CReW+

Best Practices

in Policymaking for Integrated Water and Wastewater Management (Belize)

Financed by

gef

Co-implemented by

IDB Inter-American Development Bank

UN environment programme

Co-executed by

Caribbean Environment Programme

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

OAS More rights for more people

Change Processes in Policy Development for Integrated Water and Wastewater Management

Figure 1: Picture of Caye Calker – Belize
Source: Wikimedia Commons

Background

It is estimated that only 16 per cent of Belize's population is connected to a sewage treatment plant. In Belize City, sewerage services are available to 8,200 households (ca 50%), in Belmopan City 2,100 (ca 45%) and in San Pedro Town 1,100 (ca 30%). The rest of the country may be using anything from poorly constructed septic tank facilities to unimproved pit latrines. Figure 3 shows Belize growth of the population.

Many of the existing septic systems are not functioning properly, generally due to designs which are not standard and only partially treat the raw sewage and grey water. There is also a lack of proper maintenance and desludging of the septic tanks. This fallouts in direct impacts that can immediately contaminate any nearby water body such as creeks, rivers, sea and underground water.

In rural areas, private sector septic cleaners collect the sewage, but lack proper disposal sites of sewage waste for treatment.

Moreover, the sewage charges are low when comparing to the Latin American and international levels, as showed in Figure 2 below.

