of climate resilient and disaster risk management strategies on-farm. They were further instructed in the usage of irrigation pumps powered by solar photo voltaic systems to avoid CO² emissions and reduce the cost of operating pumps. Further to this, farmers were given access to disease resistant planting material (vegetables and citrus) and the capacity of nurseries were expanded (installation of screen houses and equipment and sourcing of disease and climate resilient germplasm).

In two of the communities (Langley Park and San Souci), the project designed affordable climate-resilient, community-based water harvesting, storage and distribution systems.



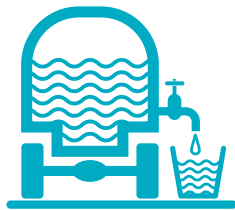
Pictured above is a map of St.Vincent highlighting the areas of Langley Park, Grand Sable, San Souci, Barrouallie, Chateaubelair and Calder

Channelling Water Resources: Impact of the Projects

Although the two projects were implemented in different environments, they both made a substantive impact on the various farming communities. Before the project, farmers in St. Vincent and the Grenadines were forced to manually irrigate crops, which resulted in 2 to 3 hours several times a day in watering fields. This manual method meant that only small areas could be planted and reduced the quality of crop yield. While results varied in the different communities there was marked improvement at the completion of the project. The below chart highlights the main impacts of the projects in Grenada, and St. Vincent and the Grenadines.

Grenada

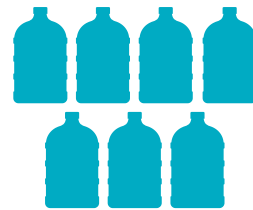
Outcomes of the Project



Reduced reliance on the potable water system



The station can now irrigate for an additional 4-6 weeks which will significantly reduce crop loss by approximately 10%



Total available storage capacity at the station increased to 53,000 gallons



More efficient irrigation systems including micro sprinklers and drip systems which would further reduce their water needs

St. Vincent and the Grenadines

Outcomes of the Project



Increased crop yield

(farmer noted that after the irrigation project he reaped approximately 700/800 pounds as compared to approximately 60 pounds before)



Increased profitability

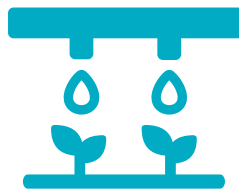
(one farmer explained that before the consistent irrigation he was averaging \$200/300 in sales and this has increased to \$600/700 per week)



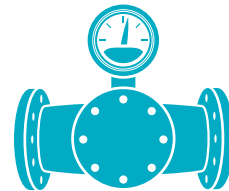
Assisted one hundred and seventeen (117) farmers in three geographically distinct areas, operating on seventy-five (75) acres of lands



Increased diversity of crops available to be planted year round



The introduction of drip irrigation systems for water conservation



Inclusion of tensiometers to measure soil moisture and water meters to accurately determine water use



A Vincentian farmer

The projects achieved J-CCCP's Outcome 2. In Grenada, the project addressed "the adoption and implementation of mitigation and adaptation technologies; as it relates to sustainable agriculture and community-based climate smart resilient infrastructure". While in St. Vincent and the Grenadines the project addressed "climate-smart community-based water management systems (harvesting, storage and distribution), crop diversification practices, water capacity and irrigation systems". These projects also addressed some of the Sustainable Development Goals (SDGs) as outlined below:



Goal 2:
Zero Hunger

- The projects contributed to the long-term goal of sustainable food production systems and implemented resilient agricultural practices designed to increase productivity and production. They further strengthened the capacity for adaptation to climate change, extreme weather, drought and flooding.



Goal 13:
Climate Action

- The projects boosted the water capacity of the two communities which strengthened their resilience and adaptive capacity to climate-related hazards (e.g. water shortages)

Insights and Take-aways



Government involvement is important to promote agriculture and climate action.

In both projects the government took the lead. The active involvement of the government highlights to the public the importance of the agricultural sector and further showcases that the government is actively working to promote climate resilient initiatives.



Community groups are key to sharing information with the larger community. In St. Vincent and the Grenadines, the project positively impacted the following groups:

Women in Agriculture Langley Park Cooperative (WALCO), Langley Park Fair Trade Group (LPFTG), Grand Sable Fair Trade Group (GSFTG) and Rabacca Farmers' Cooperative. By educating these groups they can advocate for, and educate the community on, climate resilient practices.



With the right investment, there is a possibility for agriculture in the region to be profitable and sustainable.

The farmers saw increased profitability due to the projects. If more climate resilient techniques are implemented, it is likely that struggling agricultural sectors can bloom again.

Final Thoughts

Agricultural industries are as fragile as they are vital to an economy. In order to protect and bolster the agricultural industries and protect the livelihoods of farmers, it is necessary to implement projects and policies that support these sectors and mitigate some of the negative effects of climate change. These two projects focused on providing farming communities with adequate agricultural water resources and those that benefitted from the intervention flourished. It is important to promote climate smart technologies and practices across the region; Grenada and St. Vincent and the Grenadines clearly highlight the benefits

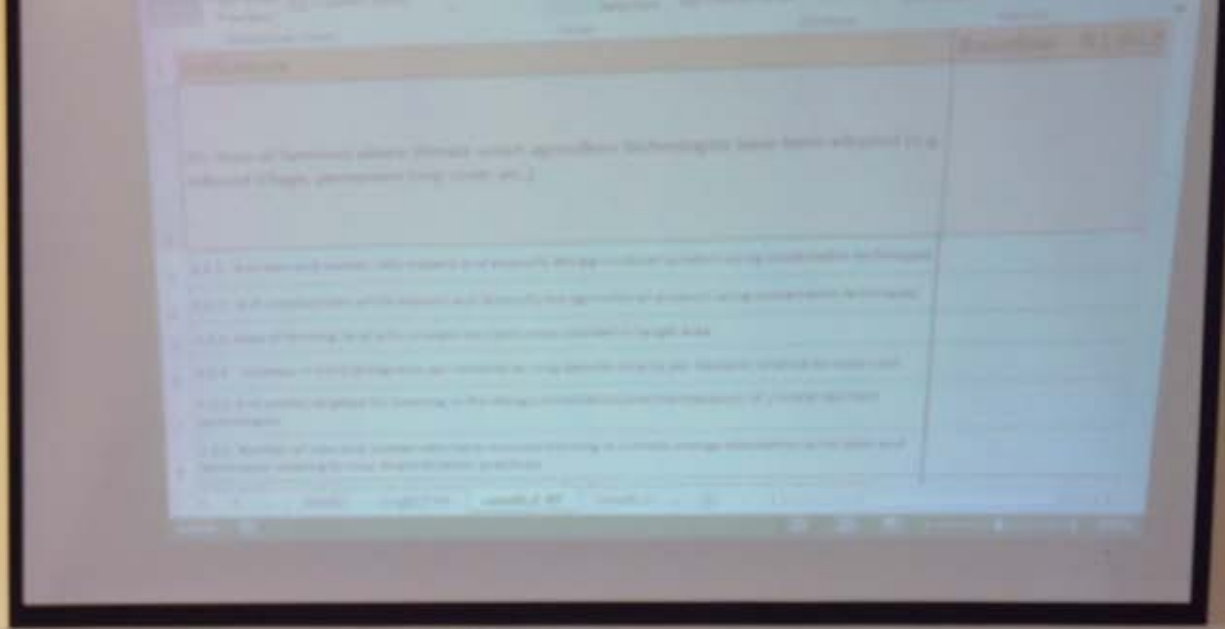
of improving water resources management in the agricultural sector.

All beneficiary farmers who were interviewed were satisfied with the results of the project. One participant when asked how the project had impacted income, responded, “oh yeh, ah happy!” - a sentiment shared by all involved.




