ADAPTATION FUND

CONCEPT NOTE PROPOSAL FOR SINGLE COUNTRY

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Securing Water Resources through solar energy and innovative adaptive management (SEAM)
Country:	Belize
Thematic Focal Area:	Rural Development and Water Management
Type of Implementing Entity:	National Implementing Entity
Implementing Entity:	Protected Areas Conservation Trust (PACT)
Executing Entities:	Ministry of Rural Transformation, Community Development, Labour and Local Government
Amount of Financing Requested:	$4,970,000 (in U.S Dollars Equivalent)

Project Formulation Grant Request (available to NIEs only): Yes ☒ No ☒

Amount of Requested financing for PFG: $50,000.00 (in U.S Dollars Equivalent)

Letter of Endorsement (LOE) signed: Yes ☒ No ☐

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: https://www.adaptation-fund.org/apply-funding/designated-authorities

Stage of Submission:

☒ This concept has been submitted before

☐ This is the first submission ever of the concept proposal

In case of a resubmission, please indicate the last submission date: 9/21/2021

Please note that concept note documents should not exceed 50 pages, including annexes.

Project / Programme Background and Context:

Belize is a country rich in natural resources. This richness has resulted in the country building its major income earning sectors around the natural resources the country has to offer, thereby being heavily dependent on ecosystem services and its proper functioning. Traditional practices and way of life for many of the country's ethnicities also rely heavily on Belize's natural resources. Located on the eastern coast of Central America, Belize has a national territory of 46,620 km^2, with its coastline extending 386 km and being notable for its rich coastal and marine ecosystems, inclusive of the Belize Barrier Reef System.

Although Belize contributes minimally to climate change the country is impacted by climate change and variability due to its distinct characteristic as a low-lying small island developing state. Majority of the country including its coastal areas and islands are flat and low-lying, making the country highly vulnerable to sea level rise, erosion, storm surges and flooding. Some of the current threats of climate change extend to changes in the intensity, distribution and frequency of extreme weather events, such as storms and hurricanes, sea level rise (SLR), increased sea surface temperature, ocean acidification, coral bleaching, drought, wildfires, and changes in crop production. All of which result in direct and indirect threats to the productive sectors of the country.

The water sector is notably a key sector possessing an important commodity necessary for the survival of all local communities. Although the country has an abundance of water resources and a high-water per capita rate, this sector is particularly vulnerable to impacts of climate change as the country extracts majority of its water resources from rivers and groundwater sources. Belize's Third National Communication (TNC) to the UNFCCC, noted that rainfall is projected to decrease more and more from the 2030s to the 2090s leading to worsened drought conditions. The latter will decrease water supply with lower projected levels of rainfall. On the opposite end of the spectrum, given climate uncertainties, the changing climate will also lead to intense rains and flooding during other periods. Additionally, deforestation further threatens water availability by decreasing ecological functionality of watershed thereby affecting water quality. Population growth also impacts the availability of water resources. Belize's TNC highlighted the need for adaptive measures such as the protection and restoration of ecosystems, increased water harvesting, water protection, and promoting sustainable water utilization.

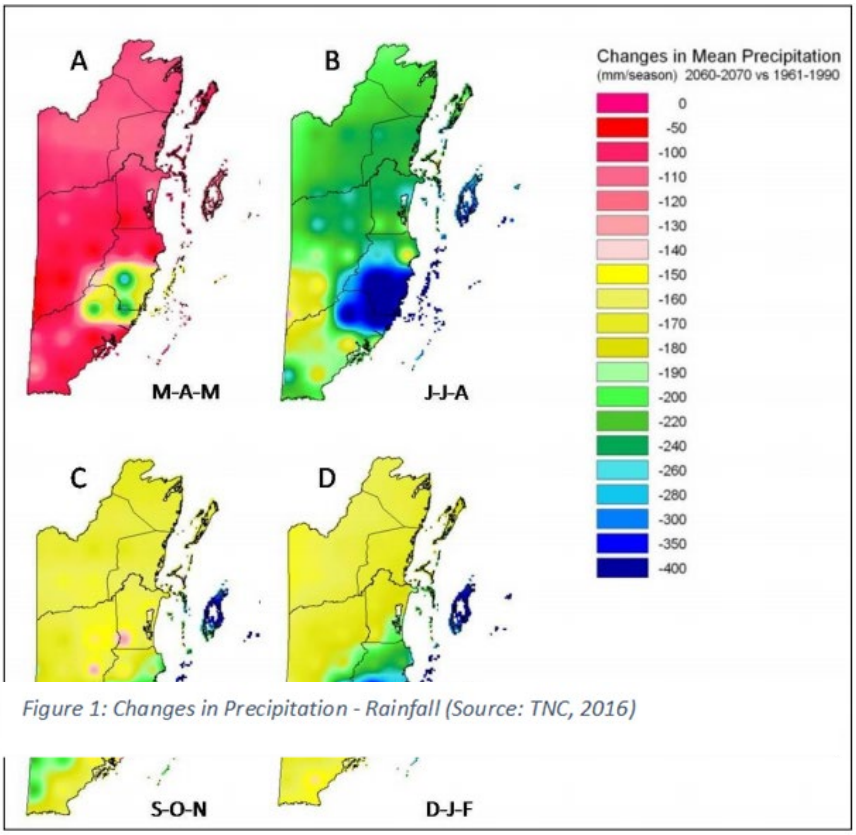


Figure 1: Changes in Precipitation - Rainfall (Source: TNC, 2016)

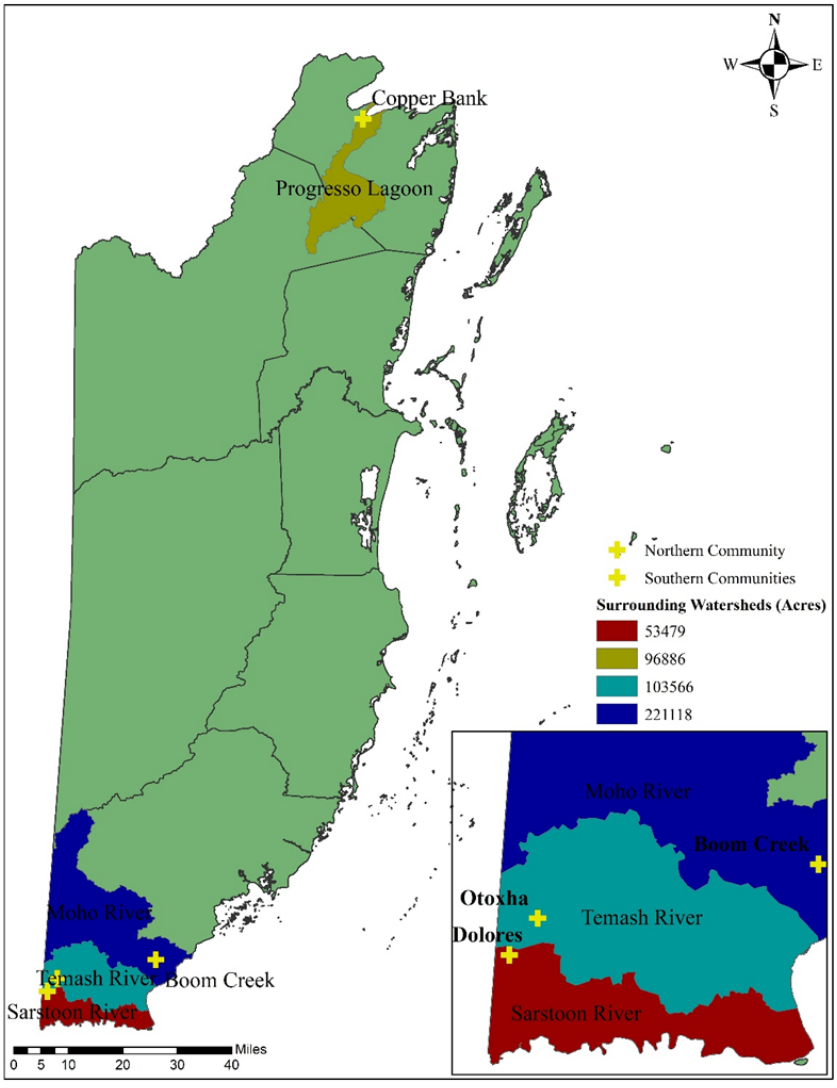
Mean season rainfall across all months for the country are projected to change for the 2060-2070 period in comparison to the 1961-1990 (Figure 1). Across all months, rainfall is projected to decrease significantly in the southeastern portion of the country. Map B in Figure 1 shows a decrease in seasonal rainfall approaching approximately 300 mm/season in a zone centered over Stann Creek and the southern Toledo District from June to August.

Map C depicts an overall decrease in rainfall of ~ 200 to ~ 220 mm/season for most of Belize from September to November, during Belize's classified Wet Season. The months of December to January, which are within the dry season are projected to have little change in rainfall with an overall decrease of approximately 100 mm/season. In the Toledo District however, this change has been projected between 150 – 200 mm/season in a centered zone

covering the Stann Creek, Cayo, Toledo and Belize Districts. As the uncertainties of water availability, linked to projected extended periods, are expected to negatively affect communities, natural systems and key economic sectors, this project proposes an integrated multiprong approach for the protection and proper management of water resources. The Ministry of Rural Transformation, Community Development, Labour and Local Government, the Executing Entity (EE), has recognized the need to institute a new approach to the management of water through its daily operations in communities across conjunction with EE. This approach takes into consideration the human, economic and environmental aspects of water and watershed management, which require synchronization in Belize. The EE and associated Government Entities will champion this new approach to water management in the rural communities of Belize that are detrimentally affected by limited water resources, which are projected to be further restricted with the impacts of climate change.

Dynamics of Target Communities

Figure 1: Map Displaying the Four Target Communities



Boom Creek

Boom Creek Village is a lowline area (swamp) located southwest of Punta Gorda Town, Toledo District along the Moho River. The village is approximately 9 km or 5.6 miles from Punta Gorda Town. The village land borders with San Felipe, Midway and John Bejerano Private land towards Punta Gorda Town. It is accessible by road, which was constructed in 1992. The road ends at the last house in the village. During the rainy season, the road to the village floods for extended periods of time. During these events the village is accessed via a 20-minute boat ride on the Moho River. The land in the village is mainly used for agricultural purposes (corn-matambre), and traditionally used on a rotational basis. Approximately, an average of 10 – 15 acres of land is being used for each seasonal crop. A small portion of private land is cleared for farms (fruit trees etc...) and the harvesting of log or extraction of lumber during the logging season. The village has one primary school and is located within the Moho River Watershed (Figure 2).

Figure 2: Inaccessible Road Boom Creek (Source: Ministry of Rural Transformation)

Figure 3: Government School in Boom Creek (Source: Ministry of Rural Transformation)

Figure 4: Creek in the Center of Boom Creek (Source: Ministry of Rural Transformation)

Otoxha: Otoxha is a tiny Mayan Indigenous community in south-eastern Belize within the Toledo District located near the Temash River. The community is two miles away from the community of Dolores and the nearest urban area is Punta Gorda. Most families in the community live in thatch houses and are subsistence farmers. The village has a multigrade primary school; however, students must travel 1-2 hours to attend secondary school. The main form of transportation to and from the village is by public transportation, buses. The road may become inaccessible during rainy season, because of flooding of the Blue Creek Bridge but there is a short cut that leads into Sunday Wood Village. There is a public heath post that is serviced by mobile health clinics in the community approximately every six (6) weeks. The community is located in the Temash Watershed (Figure2). The community is situated on rolling slopes, surrounded by secondary vegetation, several small creeks, and swampy areas. The climate in Otoxha is basically humid.

Dolores: Dolores Village is located in the south-eastern portion of Toledo District within the Adjacency Zone, which is approximately 6 miles from the Belize-Guatemala Border. It is 2 miles away from Otoxha Village or 50 miles from Punta Gorda Town and is accessible by vehicle on a gravel road constructed in 2003. The road ends at the end of the village. Most families build and dwell in thatch houses along the road leading up to the village. They are mostly subsistence farmers and community lands are mainly used for agricultural purposes, and traditionally is used on a rotational basis. On average of 8 – 10 acres of land is being used individually for each seasonal crop. Secondary vegetation is mainly used for clearing new area for housing, cattle rearing and corn (matambre) and beans. High (virgin) forest is mainly used for rice and corn. Dolores is located in the Sarstoon Watershed (Figure 2).

Copper Bank: Copper Bank is located along the west bank of Laguna Seca lagoon, which empties in the Corozal Bay in the Corozal District. The village can be accessed by various routes. The first is by road from Orange Walk Town through the villages of San Estevan and Progresso or through Corozal Town crossing the New River by ferry through Pueblo Nuevo. It can also be accessed through the village of Sarteneja by ferry across the mouth of the Laguna Seca Lagoon. The northern community is located within the Progress on Lagoon Watershed (Figure 2).

Climate Change Impacts to Water Availability in communities

Locally there are two seasons namely the dry and rainy season. Floods are very common from June to September but October to January the rate of rainfall is undetermined, thereby limiting the communities access to water in the area. Floods similarly threaten water supply, as flood waters contain a high level of debris and can be contaminated by fecal matter from nearby latrines and livestock. The country has over the past two years experienced increased frequency and intensity of hurricanes due to climate change that have resulted in large scale flooding to communities, especially those in southern and central Belize. Flood waters in these areas took weeks to recede leaving large scale damage to communities and minimizing access to basic needs such as water and food. During that time the EE, expended a significant portion of its resources to aid communities to recover from the events.

On the opposite end, February to May is dry season and May is the peak of the dry season, where water resources are further limited. The latter presents a challenge for community members that are mainly subsistence farmers, and dependent on the rainfall to water their crops and provide drinking water to livestock. During these seasons water becomes a scarce commodity. In Northern Belize, the driest part of the country, in communities such as Copper Bank, water becomes a significantly limited resource. In previous years, water from lagoons and water bodies such as Sapote Lagoon and Honey Camp Lagoon, dried up completely. Livelihoods were also affected as these areas we are used for fishing.

This was particularly evident in 2019, when the country experienced a long and extremely hot period and, drought. The lack of precipitation in the area for an extended period of time had drastic effects on the country's agriculture, water supply and even on public health. The Standardized Precipitation Index (SPI) which is an index used to provide early warnings of extended droughts as well as assessing drought severity, was utilized and it determined that long term drought had evolved over most of the Cayo District as well as southern Orange Walk and Western Belize and Stann Creek. Climate Change thereby affects both ends of the spectrum in relation to water availability during Belize's wet and dry seasons.

Social and Economic Status of Target Communities

Many of the target communities are located in remote rural areas of the country with limited access to modern day conveniences. Villages such as Boom Creek, Otoxha and Dolores have no access to electricity via the national grid. The economic and some social factors of the communities are presented below.

Boom Creek Village

In Boom Creek, twenty-five (25) households have access to solar power and three (3) households still utilize candles and homemade lamps. Current income earning activities include subsistence farming utilizing traditional methods which in many

cases are not environmentally friendly. The rearing of domesticated animals is also common in the community, with excess crops and animal products being sold in the nearby Town of Punta Gorda. Communities such as Boom Creek also have small scale logging ventures that provide income to a few households that have access to private land.

Water Supply/Source

There are two functional hand pumps in the village and one production well; one is in a community member's property and the other in the school's compound. Rainwater is their main source of drinking water. Each household has a water catchment tanks to harvest rainwater. A few households have access to hand dug wells. The community hand pumps are mostly utilized during dry season which is a burden for families that do not possess a vehicle to transport containers filled with water to their homes. Females do laundry at the creek which is located in the center of the village. The nearby river has salt content, so it is not used for consumption or washing, just bathing.