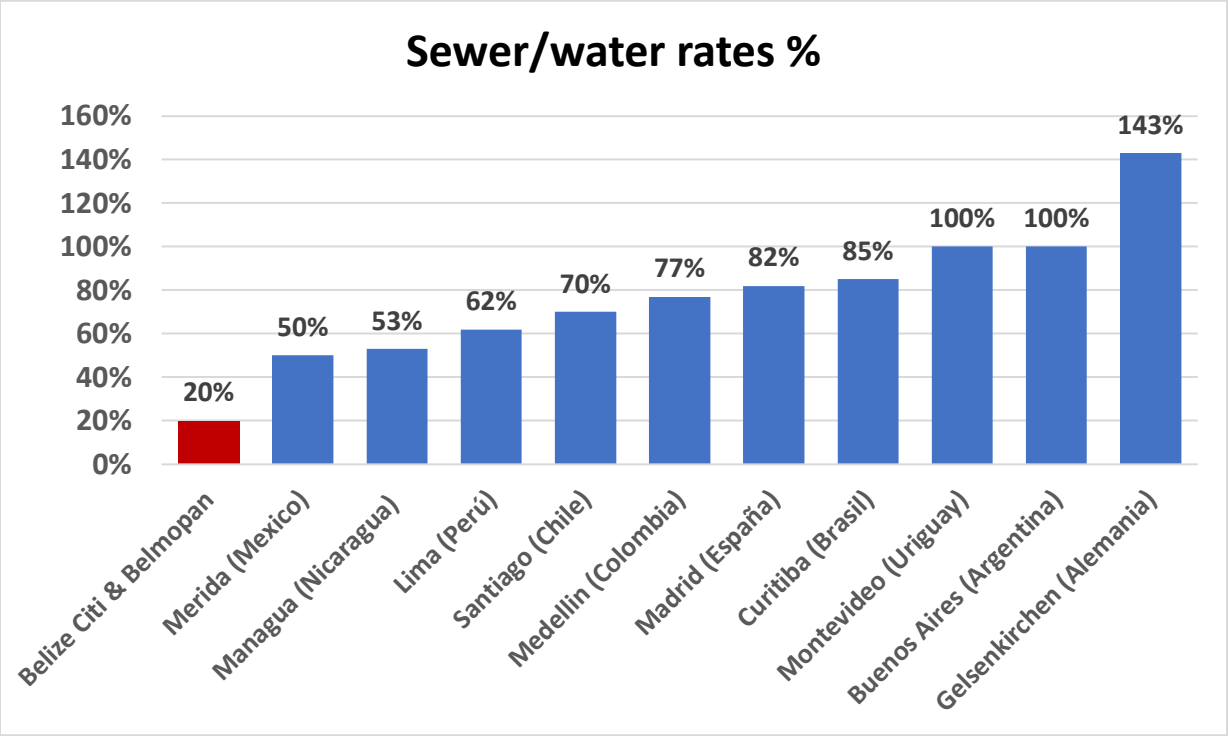


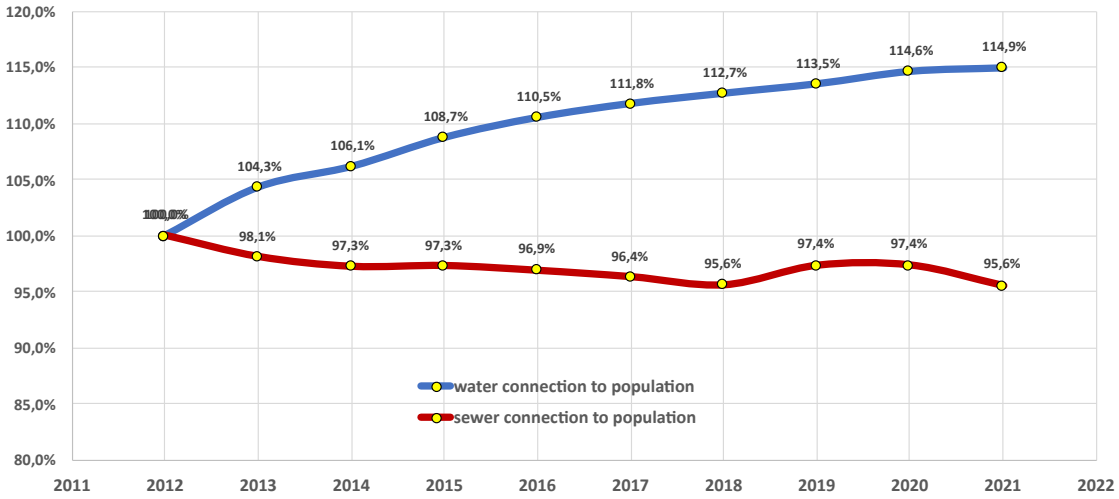
Figure 2: Sewage rate percentage of the water charges; Source: @GIZ/AKUT

Also, in the sectors of Industry and Agriculture, from distilleries and breweries, sugar processing plants, citrus, bananas, shrimp and aquaculture discharge wastewater every day. Effluent regulations have been established for these different industries since 2009. But it appears that currently they are not being fully applied and monitored, which leads to lack of control of industrial pollution. The monitoring and evaluation processes are inadequate and must be upgraded to allow proper regulation of the sector. Currently, there are only 60 wastewater licenses emitted for all the country, but that is insufficient. The industries/companies are not reporting in adequate frequency and the information reported to the Department of the Environment of Belize in not up to date.

The Challenge

The challenges of inadequate wastewater management – inadequate sanitation – represent an inconvenient truth that many are content to 'flush and forget!' The impact though, must be fully understood. The water resources are affected – particularly water quality - by wastewater management or the lack thereof. The health and well-being of the Belizean people is at risk. In key areas for tourism expansion and great economic potential, inadequate sanitation further risks irreparable damage to the reef, the fishing industry and the quality of our coastal waters.

Over the past ten years the percentage of the Belizean population connected to sewer connection decreased, as shown in Figure 3.



water connection to population	100,0%	104,3%	106,1%	108,7%	110,5%	111,8%	112,7%	113,5%	114,6%	114,9%
sewer connection to population	100,0%	98,1%	97,3%	97,3%	96,9%	96,4%	95,6%	97,4%	97,4%	95,6%

Figure 3: Sanitation evolution of household connections in regard to the population growth Source: @GIZ/AKUT

Household sanitation has always come a poor second to water supply and distribution services. It is usually a lower priority for householders and has been neglected. Debates over public investment in sanitation tend to be poorly informed and somewhat emotive with concern over 'standards', health and politics tending to produce unsustainably high levels of provision for the few and nothing for everyone else!

The provision, improvement and ongoing operation of adequate sanitation affects all members of society. It should be addressed in a coherent and consistent way.

The effects of this wastewater management challenge are threefold:

- Human Health – particularly for children and their quality of life, their education and the development potential of the communities.
- Economic – the impact on the rapidly developing tourism sector could be catastrophic – while the effect on household communities in terms of the cycle of poverty, illness and lost educational and economic potential is no less important.
- Environmental – Inadequate sanitation leads to dispersed and diffuse pollution of water sources, damage to reef and coastal ecosystems which may be irreversible.

For industrial and agricultural wastewater, there is a lack of systematic data to be able to determine the pollution per source, area and water body.
In this context of pollution and a lack of clear policy, monitoring systems and adequate tariffs in that the project plays an important role as explained in Section "The CReW+ Approach".