Japan-Caribbean
Climate Change Partnership





Empowering Communities

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

Empowering Communities

Renewable Energy and Energy Efficiency in the Caribbean:
Case Study of the Japan-Caribbean Climate Change Partnership



Background

Even though the Caribbean region is uniquely positioned to benefit from renewable energy solutions such as solar and hydropower, historically, this region has been highly dependent on fossil fuels for energy production. This is changing. Various Caribbean governments are working to reduce their dependence on fossil fuels and provide their communities with more reliable, efficient energy options to propel sustainable development and reduce poverty gaps.

This shift is partially due to various studies confirming that access to reliable energy sources can reduce

the divide between rural and urban communities and promote further economic growth¹. Currently, rural and farming communities are unable to implement the required technologies to improve their energy efficiency, benefit from renewable resources and reduce their dependencies on fossil fuels. This case study looks at the steps taken to employ renewable energy practices in two distinct communities: an indigenous community located in the hinterland of the Republic of Suriname and farming communities in Saint Vincent and the Grenadines.

Powering Development

The UN Development Programme's Japan-Caribbean Climate Change Partnership (UNDP J-CCCP) partnered with the Amazon Conservation Team (ACT) in the Republic of Suriname, and the Ministry of Agriculture, Forestry, Fisheries and Rural Transformation/Animal Health and Production Division in Saint Vincent and the Grenadines whereby two projects were executed, which focussed on renewable energy and energy efficiency.

The Suriname Example



Map showing the location of Pelelu Tepu

The Village of Pelelu Tepu, a remote indigenous community only accessible by chartered flight, was dependent on a generator and diesel to power the entire 84-household community. With this outdated system, the villagers only had electricity for 8 hours per day. This impacted the quality of education available, the quality of life of the villagers, and made day-to-day tasks more difficult. Additionally, due to the remote location of the village, sourcing fuel for the generator was an expensive and laborious process.

Due to this unreliable supply, the villagers expressed their need to have greater access to reliable energy supplies. The ACT lobbied for finances and found a partner in the UNDP. The two agencies worked together on a joint project designed to provide the villagers of Pelelu Tepu with a consistent supply of energy that could positively impact their lives. This occurred through the installation of a 75 solar photovoltaic (PV) panel system and capacity building of the community members by educating them on the importance of energy efficiency and the maintenance of the 16 Watt KVA system.

¹ [http://www.un.org/millenniumgoals/pdf/AGECCsummaryreport\[1\].pdf](http://www.un.org/millenniumgoals/pdf/AGECCsummaryreport[1].pdf)

The UNDP J-CCCP/ACT project was officially titled, 'Women Empowerment and Renewable Solar Energy Pilot Project'. Before the project, two villagers – Ketoera and Anna, travelled to India to be trained in the installation, repair and maintenance of solar PV systems. The design and installation of the renewable solar PV system was completed by Interdata, while the government of the Republic of Suriname/DEV supported the project through the provision of the current distribution network. During the project, Ketoera and Anna provided training to fellow community members, as well as to members of other villages. The community now assists with the maintenance

of the renewable solar PV system that provides the community with 24-hour energy.

The project challenged gender stereotypes by empowering female technicians to install solar panels and allowed women to play a leading role in the project. The village now serves as an example for other rural communities and has taken a big step to reduce the gap between rural and urban quality of life. Additionally, community members are now aware of the importance of securing funds for maintenance; and ACT continues supporting the community by securing these funds through income generating activities.

The Saint Vincent and the Grenadines Example

Climate change was negatively impacting farmers in Saint Vincent and the Grenadines. Farming communities were afflicted by declining incomes due to increased intensity and frequency of the dry period. Additionally, farmers were plagued by high energy costs and a dependence on fossil fuel. The farming community requested the assistance of the government, who also has a mandate to promote energy-saving practices and reduce fossil fuel reliance. As these two objectives aligned, the Climate Change Adaptation Project for Livestock Production Project was conceptualised.

This project, which included 20 farmers, was designed to reduce each farmer's vulnerability to the effects of climate change, by constructing small water harvesting systems on small livestock holdings to harvest rainwater for later use. The project procured pelletizers to produce high quality forage for periods of droughts or floods, and provided resilient tropical breeds of goats to support the growing goat milk industry. Finally, as it relates to energy efficiency and renewable energy, the project installed two biodigesters on pig farmers' holdings to convert waste into renewable energy in the form of methane gas. The remaining bi-product from the process can then be used as organic fertiliser.



Pictured above is a large component of a biodigester system which uses a bag to allow for an easier installation process.

Unfortunately, the cost of renewable technologies – specifically installing biodigesters – has been a deterrent to farming communities, with many farmers being unwilling to invest without tangible proof of the benefits. The biodigesters will also be used in two demonstration farms so that farmers and other agro-stakeholders can see first-hand the benefits of the technology. The project improved on previous models and addressed misperceptions that some farmers had as it relates to the practical uses and benefits of biodigesters. This practical example can encourage investment and support for the purchase of additional biodigester systems.



Pelelu Tepu villagers



Vincentian farmers discuss the use of biodigesters

The Forest and the Farm: Impacts of the Projects

Although the two projects were implemented in different environments, they both made a substantive impact in the livelihoods of the two communities. These projects also provided participants with the knowledge and skillsets to power their own development. The diverse projects were able to achieve results under Outcome 2 of the J-CCCP mandate, which is adoption and implementation of mitigation and adaptation technologies. Additionally, the projects address some of the Sustainable Development Goals (SDGs) as outlined below:



Goal 7: Affordable and Clean Energy

- Both projects created systems which provided beneficiaries with clean, reliable energy solutions (e.g. Solar PV system and Biodigesters).



Goal 12: Responsible Consumption and Production

- In Saint Vincent and the Grenadines, the biodigester allowed for the creation of a renewable energy source that not only reduced waste but also aided in the production of food products and better food preservation (e.g. coconut oil, dried fruit and pepper production).



Goal 13: Climate Action

- In the Pelelu Tepu example, community members educated others in the community and surrounding villages on the installation and maintenance of a reliable source of energy.
- In Saint Vincent and the Grenadines, the planned implementation of the ‘demonstration farms’ with the support of the Ministry of Agriculture will be used for training to support wider adoption of the technology; which, if adopted, will reduce their dependence on non-renewable sources of energy.

Reducing the Poverty Gap

Inclusive economic growth is one of the most effective means of reducing poverty and promoting development. However, for this economic growth to be achieved, communities seeking this growth must have access to a reliable supply of energy.

The Republic of Suriname project showcases the ability to improve the development of communities through the provision of reliable energy. The project instituted the technology and techniques necessary to harness renewable energy and improve energy efficiency. Solar powered electricity allowed the village to improve their quality of life by powering refrigeration for safer storage of food; their livelihood by powering small processing equipment for income generating activities; health

care by facilitating improved medicine storage and education by providing light for night time studies.