Figure 6: Village Hand Pump for Water (Source: Ministry of Rural Transformation)

Otoxha Village

Otoxha, another rural community in the Toledo District, contains 58 households and approximately 302 persons. This Indigenous Community is home to both Mopan and Q'eqchi Maya and is governed by the traditional village Alcalde System and the Village Council system working at the local governance level. On average, households in the community earn less than BZD $100.00 per month approximately 57.4%, which is well below the poverty line. The main source of income being agriculture and livestock rearing at a small scale, which accounts for 63% of the population. The remaining community members earn wages from government employment (9.3%), social security benefits (9.3%), construction (5.6%), logging (1.9%) as well as arts and crafts (1.9%). The majority of households in the community do not have access to electricity (68.5%), with the remaining gaining access via solar energy and diesel generators. A total of 94.4% of the households do not have a telephone relying on the village community phone for communication purpose.

Water Supply/Source

The main source of the village's drinking water, 68.5%, is from a public hand pump, 9.3% obtain water from a local spring, 9.3% from wells, 3.7% from surface water and 1.9% have access to water piped into their yards (Saunders, 2009). In terms of water treatment, a total of 75.9% of villagers indicated that they treated their drinking water supply by boiling. The main source of water supply for other purposes including washing was surface water (85.2%).

Dolores Village

Dolores is a tiny village in the southern portion of the country that contains 106 households and approximately 596 persons. The village is predominantly Q'echi Maya (64%) with Q'echi and some English and Spanish being spoken. The village is also occupied by East Indians (27%) and Mopan Maya (6.0%). The village is governed by the Village Alcalde System and the Village Council System. Similar to Otoxha, the average monthly income of most community members was less than BZD $100.00 per month, with the income source being primarily agriculture and livestock production (95%). Most of the population is living below the poverty line. Most of the homes in the village of Dolores are thatch houses (94%) and less than 40% of the community has access to electricity, with solar being the main source.

Water Supply/Source

The main source of the village's drinking water is from surface water. Another 30% utilize water from spring, and 19% use rainwater from individual collection systems. The vast majority of villagers treat their drinking water. In terms of water for other purposes including washing, the main source of water supply was from spring (47%) and the creek (27%) with 19% utilizing other sources such as piped water (Saunders, 2009).

Copper Bank Village

Copper Bank is located in the rural area of the Corozal District containing 150 household and approximately 550 persons. The ethnicity is mainly Mestizo, and the predominant language is Spanish with a majority being bilingual speakers. The community falls under the Quintile 2-Lower-Middle classification in accordance with the SIB Poverty Index. Income is generated from fishing (80%) construction (2%) and cane farming (18%), with an average income of BZD $500-2000 per month. The majority of the community, 99%, have access to electricity via the national grid.

Water Supply/Source

The main source of drinking water in the village is rainwater collection. Households harvest rainwater for drinking and utilize well water for other purposes. Through the use of water pumps, some households pipe well water into their homes for toilets, laundry and for other household use. There are a reported 85 water wells in the community. However, during the months of January to May eighty percent (80%) of the wells dry up resulting in households having to utilize the community water pumps. Additionally, only 20% of the wells have availability of water. Copper Bank has 3 hand pumps connected to 3 community water wells; only 1 pump is functional at this time. Most households harvest rainwater with approximately 60% of households pumping rain or well water into their homes for household use. Well water being utilized is not chlorinated prior to use. To address this issue, the Ministry of Health has been distributing chlorine tablets to households especially during outbreaks of gastroenteritis (diarrhea and vomiting) and Hepatitis A.

Treatment of Water in Belize

In most communities across Belize, that are not connected to the national water supply system, water is not treated prior to use, which often results in the prevalence of diseases and health issues in the country. The Ministry of Health and Wellness (MOHW) in conjunction with the EE and other national bodies, have been working with communities to create awareness of the importance of water treatment. This has been a challenge in many communities as there is limited knowledge and awareness at the community level about the impacts of inadequate water treatment and human health. The MOHW in conjunction with the EE, Belize Water Services Limited (BWSL) and the Belize Social Investment Fund (BSIF) have developed an Operations and Maintenance Manual for Rural Water Systems, which aims to improve water treatment and minimize health impacts which also promotes the sustainable use of the resource. The MOHW also works with the EE to conduct periodic water quality testing of water systems including wells to inform water management. Given the importance of water, the country is also aiming to develop a Water Safety Plan which also takes an integrated approach to water protection and use. This project aims to also address aspects of water quality and human health through its actions, while building on the other core actions already being implemented in country.

Table 1: Community Statist

Community	Households	Population	Male	Female	Ethnicity	Language
Boom Creek[2]	25	112	52	60	Mestizo (53.8%) Q'eqchi (30.8%)	Spanish English Q'eqchi
Otoxha	54	302	145	157	Q'eqchi (85.2%) Mopan-Maya (11.1%)	Q'eqchi Mopan Maya
Dolores	106	596	291	305	Q'eqchi (64%) East Indians (27%) Mopan Maya (6%)	Q'eqchi English and Spanish
Copper Bank	150	550	250	300	Mestizo (98%) Caucasian (2%)	English and Spanish

Problem Statement

The traditional means of supplying potable water to households from underground aquifers via wells has been increasingly challenging, resulting in some communities experiencing water scarcity. Water availability in rural communities located in the poorest regions of Belize will be further threatened by climate change and vulnerability; consequently, through this project potable water resources will be restored in the four identified target communities in Belize, via solar water extraction systems and an integrated approach to the long-term utilization and management of water resources facilitated by community lead action. The project also takes into consideration the ecological functioning of watershed and intends to involve communities in restoration of watersheds via nature-based agricultural techniques to restore the water catchment function of watershed.

Project / Programme Objectives:

List the main objectives of the project/program.

The core objective of the proposed project is to promote the advancement of rural communities by securing water resources in four communities located in the Northern and Southern regions of the country. This will be achieved via three interlinked project components:

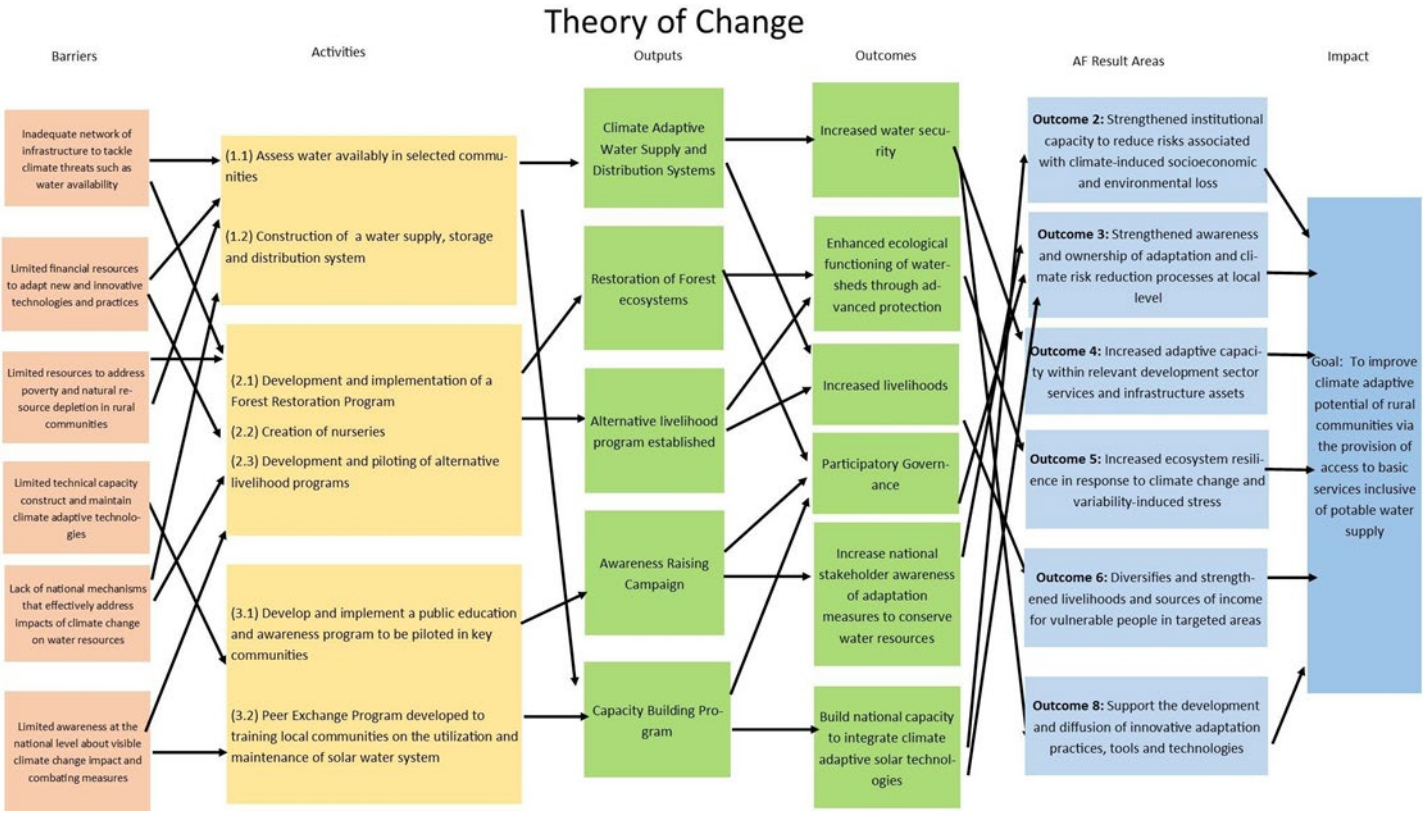
1. Improved Potable Water Supply Systems
2. Community Based Watershed Protection and Management
3. Improved Governance and Enhanced Appreciation for Water Resources

This project aims to decrease the uncertainty of water availability in communities by providing climate innovative and adaptive mechanisms to address current and future climate change impacts on water resources. Under Component One, water supply and distribution systems powered by solar energy and fitted with climate adaptive fixtures will be installed in the four selected communities. This component provides communities that traditionally relied on wells for water resources, with a viable long-term source of potable water.

Component Two takes into consideration the securing of water resources via the protection and sustainable utilization of the watershed resources. Under this component, the Executing Entity will work with communities that traditionally unsustainably extract and utilize resources within the watershed, to adapt climate friendly and sustainable alternative livelihood projects that benefit the ecological functioning of the watershed as a water catchment. This Component also includes actions for restoring the ecological functionality of the watersheds.

Component Three, Improved Governance and Enhanced Appreciation for Water Resources, aims to increase the knowledge of local communities on the importance of water resources and ways to secure resources in a future of climate uncertainty linked to climate change and vulnerability. As water is a vital resource for the survival of all communities it is important that communities become aware and become actively involved in the conservation, protection and sustainable utilization of water resources. Continuous education and outreach are necessary to garner public support for the project and to ensure the long-term sustainability of the project interventions. Campaigns and trainings with local municipalities and communities will allow for the integration of best practices for Belize. Under this component actions will also be instituted to improve the management of the new integrated system by local counterparts with the aid of the EE. This includes the digitization of water board systems to be compatible with modern technology, which promotes the efficient use of water resources by minimizing waste and monitoring use in communities. To improve local governance, the EE also aims to develop a program to monitor and assess ground water levels in target communities, with the possibility of scaling up the program in other communities in the future.

The objectives of this project are strategically aligned with the Adaptation Fund Strategic Results Framework in its overall aim of building the adaptive capacity of four local communities via the provision of secure water resources. Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level will be achieved via the implementation of Component 3 of the project for enhancing awareness. In all actions of the project, the Executing Entity will aim to provide communities and national stakeholders with the skills and knowledge necessary to increase their adaptive capacity. The project is built entirely on providing communities with the tools to address and combat climate change impacts, which will require communities to understand the context of climate change and the adaptation solutions. This component also contributes to improved national governance and promotes the integration of communities in the decision- making process. Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets is evident under Component One, via the installation of climate adaptive water extraction, supply and distribution systems that can withstand climate change impacts, thereby securing water resources for four water deprived communities. Outcome 5, Increased ecosystem resilience in response to climate change and variability-induced stress, will be realized through the implementation of restoration programs for watersheds, which target the riparian forests to improve their functionality. Alternative livelihood programs based on the uniqueness of target communities will be identified and implemented. These programs will be in alignment with the goal of maintaining the ecological functionality of the watershed and hence will contribute to its protection. The Project will also contribute to Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas of the AF. The main goal of the project is to provide rural communities with innovative technologies and practices that would better enable them to secure water resources in a future of climate variability. The latter contributes to the Fund's Outcome 8 via the adaption of these new methods in traditional communities. Further information can be found within Annex 1.



Project/Programme Components and Financing:

Fill in the table presenting the relationship among project components, outcomes, outputs, and countries in which activities would be executed, and the corresponding budgets.

Project/Programme Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)
1. Improved Water Supply Systems	1.1: Increased water security in for four rural communities in the poorest regions of Belize	1.1.1: Four water extraction and storage facilities 1.1.2: Four community distribution systems for water supply	Belize	3,454,401
2. Community Based Watershed Protection and Management	2.1: Enhanced ecological functioning of watersheds through advanced protection	2.1.1: Riparian Restoration Program 2.1.2: Alternative Livelihood Program	Belize	315,025
3. Improved Governance and Enhanced	3.1: Increased national stakeholder awareness of climate change	3.1.1: Awareness Raising Campaign	Belize	376,108

Appreciation for Water Resources	impact on the water resources 3.2: Build national capacity to integrate climate adaptive solar technologies 3.3: Increase capacity of local water boards to effectively manage water systems	3.1.2: Capacity Building Program 3.1.3: Integrated Training Program for the management water systems 3.1.4: Digitization of water system 3.1.5: Ground Water Monitoring Program		
6. Project/Programme Execution cost				435,166
7. Total Project/Programme Cost				4,580,700
8. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)				389,300
Amount of Financing Requested				4,970,000

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Milestones	Expected Dates
Start of Project/Programme Implementation	August 2023
Mid-term Review (if planned)	2024
Project/Programme Closing	April 2028
Terminal Evaluation	July 2028

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience. For regional projects describe also how they would build added value through the regional approach, compared to implementing similar activities in each country individually. For the case of a programme, show how the combination of individual projects would contribute to the overall increase in resilience.

Component One, Improved Water Supply Systems, aims to provide an alternative and reliable water production system to the four target communities of Dolores, Boom Creek, Copper Bank and Otoxha, which are in the poorest and remote areas of the country. These communities were traditionally utilizing Rudimentary Water Systems, that supplied water via wells constructed for extraction from underground aquifers. Some communities contain numerous wells, some suppling water resources to individual households. Other sources of water include rain fed collection systems and the manual extraction of water from local streams and springs. The target communities lack access to potable water for drinking and household use, which is further inaccessible during Belize's dry season. During the dry season, some communities are only able to access water from water trucks that transport water from other municipalities. The unavailability of potable water and improper wastewater management further prevails the prominence of disease outbreaks in the communities, leading to long-term health impacts. Additionally, recent efforts

to access water from new water wells dug in communities have been futile. The EE exhausted materials and resources in the past 6 months to locate new water sources to supply water to communities where existing wells can no longer provide water. During 2020-2021 the EE has dug wells beyond the maximum depth of previous systems and have only been able to access approximately 3 feet of water, which is insufficient to provide water resources to the community. The success of this component also requires the completion of a requisite hydrological investigation to ensure that the water systems can provide the volume of water and recharge rate needed. The latter, tied to actions under Component 3, will avoid the over-abstraction of water that damage the aquifer and results in negative impacts (salinization of coastal aquifers) for all. Where required, saline intrusion zone studies may be conducted to determine the zone of influence. It is the aim of this project to provide four rural remote communities, with secure access to potable water resources thereby increasing the ability of the community to adapt to changes in the climate that would further threaten the availability of water resources during periods of drought, inclusive of hydrological droughts. The project also contributes to Belize's mitigation potential by minimizing the utilization of fossil fuels tied to the use of traditional systems for the extraction, treatment, and supply of water resources in communities.

