



## CONCEPT NOTE FOR REGIONAL PROJECT/PROGRAMME

### PART I: PROJECT/PROGRAMME INFORMATION

<b>Title of Project/Programme:</b>	Climate Resilient Agriculture Programme: Strengthening Adaptation and Productivity for Sustainable Growth
<b>Countries:</b>	Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and the Grenadines
<b>Thematic Focal Area<sup>1</sup>:</b>	Food security
<b>Type of Implementing Entity:</b>	Regional Implementing Entity
<b>Implementing Entity:</b>	Caribbean Development Bank (CDB)
<b>Executing Entities:</b>	Food and Agriculture Organization of the United Nations (FAO) – Sub-regional Office for the Organisation of Eastern Caribbean States, in collaboration with Ministries of Agriculture in Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and the Grenadines (National)
<b>Amount of Financing Requested:</b>	USD13,999,520
<b>Project Formulation Grant Request:</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<b>Amount of Requested financing for PFG:</b>	USD100,000
<b>Letters of Endorsement (LOE) signed for all countries:</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

*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 proposal has been submitted before including at a different stage (pre-concept, concept)
- This is the first submission ever of the proposal at any stage

In case of a resubmission, please indicate the last submission date: 12/7/2023

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<sup>1</sup> Thematic areas are: Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.

**Please note that the Concept note proposal document should not exceed 50 pages, including annexes.**

## **PROJECT / PROGRAMME BACKGROUND AND CONTEXT:**

1.1 The Caribbean is on the forefront of the battle against climate change and variability, experiencing the full force of its impacts. Extreme weather events, droughts, floods, rising sea surface temperature, ocean acidification, and sea level rise are just a few examples of the deleterious effects already being felt. Despite the collective efforts of the Region, it is unlikely that the current trajectory of climate change will be significantly altered through the implementation of mitigation measures. Consequently, the Region must focus on adaptation and resilience.

1.2 The impact of climate change on the Caribbean is a complex and multi-dimensional challenge that encompasses economic, social, and environmental factors. The increasing frequency and intensity of climate-related hazards across the region have led to prolonged recovery periods, as evidenced by the experiences of Dominica and Antigua and Barbuda in 2017 after Hurricanes Maria and Irma. Given these circumstances, enhancing multi-sectoral climate change adaptation and resilience becomes paramount.

1.3 Agriculture sector output is directly dependent on climate conditions hence the vulnerability of this sector to climate change is of particular concern. Climate change exerts mounting pressure on the Caribbean's food production capacity, undermining the region's food and nutrition security. A study on the Status of Disaster Risk Management for Floods, Hurricanes and Drought in the Agriculture Sector in the Caribbean notes that the regional agriculture sector continues to be severely impacted by the frequent occurrences of natural disasters, which are projected to increase in frequency and magnitude under climate change. In light of this, the Caribbean Development Bank (CDB) is seeking funding to enhance climate resilience within the agriculture sector of three islands: Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and the Grenadines. This regional initiative will prioritize specific sites identified as highly vulnerable to the adverse impacts of climate change."

## **STATUS OF THE AGRICULTURE SECTOR**

### ***Antigua and Barbuda***

1.4 Unlike the other income generating sectors of its economy, agriculture has been affected by a steady decline in terms of its contribution to GDP. As at 2019 the sector contributed approximately 2% of the national GDP with much of the overall contribution owing to the fisheries sub-sector, which also makes a substantial contribution to the sector's export earnings. It was noted that the agricultural sector remains largely underdeveloped accompanied by low capital inputs with minimal attention being placed on sustainable agricultural practices.

1.5 The Food and Agricultural Organisation (FAO) of the United Nations estimated an area of 9000 ha for agricultural production in 2019 - constituting an estimated 20.5% of the island's total land area. Contribution of domestic agriculture inclusive of fisheries towards the nation's GDP has fluctuated, albeit trending upwards. The contribution of the agriculture sector, in real terms, towards GDP increased from a low of 1.47% in 2001 to a high of 2.29% in 2011. This reflected overall increases in sub-sectors; crops (21.4%), livestock (18.8%) and fisheries (118.5%). It is also estimated that agriculture provides a source of livelihood, employment and home-based income for an estimated 10,700 persons, inclusive, of 3,500 crop and livestock farmers. The Food Security policy accredits this growth within that time period to the strategic approach by the Government of Antigua and Barbuda to boost the contribution of the

agricultural sector towards economic development via focusing on selected priority commodities, policies and programmes aimed at improving output and productivity.