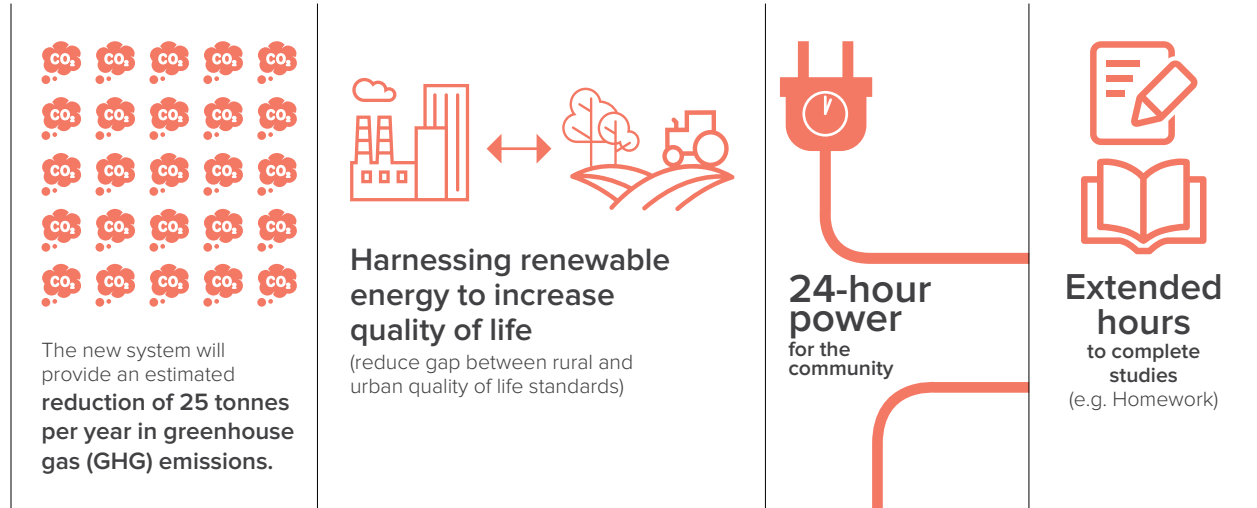
In the case of Saint Vincent and the Grenadines, the biodigester provided farmers with an energy source necessary to increase their product range. Before the renewable energy supply, farmers explained that their heating came from wood fire. This heat supply could not reach the temperatures required to manufacture additional products needed for business expansion. With the use of the biodigester however, farmers in the community are now poised to improve their livelihood and capacity for wealth creation through the product diversity and business expansion that the renewable energy source provided.



Solar PV system installed in Pelelu Tepu

Suriname

Outcomes of the Women Empowerment and Renewable Solar Energy Pilot Project



Saint Vincent and the Grenadines

Outcomes of the Climate Change Adaptation for Livestock Production Pilot Project



Insights & Take-aways:

Collaboration between farmers and technicians can improve buy-in and efficiency of projects.

In the case of the biodigester, a representative from the German company based in Grenada which installed the equipment directly interacted with the farmers to address technical issues. The company formed a regional WhatsApp group which allowed for the South-South transfer of knowledge and provided practical solutions for problems which many farmers faced. Additionally, a representative conducted a follow-up assessment after installation which allowed for minor problems to be addressed and the equipment to be tweaked to the specifications of the farmers. The group also benefitted from the knowledge of the farmers who were able to adjust the biodigester systems to meet site specific needs and advise other farmers on ways in which they could optimise their systems.

South-South training can be used to build capacity.

This occurred when a Vincentian Agricultural Officer travelled to Grenada and received training in order

to build capacity in the Ministry of Agriculture and continue to work with local farms to use, install and maintain biodigester systems.

The involvement of the community can help reduce the urban-rural gap.

The community involvement in the Pelelu Tepu project increased buy-in and allowed for the project to be completed successfully.

Gender-biases can be overcome through open communication and the support of community leaders.

This was witnessed in the Pelelu Tepu Project. Despite some negative reactions from men in the community, the village leader allowed the two women to head the project and supported their role. The elder's position encouraged men who were previously against the project to also support the women in this venture.

Best Practices

Several best practices have been identified in the two projects as outlined below:

South-South Transfer of Knowledge	Intimate Involvement of Service Providers	Community Involvement	Continuous NGO Involvement	Training in Native Language
<ul style="list-style-type: none"> ■ Biodigester training in Grenada partnering with GIZ. ■ Sharing information via a regional farmers' WhatsApp group. ■ The creation of 'demonstration farms' which provided practical examples to farmers which improved buy-in. ■ Community members training others. ■ Pelelu Tepu villagers educating surrounding villages. 	<ul style="list-style-type: none"> ■ Allowed for ease of adjustments/follow up visits. ■ Provided practical solutions to community needs. 	<ul style="list-style-type: none"> ■ In the case of Pelelu Tepu, the community was involved in the project, which allowed for greater knowledge sharing, higher employment and improved technical skills to propel the community's own development. The community's involvement promoted greater buy-in and contributed to the overall success of the project. ■ In Saint Vincent and the Grenadines, the 'demonstration farms' have provided a hub for the farming communities to interact and learn about the benefits of renewable energy. 	<ul style="list-style-type: none"> ■ The continuous involvement of NGOs was also a success for the project. ACT had a station manager in Pelelu Tepu, which made it easy to communicate with community members and to complete the day-to-day work. The development of a trusting relationship between the community and ACT aided the successful implementation of the project. 	<ul style="list-style-type: none"> ■ The residents of Pelelu Tepu speak their own native language and it became evident that more efforts are needed to teach/ educate communities in native languages in order to increase the number of persons who can benefit.

Final Thoughts

Renewable energy and energy efficiency are integral to the successful transformation of rural and farming communities. It is evident that the provision of consistent, affordable, clean energy allows for economic development which can reduce the urban-rural gap.

In Saint Vincent and the Grenadines, the two biodigesters were a benefit to both the farmers and the environment, and definitely a move in the right direction. However, it is important to note that the cost to implement these systems on an individual basis is restrictive. Therefore, it is necessary for support and subsidies to assist farmers in installing additional biodigesters in the future.

The Republic of Suriname project was implemented in a remote area with a relatively small population. The project was up-scaled to include two other communities, and provides a model for replication in

other communities in the future. Even though the project was a success, to sustainably maintain the renewable energy system an income generation component will need to be attached to the electrification. The proposed next step is to design a village wide project for income generation, to aid in the maintenance of the system, provide a viable source for potable water and propel the development of the community.

While mitigation measures may need to be considered in the two projects, overall, the communities in both the Republic of Suriname and Saint Vincent and the Grenadines have used renewable energy to improve their lives and their livelihoods.



The Theory And Practice Of Climate Resilience

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

A Land of Hills and Honey

Case Study: Building the Resilience of the Honey Sector
The Saint Lucia Example



Background

Bees, industrious, meticulous, and vital in maintaining biodiversity across the globe, are being dramatically affected by climate change. Changing weather patterns, global warming, the indiscriminate cutting of trees and the use of pesticides all negatively affect bee populations in Saint Lucia.

Not only are bees affected by our activities, but they are also threatened by parasites that can wipe out entire hives. Additionally, there are several invasive (Africanised) species of bees which are not native to Saint Lucia and are low-honey producers. To exacerbate the problems bees are facing, bees are unable to adapt to fast-paced environmental changes easily; meaning they are especially in danger from the unexpected effects of climate change. Due to climate change, the seasons of production are changing - the

flowering period of the natural forage is reducing which results in bees having a shorter period of time to collect nectar and pollen. Extended rainfall destroys blossoms and flowers and further reduces the bee's foraging opportunities.

Bees are losing the battle to climate change and without appropriate intervention their demise could mean disaster for the island's economy, specifically the honey industry, as well as damaging local food supplies (through reduced pollination of crops). To mitigate the effects of climate change on the bee populations in Saint Lucia, the government partnered with the J-CCCP to execute the "Building the Resilience of the Honey Sector to the Impacts of Climate Change Through Genetic Security and Adoption of the Best Proven, Climate Smart Production Methods" Project.



Beekeeper - Richard Matthias - shows the Perone Hive, which he's comparatively researching

Project Overview

Honey production declined by over 50% between 2015 and 2016 with many adverse weather systems, such as drought and high temperatures, that affected flower availability for production of nectar. As a subset of the agriculture sector, which contributes an average of 2-4% to GDP, decreases such as this can have extremely harmful impacts on the sector which has also seen declines in recent years

The overall objective of the project is to build a resilient apiculture industry in order to adapt to and mitigate the impacts of climate change. To save the bees and give them the necessary boost needed to navigate an increasingly volatile world, the project focused on three main areas.



The project concentrated on habitat restoration, forestation and reforestation of flowering plants, fruit trees and endemic species. Various long term and short term flora were planted. This was done to restore and protect the habitat and make more food available for bees.