Key actions under the project include:

i.The construction of new adaptive hybrid power photovoltaic water extraction systems that utilizes readily available water from nearby water sources such as streams, tributaries and/or springs.
ii.The installation of treatment facilities to ensure the provision of potable water, that meet national standards; as well as the construction of water storage and distribution systems which enable communities to improve access to water resources.

Component Two, **Community Based Watershed Protection and Management**, aims to improve and safeguard the ecological functionality of the watersheds via the adoption of climate friendly restoration action and alternative livelihoods that contribute to the long-term protection of the watershed and resources within. Restoration actions will enable the watershed to continuously provide water resources to local communities through its natural processes. It will also enable a holistic approach to the management and utilization of water resources. As riparian forests provide key filtration and stabilization functions in watersheds, it is important that they be restored and protected to ensure ecological functionality and the stable supply of water resources. Alternatively, the action also contributes to the sequestration of carbon dioxide, thereby contributing to Belize's climate mitigation targets as well. This will be done via the cultivation of nitrogen fixing trees species in and along the watershed corridor to maintain and enhance forest cover, supporting environmental protection, climate resilient agriculture and alternative livelihoods.

Actions to be completed under this component include:

i. The identification and piloting of alternative livelihood programs in communities, minimizing the prominence of poverty
ii. Identification and restoration of forested areas via replanting and adaptive management
iii. Establishment of seed banks and nurseries for restoration actions

Component Three, **Improved Governance and Enhanced Appreciation for Water Resources**, aims to create an enabling environment that would support the large-scale adoption of innovative practices and technologies in communities across the country. The EE has recognised the need to create sustainable structures and avenues for the enhanced understanding of climate change impacts and adaptive measures to minimize impact and increase resilience. As public acceptance and support are key to the success of the proposed initiatives, actions to integrate community members and provide them with the resources and skills necessary to effectively contribute to the successful implementation of the project is vital. This will be achieved via:

i. The implementation of a national stakeholder awareness campaign
ii. The implementation of a capacity building, peer exchange program, to increase knowledge of adaptive approaches to water resources management and utilization
iii. The development of a long-term integrated training program to enhance the successive capacity of local water boards to manage the water systems
iv. Digitization of water system
iv. Program for assessing and monitoring ground water

These initiatives and innovative systems will transform the ability of the communities to mitigate and adapt to the impending threats of climate change. There are barriers to be overcome for the seamless achievement of Belize's resilience. Barriers to the implementation of climate adaptive strategies range from the lack of technical expertise to the large gap that exists within the country to finance climate change adaptation.

Technical Barriers
The EE and the Local Water Boards lack the technical resources to construct and manage new water systems in target communities. Currently, actions for the provision of water in communities require remedial technologies and expertise for the extraction and management of water resources. The adoption of climate adaptive technologies for the long-term extraction, treatment and distribution of water in target communities will require the technical expertise of numerous engineers and technical skills, which do not currently exist within the EE. The acquisition, installation, and training of personnel on the utilization of the new technologies will enable EE to see the integrated adoption of new water systems in various areas of the country.

Financial Barriers
Local Water Boards and the EE lack the financial resources to transform local water systems to secure water resources. Approximately 148 communities in the country are under the management of Local Water Boards in rural areas, with the communities gaining access to water from groundwater sources. Decreased water availability from local underground water sources, linked to climate impacts such as decrease in rainfall and shorter, more intense rainfall, poses a particular challenge to those communities not connected to the national water system and are unable to upgrade infrastructure to supply potable water to communities. Currently all major municipalities and 44 villages are connected to the water systems managed by Belize Water Services Limited (BWSL), which contain large scale infrastructure for water supply and distribution. The initial investment, inclusive of assessments, and financing for the construction and maintenance of systems are limited and, in most cases, non-existent at the national level. Financial resources of the EE are restricted by national budgets, which inhibit the upgrading of water systems to modern climate adaptive systems, that provide secure water resources to communities.

Institutional Barriers
Currently, the Ministry lacks the formal structures necessary for the long-term sustainable management of newly built adaptive systems by the local Water Boards. To depart from the business-as-usual management of water systems, which have been deemed unsustainable, there is the need to advance management strategies that would better enable the longevity of the system through effective management. The creation of a progressive initiative within the Ministry that functions as a succession program for the management of the water systems, will enable communities to maintain fully functional water systems and secure water resources in communities already impacted by climate change and variability.

Participatory Governance
The proposed project is designed with participatory governance principles which allows the communities to actively engage in the decision-making process. The project will adopt participatory planning, budgeting, action and M&E systems. The participatory governance approach will positively contribute towards beneficiary ownership, local capacity enhancement, accountability and transparency. The project will ensure appropriate local engagement platforms are in place for all the local stakeholders to actively engage in the decision-making process. A strong community and local stakeholder mobilization process will be carried out from the inception of the project to ensure all local stakeholders including the target communities are brought in within the overall participatory governance model. The below diagram depicts the overall participatory governance model that will be adopted by the project.

Participatory Planning: The planning of access to water and watershed management practices will be done using participatory processes. The identification of problems, analysis, generation of options, etc. will be carried out in a community-centric manner.

Participatory budgeting: The budgeting of the local development interventions including community drinking water supply initiatives will be done using participatory budgeting processes. This will enable a higher level of financial transparency and accountability while promoting higher community contributions (in-kind).

Participatory Action: The implementation of the climate change adaptation initiatives will also be done in a participatory manner where men and women in the target community groups along with the other stakeholders will take responsibility for the implementation. The participatory planning process will identify the roles and responsibilities of different community groups, including women and youth, during the implementation process.

Participatory M&E: Participatory actions will be embedded into the monitoring and evaluation processes as well. The overall monitoring framework will be designed to provide main responsibility to the community groups.

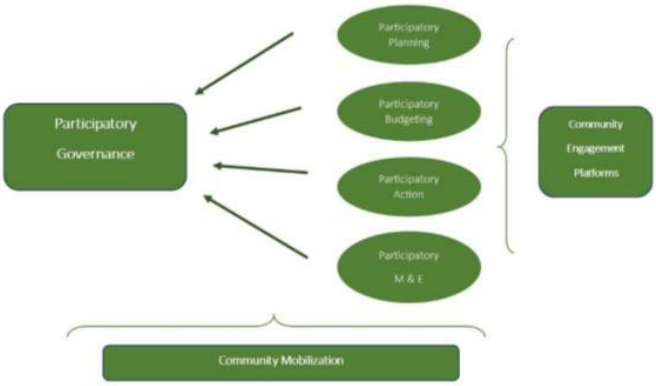


Figure 7: Diagram of Participatory Governance

B. Describe how the project /programme would promote new and innovative solutions to climate change adaptation, such as new approaches, technologies, and mechanisms.

The proposed project enables the adoption of an integrated and innovative approach to water supply and management based on a holistic understanding of the functionality of watershed and the institution of mechanisms to sustainably utilize and protect water resources. The adoption of sustainable climate resilient water systems in remote rural communities in the country will enable communities to build their climate resiliency and address the impacts of climate change that are already affecting the supply of water resources. Similar Hybrid Power Photovoltaic Systems have been piloted in other areas of the country, within larger communities and have proved effective in the reliable supply of water to communities such as Conejo Creek and Pueblo Viejo villages in the Toledo District. These two communities, located in remote rural areas, have been provided with Rudimentary Water Systems that gravity feed water to the communities consisting of a well, pump house with a submersible water pump and chlorinator, water tanks, solar powered electrical systems and water meters. The communities were also provided with WASH (Water, Sanitization and Hygiene) Training by the MOHW. These communities faced similar instances of inadequate water supply from traditional sources and have .similar characteristics. Under this project the innovation process will involve the rolling out of the Rudimentary Water Systems and adaptive management practices provided to the other communities, with a focus on the community's unique characteristics and needs. This project will undergo a process of examining, selecting and adapting the best suited technologies, systems and practices for the area to ensure the long-term sustainability of the system to meet climate adaptive needs and access to safe water. The focus will be on the benefits to the communities and to make investments in technologies and practices that have a higher beneficial outcome. The project will also utilize the technical expertise of various experts from government and private sector entities to devise these solutions and select suitable technologies. The lessons learnt from similar projects will be used as a benchmark for this one. Where possible, the traditional tools and practices of the local and Indigenous communities will be integrated, captured and disseminated for the eventual scaling-up of the process.

The actions under this project aim to build on the success of the other water supply systems by integrating activities for the long-term protection of the water resources by improving community practices in the watershed, that benefit the functionality of the watersheds. This approach will require the comprehensive assessment of current practices, to determine those that are detrimental to the longevity of the watershed. Following the assessment, actions will be developed in close consultation with community leaders and community members. These actions will be prescribed environmental and climate friendly best practices that positively impact the ecosystem while enabling communities to attain value added economic and social benefits. The integration of these best practices will see the protection of the resources and ecosystem services on which the community depend, thereby securing water and in some cases food production systems. The technical and social approach to holistic water management has been identified by the EE as a necessary shift to the traditional water production systems that are currently threatened. Component 2 contributes to the social and economic innovation of the project, by working with communities to identify and implement a new approach to natural resource utilization and the creation of an alternative source of income that can progress despite changing climatic factors. The project will also introduce to the communities, new methodologies and practices for the supply of food supporting vulnerable communities.

C. Describe how the project/programme aims to roll out successful innovative adaptation practices, tools, and technologies and/or describe how the project aims to scale up viable innovative adaptation practices, tools, and technologies.

The innovative adaptation practice, which the project intends to roll out, extends to the integrated technological and social approach to the supply of potable water and the safeguarding of water resources. Actions included in the project that will enable the successful roll out are evident in Components Two and Three. Contrary to traditional practices of installing water systems and relying on the EE, Water Boards and Regulatory Agencies to ensure the long-term functionality of the system; through the improved management framework for the water systems and the livelihood actions, the interventions should be self-sustained decreasing the need for large scale financing from the EE and Government of Belize for the supply of water in communities. The traditional practice of obtaining water from rivers or central water pumps will be replaced by systems powered by solar energy, thereby modifying the process of providing communities with water and adopting new tools that enable them to build climate resiliency. Although these systems are not new, they are far from the traditional way of life of some target communities, such as those in the southern portion of the country. This project also intends to involve community members in complementary actions that would enable the maintenance of the system; via the implementation of forest restoration actions and the minimization of negative anthropogenic impacts via the identification of environmentally friendly alternative livelihood actions to secure water resources. These actions can be replicated in other communities thereby promoting the protection of water resources and decreasing the stress to water resources that would be compounded by climate change. Previous water system projects have only focused on physical infrastructure. Although communities are provided with a basic need, they are unable to sustain the operation of the system due to other harmful practices. Under this project, innovation extends to the complementary natural resource management practices that the community will adopt for the protection of the ecosystem and its services – reforestation and alternative livelihood options. Community involvement for the protection of the water and forest resources will change the business- as- usual approach to water management.
Component Three functions as the knowledge capturing component of the Project, enabling the project interventions to function as a pilot for eventual scaling up in other communities with water supply challenges. The mechanisms for building institutional capacity to manage the water systems, restoration and livelihood support actions enable the EE and regulatory agencies to monitor and evaluate the dynamics of an integrated system in a rapidly changing system impacted by climatic factors. The latter enables entities to devise a proactive approach to addressing water supply issues that may arise in similar systems. By increasing the community's knowledge and understanding of climate change impacts and promoting the integrated management of the water resources through ecological protection and sustainable utilization, the chances of project success in target and other communities is increased. The Component also facilitates the long-term monitoring of these systems under controlled circumstances which enables prompt adaptation to new challenges and impacts as they arise. The EE periodically monitors systems and communities through a network of Rural Community Development Officers (RCDO) within each district. These officers will work with communities and local water boards to ensure the effective management of the water supply in the communities, among other things. Under this project that monitoring will be extended to the other proposed interventions. The Monitoring and Evaluation System in place adds value to the project's knowledge capturing elements. Peer Exchanges similarly enable the capturing and dissemination of knowledge for the adoption of interventions in other communities in the country. Overall, the actions of Component Three contribute to the evidence basis for the future scaling up of the project interventions

Roll Out Methodology

The communities' direct involvement in the design and management of the system, restoration actions and livelihood set the stage for the institutionalization of a new pathway to project design and management within the EE and target communities. In contrast to traditional practice of constructing water supply systems, the fit- for- all approach, will not be utilized to supply water to these communities. Assessment of a community's needs and the best suited technologies and practices will be devised in conjunction with the community members to foster ownership and greater appreciation for the project. The participatory governance approach is key to the innovation focus of this project; communities will be both the creators and recipients of the innovative tools and approaches. As there is the possibility of lack of support from target communities and reluctance to minimize the utilization of harmful/destructive practices, the project will seek to operate within the participatory governance approach to involve communities in all phases of the project. There have been previous challenges of miscommunication under other projects. To address this issue the proposed project will ensure the effective inclusion of community leaders and members. There will be a process of addressing project challenges and barriers, involving the input of communities. The technical expert group will likewise be consulted to obtain information on best practices and reasonable solutions for the adoption of the technologies and practices under the project to ensure that the needs of communities are met.

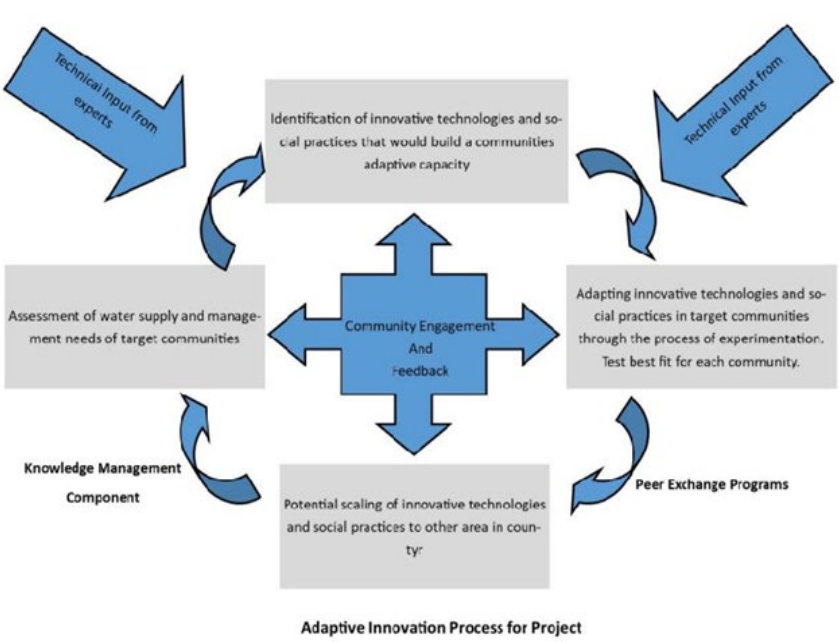


Figure 8: Adaptive innovation Process of the Project

D. Describe how the project / programme would provide economic, social, and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme would avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

Water is a key resource for the survival of communities. In rural communities with minimal financing to transform to adaptive water supply systems that can provide a sustainable source of water, new approaches are required to ensure the survival of communities. The proposed project has numerous benefits to the four target communities and the innovative approach is welcomed by community leaders as it provides a sense of security. Most of the communities are low-income with majority of the households earning less than BZD $100 per month, equivalent to USD $50. Most women in the communities are domestics and tasked with the day-to- day management of the households. Most of the population in the target communities are involved in agriculture and livestock production at a small scale. Other sources of community income range from government employment, construction, logging, arts and craft, fishing and cane farming among others (See PART I – Social and Economic Status of Target Communities and Annex 2 for further information). These low-income, small- scale jobs hinder the population in the target communities from moving above the poverty line. The economic benefits of the project are high as viable alternative livelihood options will be developed for each community, allowing members to meet household needs. Further assessment of the socio-economic characteristics of the communities will be examined during the project development phase, as disaggregated data is limited at this time.