Relevance for Development

The issue faced in this case, is mainly related to SDG6 – Clean Water and Sanitation, but also to SDG 3 – Good Health and Well-being, SDG 11 – Sustainable cities and communities, 12 – responsible consumption and production, 13 – climate action, 14 – Life bellow water and 15 – life on land.

Specifically, the SDG target 6.3 is: 'By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally'.
To track progress towards the target, SDG indicator 6.3.1 monitors the proportion of total, industrial and domestic wastewater flows safely treated in compliance with national or local standards.

But as shown in figure 3 this numbers are decreasing for domestic wastewater, and so the activities of the project come in the right moment to improve these indicators and help on their monitoring.

The CReW+ Approach

Change Processes Supported by CReW+

The three CReW+ activities are positive for the wastewater policy development, defining a way forward for the whole country. It defines tariff issues, defines financing needs for measures and establishes deadlines for indicators to achieve certain sanitation services levels.

With this project it was clear the interconnection of the three components that were contracted in the consultancy. The work had an integrated approach, working from the national level of policy development, passing by the need for implementation through available funds in the country (working on the revolving fund) and also analyzed through a concrete project the innovative possibilities of collection and treatment (case study of Caye Calker). The description of the three components (Policy Development, Revolving Fund and Case study) worked by the consultancy are described below.

1. Policy Development

In the policy draft development six meetings were held with the formed Wastewater Policy Steering Committee. The meetings were very important to promote trust and then to get the stakeholders inputs for the policy. The inputs included the goals for the next years and the principles that the policy should be based on.

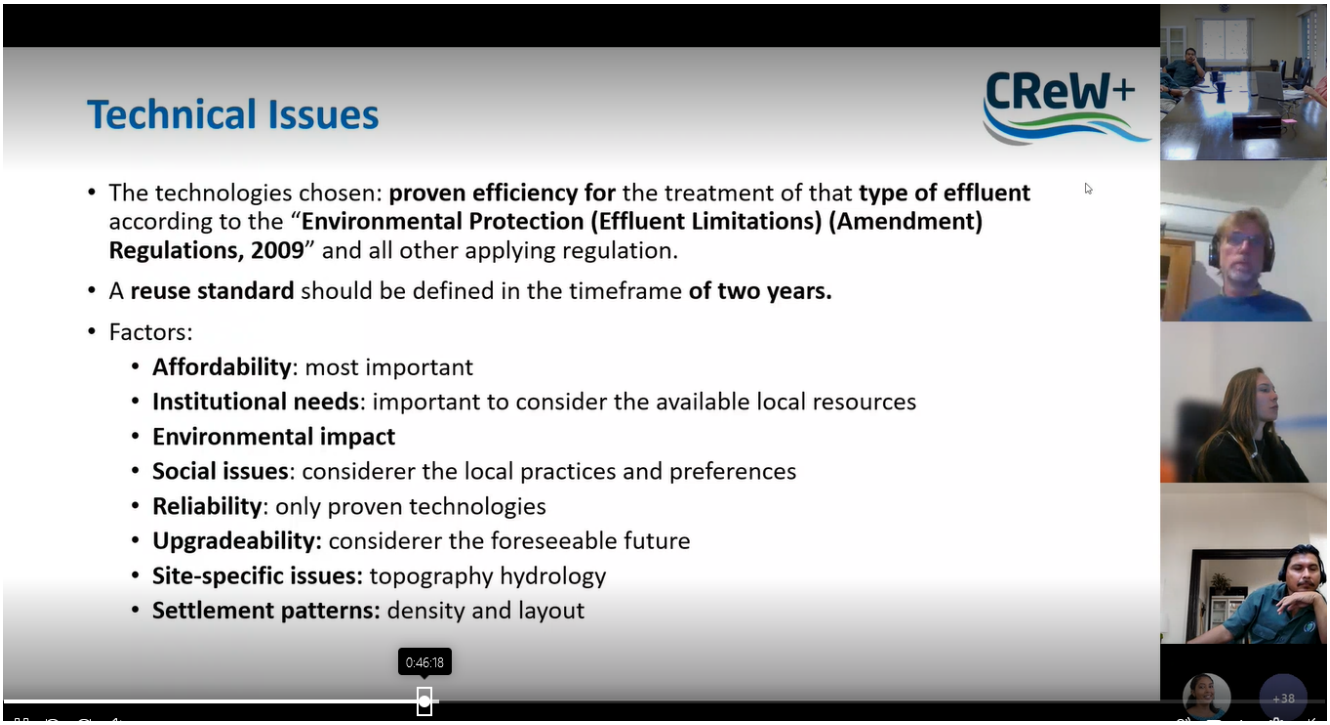
One important added principle is the implementation of the Polluter Pays practice, meaning that the cost for cleaning the wastewater must be paid by the polluter as a basic principle.