1.6 While agriculture no longer contributes significantly to the country's GDP due to the decline in large scale sugar production, molasses and rum, some agriculture production (vegetables, food crops, vine fruits, tree fruits and livestock production) still occurs. However, the sector is constrained due to inadequate water availability, particularly during severe droughts. With an increase in consumption patterns and food demands due to population growth, future water demands will also increase. The continued development of training programmes in improved farming practices to include water conservation measures and provide incentives to farmers who incorporate these practices on their farms was identified as a short-term adaptation need for the water sector. Also, in the lower watershed areas, food crop and livestock production are carried out, often in close proximity to surface reservoirs or groundwater supplies. Concerns have been raised about the possibility of pesticide contamination of water supplies or leaching out into the coastal zone in times of heavy runoff. Additionally, wells become unusable during the dry season because of saltwater intrusion, an impact which will be exacerbated by climate change. Overgrazing of pastures and upper watershed areas by livestock has led to the over-exposure of topsoil, which results in erosion and downstream sedimentation. Such occurrences have caused dams, streams, and ponds to lose effective storage capacity and have thus increased the likelihood of downstream flooding and pollution.

### ***Saint Kitts and Nevis***

1.7 Historically, the agriculture sector in Saint Kitts and Nevis (SKN) was once synonymous with sugar (Saint Kitts) and cotton (Nevis), however the monoculture sugar industry was closed in 2005. The agricultural sector is now primarily inclusive of crops, fisheries, forestry and livestock. Although the sector contributed toward only 1% of GDP as of 2019, it is a major supply of food for Saint Kitts and Nevis. The Saint Kitts 2013-2016 Agriculture Development Strategy (ADS), notes that despite its relatively small share, primary agriculture has exhibited the capacity to generate high rates of growth within the economy. This reality was noted for period (1999 to 2008), where even amid economic recessions for period 2001 to 2002 and slow growth for period 2007 to 2008, the growth in primary agriculture was substantially higher than the national growth. However, despite its relatively small size and difficulties in the leading crop industry, agriculture still remains a significant component of the Kittitian economy, generating 26.2% of merchandise exports and employing just over 2% of the labour force as of 2016. In 2016<sup>2</sup>, it was estimated that 527 persons (2.5% of the working population), 19% female and 81% male, were involved in agriculture. About 60 square kilometres which represents 23% of the total land area is used for agricultural purposes in Saint Kitts and Nevis.

1.8 The main agricultural export crops include peanuts, sea island cotton, and coconuts. Crops grown for domestic consumption include sweet potatoes, rice, bananas, onions, tomatoes, cabbages, carrots, and breadfruit. Saint Kitts and Nevis is also regarded as a net food importer; with food import in 2022 being US\$84 million compared to US\$31 million in 2002, thereby showcasing an exponential increase in value of 174% in food importation over the 20-year period. Agricultural exports, estimated at EC\$ 20.8 million (US\$ 7.7 million) in 2022,

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<sup>2</sup> Employment by Sector and Sex, 2013 and 2016 - Department of Statistics, Ministry of Sustainable Development (stats.gov.kn)

comprised of a limited number of commodities but is dominated by fisheries products. It is important to note that even amid a sharp 84% fall in 2005 from 2004, due to closure in the sugar industry, trade performance gradually improved thereafter. In this regard, the agriculture strategy notes that domestic agriculture can contribute to the economy via reducing the food import bill and export growth. It is important to note that food imports account for over 60% of Saint Kitts and Nevis food supplies with increases experienced in all major categories, making the nation very vulnerable to rising food prices. It was reported that the country imports around US\$50 million worth of agricultural and food products annually which constitute 17% of the total merchandise imports.

1.9 Additionally, the agricultural trade balance has been increasingly unfavourable for Saint Kitts and Nevis with an average trade deficit for period 2018 to 2022 estimated at EC\$ 197.2million with sharp increases in recent times due to rising food prices stemming from COVID-19 related supply chain disruptions and the impact of the Russia-Ukraine war on commodity markets. Annual earnings for agricultural exports were averaged at EC\$ 14.6 million, contributing only 7% to the food import bill and to a growing agricultural trade deficit. In this regard, it would prove beneficial for Saint Kitts and Nevis to enhance the climate-resilience of their food systems, as a means of attempting to continue to meet local food demands amid a changing physical climate and to increase the agriculture's sector contribution to the economy and reduce the deficits. The closure of the sugar industry in Saint Kitts and Nevis resulted in an impetus for the Government to increase non-sugar agricultural production. Generally, in Saint Kitts access to irrigation water is very limited, because vegetable production is carried out on the lower hillslopes. The Water Service Department does not cater for irrigated agriculture but has accommodated the requests of some livestock owners. Because of the relatively high consumption and water scarcity situation, requests from crop farmers are rarely given consideration.