Economic

The alternative livelihood actions within the project, provide the poor rural communities with a new source of income to reduce the instances of poverty within the community. Drawing on the unique characteristics of the community and the findings of the social assessment to be conducted, sustainable alternative livelihood activities will be proposed for each of the target communities. Within Indigenous communities, this assessment and social interaction with village leaders and members is key to the success of the intervention and the improvement of the economic status of individual households. The assessment will also take into consideration the gender differences and cultural roles of men and women within the target communities, some of which are Indigenous. Therefore, proposed activities will take into consideration and be mindful of the social and cultural practices of the communities. As many of the communities contain households that earn an average of BZD $100.00 per month, interventions to provide a stable source of income and food within the individual households is vital. Most women in communities are care providers and are traditionally tasked with domestic work. Through the alternative livelihood actions, women can participate in income earning

activities supporting the needs of their households. Activities targeted under this component will be in alignment with the cultural and traditional practices of the Indigenous community to ensure that women can actively partake in the project. The rights and cultural norms of all members will be carefully considered to ensure inclusion. The latter process might present other opportunities for the communities to devise innovative solutions to current practices that bear negative impacts on the natural environment and further benefit the communities. It may also present opportunities for new financial markets thereby enabling communities to thrive independently and survive in a changing climate. The financial challenges were further amplified during the Covid-19 pandemic, with community leaders indicating the need to provide many households with food and water provisions due to the corresponding economic crisis faced by the country. As an added benefit, actions to increase income from other sources also decrease the community's dependence on natural resources thereby adding to the protection of the natural environment.

The interventions under Component One and Three work in conjunction to decrease the financial resources required by the Government of Belize and the EE to source water in communities that have experienced water shortage issues, anticipated to be compounded by climate change. The climate adaptive water systems will decrease the annual fuel consumption cost to the GOB and Local Water Boards for the extraction of water from wells using diesel generators. The new supply and distribution system will also provide a source of income to the Boards for the maintenance of the system via the water consumption payment system to be instituted for each community. The new systems will also enable individual households to access water from a stable supply, thereby in some cases decreasing the need for water to be transported from outside villages at a higher cost as is the case for Copper Bank.

To ensure the project's success, the training and capacity building provided under Component 3 will ensure that technical barriers in managing the new water systems are addressed. The necessary vocational training will be provided to the community members tasked with the management of the systems. Additionally, formal agreements will be made with certified technicians in each district to support the work of the community members such as the pump operators. Thus, ensuring the proper maintenance of the system and extending the timeframe for it to provide water to the community.

Social

The social benefits of the project are tied to the long-term solutions the project intends to cultivate. The integration of community leaders and community members in all project actions creates a sense of ownership in the communities adding to the social advancement of the community and the effectiveness of project interventions. This is key to the success of the project and the increased social benefit to community members. The provision of a stable potable water supply to the communities enables households to carry out basic functions such as cooking and the maintenance of hygiene, thereby improving heath of communities. Currently, most women do laundry in nearby streams and creeks and carry water from the creeks, pumps or backyard water catchments to meet daily needs. This can be extremely tiring, unhygienic and detrimental to the water supply via the introduction of untreated chemicals. Current utilization of untreated water from streams and wells have resulted in the prevalence of diseases and health complications in some communities. The steady supply of water is particularly crucial to women, children, the elderly, sick and disabled that have varying water supply needs.

The alternative livelihood actions foster men and women as entrepreneurs in communities traditionally stricken by poverty; having an added benefit of food security, dependent on the solutions identified in conjunction with community members. Water and food security are key issues threatened by the changing climate; therefore, the project intends to simultaneously address both issues to enable the resiliency of the target communities and its members. Alternative livelihood activities provide a new revenue stream for the communities minimizing their social dependence on financing from unreliable sources. These actions will be selected during project implementation in conjunction with the communities and can cover a broad range of actions. As the characteristics of each community differs, the alternative livelihood actions will be dependent on the location of the community, traditional practices, materials readily available and the traditional skills of the men and women in the community. Further assessment of the alternative livelihood options will be examined during the project development phases under the Social Assessment through consultations with community members.

Restoration actions further protect the communities by minimizing erosion, thereby reducing the need to relocate in instances where homes are near eroded riverbanks. Restoration actions also enhance local biodiversity. This in turn provides communities with building materials for traditional homes and firewood as well as secure sources of game meat, harvested from the surrounding forest. The above enables the community to maintain their traditional cultural practices.

To ensure social inclusion, both men and women will be given equal opportunity to participate in all training and capacity building activities under Component 3. In Indigenous communities, with permission from the Alcalde, the project will ensure that if needed, men and women will be engaged separately, in accordance with traditional norms, to ensure that women can fully participate in the training and capacity building activities. The project will ensure that the proper protocols for engagement are adhered to. At the national level, both men and women will be provided with information from the knowledge dissemination campaigns. This project will call on those traditional norms and those men to be able to allow women to do more than just the domesticated work. For those that will not break down the

barriers, the women will be trained separately from the men and with the innovation of the projects such as this, change and development will allow those men to realize that to survive in the future progress must be free.

Social Barrier
Members of communities prefer to communicate in their native language, Mayan (Mopan and Q'eqchi) and Spanish. The EE has been working in these communities and have point persons to aid in this process. These persons, employed by the EE will continue to provide support to bridge the language barrier in the target communities. The RDOCs will also support this action as well as the CEO within the EE. Additionally, the EE will work closely with the Ministry of Human Development, Families and Indigenous Peoples' Affairs, Mayan Leaders Alliance, Belize National Indigenous Council, and Toledo Alcalde Association.

Environmental
The proposed actions under Component One and Two have direct and indirect environmental benefits. The water extraction, supply and distribution systems have an added benefit of climate change mitigation. The Project also minimizes the risk posed to ground water resources that have not been properly assessed to determine extraction and recharge rates, as well as the possibility of saline intrusion for those communities in close proximity to coastal waters. The issue of water protection, conservation and sustainable utilization is of key importance to the longevity of Belize's water resources. As is evident in coastal communities such as Copper Bank, the supply of water is threatened by SLR, natural saline intrusion as well as anthropogenic induced saline intrusion via over abstraction. Additionally, only 20% of the 85 wells in the communities supply water. The project hopes to minimize the negative impacts to underground water sources.
Component Two focuses on the protection of ecosystem services through the restoration actions and by minimizing the anthropogenic impacts to watershed systems. This component centers on the need to maintain and protect the system in order to ensure the supply of water resources for the future by employing, a holistic functionality approach. Restoration actions included here will enable the watershed to revitalize its provisional and protective ecosystem services, such as the catchment and filtration of water, the minimization of erosion, the provision of habitat, the maintenance of biodiversity for utilization by communities and flood protection, which all have social benefits to communities. The alternative livelihood actions, minimize the negative impacts caused by communities during the traditional utilization and extraction of resources as an income source. The project intends to propose socially accepted alternatives that benefit the environment, thereby ensuring the sustainable utilization of natural resources by communities. As these communities are heavily dependent on the surrounding natural resources for food, building materials and firewood for cooking, it is important that the resources be protected and used in a manner that promotes sustainability. The project can potentially enable communities to discover new methodologies for the cultivation and harvesting of crops that have been piloted in other areas of Belize or in other countries. This will enable the communities to garner a new source of income and seek new practices/methods that are intrinsically aligned to their traditional norms.

E. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme and explain how the regional approach would support cost-effectiveness.

Beyond the lifespan of the project the interventions are anticipated to continue providing benefits to target communities and create an avenue for the adoption of the technical and social paradigm shift that is needed for the effective management of Belize's water resources. The project will also improve existing operational structures of the EE to ensure sustainability and cost effectiveness. The project will also take into full consideration the multisectoral and multilevel approach necessary for the successful implementation of project actions.

Under Component One, cost effectiveness is evident in the adaptive Hybrid Power Photovoltaic Water extraction, treatment, storage and distribution systems that decrease the community's dependence on fossil fuels. These systems will also provide communities with a stable supply of water that minimizes the need for the EE to identify and construct wells for new sources of water from underground sources periodically. The design of these systems will take into consideration the low-lying characteristic of Belize as well as the natural disasters that the country experiences. In the design of the systems, prior to construction, the engineers will take into consideration building requirements to withstand a hurricane, location of systems to avoid placement in areas prone to flood, the construction requirements to avoid building facilities that are below standards and avoid the contamination of water systems (elevated housing) and the traditional practices of the community that could potentially be hindered by the location of water systems. The human and financial resources required to identify and access new water sources will be decreased, thereby enabling the EE to channel resources to other priority areas. The recent actions to source water in the traditional manner have been futile and resulted in the loss of significant financial resources. Systems such as the proposed are more sustainable for the local water boards and EE to manage as they reduce cost for maintenance, and reduce fossil fuel utilization, which is a challenge to access in remote areas. However, there are costs associated with the maintenance of the solar panel system. Solar systems will require regular maintenance to ensure they are operating safely, correctly and efficiently. Over time dust and debris can build up on the solar panels, which may compromise the performance

of the system. Hence the system requires a monthly maintenance including the batteries that require regular cleaning. One of the challenges is the scheduled maintenance that will be required by the supplier of the system with the aid of the maintenance personnel in the village. As there is limited capacity in most villages for the maintenance of the systems, training will need to be provided under the project to ensure that persons are equipped with the skills to manage and maintain the systems. This training can be guided by the Indigenous Female Solar Engineers Project. This maintenance of the entire rural water system will have a monthly cost to it and it will be covered by the water board that will be appointed to manage the day to day operation and the maintenance of the system. Revenues will be collected from residents utilizing the service. The project has taken into consideration the cost for such operation, which will be the responsibility of the EE and communities, beyond the project's lifespan. The cost of this Component is USD $3,439,375.

The cost effectiveness of Component Two is evident in the paradigm shift potential of project actions. The protection of water resources is the mandate of regulatory agencies within the Government structure, with significant human and financial resources being required to manage these resources. However, the approach proposed by the project will see the involvement of communities in the daily management and protection of water resources through actions that minimize anthropogenic impacts to the water systems. The shifting of traditional practices and increased understanding of the value of water resources and mechanisms to secure the resource for future use at the community level, will decrease the financial and human resources needed to promote sustainable water resource utilization by regulatory agencies. Actions to restore forest resources will also improve the functionality of the watershed, thereby providing the requisite ecosystem services which will secure the water resources. These actions also provide communities with additional provision and protection of ecosystem services. The minimization of anthropogenic impacts will also result in decreased stress to the water resources, natural resources and improved management championed by community members. The latter should secure the supply of water resources in the community. The cost of this Component is USD $300,000.

The integration of a new governance approach and training programs will enable the EE and Local Water Boards to manage systems and project interventions' success in the long-term. The latter contributes to the cost effectiveness of Component Three. By building formal structures and national capacity to integrate and manage the new systems and ecosystem-based actions, the proposed actions within the project will be beneficial to the country, beyond the one-off investment. Training on the day-to-day management will ensure that the systems are maintained to function at optimal capacity. The strengthening of the water boards that will be appointed to manage the operational aspect of the water system will be done using module and a more practical approach. The peer exchange programme will enable the adaptation of modified systems in other communities in Belize that are experiencing similar water availability issues to be exacerbated by climate change. Programs such as this one can be easily replicated in country. The cost of this Component is USD $376,108.

F. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist. If applicable, please refer to relevant regional plans and strategies where they exist.

The proposed project was developed for strategic alignment with national and sectoral development strategies as well as obligations under international conventions to which the country is a Party. The Project has been aligned to the **Growth and Sustainable Development Strategy** (GSDS) 2016 – 2019, which is the overarching strategy aimed to comprehensively guide national development. The project contributes to achievement of Critical Success Factor 2 and 3 of the GSDS via the development of livelihood programs, the protection of ecosystems via effective ecosystem management and building national resilience to climate change.

Actions are also linked to **Belize's National Climate Change Policy, Strategy and Action Plan (NCCPSAP)** via the actions to increase the resilience of water resources, which is a key sector of the NCCPSAP. The Nationally Determined Contribution of Belize has similarly prioritized actions to protect and manage water resources. Other national polices include the Forest Policy, National Adaptation Strategy and Action Plan for the Water Sector, and the Integrated Water Resources Management Policy which call for a holistic approach to water management via the protection of the corresponding forested areas. The project is aligned with Belize's National Gender Policy (2013) and will fully integrate and ensure that the needs of women, men and children are addressed effectively in the project.

The Project also contributes to the achievement of Sustainable Development Goals (SDGs) 5- Gender Equality, 6 - Clean Water and Sanitation, 7 – Affordable Clean Energy, 11 – Sustainable Cities and Communities, 13 – Climate Action and 15 – Life on Land. In order to transition to a climate-resilient and low-carbon development, Belize needs to structurally adopt environmentally and socially sound, cost-effective, and better-performing climate technologies on a large and widespread scale. As prioritized in its NDC, Belize aims to conduct a Technology Needs Assessment (TNA) for which it has already started the identification process of prioritized sectors in 2017. At this stage, Belize has prioritized the following sectors for a detailed assessment of specific Adaptation technology needs: Agriculture, Water, and Marine and Coastal Ecosystems; while for Mitigation the sectors included: Energy, Transport and Land Use Land-use Change and Agroforestry.

G. Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

The project will ensure compliance with relevant technical standards such as building and construction codes for the development of the water supply, storage and distribution systems. Including potable water standards being adhered to in country, which have been established by the World Health Organization (WHO) Guidelines on Drinking Water. All materials will be examined by the Belize Bureau of Standards to ensure compliance with technical standards of materials and equipment. The management of the water systems will be guided by the standards and provisions of the Operation and Maintenance Manual for Rural Water Systems that was developed by the MOHW.
The project will adhere to the Environmental and Social Policy and devise mechanisms to be in full compliance with all human rights including those of marginalized and vulnerable groups and indigenous peoples. The project will ensure that the activities contained within are properly assessed to determine the necessity for an EIA or a limited level study as per the EIA Regulations of the Subsidiary Laws of Belize (2003), which contains a list of activities for which an EIA is required. If required, all stipulated conditions will be met to ensure the Project activities are in full compliance with its requirements.

Table 2: Relevant Standards and Corresponding Project Actions

Component	Relevant National Technical Standard	Action
Component 1: Construction of Water System	World Health Organization (WHO) Guidelines on Drinking Water	Compliance with standards to ensure that water is within safe recognized standards
	Operation and Maintenance Manual for Rural Water Systems	Compliance wit protocols set out for the basic system requirements, chlorination, regular testing, flushing and scheduled maintenance of water in the system and maintenance protocols to ensure the supply of safe portable water
	Environmental Protection Act Cap 328	Determine if project activities are likely to significantly affect the environment and will result in the need for an environmental impact assessment (EIA).

H. Describe if there is duplication of project / programme with other funding sources, if any.

Actions included within the proposed project will complement the series of ongoing and planned projects in country. There are no known duplications of project actions within the target communities. Other pipeline projects funded by other entities focus solely on the electrification of villages that currently have no access to electricity.

Table 3: Represents projects that are ongoing or currently in the pipeline that are not duplicating efforts with the proposed project but complement and create Synergies.