Other important new principles were:

- Legal and Policy reforms must be harmonized with national priorities (Plan Belize, SDGs, NDC, etc.) to establish a robust framework for Wastewater Treatment in Belize.
- Development of Wastewater Monitoring and Evaluation Systems for evidence-based solutions.
- Implementation of the Circular Economy approach, recognizing waste as a valuable resource.

It is worth mention that one of the first activities predicted in the policy is to develop, in the next 2 years, a systematic survey of polluting loads in the country. Therefore, developing an inventory of the polluting loads and crossing with the preservation areas.

The Figures bellow show important improved process that were included in the policy being presented and commented in the stakeholders meeting.



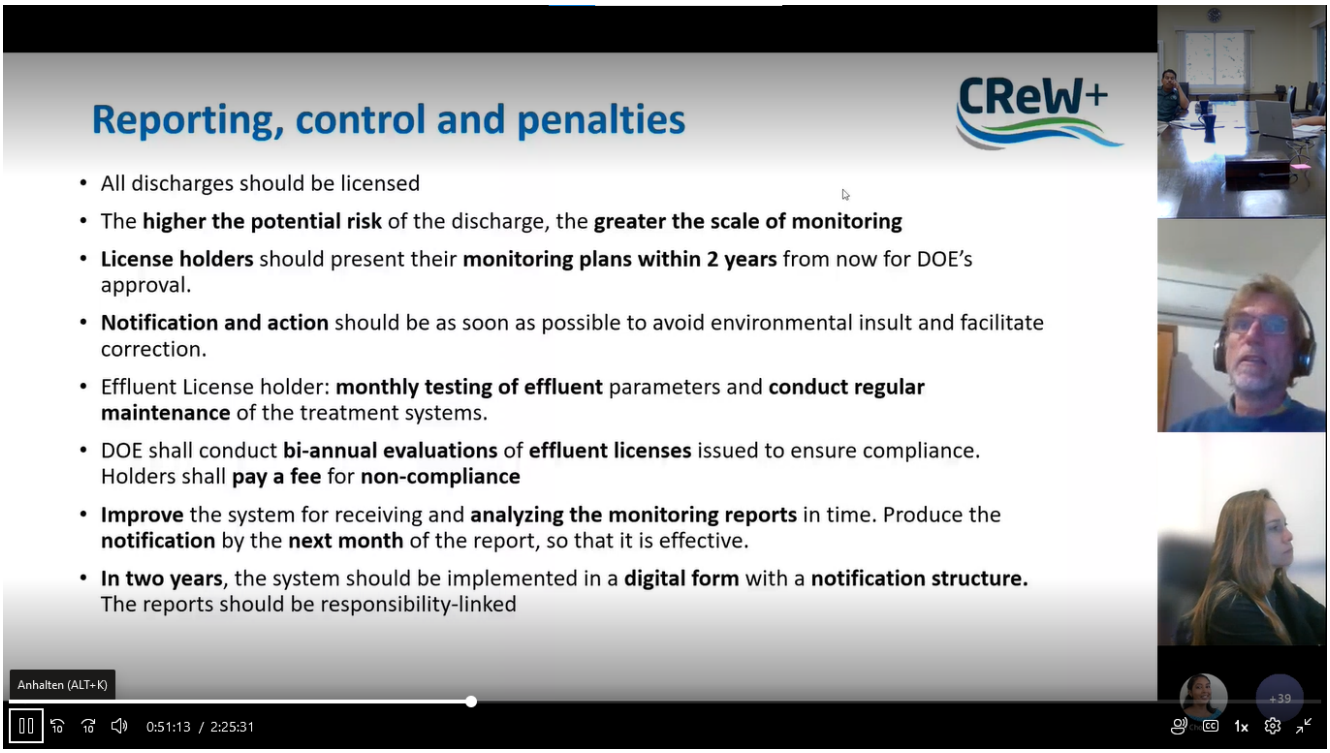


Figure 4: Two examples of important issues being presented and discussed in the stakeholder policy meeting

For the policy development, it is important to mention that the time schedule was very tight, which caused the consultancy to deliver a very extensive and complete first draft, and to need feedback very quickly from the stakeholders. It is very important to considerer time to be able to work in a didactic way, step by step and it is better to deliver the draft in stages per chapter and discuss it as it develops, also being able to interview the stakeholders one by one. A policy development usually is a process of 1,5 years.