1.10 The Department of Agriculture, Saint Kitts and Nevis, considers the lack of water for supplementary irrigation in the dry season the major obstacle to achieving one of its primary goals: year-round production of selected vegetables. Constraints on water and irrigation development include:

- high cost of exploratory drilling.
- high cost of irrigation development per unit area.
- difference in altitude between farms and the groundwater aquifers near sea level.
- small catchment areas, which limit the maximum size of reservoirs; and
- inaccessibility of mountain springs

1.11 Climate projections suggest that by the second quarter of the century, conditions may be too dry to support rain-fed agriculture, and yields would likely fall below economically viable levels. Consequently, sugarcane cultivation would only be possible with irrigation, for which the same model suggests there would be inadequate water. The projections also suggest that future prospects for livestock, fruit and vegetable production would be grim. In Nevis, rising sea levels are likely to lead to salinisation of agricultural soils in lowland areas, and in both islands salinisation of coastal aquifers, which is already being observed, will adversely affect water availability for agriculture.

## *Saint Vincent and the Grenadines*

1.12 Traditionally, the economy of SVG depends largely on Agriculture through its contribution to GDP, employment and foreign exchange. Family farms constitute more than 90% of the approximately 7000 holdings, which are characterized by small farm size (< 5 acres), low mechanization and limited infrastructural investment and technology use (IICA, 2014). The contribution of agriculture to GDP stood at 8.2% in 2019, 8.7% in 2020 and subsequently fell to 6.2% in 2021 and 5.5% in 2022. Prior to the removal of preferential trade arrangements, the country along with other OECS members was supported by a thriving banana industry. The introduction of trade liberalization, together with increased occurrences of natural disasters and reducing developmental attention have significantly reduced the sector's ability to contribute to economic growth and development. The country experienced multiple volcanic eruptions in 2021 which forced the evacuation of over 30,000 people, many of them farmers who lived and work on lands adjoining the volcano. The volcanic eruption resulted in significant crop losses to the extent that the government declared a food security emergency. A Post-disaster Needs Assessment (PDNA) of the volcanic eruption estimates that over 20,000 persons (around 20.0% of the population) were temporarily displaced, with damage and loss to infrastructure, agriculture, and related sectors from significant ashfall and superheated mud flows, of approximately US\$235 mn (around 26.0% of GDP). Damage and loss for Agriculture, Forestry and Fisheries stood at US\$85.24 mn (or 36.3% of total).

1.13 Agriculture remains an important sector for rural employment of approximately 26% of the country labour force and contributing to economic and social development. Banana remains the dominant economic crop, but there has been an increase in the cultivation of root crops including cassava, eddoes, dasheen, yam and sweet potato. CARDI noted that the government has been implementing a series of structural reforms to promote greater investment in agriculture through restructuring the banana industry and agricultural diversification with a series of fiscal incentives and farm support services. Other key agricultural products are coconuts, arrowroot, spices as well as small holdings of cattle, pigs, sheep and goats. Efforts at developing the sector are conditioned by the vulnerability to climate variability and climate change.

## **GEOGRAPHY OF PARTICIPATING COUNTRIES**

1.14 **Antigua and Barbuda** is a twin island state located at 17°10' north, 61°55' west (Antigua) and 17°35' north, 61°48' west (Barbuda). Antigua is the larger of the two islands at 280 km<sup>2</sup>, while Barbuda, which is 40 km north of Antigua, has a land area of 176 km<sup>2</sup>; and together they have an exclusive economic zone of 110,071 km<sup>2</sup>. Both islands are low-lying with 70% of the land in Antigua being less than 30 m above mean sea level and most of Barbuda only 3 m above mean sea level. Antigua has three topographic zones. The first is the mountainous southwest volcanic region, comprised of hard igneous rocks in the uplands and sedimentary material in associated valleys. The second zone is relatively flat central plains, consisting of heavy clays, not readily drained. The third zone is described as the rolling limestone hills and valleys of the North and East. Barbuda is relatively flat with some low-lying hills rising to just below 40 m in the Highlands area and is dominated by coralline limestone rocks. Barbuda can also be divided into three topographic zones, however, less marked than Antigua. The first zone consists of highland limestone areas – hard limestone riddled with caverns and sink holes. The second zone is the Codrington limestone region, comprising of sandy and fossiliferous sediments, less crystalline than the Highland limestone.