Additionally, steps were taken to ensure sufficient water supply for the bees during dry periods. The project educated beekeepers on how to appropriately harvest water for bees and promoted the establishment of small-scale rainwater harvesting facilities at all apiaries.



In addition to these interventions, a large part of the project was focused on improving the breeding stock of bees for local and regional beekeepers through instrumental insemination and queen rearing. This was the beginning of continued steps to building beekeepers' capacity for the application of climate smart practices in the apiculture industry.



Beekeeper shows the insemination process

A Bee Paradise

The natural environment is very important for the successful bee population, and lack of habitat was negatively affecting the bees' ability to forage and collect sufficient pollen. During the project, the team identified various hardy plant species that are climate resilient, while still producing substantial nectar and pollen for the bees.

The Ministry of Agriculture, Caribbean Agricultural Research and Development Institute (CARDI) and other agencies took center stage in this area and developed additional forage efforts to increase the island's coconut stock, which is especially useful to bees. Additionally, they developed a large sunflower plot in the Praslin community. The sunflower was chosen because it is well-equipped to withstand drought, high salinity, vastly variable ecosystems, and requiring little fertilizer, making it one of nature's finest "apocalypse preppers".

In addition to the bees' natural environment, the project also focused on the hives. There are two main types of hives, the traditional Langstroth Hive, which has been in existence for more than 100 years, and the Perone Hive, based on a new technology developed within permaculture as a way to avert some of the diseases and pests that affect the bees. Although Langstroth Hives are designed to produce more honey, they are more costly to manage. In the Perone Hive (a hollow box) the bees naturally produce wax and honey. This method is less intrusive and substantially less expensive although the honey output is less per hive. However, honey produced in the Perone Hive has a lower per unit cost, still making it an attractive option. The project is continually monitoring the two types of hives to see which option is better suited to the changing climate.

Taking a Closer Look: Monitoring Systems

To get an accurate understanding of the impact of climate change on the bee population it was important that factual, real time data be recorded to accurately analyse the effects of climate change. A data-logger was used to continuously record the hives' humidity, temperature and acoustics. These hive characteristics were then correlated to atmospheric and environmental conditions to see how the hives were adjusting. This current data is vital to ensure that well-informed solutions can be implemented to protect the bee population.



Beekeeper showcases honeycomb



Monitoring system installed on a bee hive to track humidity, temperature and acoustics

Project Outcomes

The project achieved several outcomes which benefitted the Saint Lucian community as well as the apiculture industry. The below outlines the main outcomes:



Enhance the stock of local bee species to make them more tolerant to the changes fostered by climate change

There has been an increase in colonies as a direct result of the project. 207 queens were produced, of which 93 were introduced to colonies, 77 distributed to beekeepers, and 37 rejected due to quality control



Increased habitat

Coconut groves and a sunflower field were planted toward boosting foraging/ habitat for the bees



Apiculturist trained in small scale water harvesting techniques

Rainwater harvesting was implemented at Castries locations as well as at three additional locations: Mon Repos, Praslin, and Anse la Raye



Improved technology to monitor and support hives

Four sites have implemented the improved monitoring system and are online collecting valuable data. These include:

- o Castries - 11 units online
- o Anse la Raye - 7 units online
- o Mon Repos - 4 units online
- o Ma Kote - 11 units online



Beekeepers inspecting a hive

The project addressed the focal area of Sustainable Agriculture within J-CCCP's Outcome 2, and also addressed some of the Sustainable Development Goals (SDGs) as outlined below:



Goal 9:
Industry, Innovation and Infrastructure

- Through training of youth and various members of the community, the project created the framework for additional jobs in the growing honey sector.



Goal 13:
Climate Action

- The project began the journey to boost the climate-resilience of the local bees and in turn the honey industry.

Best Practices and Lessons Learnt

The following best practices were highlighted from the Saint Lucia example:



Collaboration with key stakeholders

The Ministry of Agriculture, UNDP J-CCCP team, beekeepers' association and other governmental agencies all worked together to execute the project. This collaboration assisted in achieving the various outcomes of the project.



Use of technology in agriculture

The project showcased the benefits of technology and technological advances in solving agricultural problems. The artificial insemination and selective breeding of climate-reliant bees improved the stock, while advanced monitoring systems provided beekeepers and decision makers with vital information to make any necessary changes to protect bees and in turn, the honey industry.

Final Thoughts

The apiculture industry is a largely untapped resource in Saint Lucia but is also very fragile as it relates to changing weather patterns. This project is the beginning of developing this industry which has the potential to create additional economic prosperity for Saint Lucia. However, as climate change continues to negatively impact the region, it is necessary to assist species (e.g. bees) and industries, like the apiculture industry, that are vulnerable. Through sustainable, responsible intervention we can boost the resilience of our natural resources.







Let's Act!

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

The Theory and Practice of Climate Resilience

Case Study: INFRA HUB and the Kampong Sawa Pilot Project
The Suriname Example



Background



The project team reviews before and after photos of the Kampong Sawa Pilot Project

Caribbean islands across the region have experienced first-hand the devastating effects of climate change. However, none are more acutely aware of the very real effects of our changing climate than rural communities that are below sea level. The 28-household community in Kampong Sawa, located in the Old Kampong Mariëburg in Suriname is one such community.

Mariëburg, located on the coastline of Suriname, is below sea level and Kampong Sawa residents suffer negative impacts from the rising sea levels and increased flooding associated with climate changes. Residents have reported that in recent years an upsurge in flooding has been occurring (approximately 6-8 floods a year).

Heavy rains, paired with improper maintenance and neglect of the drainage system, resulted in flooding which in turn cause sanitation and drainage problems for the entire Kampong Sawa community. Fifty per cent (50%) of the households in Kampong Sawa didn't have properly functioning septic tanks while 24 households

didn't have proper drainage systems. The poor sanitation and increased flooding results in a very high risk of contamination of ground water for the villagers.

INFRA HUB was established to address the needs of Kampong Sawa and other vulnerable communities in Suriname. The innovative project was a joint partnership between Japan-Caribbean Climate Change Partnership (J-CCCP) and the Anton de Kom University of Suriname's (AdeKUS) Department of Infrastructure. INFRA HUB merges theory, research and practical projects and was designed to educate and prepare students/communities on and for practical solutions to climate change.

This case study documents the first pilot project (Kampong Sawa pilot project) conducted through INFRA HUB, designed to 'Combat flooding in Kampong Sawa through adaptation measures for drainage and sanitation systems as well as to mitigate the effects of climate change.'

Project Overview

The Kampong Sawa pilot project was designed to reduce flooding to the Kampong Sawa community and consisted of structural and non-structural measures. The small-scale venture served as a demonstration project for the entire community of Old Kampong Mariënborg (1,047 people) experiencing similar problems. The pilot project has benefited approximately one hundred (100) students from AdeKUS and fifty-nine (59) direct beneficiaries (people living in Kampong Sawa).

The structural measures within the project included: rehabilitating the main discharge line in Kampong Sawa, improving drains for households' wastewater

and storm water and improving the overall drainage system of the community. Additionally, to address the sanitation issues, septic tanks were constructed, latrines (kakos¹) were replaced with water-flush toilets, and closed drainage systems were built.

The non-structural measures of the project focused on capacity building regarding improvement and maintenance of the drainage and sanitation system. It also created awareness about the effects of climate change in rural areas such as Old Kampong Mariënborg.



Kampong Sawa pilot project signage

A closer look at the INFRA HUB

The Department of Infrastructure identified a need for applied, result based and result oriented research and teaching methods focussing on climate change related infrastructural problems. The aim is to educate students to be both theoretically and practically able to solve climate change related infrastructural problems. INFRA HUB will be the vehicle for students (tutored by lecturers) to conduct research, design and build live projects in collaboration with actors (Government + non-Government), constructors, engineers/architects.