Non-Duplication	Complementarities/Synergies
The European Union Electrification Project aims to install mini grids in 6-7 villages and provide a National Sustainable Energy Road Map for Belize.	This Project can complement this project in the providing a national framework for the supply of water services to all local communities, providing water access for those vulnerable areas.
The BSIF has three water system rehabilitation projects ongoing, each with a potential financing capacity of BZD 1.4 million with financing provided by the Caribbean Development Bank (CDB). 1. Location: within the southern community of Crique Jute in the Toledo District. The project endeavors to construct a new water extraction, treatment, transmission, and distribution system for the community.	1. The First two projects led by BSIF, will not create a duplication but can create synergies with this project. First and foremost, these activities are located and being carried out in far different locations than this proposed areas of this project. However, exchange visits can be established to see results and receive feedback/experience on the type of treatment of water these upgrades will receive. Based

2. Location: Sarawee, a community located on the outskirts of Dangriga Town in southern Belize. This project aims to upgrade the water supply system and will upgrade the transmission and distribution network of the water system as well as improve the treatment of water. 3. Location: Villages of San Jose and San Pablo in the Orange Walk District. This Project will conclude with the upgrading of the rudimentary water system serving both communities. The project will include the construction of new tanks, upgrading of equipment for the extraction of water and a pump house as well as a chlorinator to treat water prior to distribution. The upgrading of the system also expands the network and utilizes water meters as monitoring devises.	on the results, support can be shared to compliment on one of the activities this project will have which is the mitigation of water contamination.
The Indigenous Female Solar Engineers Scaling Up Solar Energy Project to Machakil Ha and Graham Creek Villages in Toledo District.	This proposed project will utilize the methodologies and gender focus used by the project to engage communities and further embrace the participatory governance approach. Similar like Machakil Ha and Graham Creek Villages, this project also ventures to work within Indigenous Communities and provide rural development benefits such as access to electricity and water. It not only compliments but synergies can be formed to with the indigenous communities via these Local Solar Engineers.
emPOWERing Rural Electrification Project (emPOWER) currently being financed by the UAE-Caribbean Renewable Energy Fund (UAE-CREF) aims to provide renewable energy solution to three villages in southern Belize. These villages, Indian Creek, Medina Bank and Golden Stream will be supplied with energy via a microgrid powered by 335kW of solar PV and battery storage.	Like the emPOWER project, this proposed project intends to allow for the adoption of innovative approaches and varied technological solutions to provide basic needs to target communities. This project will consider the design of emPOWER's microgrid for the design of the water systems being proposed. Therefore, creating synergies between projects, even though different villages are being targeted.
Adaptation Fund Enhanced Direct Access (EDA) Project, under development by the Protected Areas Conservation Trust (PACT).	This project will complement the proposed project in providing more data and knowledge to be able to understand further the protection and management of riparian forest and water resource management. It can complement on the development of the proposed project in basis of these two main components from this EDA project. Component 1: Safeguarding Forest and Water Resources through strategic protection and restoration solutions and Component 3: Creating opportunities to support alternative livelihoods. Both projects can support each other and therefore it won't be creating a duplication, especially being that they are targeting different areas as well.

I. Describe the learning and knowledge management component to capture and disseminate lessons learned.

Component 3 will enable the EE to share knowledge and disseminate lessons learnt for the scaling up and modification of similar actions in different communities. The capturing of lessons learnt will better enable the EE and communities to address the impact of climate change and water security via the utilization of innovative technologies and the construction of climate adaptive infrastructure. The multistakeholder approach to management will further improve collaborative action across departments. Agencies such as the NHS, BWS, MOHW, Forest Department, National Climate Change Office (NCCO) and Ministry of Natural Resources have operated under this approach recognizing the need for various skills and expertise to be utilized for the formulation, construction, and maintenance of water systems and for addressing the climate adaptive needs of communities. The technical committee will take note of project success and necessary adjustments required for the useful scale up of the innovation. Given the varied characteristic of each community, the committee will ensure that community dynamics are taken into consideration for the potential scale up. This project will strengthen that collaboration for a unified action and serve as the baseline for future actions. As the EE works closely with all communities across Belize, with water supply systems under their management, the EE can utilize the success of this project to garner support to advance its work with other communities that have similar characteristics to begin the process of assessing their water supply needs and potentially adopting similar innovative

practices. The peer exchanges is an excellent way to support the long-term provision of knowledge dissemination beyond the lifespan of the project across other communities in country and in neighbouring countries.
Empowering communities with knowledge of climate change impacts on water resources and adaptive methodologies better enable communities to adapt by promoting a shift in traditional utilization practices towards conservation and protection. This will be done through educational campaigns and public awareness sessions to enhance knowledge and learning of climate change. The project will also utilize multimedia platforms to increase awareness across the country and promote the innovative and sustainable technologies being utilized. As actions will target Indigenous Communities, an Indigenous Expert is key to the success of the actions. Within most communities', members prefer to converse in their language, Mayan (Mopan and Q'eqchi) and Spanish. The EE has been working in these communities and have point persons to aid in this process. These persons, employed by the EE will continue to provide support to bridge the language barrier in the target communities. The RDOCs will also support this action. Additionally, the EE will also work closely with the Ministry of Human Development, Families and Indigenous Peoples' Affairs, Mayan Leaders Alliance, Belize National Indigenous Council and Toledo Alcalde Association. Awareness raising initiatives are important to build the resilience of local communities to adapt to imminent threats and promote ownership on initiatives. These will be conducted in various languages as specified by the communities.
The digitization of the Local Water Boards will follow the process that has been piloted in other communities with Rudimentary Water Systems. The digitization of the system allows for five key information needs to be addressed: the monitoring of physical infrastructure of rural water services; provision of a direct reporting mechanism from citizens on the functionality of water systems; a mechanism to check on the performance of water boards; a mechanism to include citizens' experiences and perspectives in the management of services; and finally, a way to track progress over time at the outcome and impact levels. A database will be developed using Postgres SQL in order for it to be compatible with what is being used in other government ministries, housed within the EE. The RDOC will serve as the point source for the process along with the Local Water Boards via monthly monitoring and reporting, and necessary training will be provided. As required the water system will be provided with the facilities to facilitate the digitization including access to electricity. All necessary equipment, software and training will be provided under the project. Further information on the digitization will be examined during the project development phase.

J. Describe the consultative process, including the list of stakeholders consulted, undertaken during project / programme preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

As the project is multifaceted, its development involved the engagement of numerous entities and communities that will contribute to or will benefit from the project interventions. The EE conducted initial assessments of the target communities and engaged the community leaders on the proposed interventions from the four target communities of: Dolores, Boom Creek, Copper Bank and Otoxha. Discussion with entities that play a pivotal role such as the National Hydrological Service (NHS), Protected Areas Conservation Trust (PACT), Caribbean Community Climate Change Centre (CCCCC), Ministry of Health and Wellness (MOHW), Local Government (Community Leaders and Water Board Members) and local NGOs were consulted for input into the design of the project and its activities. Please See Annex 2 for the consultation reports with target villages (Dolores, Otoxha and Boom Creek.
A committee has been formed within the Ministry of Rural Transformation, Community Development, Labour and Local Government to guide the process of concept development. A Technical committee will be established, which will be comprised of technical experts from various sectors. The technical committee provided their knowledge from working on the ground with their stakeholders, sharing stakeholder needs, gaps and priorities and any relevant information that they possessed.
At the local level, during the project development phase and project implementation the EE will continue to work closely with integral departments, ministries, and communities to design a technically sound project. During project development phases the EE will further liaise with community leaders and conduct socials assessments to inform the gender and social considerations for the project's design. The aim of the project is to have communities involved in the decision-making process to foster ownership and to garner knowledge that enables the selection of potential alternative actions under Component 2 that are in line with the traditional norms and practices of the target communities. Hence the communities will be involved in the formulation of the innovative adaptation, functioning as both recipients of innovation and innovators. As recipients the communities will benefit from the integration of new adaptive practices that minimize their risk to climatic changes such as change in rainfall patterns that threaten water usage or instances of torrential rains that result in flooding. As innovators the community will work closely with the EE to devise these new adaptive technologies and practices that will not only provide them with a water system, but a new way of life that is compatible with their traditional practices and needs in the face of climate change. As allowed, the project will ensure that women, youth, Indigenous Peoples, the marginalized and vulnerable groups are included within the consultation process and are continuously engaged in the project's actions. The training and capacity building component of the project, Component 3, will also ensure that communities are continuously involved in the process. Under that same knowledge management component national campaigns for raising awareness will ensure that community members are provided with the requisite information that will enable them to function as the long-term benefactors and implementors of the innovative practices

K. Describe how the project/programme draws on multiple perspectives on innovation from e.g., communities that are vulnerable to climate change, research organizations, or other partners in the innovation space, in the context in which the project/programme would take place.

The proposed project's success is built on the collaborative efforts of key entities and target communities. The project's actions were identified via observation and information gathering by Rural Development Officers in the districts within the EE as well as through consultations with community leaders and members. Other government ministries such as the MOHW have also noted the need for immediate interventions in communities, to safeguard human health and wellbeing. The National Hydrological Service (NHS) has continuously highlighted the need to assess, monitor and properly utilize water resources for future access to the commodity. The project builds on those needs and collaborative actions that have been clearly signalled by parties.

The EE, MOHW and NHS have traditionally worked closely with communities across Belize to improve standards of living and access to basic needs. Through this project the relationships established will be further strengthened by further integrating communities and their climate adaptive needs into the proposed interventions. The community leaders as well as the local Water Boards will be pivotal in the action of construction and maintenance of the water systems being proposed. Similarly, community leaders and community members will work closely with the EE to devise suitable livelihood options that take into consideration the traditional and cultural practices of the communities to not infringe on their rights or threaten their way of life. The restoration actions will also seek the assistance of communities in the immediate and long-term monitoring and maintenance of the action.

Monitoring of the water system by the local water boards will require their inclusion in the design of a system and the provision of technical training for maintenance, participatory governance. The members of the Water Boards, who are also members of the communities, can provide local knowledge of potential sites for the water extraction and the design of the system to avoid negative environmental impacts or the poor design of the system. Community members will also be integral to the Ground Water Assessment and Monitoring Program, as they again, have local knowledge of all water extraction points in the village and can indicate areas where wells exist. It will also be beneficial for them to work along with the EE, via the District Coordinators, to monitor the well systems and provide timely updates that require immediate actions by the regulatory agency. Research will be done extensively by the EE, MOHW and NHS, to assess all aspects of water availability and health in the communities. Currently information obtained from the NHS and MOHW are used to guide the action of the EE. For this reason, there is the need to strengthen collaborative efforts and for national mandates to be recognized for seamless integration to build a better informed and functioning water management system which takes into consideration the ecological and human health aspects.

The strengthening of collaborative actions across all levels and the knowledge capturing aspects of the project, will prove useful to the scaling up of modified actions in other communities.

L. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Component One of the project aims to construct water extraction, treatment, supply and distribution systems in each community. The initial phase of the project will result in the assessment of water supply sources and the construction of water extraction areas, via pump house and chlorinator, as well the construction of water storage facilities that serve as a point source for the distribution of water in the community. The actions included in the project would enable communities to adapt to the impacts of climate change that have altered water resources from traditional sources such as wells and backyard catchment systems. With rainfall becoming increasingly sporadic given climate change, communities are unable to attain water through traditional methods. Water can be obtained from nearby creeks and tributaries; however, this water is not safe for human consumption and is often contaminated with faecal matter from livestock. Additionally, these communities are not in areas that can be supplied with potable water by the national supply company. Water, in most cases, have been extracted from underground aquifers via wells but are experiencing insufficient water supply to meet the very basic human right of access to water. Recent efforts to supply water to the communities from traditional sources have been futile with wells not being able to provide water to communities and new wells being unsuccessful. In the absence of funding from the AF, the communities will continue to experience water supply issues as current national budgets are severely restricted and make no provision for the installation of new adaptive water systems in country. The current national supply company focuses on larger populated areas of the country. Target communities of the innovation action are outside of the realm of the national supply company, therefore require funding from alternative sources such as the AF to meet their basic needs. The installation of new water extraction, supply and distribution systems, which extract water from nearby water sources such as rivers and tributaries provides the opportunity for communities to have restored access to water. In the absence of such interventions the vulnerable member of the communities such as the elderly and disabled are excluded from the provision of a basic need. As a climate adaptive measure, communities must also learn to source water from other sources that are readily available. The cost of activities under this component is estimated at USD $3,439,375 over the lifespan of the project.

In order to protect the water resources and ensure its availability for the long term, project actions must take into consideration the maintenance and restoration of forests that function as water catchments. The restoration of watersheds enables the viability of water resources, and thus enable communities with increased access to potable water. A recent

in-country assessment determined the need to restore degraded ecosystems, specifically functioning riparian forests, to ensure the future supply of water and resources anticipated to be severely impacted by climate change due to an increase in temperature and extended periods of drought. Without proposed interventions under this project, the destructive practices of target communities would continue to degrade the natural ecosystem leading to further negative impacts that can affect the availability of traditional resources that these communities depend on. Further removal of riparian forest could lead to the erosion of waterways and the further reduction in water quality. The proposed restoration of forest ecosystems under the project serves a dual purpose of increasing carbon sequestration, thereby mitigating climate change impacts. Alternative Livelihood actions will likewise promote the sustainable utilization of forest resources and the protection of water resources via climate-friendly practices within agriculture that contribute to water security. Changing traditional agricultural farming methods, which may be destructive and reduce forest cover, and Belize's ability to mitigate and adapt to the impacts of climate change is a key transformative action to be employed. The transformative change to varied alternative livelihoods provided communities with the skills and tools to survive and adapt. These alternatives also allow communities to identify long term solutions to provide for themselves financially. Without funding from sources such as the AF, communities such as these are often overlooked at the national level as financing is directed to the larger municipalities, where large scale communities require greater attention. National budgets are limited for actions that are not focused on country development. Therefore, financing is often unavailable at the scale needed to implement projects and activities that have an environmental focus, with water often being considered a commodity of abundance. Although this may be the case at the macro level in country, the water supply needs of remote rural communities are a daily reality affected by changes in weather and rainfall patterns because of climate change. In the absence of measures such as this, communities may be further infected by contaminated water, lose the ability to protect the waters on which they depend and/or be forced to relocate to other areas where water supply needs can be met. The cost of actions under this Component is estimated at USD $300,000.

Financing from the AF will also enable the EE to carry out extensive awareness raising and capacity building actions in these communities and at the national level. In the rural communities of Belize, climate change impacts are visible but not clearly understood. Without the proposed interventions communities may continue to misuse the water and lose their ability to meet water supply needs. It is the aim of the project to educate the communities on the impacts of climate change on water supply, forest ecosystems and demonstrate how unsustainable practices amplify the impacts. The project will also support the future scaling up of actions via the provision of skill building and training in local municipalities and regulatory agencies for the replication and scale-up of similar systems in other vulnerable communities. The cost of actions under this component is estimated at USD $376,108.

M. Describe how the sustainability of the project / programme outcomes has been taken into account when designing the project / programme.

The project and intended goals are intrinsically linked to the operational mandate of the EE. As such, it is the aims of the EE to replicate and promote the adoption of similar technologies in other communities. The introduction of new technologies/methodologies and the participatory governance approach to watershed management for the supply of potable water in rural communities will be beneficial to the country well beyond the lifespan of the project. The technologies and practices, selected during the implementation of the project, can be scaled up and modified to provide access to water in other communities that are still relying on traditional well and pump systems for the provision of water. Given the varied characteristics of each community, the project will undergo a period of assessment and selection to ensure that the appropriate technologies and practices are identified under its participatory governance process. The selection and design of appropriate technologies, materials and water extraction sources for the proposed water systems will require preliminary assessments by experts including hydrologists and engineers. Prior to the selection of an appropriate system the NHS, EE and the MOHW will conduct a joint hydrological investigation/assessment to determine water extraction points, volume and the recharge rate of water sources to be used to the determine the community and system needs. These assessments will vary by community given their location, population, water availability and atmospheric characteristics. Given the communities first-hand knowledge of water sources and unknown locations, the knowledge of community members will be integral to the selection process.