The third zone is the Palmetto Point Series that overlies the Highlands and Codrington formations in coastal areas and is composed of beach sands and ridges with shelly horizons<sup>3</sup>.

1.15 The twin island Federation of **St. Kitts and Nevis** is a state composed of two islands in the northern region of the Lesser Antilles. St. Kitts is located at 17°15 north and 62°45 west, whereas Nevis is located 3 km to the southeast at 17°1 north and 62°35 west. St. Kitts, the larger island, is 37 km at its greatest length, with an area of 176.8 km<sup>2</sup>, whereas Nevis has an area of 93.6 km<sup>2</sup>. The islands are the summits of a submerged mountain range, which forms the eastern boundary of the Caribbean Tectonic Plate<sup>4</sup>. The physical landscape of St. Kitts is characterised by three volcanic centres and ranges. The first is the central northwest range, dominated by Mt. Liamuiga, which rises with a pronounced crater to 1,156 m. The middle range is dominated by Verchild's mountain at 975 m but otherwise consists of a number of irregular peaks. Nevis is volcanically active with fumaroles and hot springs<sup>5</sup>. The highest point in Nevis is the central Nevis peak at 985 m, while Windy Hill, Saddle Hill and Butler's Mountain at 309, 381 and 478 m respectively, define a north-northwest to south-southeast spine across the island<sup>6</sup>. The land in Nevis is typically flat near the coast, with sandy beaches, freshwater lagoons, rocky shores and cliffs.

1.16 **St. Vincent and the Grenadines** is a multi-island nation comprised of 32 islets and cays each with its own characteristics, in the Lesser Antilles of the south-eastern Caribbean. St. Vincent, located at 13°15 north and 61°12 west, is the largest of the islands with a size of 344.5 km<sup>2</sup>. The Grenadines extend 1.6 km to the south-west of the mainland and covers a land area of ~44 km<sup>2</sup>, however, only eight of the islands are inhabited. St. Vincent is of volcanic origin and mountainous in nature. The central mountain range which stretches from north to south along the entire length of the island is considered the main topological feature. The northernmost part of the range is home to the island's active volcano, La Soufriere, which is the highest point on the island ~1233.8 m above mean sea level. Conversely, the southernmost part of the range consists of elevations from Richmond Peak at 1073.8m to Mt. St. Andrew at 735.5m. The range is characterised by lateral spurs which radiate outwardly to the east and west, giving rise to deep narrow stream filled valleys that drain unto predominantly black sand beaches. The Grenadines are also volcanic in origin; however, they are low-lying with no point higher than 304.8m. In addition, there are coral formations on these islands that give rise to white or beige sand beaches. The low-lying nature of the islands makes them vulnerable to the expected effects of sea level rise.

## SOCIO-ECONOMIC CONTEXT

1.17 **Antigua and Barbuda's** population stands at 100,722. Currently, the tourism sector contributes approximately 48% of the GDP and has formed linkages with other ancillary sectors like transportation, wholesale/retail, agriculture and communications<sup>7</sup>. However, Antigua's Updated Nationally Determined Contributions (NDC) now places the tourism industry's contribution at 80% citing its employment rate at 70% and accounting for 85% of foreign exchange earnings. The country's economy is therefore characterised as being natural resource dependent, with dependence on low-lying coastal zones and favourable climate conditions which drive the tourism industry.

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<sup>3</sup> Government of Antigua and Barbuda (2015)

<sup>4</sup> Government of St. Kitts and Nevis (2001)

<sup>5</sup> Global Facility for Disaster Reduction and Recovery (2010)

<sup>6</sup> Government of St. Kitts and Nevis (2007)

<sup>7</sup> Antigua and Barbuda – Statistics Division, Ministry of Finance and Corporate Governance

1.18 Approximately 18% of the population falls below the national poverty line, with 3.7% being indigent (food poor) and 10% vulnerable to poverty in the event of significant socio-economic shocks or natural hazards. When consideration is given to the proportion of the population that is at risk of falling into poverty on the onset of a shock to the economy, the percentage increases from 18% to 28%. Antigua and Barbuda is committed to achieving Sustainable Development Goal (SDG) 5 “Gender Equality” via the promotion of low carbon development where both genders (men and women) contribute to climate change mitigation and adaptation and their contributions are recognized and valued, and reduction in existing gender inequalities and opportunities for effective women empowerment are promoted.