INFRA HUB will function as a practical project-based learning and knowledge-sharing centre based on two pillars: (1) conduct research/ develop information and (2) implement small scale infrastructure measures to combat the effects of climate change in the built environment.

An important component of INFRA HUB is that the communities themselves will be an integral part of the research and identification of solutions as it relates to the various climate-related problems affecting them.

¹The Dutch word for latrines



An AdeKUS student involved in the INFRA HUB Pilot Project

Outcomes of the Project

The project achieved several outcomes and the main benefits of the pilot project are outlined below:



Reduced Flooding

The improved drainage systems allowed the residents to enjoy a flood-free environment. This positively impacted small farmers and allowed flood-prone areas to be better used by members of the community.



Improved Drainage

The project cleared drains and upgraded the current drainage system.



Improved Sanitation

All households in the community received low flush toilets, which were connected to a functioning septic tank.



Practical Education of Students

The entire project allowed students to get hands on experience and practical knowledge needed to build climate resilience in the future.



Improved Quality of Life

Reduced flooding and the upgrade from latrines (kakos) to low-flush toilets provided residents with an improved standard of living. The project reduced the risk of water-borne diseases and residents were pleased to participate in the project.

The project further addressed the focal area of Community Based Climate Smart Resilient Infrastructure within J-CCCP's Outcome 2. It addressed Output 2.5: Climate resilience and disaster risk management activities - Small-scale infrastructure implemented to reduce climate change and disaster-induced losses. Additionally, the below Sustainable Development Goals (SDGs) were also addressed:



Goal 4: Quality Education

- The project provided high quality hands-on training for both genders. It provided students with the opportunity to acquire the knowledge and skills needed to promote sustainable development.



Goal 6: Clean Water and Sanitation

- The project improved the community's drainage and sanitation systems and reduced the risk of contamination of water sources.



Goal 13: Climate Action

- The project boosted the climate-resilience of the community. Due to better drainage systems, flooding no longer impacts the community.

Best Practices

As the first project of its kind in Suriname, there were several key areas that are important to note. The pilot project was seen as successful both to the beneficiary community and to the students who contributed. The following best practices were highlighted and can be considered in further community-based projects.

Bottom-up approach to solving problems

■ Members of the community were involved in the planned solutions which encouraged buy-in and community involvement. The project was designed to first listen to the needs of the residents and then, through collaboration, find solutions that best suited that particular community. This allowed vulnerable communities and beneficiaries to become active participants in building their own resilience.

Use of participatory action research (PAR) to find solutions

■ The participatory action research (PAR) in this context is a methodology that aims to gather and use research for addressing or solving local-level problems, rather than conventional research that focuses on gaining knowledge. This method serves the dual benefit of expanding the body of knowledge on climate change but also providing relevant data to solve current issues and contribute to policy development by providing relevant island-specific information.

Preparing youth with practical skills to promote climate resilience

■ The project gave students (supervised by their lecturers) the opportunity to conduct research on climate change related infrastructural issues. The students were able to develop applied research on practical solutions which are immediately implementable.

Collaboration with community and key stakeholders

■ Cooperation and collaboration with the community is crucial for sustainability. The project fosters collaboration and partnership between local communities, governments, and technical experts with the local communities driving the process.



The project team stands on a newly installed septic system, while discussing the project's progress

Final Thoughts

The successful execution of the pilot project through INFRA HUB highlights the importance of participatory action research and paves the way for many more climate resilient projects to be executed in the future. It takes a first hand approach to building community and local capacity to address climate change needs related to infrastructure.

This project is a shining example that theory and practice can work hand in hand to build more resilient communities.

COMMUNICATIONS & KNOWLEDGE SHARING

- Community-based Communications
- Let's ACT Communication Campaign
- Transfer of technology

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

Suriname's Community-Based Communication Initiatives



Background/Context:

The UN Development Programme’s [Japan-Caribbean Climate Change Partnership](#) (UNDP J-CCCP) is an initiative designed to strengthen the capacity of countries in the Caribbean to invest in climate change mitigation and adaptation. The Caribbean is particularly vulnerable to the impacts of climate change and this partnership seeks to develop projects and campaigns to educate, inform, and create opportunities for climate change awareness.

As part of this partnership, J-CCCP designed and facilitated a communications campaign based on the results of a [Knowledge, Attitudes, Practices and Behaviour \(KAP/B\)](#) survey carried out in two selected Suriname districts: Marowijne and Commewijne. The low population density combined with the impressive diversity and large land mass, relative to other Caribbean territories, of Suriname made it challenging to sample the entire population. These communities were selected to ensure that the sample would be representative of the great diversity in Suriname as both districts had very distinct characteristics. The survey formed the base for the communication strategy, to determine what people know, feel and do in relation to the climate they live in and what changes they perceive.

About the Suriname Storytelling Workshops



Storytellers performing to a group of primary school students

The KAP/B survey informed the decision to develop an aspect of the communication campaign based on storytelling. Traditional media channels were recorded as the main source of information, however because rural areas did not consistently receive television and radio programming - additional points of communication that took into account their belief systems, language skills and entertainment preferences were recommended. The storytelling workshops were organised where artists, educators, local authorities and local media gathered to learn about the effects of climate change and were encouraged to have open discussions amongst themselves about sustainable development and other applicable issues. Of help



Students review environmental material during the launch of the climate change animation

The campaign, which utilised local storytellers, was unique in that it developed climate change awareness materials, based on content created at the community level. Due to the effectiveness of this ‘grassroots’ approach, this case study has been developed to highlight the key points, takeaways and insights as it relates to the campaign.

during the workshop, was an [animation](#) created with a Dutch voiceover which assisted in outlining the climate change concerns faced by Suriname. The animation acted as a learning tool and later, was used to [launch the campaign](#) along with the storytellers.

During the workshop, the stories were presented, refined and finally some were selected for recording and distribution via traditional media, which still leads as a source of information, according to the KAP/B results. The stories were also used at ‘live’ performances, public hearings and other social gatherings. It is important to note that prior to broadcast, the animation and the stories were pre-tested using focus groups in local communities and revised as necessary, to ensure that the message was understood and could easily be adopted.

1.	KAP/B → Storytelling Workshops → Story Development
2.	Story Development Testing → Material Disseminated
3.	Communities use this Material to Gather Knowledge and Develop Additional Items
4.	Items Distributed via Social and Traditional Media

Insights & Take-aways:

Development of Programmes which Reflect Suriname's Diversity

The rationale behind these storytelling workshops resulted from the desire to educate locals on climate change as well as to create communication materials and content that reflected the audience's lived experiences. Due to Suriname's diverse population and variation in languages spoken, a one-size fits all approach from the top-down would not effectively address the target audience. It was determined, based on the KAP/B results, that many Surinamese rely on local broadcasts and social face-to-face gatherings (also known as *krutus*) to receive, process and share information. As such, it was prudent to ensure that all communication materials resonated more closely with them so they would be easily shareable. Hence the decision to have community leaders and artists create their own unique materials.

User Generated Content

User Generated Content is defined as any type of content that has been created and distributed by unpaid contributors. The use of it in campaigns is an effective way to create buzz and ensure that the audience is invested and connected to the content. The storytelling workshop and resulting deliverables was a smart and effective way of helping to bridge the gap for Surinamese who are aware of climate change but not necessarily clear on how it directly impacts them.

Brand Ambassadors and Community Links

Resulting from these workshops, the initiative got immediate brand ambassadors, in the form of the workshop participants. The participatory approach ensured buy-in from storytellers who were engaged and willing to write, adjust and create content for climate change awareness. This is especially important considering that in-person conversations and social gatherings is the way many Surinamese receive and share information and providing the information to these potential partners secured further involvement from the local community. This means that the storytelling workshop's success was two-fold: development of effective, shareable materials as well as "partners" who can champion the cause of climate change awareness.