Following the construction of the systems, the EE will continuously work with the target communities to manage and maintain the water systems and monitor their success within the communities. The Local Water Boards will be tasked with the day-to-day management of the systems. As is the mandate of the EE, the EE will work with the local Water Boards via its Rural Community Development Officers (RCDO's) for the long-term maintenance of the systems. Each water system will be supplied with a trained pump operator and each district will have an on-call licensed technician. Under Component 3 the pump operators will obtain certified training for the operation of the systems. The Ministry of Health and Wellness will also support the operation of the systems through its periodic assessment of water quality. All systems will be operated in line with the Operation and Maintenance Manual for Rural Water Systems to ensure that communities are provided with safe potable water. The EE will utilize its budget allocation to assist the water boards to maintain the systems. Additionally, the payments from community members for water utilization will be reinvested back into the maintenance of the systems. The latter will be the responsibility of a Billing Clerk, who will similarly receive the necessary training under the project. Under the project an assessment will be conducted to determine water payment rates for the community. The assessment will take into consideration the communities social and financial

characteristics; therefore, rates will not be standard across target communities. Determining water rates are based on several different factors including size of community, demand for water and whether residents can pay for the service. Each of these four communities have a different population size, occupation and skill set. Water will be utilized for different reasons and as such each community will need to discuss the water rates specific to each. Therefore, the Crique Jute can be used as a baseline to indicate whether the rates would be applicable on the 4 different communities. 96 connections to their system with a flat rate of $10.00 and is payable not exceeding 1,000 gallons. Exceeding 1,001 to 3,000 gallons = 2 cents per gallon, exceeding 3,001 to 5,000 gallons = 2.5 cents per gallon. Hence, every additional gallon beyond 5,000 gallons = 0.025 cents. A Formal maintenance Memorandum of Understanding (MOU) will be established during project implementation.

The sustainability of the project depends not only on system's capacity and capabilities, or on its financial prospects, but also on the larger socioeconomic and resource environment that both supports and draws on the system, the regulatory requirements the system must meet, and the technical and financial assistance available to it.

The Project will include peer exchanges within other communities in Belize, that would enable other local municipalities to garner knowledge on the construction and operation of similar water systems in their communities. This will not only serve as a form of social inclusion to strengthen community development and empowerment, but it will also become environmentally sustainable as other communities will view the importance of water conservation and positive economic benefits of the implementation of water bulk meters. This implementation will also significantly reduce the use of open source well (ground water contamination) by constantly monitoring and measuring the flow rate of water, which will allow analysis of consumption and constant checkups of potential discrepancies. In conjunction with the EE, the country can invest in the installation of similar systems in other water deprived areas of the country. The engagement of the communities and their members in the process will also ensure the success of the project.

Restoration actions will enable the long-term protection of water resources, by maintaining the ecological functionality of the watersheds to catch, filter and store water for human utilization. This action will ensure that water resources are more readily available despite the changing climate. Restoration activities will also contribute to the maintenance of water quality. It is vital for this project to have social and economic sustainability and therefore, the alternative Livelihood activities in the project will provide members of the communities with a source of income taking into consideration their cultural and traditional practices. Following the Covid-19 pandemic, the communities in the poorest region of the country were severely impacted by the economic implications of the pandemic. Hence, this project aims to provide the communities with an alternative source of income and supply of food, that would enable them to recover from the impacts of the pandemic. By creating an alternative source of food and livelihood for the communities the actions of the project will enable communities to become independent and better provide for themselves beyond the one-off investment.

N. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

The proposed project is categorized as a Category C project given the low to minimal risk posed to the communities and natural environment in which the project interventions are proposed. During the development of the full project proposal, a comprehensive assessment of environmental, social and gender risk will be conducted, and appropriate mitigation measures will be developed to be executed during project implementation. Additionally, during the project development phases the risks will be examined thoroughly and appropriate risk mitigation measures and plan formulated.

Table43: Risk Assessment

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	X	No Risk There are no risks posed to the provisions of national and international legislation. The proposed project will ensure compliance with all relevant national legislations and international laws.

Access and Equity	X	Low Risk Potential Risk – given budget restrictions, not all households within the community may be provided with clean water voiding Principle 2 of the AF. This risk has been taken into consideration during the initial design and budgeting process. The project will not compromise the target community's access to health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights. Potential Risk – only a few members of the community will benefit from the livelihood ventures to be adopted. The project will ensure that all members of the community are engaged for the selection and implementation of all livelihood ventures to ensure equitable inclusion via a participatory process. This will be further substantiated during the assessments of the Project's Feasibility
Marginalized and Vulnerable Groups	X	Low Risk Potential Risk – the special needs of marginalized and vulnerable groups are not considered, thereby disenfranchising selected community members. Through the EE's continuous work with the target communities, the needs of marginalized and vulnerable groups have been integrated during the design and risk management solutions will be executed during the implementation of the project. The project's actions have been formulated with the above in mind, thereby minimizing unequal access to a basic need. Furthermore, the project will not impose any disproportionate adverse impacts on marginalized and vulnerable groups including children, women and girls, the elderly, indigenous people, tribal groups, displaced people, refugees, people living with disabilities, and people living with HIV/AIDS. Potential Impact to Indigenous communities are further examined under Principle 7.
Human Rights	X	No Risk The proposed project will respect and adhere to all relevant national legislation and international conventions on human rights and will not violate any pillar of human rights.
Gender Equity and Women's Empowerment	X	Low to Moderate Risk Potential Risk – women from the target communities are not engage effectively throughout the project. The project will respect the rights of women and indigenous women, thereby contributing to the gender equality and women's empowerment. The unique characteristics of Indigenous women will be taken into consideration from the project design phase. The EE will work with the village Alcaldes and Community Leaders to further engage women in the project implementation. Targeted consultation with indigenous women will be held to ensure that gender considerations for participation in the project activities are integrated. The project will promote the equal

		participation of men and women, leading to inclusive participation. All actions will respect the rights of Indigenous Women. Further assessment required during the full proposal development phase under the Gender/Social Assessment.
Core Labour Rights	X	No Risk The proposed project will adhere to core national and international labour laws and rights of all parties.
Indigenous Peoples	X	Low to Moderate Risk Potential Risk – Shift in traditional norms linked to introduction of new practices and technologies to Indigenous communities. The project will respect the right of the Indigenous communities in line with national and international legislations and convention. As many of the target communities are Indigenous, the EE has established and will continue to maintain a beneficial working relationship with the communities in Belize. These communities have been engaged by the EE resulting in the identification of potable water needs in the selected communities and an assessment of current water utilization. Through its work with these communities, the EE will ensure that the rights and cultural norms/values of the communities are respected during the design and implementation of the project. Community Leaders, Alcaldes and Community members will be continuously engaged in the design and implementation of the project. The participatory governance approach to project implementation will ensure that the communities are involved in the decision-making process and that their priorities and needs are fully considered. The project will ensure that Free, Prior and Informed Consent is obtained from the Alcalde's and members of Indigenous communities. The latter will also be aligned with the protocols established under PACT's Indigenous Peoples Policy. Furthermore, the EE and AE will utilize the existing communications protocols and structures established to consult with Indigenous communities for the design and implementation of the project. The Belize National Indigenous Council (BENIC), the Maya Leader's Alliance, Toledo Alcaldes Association, Norther Maya Association of Belize National Association of Village Councils (NAVCO) and District Association of Village Councils (DAVCO) will also be engaged throughout the process. Further engagement and a Social Assessment – Indigenous People will be carried out during the project proposal development phase.
Involuntary Resettlement	X	No Risk No project actions will involve any voluntary or involuntary resettlement of communities.
Protection of Natural Habitats	X	Low to Moderate Risk The project will respect the rights of habitats that are recognized as protected by traditional or Indigenous local communities. Through consultations critical habitats will be identified with the help of community leaders and members. The project activities have been formulated based on the ecological functionality of watersheds. Therefore, the actions for restoration and alternative livelihoods will

		be designed to avoid any negative risk to natural habitats. PACT's Policy on Natural Habitats and Biodiversity as well as national legislation for the protection of the natural environment will be adhered to. During the implementation of the proposed project, prior to the selection of water extraction point, the Department of Hydrology in conjunction with the EE and the Ministry of Health and Wellness will conduct assessments of potential water sources to determine appropriate water extraction points and determine the volume of water that can be safely extracted to meet community supply needs. The feasibility of water extraction methodologies will be examined during the project development phase and further determined during project implementation phase.
Conservation of Biological Diversity	X	Low to Moderate Risk Potential Risk – Introduction of non-native species during reforestation activities. The project will avoid the introduction of non-native and invasive species to target reforestation areas. An assessment of local biodiversity will be used to guide the selection of species for the restoration activities. PACT's Policy on Natural Habitats and Biodiversity as well as national legislation and international conventional to which Belize is a Party will be adhered to.
Climate Change	X	Low to No Risk The activities included within the project will not contribute to negative climate impacts nor will it contribute any significant emission of greenhouse gases. The proposed project activities will enhance the ability of the target communities to adapt to anticipated climate change impacts.
Pollution Prevention and Resource Efficiency	X	Low to No Risk The project will produce minimal waste via the construction of water systems. The waste produced will be disposed as mandate by the laws of Belize including those included in the Environmental Protection Act. The project will also not release pollutants. The project will also promote the utilization of a renewable source of energy, solar energy, thereby promoting energy efficiency. The latter will be done in consultation with the Energy Department.
Public Health	X	No Risk The project will pose no risk to public health in the target communities. Relevant national standards and protocols will be adhered to in an effort to avoid the distribution of water that is deemed unsafe. Communities and local Water Boards will also be sensitized on protocols included in the Operations and Maintenance Manual of Rural Water Systems developed in conjunction with the Ministry of Health and Wellness of Belize.
Physical and Cultural Heritage	X	Low to No Risk The project will pose no risk to physical and cultural heritage. Consultations will be held with community leaders and members to identify physical and cultural heritage present in the project site. The

		project will be designed to avoid any potential impacts to heritage in the area. Protocols established by the National Institute of Culture and History (NICH) will be adhered to as well as the principles of PACT's Policy on Physical and Cultural Resources.
Lands and Soil Conservation	X	Low Risk Potential Risk – Selected alternative livelihood actions can pose potential negative impacts on land and soil conservation. The project will ensure that selected alternative livelihood options selected do not result in any negative impacts to lands and soils. Any livelihood actions involving agricultural actions will be sure to adhere to the principles of sustainable agriculture with a climate change focus. The activities under component 2 for reforestation will be sure to avoid any further potential damage to the ecological functionality of the system.

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[1] *Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project / programme. Add more lines as necessary. The endorsement letters should be attached as an annex to the project/programme proposal. Please attach the endorsement letters with this template; add as many participating governments if a regional project/programme:*

6. Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Dr. Osmond Martinez Chief Executive Officer Ministry of Economic Development	Date*:*

B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development Strategy and Adaptation Plans (Plan Belize: Medium Term Development Strategy and the National Climate Change Policy, Strategy and Action Plan and Belize's Nationally Determine Contributions to the UNFCCC) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.
 *Mrs. Nayari Diaz-Perez* *Executive Director* *Protected Areas Conservation Trust*

Mrs. Nayari Diaz-Perez *Executive Director* *Protected Areas Conservation Trust* Implementing Entity Coordinator	
Date:	Tel. and email: (501) 822-3637 ed@pactbelize.org
Project Contact Person: Ms. Abihail Pech Project Development Officer	
Tel. And Email: (501) 822-3637 projdevofficer2@pactbelize.org	

ADAPTATION FUND

Letter of Endorsement by Government

[Government Letter Head]

January 12, 2023

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for “Securing Water Resources through solar energy and innovative adaptive management (SEAM)”

In my capacity as designated authority for the Adaptation Fund in Belize, I confirm that the above national project/programme proposal is in accordance with the government’s national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the country.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project/programme will be implemented and executed by Protected Areas Conservation Trust (PACT).

Sincerely,

Osmond Martinez, Ph.D.
Chief Executive Officer
Ministry of Economic Development

Annex 1

Annex 1: Alignment of Proposed Project Objectives/Outcomes with Adaptation Fund Results Framework

Project Objective(s)[3]	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
1. Improved Potable Water Supply Systems	Number of communities with functional water supply and distribution systems supplied by solar energy	**Outcome 4:** Increased adaptive capacity within relevant development sector services and infrastructure assets	4.1. Responsiveness of development sector services to evolving needs from changing and variable climate 4.2. Physical infrastructure improved to withstand climate change and variability-induced stress	**$3,439,375**

		Outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies	8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level.	
2. Community Based Watershed Protection and Management	Percentage of watershed restored in communities	**Outcome 5:** Increased ecosystem resilience in response to climate change and variability induced stress	5. Ecosystem services and natural assets maintained or improved under climate change and variability- induced stress	**$300,000**
	Number of communities with successful alternative livelihoods projects	**Outcome 6:** Diversified and strengthened livelihoods and sources	6.1 Percentage of households and communities having more	
	Percentage of communities engaged in alternative livelihoods projects	of income for vulnerable people in targeted areas	secure access to livelihood assets	
			6.2. Percentage of targeted population with sustained climate-resilient alternative livelihoods	
3. Improved Governance and Enhanced Appreciation for Water Resources	Percentage of communities with increased appreciation for climate interventions Percentage of Communities with increased knowledge of climate change impacts	**Outcome 2:** Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.1. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased	**$376,108**
		Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	
			3.2. Percentage of targeted population applying appropriate adaptation responses	
		Outcome 4: Increased adaptive capacity within	4.1. Responsiveness of development sector services to evolving needs from changing and variable climate	

		relevant development sector services and infrastructure assets	4.2. Physical infrastructure improved to withstand climate change and variability-induced stress	

[3] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
1.1 Installation of Water extraction, treatment and storage facility utilizing solar energy	Number of water systems constructed and functional	***Output 4:*** Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	**$3,435,375**
		Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	
			8.2. No. of key findings on effective, efficient adaptation practices, products and technologies generated	
1.2 Construction of distribution system	Number of distributions systems constructed	***Output 4:*** Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	
		Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	
			8.2. No. of key findings on effective, efficient adaptation practices, products and technologies generated	

2.1. Restoration of Riparian Forests	Acres of riparian forests restored	***Output 5:*** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)	**$300,000**
2.2. Develop and implement alternative livelihood programs in target communities	Number of livelihood program functional (male and female participation)	***Output 6:*** Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies	
3.1. Develop and implement a awareness raising campaign	Number of communities with enhanced awareness of climate change	***Output 3.1***: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1 No. of news outlets in the local press and media that have covered the topic	**$376,108**
3.2 Develop training program for the maintenance of solar technologies and	Number of communities trained on the utilization of solar technology systems	***Output 3.2:*** Strengthened capacity of national and subnational	3.2.1 No. of technical committees/associations formed to ensure transfer of knowledge	
scale up in other communities		stakeholders and entities to capture and disseminate knowledge and learning	3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	
3.3 Develop an integrated training programs for the management of the water systems	Number of water board members trained under the program (male and female)	**Output 2.1:** Strengthened capacity of national and sub- national centers and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	
			2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)	
3.4 Digitization of water system	Number of water system digitized to reduce wastage	***Output 4:*** Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	

3.5 Ground Water Monitoring Program	Number of ground water systems assessed for long term monitoring	***Output 3.2:*** Strengthened capacity of national and subnational stakeholders and	3.2.1 No. of technical committees/associations formed to ensure transfer of knowledge	
		Entities to capture and disseminate knowledge and learning	3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	

Annex 2: Consultation Reports

Dolores Village Field Report

On Friday, March 18, 2021, Toledo East RCDO visited Dolores Village in the Toledo District to meet with village leaders at the Cabildo (community center) to review and update key sections of the Dolores Community Profile of 2004.