1.19 **Saint Kitts and Nevis** has a population of approximately 47,606 (2021)<sup>8</sup>. The country has a GDP per capita of \$US18,082.61(2021). Therefore, it is characterised as a high-income country. Unemployment in Saint Kitts and Nevis is among the lowest in the Caribbean, based on 2016 labour market data from its Department of Statistics<sup>9</sup>, when only 2.0% of the population were unemployed at that time. The leading employment areas on the island include Public Administration (15.8%); Wholesale and Retail (11.9%), Education (11.2%), Accommodation and Food Service (10.3%) and Construction (9.7%).

1.20 **Saint Vincent and the Grenadines (SVG)** is a small island developing state with an estimated population of 110,872 (2022) and a gross domestic product (GDP) per capita of US\$8,555 (2022). Females account for 48.7% of the total population while males account for the remaining 51.3%. The urban population, now at 50.5%, continues to grow as people migrate to the urban areas predominantly in the south of the country. The country has endeavoured to manage population growth within the confines of limited space and resources to ensure sustainability and prosperity to citizens.

1.21 Saint Vincent and the Grenadines is an upper-middle income country. Agriculture, light manufacturing, and tourism are the main economic drivers that have helped sustain development progress, aided by targeted public spending in health, education, and infrastructure development. The majority of the work force is employed in agriculture, construction, and tourism and related services, with a continual shift from agriculture due to loss of preferential trading arrangements and external market contractions. Positive although fluctuating growth in real GDP has been reported between 2015-2019, however, COVID-19 led to a contraction in real GDP which fell by 3.7% in 2020. In addition to the adverse impacts of COVID-19, SVG suffered the effects of the La Soufrière volcano, which erupted in April 2021 and compounded the already difficult socioeconomic challenges facing the country. The country recorded marginal growth of 0.8% in 2021. The economy is likely to benefit from a gradual recovery in tourism, rising agriculture and fishery exports, and strong infrastructure development including hotel construction and port modernisation over the medium term. Reflecting fiscal pressures from the port modernisation project as well as post-volcanic eruption reconstruction, public debt is expected to remain elevated in near-term. Total public debt to GDP stood at 88.0% in 2022 relative to 89.2% at the end of 2021. The Government has taken a policy direction to reduce poverty and actioned programmes and activities which have been moderately successful. However, the vulnerability levels remain a cause of concern. In 2008, the vulnerability level stood at 48.2%, with the rural and banana farming population identified as being at high risk and needing particular poverty reduction strategies.

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<sup>8</sup> World Development Indicator

<sup>9</sup> Employment by Sector and Sex, 2013 and 2016 - Department of Statistics, Ministry of Sustainable Development (stats.gov.kn)



## GENDER ANALYSIS

### *Antigua and Barbuda*

1.22 Women account for approximately 52% of Antigua and Barbuda's population and workforce, with the majority being employed in the government (60%) and tourism sectors. Compared to men, female Antiguan and Barbudans face higher rates of unemployment (14.5% vs. 12.9%) and poverty (10% vs. 8.3%). The country's Women, Business and the Law 2023 score<sup>10</sup> is in the middle range (66.3), with all areas between 50 and 100 except for laws affecting women's work after having children (0). The Directorate of Gender Affairs (DoGA) is the national gender focal agency, which works towards increasing women's participation in decision-making and leadership and advocates for the advancement and uplifting of the status of women to enhance their effective participation in the socio-economic, cultural, and political development of the country. Whereas there are several small initiatives seeking to address gender-based issues in different economic sectors, the DoGA does not currently have a gender policy. The Enabling Gender-Responsive Disaster Recovery, Climate and Environmental Resilience in the Caribbean (EnGenDER) Project found that traditional social and cultural beliefs, in which the male is the head of the household, present challenges.