Final Thoughts

The community-grassroots approach employed in this campaign was successful in targeting hard-to-reach communities in Suriname. Engaging storytellers to create their own climate change content was a novel approach and has successfully expanded the scope for the development and reach of communication campaigns. Future use of local user generated content should be explored in similar campaigns to better the chances of brand recall and local engagement.



Animation produced for Suriname with Dutch voice-overs

Building A
Climate Resilient
Caribbean

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

Let's A.C.T. Saint Lucia Communication Campaign



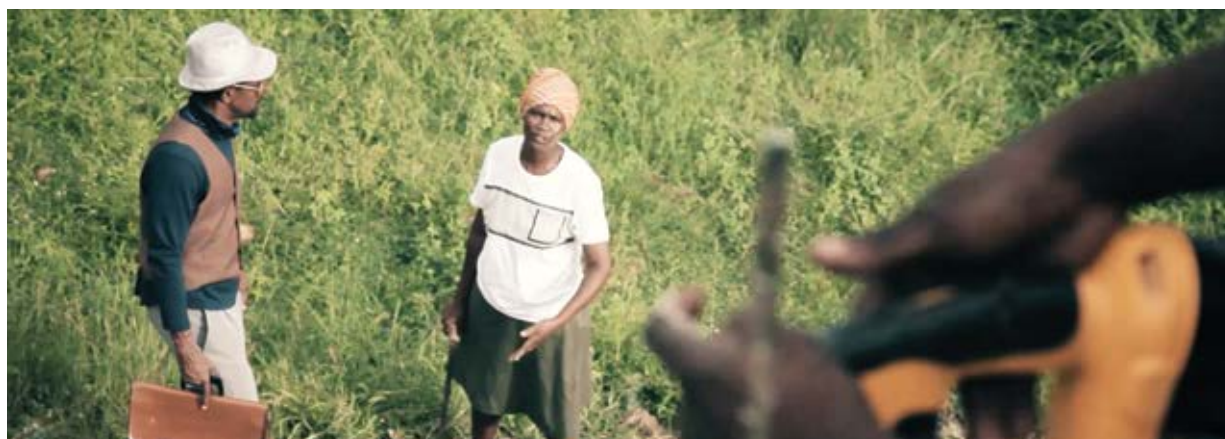
Background/Context:

The UN Development Programme's Japan-Caribbean Climate Change Partnership (UNDP J-CCCP) is an initiative designed to strengthen the capacity of countries in the Caribbean to invest in climate change mitigation and adaptation technologies. Climate change is recognised as a threat to the Caribbean and this partnership seeks to develop initiatives, including campaigns, to educate, inform, and create opportunities for climate change adaptation and awareness.

As part of this partnership, a multi-tiered campaign was developed, entitled 'Let's A.C.T. (Adapt. Change. Take Action) Saint Lucia', based on the results of a Knowledge, Attitudes, Practices and Behaviour [KAP/B Survey](#) carried out across the island. The 2016 KAP/B study targeted a representative cross section of the Saint Lucian population through a general household survey and focus groups targeting decision makers from the commercial sector, the building and construction sector, secondary school students and interview-administered questionnaires with farmers from each of Saint Lucia's eight agricultural districts.

The results supported the need for increased public education and awareness activities as a critical measure to tackle the impact of climate change. Overall, 91.2% of respondents were interested in more information on climate change. Specifically, respondents offered recommendations and practical suggestions to address climate change impacts including: encouraging recycling options/manufacturers to become involved in developing recycling options for waste material, enforcing building codes, continuous adaptation and mitigation focused farmer education, and the installation of alternative and renewable energy sources, among others.

The inputs provided the basis of the evidence-based campaign, which was further informed by a targeted communication strategy, designed to encourage behaviour modification and improve Saint Lucia's resilience to the impacts of climate change. This case study has been developed to highlight key points, takeaways and insights as it relates to the campaign.



Screen-shot from the bilingual TV advertisement produced during the campaign

About Let's A.C.T. Saint Lucia

'Let's A.C.T. Saint Lucia' was designed to appeal to a broad demographic of Saint Lucians. Many of the initiatives and media products were developed particularly with the country's future decision makers in mind, hence why there was a deliberate outreach toward schools. As the campaign strategy and goals became more clearly defined, the list of campaign deliverables was adapted and adjusted as necessary for greatest impact. The main items produced during this campaign are as follows:

- [A calypso](#)
- 8 radio Public Service Announcements (4 in English; 4 in Kwéyòl)
- 7 digital posters
- [A sixty-second bilingual video](#)
- [School outreach activities](#)
- [A social media video competition](#) for primary schools (including a [digital media training workshop](#) for students)

Insights & Takeaways

Revise and Refine

Campaign materials were developed and implemented through a fully participatory process. Guided by the results of the KAP/B study, materials were produced and subsequently reviewed by technical officers within Saint Lucia's Department of Sustainable Development and UNDP to ensure accuracy. Later, materials were returned to the communities for pre-testing via focus group discussions in the North, South and West of the island. These focus groups, comprised of various homogeneous audiences, served to confirm guidance received from the KAP/B study. For example, KAP/B

results indicated that print news was no longer an effective means of disseminating messages. This was confirmed during pre-testing and print news outlets were forgone in favour of digital media. The social media posts developed in their place were boosted online at a fraction of the cost, ensuring greater reach. Overall, pre-testing determined that the campaign was sound and provided achievable actions for the local population. Where requested, amendments were made. Many of these related to placement of text or expressions used.



The A.C.T. Now Saint Lucia music video has over 10k YouTube views and climbing

Use of Local Influencers and Approaches

The Government of Saint Lucia, through the Department of Sustainable Development, hosted a climate change workshop for members of the local entertainment industry, including artistes, writers, producers and other 'creatives'. The workshop proved very effective, not only in terms of educating public figures on climate change but also transforming them into effective climate change and adaptation 'ambassadors' of sorts. The resultant calypso and music video benefitted from the creativity, experience and expertise of the attendees, ensuring that it was an instant success. It is important to note that the artistes who developed the calypso were not scripted. The content was produced based on their understanding of the challenges Saint Lucia faced and guidance from the KAP/B report.

Local culture, particularly language (Kwéyòl) and music (calypso) were given preference to reach a wider cross section of Saint Lucians and these were positively highlighted during focus group sessions. Of materials developed, the calypso was especially well received from inception, being applauded for its use of familiar concepts, the ease in which it could be remembered and the use of Kwéyòl. Once the [music video](#) for the calypso was released, it recorded thousands of views within a few hours with limited promotion – reaching approximately 10,000 views at the time of this report and spreading to neighbouring islands who also speak a French creole, similar to Saint Lucia's. The music video was also shared widely across a popular online messaging platform in file format, which meant uptake could not be recorded.

Multi-Platform Reach

The communication channels utilised in this campaign included radio, TV, social media and community outreach. Radio ads and video content were incredibly effective due to their relatable content, as outlined above. The campaign messaging was then reinforced by the social media content. The social media competition, in particular, successfully attracted young people while also creating effective ‘in-person’ information forums. For example, the pre-competition orientation which briefed students on climate change

The campaign received over **42k views** on social media!

Repetition for Reinforcement

The campaign greatly benefitted from a strong key message, encouraging Saint Lucians to ‘act’ while succinctly outlining what it means to ‘act’, in the acronym. The campaign slogan, “Let’s A.C.T. Now Saint Lucia” was derived from the campaign’s title, ensuring



Community outreach at the Dame Pearlette Louisy Primary School

message consistency. Similarly, the jingle, adapted from the calypso, allowed for more streamlined campaign messaging and greater audience recall as the same messaging would have been reinforced.