The solution in this case of such a short time was to prepare a questionnaire with straight to the point questions, specific to each stakeholder, including their expected neuralgic points.

It was also crucial to have a local consultant with network at a high level in the agencies, who is known and respected and listened by all the actors and knew the local steering structure.

The policy final draft was presented in a final validation workshop with important stakeholders in order to get a broader opinion. The comments and discussions made in that workshop were also included in the final product. The consultancy work was developed until the green paper stage.

Therefore, the policy development and establishment of the sanitation and wastewater management way forward for Belize was a very important achievement. However, it is very important to make sure the planned goals are executable. In practice, it is very important to have a fund that can assure projects will be implemented.

2. Revolving Fund

In order to be able to guarantee a good flow of resources to meet the policy goals, it is important to revitalize the Revolving Fund that already existed successfully in Belize. This integrates the second activity of the project.

The problem with the fund was that it only financed a few large projects that took up the resources and the borrower of the fund was only BWSL.

As a first activity, the members board was reactivated and rebuilt. Four meetings were held and to guarantee a continuous work in the generation of projects, a technical committee was created in the leadership of the DOE. The objective is to guarantee that the projects that are chosen and promoted are the ones that bring the most benefits to sanitation.

To form the Technical Committee, terms of reference were developed and discussions were organized to define on how to choose projects under what criteria. As a support for this process, score point sheet formats were developed with criteria to prepare the decision of the technical committee for the board.

A suggestion of interest rates for the different borrowers of the funds was performed, in order to include social and environmental aspects of prioritization of sanitation areas in Belize.

As a strategy, the fund decided to experiment with two projects to generate all the necessary documentation for a greater flow of projects, and afterwards, it was decided to implement a publicity campaign with the Advertising Department from DOE.

Both the Ministry of Finance and Ministry of Economic Development signaled that in the event of a positive (successful) execution they would be open to provide additional resources to the fund as the current funding of 5 million USD does not meet Belize's sanitation requirements.

An important economic instrument of the policy to the revolving fund is the polluter pays principle. Essentially, a fee is charged based on the measured loads of discharged effluent. In essence, a fee per kg/BOD and kg/nitrogen – with phosphorus and heavy metals fixed, with “polluter charges” possibly being used to ‘top up’ the Revolving Fund. Therefore, this principle would also increase the available resources. This is still to be implanted as part of the Policy process.

Another important result from the Revolving Fund discussions was the recommendation of the projects sizes. It was recommended that the projects should vary between 50 thousand dollars to 400 thousand US dollars, to guarantee a diversification of the borrowers. Larger projects can be supported using the resources as equity capital, that is, development banks often request a

counter entry of 20 percent. For example, in a project that costs 2 million USD, the fund could be used for the counter entry of 400 thousand dollars.

An important definition of the revolving fund was that it may be used to assist in the possibility of increasing the number of connections to wastewater treatment plants. For example, the new connections and their associated costs for home owners can be financed within a grant that BWSL can take from the RF to encourage connections. A Program to incentive connections could take place financed by this initiative.

3. Case study

The third activity of the project was to perform a viability study for a wastewater treatment solution of a critical area. The small island of Caye Caulker is divided into a strongly developed southern island with the village of Caye Caulker and a less developed northern island. The Split between the islands is of high touristic and environmental value and needs to be protected.

In peak season, about 1,000 tourists per day visit the island. This reflects 50% of the population, and therefore implies large fluctuations of hydraulic and organic load between high and low season, which were considered in the study.
As Caye Caulker does not have a centralized wastewater system, the prevailing sanitation solution are septic tanks at household level. However, as no system for sludge treatment exists, the fecal sludge extracted from the septic tanks is often dumped in the sensitive mangrove areas. The fluctuating water consumption over the year, the high groundwater level, the environmental and ecological sensitivity of The Split, as well as limited space availability need were considered in the selection and design of a sanitation solution.