Participants:

Adrian Cus - RCDO

Julian Pop – Village Council Chairman

Village Council Members

Esteban Coc – Alcalde

Maximo Pan – Deputy

Economic Activities

Occupation in Dolores Village

	Type of Occupation	Men	Women
Dolores Village	Domestic	0	All
	Agriculture/Farmer	All	0
	Seamstress	0	0
	Fishermen	0	0
	Butcher	0	0
	Hunter	All	0
	Construction (traditional homes)	All	0
	Tour guides	0	0
	Handicraft producers	0	0
	Shop keepers	6	6
	Soldiers (BDF)	3	0
	Police officers	0	0

	Primary school teachers	2	0
	Bus Drivers	2	
	Drivers (licensed)	5	0
	Professional Skills		
	Plumber	0	0
	Mechanics	0	0
	electrician	0	0

- 15 families have Cacao cultivation when they harvest the product is sold in Toledo district.
- 4 families are involved in cattle ranching.
- 2 families are involved in the cardamum production which the sell across the border in Guatemala.

Skills in Dolores Village

	Skills in the community by men and women			
	Skills	**Men**	**Women**	**Comments**
Dolores Village	Embroidery	0	0	
	Pottery	0	0	
	Basket weaving	0	15	For household and sold locally
	Hammock weaving	0	0	
	Cuxtal weaving	0	0	
	Playing guitar	4	0	Only at the churches
	Violin	0	0	
	Harp	2	0	Played during special events
	Playing marimba	5	0	Played during deer dance and special events
	Traditional healers	2	0	
	Dory making	0	0	
	Cooking	0	All women	All housewives can cook traditional food

Interviews were conducted with the Village Council and Alcaldes of the village.

CHECKLIST FOR FIELD ASSESSMENT OF GRAVITY FED WATER SYSTEM, SANITATION, MANAGEMENT & HYGIENE

Date of Visit:	March 18, 2021
Names of RCDO, Toledo East	Adrian Cus
Village Name	Dolores, Toledo District
Community Population (M,F)	Presently, the total population is 596, which 291 are males and 305 are females.
Number of households	106 households
Number of Families	139 families
Number Primary School Students	156 students
Number of Teachers	7 teachers *(Preschool to STD 6)*
Number of Secondary School Students	58 students attending Corazon Creek Technical High School.
Distance from town	This village is 50 miles away from Punta Gorda Town, Toledo District.
Surrounding Villages/Communities served by Rural Water Systems.	Otoxha is 2 miles away from Dolores but solely depend on hand pumps while Machakilha is 5 miles away also use a hand pump to get their drinking water.

Basic description of community	Majority of the homes are thatch structures, very few zinc roofs with lumber flooring. The Cabildo has zinc roof, lumber walling, and flooring. The school is concrete but have crack in the walling and roof. Three churches are concrete buildings and two are made of lumber with zinc roof. The village seems to be stable and does not have boarder issues, violence, and domestic problems nor drugs.
Water Source	
Basic history & description of the Mini Gravity Fed Water System.	This GRW system construction date is unknown however it is said to be around 2003 and funding Agency is unknown. In 2018, US Missionary funded 4 reservoirs, 10 ft. x 10 ft. x 5 ft concrete structures at the springs. From the tanks, 2" pvc pipes are connected and runs downhill and branch off to homes in the village. One is use by the school only, for drinking, washing, and flushing of toilets. During the dry season, two out of three sources (excluding the one that feeds the school) have water and maintain the water level in the tank. The second source usually run very low. Very little amount of water enters the tank. It would get full overnight however as soon as villagers collect their supply early morning, it run out of water. Not all households are connected to this system especially families living far at the end of the village. They have access to water from neighbors that are connected to the system as the service is free.
Description of well/source	Four small shallow tiny springs (open source) are the main source of water located on the hills within the village. The springs are dam and enters through a pipe into the tank. The sources usually run low/dry during the peak of the dry season.
Capacity of reservoir	Each tank holds approximately 1,000 gallons of water
Other Water Sources	Department of Rural Development in November 2014 drilled for a hand pump well and installed a hand pump located in the center of the village. This hand pump serves most of the villagers during the dry season.
How much water is consumed by the community?	The average amount of water consumed daily is unknown as the tanks are design with overflow pipes. The system is not metered.
Is the current water supply chlorinated (is it seasonal, dependent on external factors or predictable)	The water from the system is not chlorinated, people boil their water mostly in the morning to make their tea.
Condition of water source	Villagers fence spring surrounding with sticks to keep roaming pigs from contaminating the water source.
Condition of water pipes	Pipes are old and have not been replace since. Some ¾ inch pvc connections are fasten with rubber and some extend pipelines with thin PVC pipes.
Management	No board exists. Villagers agreed to maintain/repair their pipes individually.
Sanitation & Waste Disposal	
Types of toilet facilities in community	1 outdoor pit latrine exist, villagers use the bushes.

Does the current defecation practice threaten to contaminate water supplies?	Yes, there are breakages on the main lines of the water system, community members spraying chemicals in the surrounding areas and the roaming of pigs which can cause contamination of the water supply for the village.
How do people dispose of their solid waste?	Every family is responsible for their garbage. Most would burn, bury, or dump it in their backyard or in the nearby bushes.
How do people dispose of their wastewater?	Flows out in drains in their backyard where pigs dug their ponds.
Is the water source contaminated or at risk of contamination (microbiological, chemical, or radiological)?	Yes, the water supply is exposed to contamination due to breakages of main and herbicides near the water supply lines. There are some community members that also have hand dug wells which can be contaminated due to flooding, spraying and pit latrines seepages.
Water test results from the Min of Health.	Only the hand pump water tested quarterly but there are no recent reports of contamination.
Is there a drainage problem (e.g. flooding of dwellings or toilets, vector breeding sites, polluted water contaminating living areas or water supplies)?	There is no drainage problem in the village. The springs on the hills are highly possible to be contaminated during rainy season as water flows from all over from the hilltop entering the sources. Two sources are located alongside the creek so those are at risk as well.
Use of Water	
Uses of the GFS water:	Cooking, drinking, bathing, laundry, animals.
No & % of community households connected to the GFS	79 or 75% of the total households are connected to the GF system.
No of potential households for connection to the RWS	30 households that do not have access to water pipes can directly benefit from an improved water system.
How reliable is the GFS (how many hours per day do they have water?	Approximately 12 hours daily during rainy season and 4 to 5 hours during dry season. During dry season, the springs water level draws down to six inches deep.
Who has and doesn't have access to water (e.g. schools, expanded areas of community)	Expanded areas around the village or the ones that settle far outside the village.
Are there alternative sources of water nearby?	Hand pump well located in the center of the village can be a possible source. Based of observation when water was found, the well yield is approximately 60 GPM.
Is rainwater harvesting practiced? If yes, how?	No, people depend on the GFS services.
Is there any discussion in village meetings to improve the system?	Yes, in recent discussion villagers ask village council to seek funding to improve the existing sources or apply for Rudimentary Water System for the village.
Governance & Management	
Is there a Village Water Board for the village?	There is no appointed water board, the people take responsibility to maintain their standpipe.
If a water board is established in this village, will they have the capacity to manage a RWS	Yes, there young high school graduates that can assist with management of the system.
What agencies work in the community on water related issues?	Rural Development, Public Health and Missionaries.
Hygiene Promotion	
Do people have access to water and soap for washing hands after defecation	Yes, it has become a practice during this present pandemic (COVID-19)
What needs to be improved?	Water sources, reservoirs, expansion to areas that do not have water, upgrading of transmission and distribution lines (increase pipe sizes),

	installation of cut off valves, standpipes, water meters and establishment of a water board.
Overall Risk Profile	
What are major risks to the Gravity Fed Water Supply in the village?	Major risks are the contamination of the water supply sources and breakages of distribution mains. Villagers do not use toilets. When it rains, water comes from all over the place which enters the springs. Human waste washed by rainwater from the bushes and settles in the low line areas/drains. If there are leaks, it can seep into broken lines. Land clearing around the sources can cause it dry out completely. Also, too much water wastage can cause the springs to dry out. Approximately 60% of the villagers practice water conservation. The is no proper management of the system. Presently, the system pipelines and standpipes are in poor condition.
Overall Water Contamination Mitigation	
How will these water contamination challenges be addressed?	This Rural water system's source will be that of a well where the well in time of contamination will be airlifted and super chlorinated and it will also be shocked treated to alleviate this challenge. Tests (bacteriological and chemical) are carried out by the Public Health Inspector to ensure that the source will be safe for use.

Otoxha Field Report

Village Name	Otoxha, Toledo District
Community Population (M,F)	Total population is 395, which 189 are males and 206 are females.
Number of households	79 HHs
Number of Families	80 families
Ethnicity	Maya, Mopan and Q'eqchi
Number of Primary School Students	69 students attending Otoxha Government School.
Number of Teachers	
Number of Secondary School Students	22 students attending the Corazon High School
Number of students enrolled at Tertiary level institution	1 student
Distance from town	This village is 33.3miles/58.4km away from Punta Gorda Town.
Surrounding Villages/Communities served by Rural Water Systems.	Otoxha Village is neighbor to Corazon Creek which has an existing RWS Also Border with Dolores Village.
Basic description of community	Mountainous area with a center road of 2 km stretch where homes are built along the roadside, however some households are off away from the roadside. Most of their homes are thatch but nonetheless some houses are concrete with zinc roofing. The school is a concrete building. 1 board/zinc community center Concrete churches building, shops and corm mills It's a community of friendly Maya's ethnicity who are mostly dependent on farming.
Means of Transportation	1 bus, motorcycles and 1 vehicle.
Water Source	
Water Supply/source.	There are 7 HPs, 1 production well.

Description of well/source	HPs are calvinized tubing; some are not operational. Some does have a strong scent of iron and the water is mercury look. Villagers will use a clothe to filter it. This is the main source of safe drinking water for the villagers. In addition, water is also used for cooking, and washing at their homes. A production well was drilled 2022 by RWSSU and have been tested for water supply. Water was also tested by the water analyst.
Other Water Sources	1 creek and 1 river. Creek water turns brown during the dry season, the river water however does not, but the roaming of animal does influence the water quality. During the rainy season, many different small particles are transported by the water into the river due to weathering.
Is the current water chlorinated (is it seasonal, dependent on external factors or predictable)	The water from the hand pumps is not chlorinated; people boil their water mostly.
Uses of Water	
Uses of the water:	Cooking, drinking, bathing, laundry, and farming.
Is there any discussion in village meetings to request for a rudimentary water system?	Yes, the village chairperson sent a letter to our office on behalf of the village for the need of a RWS and electricity in the village.
Number of potential households that can be connected to a water system.	79 HHs, a primary school and churches cornmills and shops.
Governance & Management	
Do you think villagers can accept appointment of a Water Board for the village?	Yes, they are in support for the maintenance and daily operation of a RWS, but they ask to be trained prior.
If a water board is established in this village, will they have the capacity to manage a RWS	Yes, there are responsible individuals who does seek for the development of the village.
What agencies work in the community on water related issues?	Rural Development, Public Health and Christian Institute
Sanitation & Waste Disposal	
Types of toilet facilities in community	outdoor pit latrines
Do the current facilities threaten to contaminate water supplies?	No, although the area has low points, the production well was drilled at an area were flooding will not be a threat.
How do people dispose of their solid waste?	Every family is responsible for their garbage. However, majority of the waste is burn or bury.
How do people dispose of their wastewater?	Flows out in drains in their backyard.
Water test results from the Min of Health.	Only the hand pump water tested quarterly but there are no recent reports of contamination.
Is there a drainage problem (e.g., flooding of dwellings or toilets, vector breeding sites, polluted water contaminating living areas)?	There is drainage problem in the village. All waters from the village make their way into the creek or river which is the lower areas.
Village Priority Needs	Water and electricity, Better Road, Upgrade Health Post.
Overall risk	
What are major risks to the Water Source in the village?	Contamination of the open water sources. When it rains, water comes from all over the place which flows into the creek and river. Human waste from overflowing pit latrines can settles in the low line areas/drains. Creeks are not safe as well.
Overall Water Contamination Mitigation	
How will these water contamination challenges be addressed?	Because of its proximity to an open water source, it will require a Reverse Osmosis plant which includes a water treatment component since the

	product of an RO plant is purified water. However, a chlorinating machine will suffice with a production well outside the village. During the rare event that a flood occurs and if the water source is contaminated the Department of Rural Development would airlift and super chlorinate the water source. Tests (bacteriological and chemical) are carried out by the Public Health Inspector to ensure that the source is safe to be used.

Otoxha labour compilation of male and female

Type of Occupation	Men	Women
Domestic	0	All
Agriculture/Farmer	All	0
Seamstress	0	5
Fishermen	0	0
Butcher	0	0
Hunter	All	0
Construction (traditional homes)	All	0
Tour guides	0	0
Handicraft producers	0	30
Shop keepers	4	4
Soldiers (BDF)	2	0
Police officers	0	0
Primary school teachers	3 (1 retired)	0
Drivers (licensed)	2	0
Professional Skills		
Plumber	0	0
Mechanics	0	0
electrician	0	0

Skills in the community by men and women			
Skills	**Men**	**Women**	**Comments**
Embroidery	0	25	Is not practiced regularly since no market exist
Pottery	0	8	For household use only
Basket weaving	3	10	For household use only
Hammock weaving	3	0	For household use only
Cuxtal weaving	0	30	Home use and sold locally
Playing guitar	8	0	Only at the churches
Violin	3	0	Played during special events
Harp	3	0	Played during special events
Playing marimba	5	0	Played during deer dance and special events
Traditional healers	5	0	Whenever they are called
Dory making	5	0	Not on a regular basis
Cooking	0	All women	All housewives can cook traditional food

Boom Creek Field Report

Interviews were conducted with the Village Council and elders of the village. **CHECKLIST FOR FIELD ASSESSMENT OF THE VILLAGE NEEDS.**	
Date of Visit:	July 06, 2021
Names of RCDO and RWEC	Adrian Cus and Manuel Hernandez
Village Name	Boom Creek, Toledo District
Community Population (M,F)	Total population is 112, which 52 are males and 60 are females.
Number of households	25 HHs and 5 houses under construction and 1 not occupied as the owner lives in town.
Number of Families	11 families, Sanchez family is the largest.
Ethnicity	16 Mestizo, 8 Maya, 1 Mennonite
Number of Primary School Students	28 students attending Living Word Government School. Was once a private school managed by church missionary. 12-M and 16-F. No preschoolers.
Number of Teachers	2 teachers
Number of Secondary School Students	5 students attending Toledo Community College in Punta Gorda Town.
Number of students enrolled at Tertiary level institution	5 are enrolled at University of Belize.
Distance from town	This village is 5.6 miles/9km away from Punta Gorda Town.
Surrounding Villages/Communities served by Rural Water Systems.	Boom Creek is an isolated village southwest of Punta Gorda town. No neighboring villages.
Basic description of community	Low line area, 2 km stretch where homes are built along the roadside, except two families live about 600 ft away from the roadside. Distance from their border to the end of the road is 3.5 km. there are 5 concrete buildings, 11 board/zinc roof and others are thatch, 1 concrete school building, 1 elevated board/zinc church building, 2 shops and 1 corm mill.
Means of Transportation	12 Private Vehicles, 21 motorcycles and 6 boats.
Water Source	
Water Supply/source.	There are 2 HPs, 1 production well.
Description of well/source	HPs are upgraded to Indian Mark III; Production well bore done 2011 by RWSSU but water is not recommended for drinking (Brackish). Two families living near the production installed solar pump in well which pumps water to their homes for washing and bathing.
Other Water Sources	Few hand dug wells, 1 creek and 1 river.
Is the current water chlorinated (is it seasonal, dependent on external factors or predictable)	The water from the well and hand pumps are not chlorinated; people boil their water mostly in the morning to make their tea.
Uses of Water	
Uses of the water:	Cooking, drinking, bathing, laundry, animals.
Is there any discussion in village meetings to request for a rudimentary water system?	Yes, in recent discussion villagers ask village council to seek assistance and apply for Rudimentary Water System.
Number of potential households that can be connected to a water system.	25 HHs, school and church, cornmill and shops.
Governance & Management	
Do you think villagers can accept appointment of a Water Board for the village?	Yes, they can accept as long as they are consulted.