Further Considerations



Students learn more about climate change during the digital media training seminar

Other campaigns might consider leveraging the use and involvement of local figures, in the future. The relationships built with local calypsonians and entertainers and their reach within the local population cannot be understated.

The participatory approach, especially for the calypso and the youth competitions, was essential to the success of this campaign. Involving community members, gate keepers and key personnel in all stages of planning and implementation secured buy-in for all involved.

Further, the development of campaign materials, driven by data and later, tested with various groups, led to greater buy-in from Saint Lucians. The level of participation and input from stakeholders and targeted communities during the vetting process was commendable and embodied the concept of communication for development and social change. This is worth replicating.

EFT
OW
S

Today you've got
hat is true
an true!

alive
You've
han You!

Today is GOING
TODAY and FOR
TOMORROW
AND THE DAY
AFTER

Time Plan Table

Time	Plan	Task	What	When	For

Today
I will be back
on time for
Monday (you'll
be promoted)

Word Choice

- 1. Use the words in the box to complete the sentences.
- 2. Do the words in the box have the same meaning as the word in the box?
- 3. Find the words in the box that have the same meaning as the word in the box.
- 4. Use the words in the box to complete the sentences.

Voice

- 1. Use the words in the box to complete the sentences.
- 2. Do the words in the box have the same meaning as the word in the box?
- 3. Find the words in the box that have the same meaning as the word in the box.
- 4. Use the words in the box to complete the sentences.

Verbs of Speech

Speak	Shout	Whisper	Yell	Chatter	Hum	Whistle	Chirp	Hum	Whistle	Chirp
-------	-------	---------	------	---------	-----	---------	-------	-----	---------	-------

LANGUAGE

Verbs

Run	Walk	Jump	Swim	Fly	Drive	Read	Write	Draw	Paint	Build	Plant	Water	Feed	Clean	Wash	Wipe	Polish	Sharpen	Grind	Crush	Break	Fix	Repair	Change	Turn	Open	Close	Lock	Unlock	Turn	On	Turn	Off	Push	Pull	Lift	Lower	Drop	Throw	Put	Take	Bring	Carry	Hold	Grasp	Grab	Seize	Catch	Hold	Release	Drop	Let	Go	Allow	Permit	Deny	Refuse	Obey	Disobey	Respect	Disrespect	Honor	Dishonor	Love	Like	Dislike	Hate	Admire	Disadmire	Respect	Disrespect	Honor	Dishonor	Love	Like	Dislike	Hate	Admire	Disadmire
-----	------	------	------	-----	-------	------	-------	------	-------	-------	-------	-------	------	-------	------	------	--------	---------	-------	-------	-------	-----	--------	--------	------	------	-------	------	--------	------	----	------	-----	------	------	------	-------	------	-------	-----	------	-------	-------	------	-------	------	-------	-------	------	---------	------	-----	----	-------	--------	------	--------	------	---------	---------	------------	-------	----------	------	------	---------	------	--------	-----------	---------	------------	-------	----------	------	------	---------	------	--------	-----------

COCONUTS ABOUT
WORD

School

Learn from your mistakes so you can do better next time.

24

Think and Solve

Time

7:30 a.m.
She got
water. At what
time did she
arrive there?

his office at
journey took
what time did



Grammar rules and definitions for various parts of speech.

To the world
you look like one
person but to
one person you
look like the world.

Why
are you
so busy
today?



Mission To Sustainability

CASE STUDY



From
the People of Japan



Empowered lives.
Resilient nations.

The Japan-Caribbean Connection

The Transfer of Agrotechnology from Japan to the Caribbean



Background

The Caribbean region is highly susceptible to the effects of climate change, and the region has already begun to experience the devastating consequences of a warming world. Some of these environmental changes include rising sea levels, more intense hurricane seasons, and extended dry seasons resulting in reduced wet seasons. These effects directly impact Caribbean economies, ecosystems, communities, and their capacity for sustainable growth.

Caribbean farmers are well aware of the impact of natural hazards, many of which have been exacerbated by climate change. Frequent and unpredictable droughts, flooding, pests and soil erosion are just

a few of the current phenomena impacting crop yield and, by extension, the region's food security. Various Caribbean governments and developmental organisations have begun implementing projects and strategies to mitigate the impacts of climate change. As such, the United Nations Development Programme's Japan-Caribbean Climate Change Partnership (UNDP J-C CCP), coordinated a study tour focusing on transferring knowledge and applicable technologies from Japan to the Caribbean in the field of agriculture. This case study highlights the key points, takeaways and insights as it relates to the North-South and South-South transfer of technology required to develop a more resilient agricultural sector in the Caribbean.



Study tour participants listen to a representative from the Japan Organic Agriculture Association (JOAA)

Learning from Japan

Twenty farmers and agricultural officers from 11 Caribbean territories participated in the 10-day [Japan-Caribbean study tour](#) in April 2018, which allowed the individuals to travel to Japan and experience first-hand, the innovative techniques that Japanese farmers were successfully employing to boost crop resilience and bolster their agricultural industry.

The Japan-Caribbean Study Tour

The tour allowed participants to engage with both farmers and technical specialists in Japan to earn technical knowledge as well as practical applications. Participants were exposed to various agricultural practices and technologies, including organic and natural farming, permaculture, and protected agriculture such as vertical farming, and light plant factories. They were also introduced to innovative advancements including membrane and hydrogel technologies. The tour concluded with a ceremony, where the participants presented their experience related to the effects of climate change and adaptation efforts in agriculture.

Caribbean countries involved in the Japan-Caribbean study tour: Belize, Commonwealth of Dominica, the Cooperative Republic of Guyana, Grenada, Jamaica, Saint Lucia, Saint Vincent and the Grenadines, the Republic of Suriname.

The Japanese Way – Techniques and Technology

During the Japan-Caribbean study tour, several techniques and technologies were highlighted. The Caribbean region currently employs some of these techniques, but the tour expanded the participants' knowledge base and emphasised the use of innovation to improve productivity in cropping systems e.g. film farming using hydrogel.

[Click here for more images of the Japan-Caribbean study tour.](#)

CARIBBEAN TECHNOLOGIES ENHANCED BY THE JAPAN-CARIBBEAN STUDY TOUR:



After the Trip: Impacts of the Study Tour

The techniques and principles acquired during the Japan-Caribbean study tour had several positive outcomes in the various territories where the knowledge was shared.

A Changing Regional Mindset

- The study tour widened the horizons of participants and began a paradigm shift in the Caribbean's approach to its agricultural industry. Those present indicated that they reconsidered concepts that they had previously been aware of, and were introduced to new techniques that could be immediately implemented.

"The study tour gave us a new perspective on how to enhance our farming techniques. Some of the things we were aware of before but it helped us change our mindset on what we can achieve. Personally, I was able to enhance my own farm and can now recover faster from the effects of hurricanes."

Kervin Vidal, participant from Dominica

"The concept of permaculture is an ideal one that should be implemented in our cropping systems even after the passage of Hurricane Maria¹."

Taletha Laudat, participant from Dominica.

Increased Revenue Generating Opportunities

- Organic approaches highlighted in the tour have the potential to ignite agro-tourism and develop agricultural cooperatives at the community level.
- As a direct result of the techniques learned during the Japan-Caribbean study tour, for example using soil pH and moisture meters, one Dominican farmer was able to expand his business to include an agro-processing section, which enhanced his revenue and allowed him to employ two additional workers.

South-South Knowledge Sharing

- UNDP partnered with Inter-American Institute for Cooperation on Agriculture (IICA), who participated in the study tour to organise a follow-up [webinar](#) which was attended by 50 persons and where four study tour participants shared knowledge gained from the tour .

¹Hurricane Maria occurred in 2017 and is regarded as the worst natural disaster on record to affect Dominica. It was categorised as the deadliest Atlantic hurricane since Jeanne in 2004.