Based on the comparison of collection system options, the consultants recommend the Vacuum system for sewerage, and for the wastewater treatment plant, constructed wetland. The key determining factors of this recommendation were:

- The Condominial System is not viable technically and economically (81 pumping station South Caye Caulker). The only way to reduce the number of pumping stations would be to choose significantly deeper sewers. Even by that, the number of pumping stations would be very significant.
- The FLAT system had the lowest CAPEX and is very suitable to be built in a step-by-step approach, but its large disadvantage are the septic tanks. It cannot be guaranteed that the tanks are watertight, and DOE expressed clearly that the sweet water lens below Caye Caulker is important to maintain. Another aspect is the necessary maintenance of the septic tanks on private ground, as well as the fact that still the houseowners have a direct responsibility directly for the system, whereas they must pay a wastewater tariff. That would need an accompanying phase during implementation.
- Both systems FLAT and Vacuum can be installed in unstable soils, in high ground water table conditions and in flat terrain, but the vacuum system has the advantage of only one point for energy provision, therefore the system is a bit less vulnerable to hazardous situations.

So, the Vacuum system was technically the most promising solution, but it is important to note that the study pointed out, that it's critical point is the need for qualified implementation and qualified maintenance. Therefore, it is necessary to guarantee well trained operators, since its implementation has a certain risk due to the need of special equipment and knowledge in O&M.

As for the treatment solution different systems were analyzed:

- Trickling filters;
- Activated sludge (SBR);
- Treatment wetland (TW) – French System.

The selection criteria included:

- Land requirement

- Flexibility to hydraulic and organic load
- Vector and odor problem
- Capital expenditure
- Operating expenditure
- Electricity
- Number of operators
- Maintenance
- Complexity of the system
- Availability of spare parts and service providers
- Level of training (operators)
- Primary treatment
- Sludge generation
- Tertiary treatment - disinfection
- Automatization

The study determined that Treatment wetland is the most suitable solution for treatment as:

- It complies with the effluent standards,
- It is possible to be installed in the given area,
- It is the simplest treatment option in regard to O&M,
- It has the lowest energy and sludge handling costs,
- It has the lowest equipment costs.

The disadvantage of this solution is its high need for area, therefore, if the area available is reduced then this would influence directly of the viability of this system and another solution should be considered.

The investments costs were analyzed and the feasibility study clearly showed that the necessary resource is beyond the possibility of being completely financed with Caye Calker village's own resource. This is a good example of a possible application for the Revolving Fund in other to have the necessary amount to be able to finance it.

Lessons Learnt

What not to do:

- Rush the policy making process and pressure the stakeholder group
- Defining goals and indicators before having a consistent and comprehensive baseline
- Suppose information in order to move faster
- Not having the main executer firmly involved in the case study since de beginning and not knowing for sure which area is available for the WWTP, since thar influences the decision for the type of treatment.

What worked:

- To have a consultant on the ground, known and respected by the local stakeholders allowed the work to go fluent
- Having frequent meeting and at least one physical visit to build trust and understanding
- Sending the draft versions before the meetings, so that the participants had time to read it
- Preparing a questionnaire with strait to the point questions about the policy draft and its content in order for the representatives of each institution to be able to take the questions and discuss them internally and them give a solid response to include in the policy

- Both the policy and the revolving fund committee had leaders clearly articulated and capable of directing the team and bringing the demands/interest of their organization with an inclusive, integrative vision.
- Well-formed, well-chosen and well-articulated committee with a skilled committee leader.
- Having a committed water and sanitation service provider participating in the case study.

Sustainability, Upscaling and Downscaling

As for sustainability, it is important to mention that the DOE has shown ownership of the policy making process and the main stakeholders as well. With the Chief from DOE directly involved in all the meetings and making observations on the policy development.
Also, in the revolving fund, the Ministry of Finance was also with the chief directly involved.

It is highly recommended that the formed group does not dissolve itself, in order to keep the work going, even if in lower intensity, for example the group of emails of the Steering Committee and the Revolving Fund could continue active and always when there is a new progress It could be shared with the whole group, and even schedule a meeting with a certain periodicity to report progress every six months or another adequate frequency.

Moreover, the awareness campaign presenting the 2 cases of the revolving fund after their implementation, is very important for upscaling.

As for BWSL is has shown to be a successful and compromised organization, they have taken the consultancy recommendations for Caye Calker and are taking next steps forward, including hiring the project company for the system.

As for upscaling, the Ministry of Finance and Ministry of Economic Development already confirmed that they will input more money in the revolving fund, thus allowing more projects to be financed. The system in Caye Calker will serve as reference for other projects in the country. Also, the revolving fund is an example of an interesting funding model that could be replicated in other countries in the region.

Published by:	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Authors:	Carolina Cabral, Peter Allen, Christoph Platzer.
Design:	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Date:	January 2023.
On behalf of:	Inter-American Development Bank funded by Global Enviromental Facility (GEF)