If a water board is established in this village, will they have the capacity to manage a RWS	Yes, there are responsible people I the village who are serious in developing the village especially young high school graduates that can assist with management of the system.
What agencies work in the community on water related issues?	Rural Development, Public Health and HOPE SPRINGS WATER.
Sanitation & Waste Disposal	
Types of toilet facilities in community	3 flush toilets and others are outdoor pit latrines.
Do the current facilities threaten to contaminate water supplies?	Yes, the area is lowline and prone to flooding especially for hand dug wells.
How do people dispose of their solid waste?	Every family is responsible for their garbage. Most would burn, bury, or dump it in their backyard or in the nearby bushes.
How do people dispose of their wastewater?	Flows out in drains in their backyard.
Water test results from the Min of Health.	Only the hand pump water tested quarterly but there are no recent reports of contamination.
Is there a drainage problem (e.g. flooding of dwellings or toilets, vector breeding sites, polluted water contaminating living areas)?	There is drainage problem in the village. Swamp water raise during rainy season and are breathing grounds for mosquitoes. Pit latrine can also overflow.
Village Priority Needs	Water, Light, Community Center/Hurricane Shelter, Better Road, Health Post.
Overall risk	
What are major risks to the Water Source in the village?	Major risks are contamination of the open water sources, (hand dug wells). When it rains, water comes from all over the place which enters the wells. Human waste from overflowing pit latrines can settles in the low line areas/drains which can seep into hand pump wells. Creeks are not safe as well.
Overall Water Contamination Mitigation	
How will these water contamination challenges be addressed?	Because of its proximity to an open water source, it will require a Reverse Osmosis plant which includes a water treatment component since the product of an RO plant is purified water. However, a chlorinating machine will suffice with a production well outside the village. During the rare event that a flood occurs and if the water source is contaminated the Department of Rural Development would airlift and super chlorinate the water source. Tests (bacteriological and chemical) are carried out by the Public Health Inspector to ensure that the source is safe to be used.

Boom Creek Labour Compilation

Occupation

	Type of Occupation	Men	Women
Boom Creek Village	Domestic	5% of population	95% of population
	Agriculture/Farmer	All	0
	Seamstress	0	0
	Fishermen	3	1
	Butcher	0	0
	Hunter	3	0
	Construction (traditional homes)	All	0
	Tour guides	0	0
	Handicraft producers	0	0
	Shop keepers	0	2
	Soldiers (BDF)	0	0

	Police officers	1	0
	Primary school teachers	1	1
	Drivers (licensed)	45% of population	30% of population
	Professional Skills		
	Plumber	2	0
	Mechanics	3	0
	electrician	0	0

Skills in Community

	Skills in the community by men and women			
	Skills	**Men**	**Women**	**Comments**
Boom Creek Village	Embroidery	0	5	Is not practiced regularly since no market exist
	Pottery	1	0	For household use only
	Basket weaving	0	0	For household use only
	Hammock weaving	0	0	For household use only
	Cuxtal weaving	0	0	Home use and sold locally
	Playing guitar	2	1	Only at the churches
	Violin	1	0	Played during special events
	Harp	0	0	Played during special events
	Playing marimba	0	0	Played during deer dance and special events
	Traditional healers	0	3	Whenever they are called
	Dory making	2	0	Not on a regular basis
	Cooking	Some	All women	All housewives can cook traditional food

Copper Bank Field Report

CHECKLIST FOR FIELD ASSESSMENT OF GRAVITY FED WATER SYSTEM, SANITATION, MANAGEMENT & HYGIENE	
Village Name	Copper Bank, Corozal District
Community Population (M/ F)	Presently, the total population is approx. 600, of which 250 are males and 350 are females.
Number of households	150 households
Number of Families	80 families
Number of Primary School Students (M/F)	86 students, of which 36 are males and 50 females.
Number of Teachers	5 teachers *(Preschool to STD 6)*
Number of Secondary Schools Students	25 students, of which 18 are females and 7 are males attending either St. Viator Vocational Highschool, Escuela Secundaria Tecnica Mexico, Corozal Community College, or Belize Adventist College.
Distance from town	This village is 15 miles away from Corozal Town, Corozal District.
Rural Water Systems serve surrounding Villages/Communities.	Copper Bank is 3 miles away from Chunox, which has a brackish rudimentary water system pending rehabilitation, and 6 miles from Progresso, which has an operating rudimentary water system.
Basic description of community	Most of the homes in the village of Copper Bank are concrete houses (60%), mixed structures (39%), and wood

	houses (1%). Although not recognized by the community as a problem, there are several exposed wells at the level of the ground, even in yards with young children. Animals and especially children, are exposed to the risk of falling into these wells resulting in injury or death. Wastewater or surface runoff from the rain flow into these wells may carry germs and other contamination into the water sources. Some latrines and family garbage dumps are located too close to the wells (within 30 meters).
Water Source	
Basic history & description of water supply.	The main source of the village's drinking water is rainwater collection.
Description of well/source	Households harvest rainwater for drinking and well water for other uses. In January 2017, The Ministry of Health reported 85 water wells. Using water pumps, some households pipe well water into their homes for flush toilets, laundry, and other household use. Even though most households have one or two wells within their yards, during the dry season or when water is not found during excavation, households depend on community water pumps located up half a mile from their homes or would share the only water source (well) with family members. Most households harvest rainwater, with approximately 60% pumping rain or well water into their homes for household use. Note that of the 85 wells, only 20% have water availability. Pumps can be purchased between BZ$200.00 to $2,000, depending on the power source, lifespan, capacity, and affordability. The well water is not chlorinated. The Ministry of Health has been distributing chlorine tablets to households, especially during gastroenteritis outbreaks (diarrhea and vomiting) and Hepatitis A
Capacity of reservoir	Not Available.
Other Water Sources	Copper Bank has 3 hand pumps connected to 3 community water wells. Only 1 pump is functional currently.
How much water is consumed by the community?	The average amount of water consumed daily is unknown as each household member consumes or extracts from their rainwater collection or shallow surface water wells.
Is the current water supply chlorinated (is it seasonal, dependent on external factors, or predictable)	The residents of Copper Bank Village resort to boiling their rainwater to consume it. The surface water wells are not chlorinated but are used for bathing, washing, and other external uses. It is important to note that of 85 well, a high percentage of more than 80 % do not have water, or during the months of Jan – May, the wells dry.
Condition of water source	The surface water wells range from 4 to 15 feet deep, depending on the distance from the lagoon.

Condition of water pipes	Not Available.
Management	There is no rural water system; by extension, no water board exists.
Sanitation & Waste Disposal	
Types of toilet facilities in the community	130 homes have ventilated improved pit latrines with raw sewage directly into the ground. When the pit becomes full, it is covered, and a new pit is dug. 20 homes have flush toilets with a septic tank system.
Does the current defecation practice threaten to contaminate water supplies?	Yes, dumping fecal waste into these latrines' pits threatens the surface water wells used daily.
How do people dispose of their solid waste?	Every family is responsible for their garbage. Most would burn or dump at the designated Copper Bank Village dump site.
How do people dispose of their wastewater?	Flows out in drains in their backyard or old wells, not in use.
Is the water source contaminated or at risk of contamination (microbiological, chemical, or radiological)?	Since most community members have and use hand-dug wells, they are susceptible to contamination due to flooding, spraying, and pit latrines seepages.
Water test results from the Ministry of Health.	None that we have been informed of recently except when there was an outbreak of diarrhea, vomiting and Hepatitis A in 2017.
Is there a drainage problem (e.g., flooding of dwellings or toilets, vector breeding sites, polluted water contaminating living areas or water supplies)?	Presently, there is no drainage problem in the village.
Use of Water	
Uses of the hand-dug well water:	Cooking, bathing, laundry, and animals.
No & % of community households using hand-dug well water.	99%.
No of potential households for connection to the RWS	150 households that do not have access to water pipes can directly benefit from an improved water system.
Are there alternative sources of water nearby?	None.
Is rainwater harvesting practiced? If yes, how?	Yes, water is stored in rotoplas tanks.
Is there any discussion in village meetings to improve the system?	There have been past and recent discussions among villagers asking the village council to seek funding to apply for Rudimentary Water System.
Governance & Management	
Is there a Village Water Board for the village?	No.
If a water board is established in this village, will they have the capacity to manage an RWS?	Yes, as all WB's are governed under the Village Councils and Water Board Act which outlines the roles and responsibilities of the Board.
What agencies work in the community on water-related issues?	The Audubon Society donated a rainwater filtration system to the primary school. The water is chlorinated and used for drinking purposes only for the students. The school requires a

	fee of $10 per year from each student to maintain this filtration system.
Hygiene Promotion	
Do people have access to water and soap for washing hands after defecation	Yes, it has become a practice during this present pandemic (COVID-19)
What needs to be improved?	Water sources.
Overall Risk Profile	
What are the village's major risks to the hand-dug well Water Supply?	Major risks are the contamination of the water supply sources.
Overall Water Contamination Mitigation	
How will these water contamination challenges be addressed?	Because of its proximity to an open water source, it will require a Reverse Osmosis plant which includes a water treatment component since the product of an RO plant is purified water. However, a chlorinating machine will suffice with a production well outside the village. During the rare event that a flood occurs and if the water source is contaminated the Department of Rural Development would airlift and super chlorinate the water source. Tests (bacteriological and chemical) are carried out by the Public Health Inspector to ensure that the source is safe to be used.

Copper Bank labor compilation of male and female.

Type of Occupation	Men	Women
Domestic	20	315
Agriculture/Farmer	80	0
Seamstress	0	2
Fishermen	200	0
Hunter	3	0
Construction	5	0
Tour guides	2	1
Shop keepers	1	7
Police officers	1	0
Primary school teachers	1	4
Drivers (licensed)	150	35
Professional Skills		

Plumber	3	0
Mechanics	2	0
electrician	4	0

Skills in the Copper Bank Community

Skills in the community by men and women			
Skills	**Men**	**Women**	**Comments**
Embroidery	0	6	It is not practiced regularly since no market exists.
Palm weaving for roofs	3	0	For household use only occasionally for hire.
Cast Net weaving	2	0	Sardine fishing or selling cast nets.
Playing guitar	3	0	Only at the churches
Traditional healers	1	2	Whenever they are called
Dory making	3	0	Only sometimes, for personal use, or when hired to build one.
Cooking	25	315	All housewives can cook traditional food, and some men cook especially for BBQ sales.

Annex 3: Initial Gender Assessment

Population Breakdown by community

Community	Households	Population	Male	Female
Boom Creek[2]	25	112	52	60
Otoxha	54	302	145	157
Dolores	106	596	291	305

[2] Some of the statistics presented may be outdated and are estimates based on the last Census and rapid assessments

Copper Bank	150	550	250	300

The EE is currently in the process of completing community profiles for each community in the country. In the absence of the updated National Census data, the community provides were utilized for the initial gender assessment. Assessments were completed for Copper Bank and Otoxha during the 2020-2021. Data included within for Boom Creek and Dolores villages are outdated and will be updated during the project development phase.

Educational Demographics

	School Enrollment			
Otoxha Village	Classes	Males	Females	Total enrollment
	Primary School	36	33	69
	Secondary	9	13	22
	Tertiary	1	0	1
Copper Bank	Classes	Males	Females	Total enrollment
	Pre-School	5	8	13
	Primary School	48	44	92
	Secondary	20	34	54
Boom Creek	Classes	Males	Females	Total enrollment
	Pre-School			2
	Primary School	10	20	30
	Secondary	1	7	8
Dolores	Classes	Males	Females	Total enrollment
	Pre-School			0
	Primary School	92	100	192
	Secondary	10	10	20

Occupation

	Type of Occupation	**Men**	**Women**
Otoxha Village	Domestic	0	All
	Agriculture/Farmer	All	0
	Seamstress	0	5
	Fishermen	0	0
	Butcher	0	0
	Hunter	All	0
	Construction (traditional homes)	All	0
	Tour guides	0	0
	Handicraft producers	0	30
	Shop keepers	4	4
	Soldiers (BDF)	2	0
	Police officers	0	0
	Primary school teachers	3 (1 retired)	0
	Drivers (licensed)	2	0
	Professional Skills		
	Plumber	0	0
	Mechanics	0	0
	electrician	0	0

Copper Bank

Village leaders reported fishing as the number one source of income (80%). The other sources of income were: 18% cane farming and construction 2%.

Boom Creek

Agriculture and livestock remained the number one source of income where 46.2% of the villagers indicated that it was their main source of income. Other sources of income high on the list were: construction 15.4%, logging 15.4%, and fishing, hunting, Social Security payments each 7.7%.

Dolores

Agriculture and Livestock was the number one source of income (95%).

Skills in Community

	Skills in the community by men and women			
	Skills	**Men**	**Women**	**Comments**
Otoxha Village	Embroidery	0	25	Is not practiced regularly since no market exist
	Pottery	0	8	For household use only
	Basket weaving	3	10	For household use only
	Hammock weaving	3	0	For household use only
	Cuxtal weaving	0	30	Home use and sold locally
	Playing guitar	8	0	Only at the churches
	Violin	3	0	Played during special events
	Harp	3	0	Played during special events
	Playing marimba	5	0	Played during deer dance and special events
	Traditional healers	5	0	Whenever they are called
	Dory making	5	0	Not on a regular basis
	Cooking	0	All women	All housewives can cook traditional food

Age Groups

The age data was disaggregated into categories as shown below in Table B:

Age range/group	Category Title
0-4	Infants
5-9	Toddlers
10-14	Pre-teens
15-19	Teens
20-24	Youth
25-49	Young Adults
50-64	Adults
65 +	Seniors

Copper Bank

The population structure for 550 residents based on the above five quinquennial and 2 other classes is as follows: 11.6% youths, 16.3% young adults, 8.1% preteens, 18.6% teens, 20.9% infants, 18.6% adults and 5.9% seniors.

Boom Creek

As per Table B (Appendix II), the population structure based on the above five quinquennial and 2 other classes is as follows: young adults 28.5%, pre-teens 28.6%, infants 28.6% and toddlers 14.3%.

Dolores

As per Table B, the population structure for 124 residents based on the above five quinquennial and 2 other classes is as follows: largest concentration of young adults (25.8%), 23.4% toddlers, 19.4% pre-teens, 15.3% infants, 7.3% teens, 2.4% adults and .8% seniors. This represents a very young population.

Consultation Session – Presentation of Draft Concept Note

July 9th 2021 - Zoom

Attendees:

Christian Loza

Ismer Ortega

Adrian Cus

Elsa Cardinez

Valentino Shal

Joyce Tun

Denaie Swasey

Ary Sosa (MOHW)

Tennielle Hendy (NHS)

Meeting Outcomes:

- Presentation of the Concept Note by the EE
- Discussion of water challenge in communities including those that relate to human health and the outbreak of diseases
    - In order to address human health, periodic testing of water sources must be performed.
- Discussion of current water supply sources in target communities. Some communities such as Cooper Bank are currently purchasing water from other communities at a high cost to meet needs
- Members highlighted the importance of treating water and the necessary campaigns that should be held to garner community support. The inaction of the Operation and Maintenance Manual for Rural Water Systems being key to the project.
- Water governance is a key aspect of the project that needs to be highlighted.
    - Water Board and personnel need to be trained
    - Operations Manual implemented
    - Digitization of the system to minimize wastage and promote sustainable water

      usage. The latter contributes to efficiency of water use for adaptation.
- The need for a national program to monitor and assess ground water levels in country as wells are collapsing at a high rate. The National Hydrological Service can assist in this venture.
- Importance of developing and implementing a water safety plan for Belize

All members are willing to partake in the implementation of the project and support the actions of the EE. Further consultations will be held during project development phase.