- Two study tour participants presented a paper entitled 'Big Science and its Role in Food Security: A Comparative Analysis between the Caribbean SIDS and Japan' at the University of the West Indies (UWI) International Food Security Conference in Trinidad and Tobago in November, 2018
- One study tour participant shared knowledge gained from the trip on national radio in Dominica, which had a listenership of approximately 10,000, during a prime time call-in programme. Following the programme, 4 farmers directly contacted the study tour participant to gain further information on the techniques shared. This participant also presented to community youth groups and was a participant on a panel discussion for young entrepreneurs hosted by the Dominican Youth Business Trust
- Other participants were invited to give presentations as well, including a television interview reaching approximately 500 persons



Example of a sustainable agriculture practice highlighted on the study tour

Putting Theory to Practice

The techniques learned in the study tour were applied in the following ways:

- **Change in Crop Type**
The Japan-Caribbean study tour exposed farmers to the benefits of growing crops, which yielded in shorter periods resulting in boosted revenues.
- **Maintaining Seed Stocks**
This practice, which was highlighted in Japan, ensured that farmers had the ability to replant faster after a disaster.
- **Improve Soil Quality of Farm**
The natural fertilisers and organic techniques learned during the Japan-Caribbean study tour allowed farmers to improve soil quality and boost output.
- **Expanded Business**
Using the techniques and knowledge gained in Japan, one farmer was able to expand his business to include agro-processing.
- **Creation of Tools**
Local farmers now have the ability to build low input /high output tools that can assist in their daily work.
- **Use of Organic Fertilisers**
This reduced the cost to farmers who could recycle and compost instead of purchasing expensive commercial fertilisers.

Mission to Sustainability

The project achieved results within Outcome 3 of the Japan-Caribbean Climate Change Partnership, which relates to strengthened knowledge networks through shared South-South and North-South experiences. The knowledge gained from the study tour addresses some of the Sustainable Development Goals (SDGs), designed to assist the world in reaching the prior Millennium Development Goals (MDGs).

SDGs Addressed Included:



Goal 2: Zero Hunger

The techniques learnt during the tour are expected to boost the capacity for agricultural productivity and are expected to assist the Caribbean in developing sustainable food production systems. Growing more resilient crops, reducing wastage through composting, employing improved farming techniques and ensuring shorter rebound periods will allow countries to bolster their food production capacity and help alleviate hunger.



Goal 12: Responsible Production and Consumption

After the tour, participants were armed with knowledge on how to improve recycling, produce natural organic fertilisers and gain more output from less inputs. Additionally, a presentation of climate proofing technologies to improve food insecurity was hosted at a UWI International Food Security Conference.



Goal 9: Industry, Innovation and Infrastructure

The participants now have the technical skills to create advanced tools, employ new farming techniques and explore innovative practices in agriculture.



Goal 13: Climate Action

The South-South transfer of knowledge promotes responsible farming and reduces the dependence on commercial fertilisers that result in the emission of greenhouse gases.



Experimentation of various light sources in a vertical hydroponic system built by Saint Lucian study tour participant



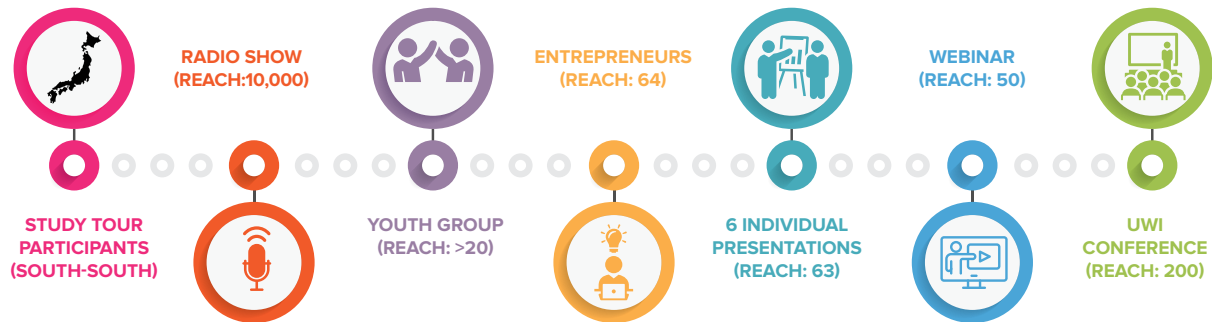
Soil and pH monitor being used by a Dominican farmer to test optimal conditions for planting



Sowing device replicated by a farmer in Dominica, following the Japan-Caribbean study tour

Transfer of Knowledge from Japan

The insights gained from the Japan-Caribbean study tour were cascaded through the various territories and communities after the participants returned home. Here is a snapshot of the transfer of knowledge:



Insights & Take-aways:

Expanded Transfer of Knowledge	Private-Public Partnerships	A Changing Regional Mindset
<p>The tour, through North-South transfer of knowledge, was able to directly educate 20 participants who then transferred this knowledge to several other groups through South-South transfer.</p>	<p>It is important to note that the benefits of private-public partnerships were highlighted in Japan's practical examples such as Chiba University and The University of Tokyo where the institutions are actively partnering with commercial entities to advance research and, by extension, the entity's productivity and profits.</p>	<p>Participants noted that the tour was very beneficial in providing them with an expanded view on the possibilities of the Caribbean agricultural sector.</p>

“ Caribbean nationals are sharing among each other and at the same time, being exposed to new methods and technologies. Japanese organisations are also benefiting from new avenues and markets for technology transfer. ”

Chisa Mikami

Resident Representative a.i. for the UNDP Sub-regional Office for Barbados and the OECS

Best Practices

Several best practices have been identified in implementing the activity of technology transfer as outlined below:

- **Pairing Low-tech and High-tech Applications**

The study tour combined a range of technologies which allowed the immediate application of some techniques (low tech) and planned applications of others (high-tech).

- **Regional Outreach**

A wide cross section of pertinent individuals including those from regional organisations and NGOs allowed for greater South-South transfer of knowledge.

- **Pairing of Farmers and Technical Officers**

Having both groups present meant that both the policy and practical decisions required, were made in unison. That resulted in greater buy-in which allowed for easier adoption of practices after the participants returned to their territories.

- **Knowledge Sharing Directly After the Trip**

Participants capitalised on the momentum and excitement directly after the trip to begin the South-South transfer of knowledge. This ensured that the knowledge was transferred before it could be forgotten and encouraged a wider cross section of persons to benefit from the information.

- **Involving Youth**

Educating the youth demographic and involving them in sustainable agricultural practices is vital for the growth of any industry or community — throughout

this project special emphasis was taken to educate the youth. Young people were nominated to attend the Japan-Caribbean study tour and there were several community youth group outreaches after their return.

- **Community Outreach**

It is important that knowledge does not remain in silos, and as seen in the Dominican example, participants shared their knowledge via radio, webinars and several community interactions to reach a wide cross section of persons that can benefit from this transfer of knowledge.

- **Primary/Direct Transfer of Knowledge**

The project allowed farmers and agricultural officers to receive the information directly from fellow farmers and agricultural stakeholders in Japan. This allowed for greater collaboration, less resistance and more buy-in compared to if the information had been distributed by secondary informational sources (e.g. leaflets and pamphlets).

- **South-South Knowledge Sharing**

The knowledge gained from the trip was directly shared with the participants' respective communities, as well as other territories that were unable to be involved in the project. This sharing of information allowed the knowledge to far surpass the 20 individuals who initially received it.

Final Thoughts

The knowledge received by the 20 participants in the Japan-Caribbean study tour is likely to have reached over 10,500 persons in the Caribbean. Eleven islands have received additional techniques, tools and ideas to bolster their agricultural industries, and the region on a whole is increasing its capacity to effectively promote sustainable growth.





From
the People of Japan