1.23 Within the agriculture sector, women face several barriers that prevent them from effectively participating in the sector on the same level as men. Of the total number of registered crop and livestock farmers, women account for only around 20%. This low figure can be attributed to the physical demands required of the sector, a lack of support for women farmers from the public and private sectors, gender norms that pivot women more to the public and tourism sectors and limit women's access and control over resources, as well as the financial cost for starting up in agriculture since women face a higher rate of poverty and unemployment in the country. Women farmers on average have smaller plots ranging from 0.25 to 2 acres. Physical labour intensity, lack of security, and the land application process may factor into the amount of land women farmers can access.

1.24 Within the agricultural community, the role of women is often overlooked. In fact, women are reported to contribute considerably to the agricultural sector through managing its business operations and selling produce at the public market or within small shops in the villages through formal and informal employment. Some women, particularly elderly women, engage in backyard gardening for subsistence purposes, which is unregistered at the Ministry of Agriculture. Low harvest yields necessitate the small business owners or informal employers to rely on imported produce, which adds a major expense to the operations that would not be as significant for larger businesses. Small businesses are then forced to sell produce at a more expensive rate, disadvantaging the most vulnerable populations who depend on affordable agricultural produce from the local market or village shops. This can be seen in St. John's City where the Public Market Complex operates and in the parish of St. Phillip, a generally rural area with large-scale agriculture, both of which have the highest rates of poverty in Antigua. Furthermore, whereas registered farmers may receive assistance from international organizations to address the impacts of extreme weather events, downstream value chain actors in the agriculture sector are often unable to access such support because their role is primarily

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<sup>10</sup> Women, Business and the Law 2023 is the ninth in a series of annual studies by the World Bank, which assesses laws and regulations on women's economic participation in 190 economies, from 1970 to 2022. The index covers eight related areas (mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension) and offers objective and measurable benchmarks for evaluating progress toward legal gender equality.

business-related and the direct and indirect damage to their businesses is not assessed. This also applies to home gardening, which is informal and unregistered.

1.25 The agricultural policy landscape that works to mainstream gender and foster gender equality is currently in a state of improvement. Agricultural policies can be seen as gender-sensitive with most having some reference to women and gender but having no clear agreement or guidance on how to respond to or transform the status quo. Efforts to make agriculture more gender-sensitive and climate-resilient benefit from a number of enabling conditions, including an active Department of the Environment (DoE), which has mobilized and harnessed climate finance for local adaptation action. It is one national climate actor with a gender policy and staff focused on environmental and social safeguards. Whereas the initial NDC did not reference gender per se, the updated version presented in September 2021 speaks more explicitly about gender and women.

### *Saint Kitts and Nevis*

1.26 About 52% of Saint Kitts and Nevis' population is female. Current data on women's labour force participation are not available but the 2012-2017 Country Report to the Committee of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) noted that single mothers/female-headed households had higher dependency ratios and faced a higher risk of poverty, with women, often responsible for the welfare of their families, either unemployed or under-employed. The Women, Business and the Law 2023 index stands at 71.3. Laws affecting women's decisions to work scored comparatively low (25). Based on 2013 data, the percentage of women in the Parliament of Saint Kitts and Nevis is 6.7% and 20% in the Nevis Assembly. As it relates to socio-cultural attitudes and behaviors, the Saint Kitts and Nevis Country Gender Assessment (2014) commissioned by CDB revealed that the Federation is a patriarchal society where power structures are dominated by men and some of the privileges associated with power are not accessible to women.

1.27 The Saint Kitts and Nevis Gender Equality Policy and accompanying Action Plan (GEPAP), which was approved by the Federal Cabinet in 2022, is the Government's commitment to mainstream gender. The Policy provides a platform for gender equality in all sectors and areas of social, economic, political, and environmental development, including agriculture, food security and climate change adaptation. The Department of Gender Affairs is the official implementing agency for the GEPAP.

1.28 Sex-disaggregated data on registered farmers in Saint Kitts and Nevis, which were provided by the Department of Agriculture in January 2024, show a consistent picture of male dominance within the sector. With an average farm size of one acre and many backyard gardens, women in agriculture are more likely to be typified less as farmers and more as women/housewives who maintain backyard gardens to provide food for their families or generate subsistence income. Most of the women in agriculture have limited assets and cannot readily access financing from commercial banks. They tend to be more represented in agro-processing. For example, the FAHIE Agricultural Women Co-operative Society (FAWCS) operating in St. Paul's comprises 15 members who produce sweets, pickles, and preserved goods from fruits cultivated in home-based plots to generate income for group members. Similarly, St Kitts Agro Processors comprises 16 women and three men who use available/seasonal fresh fruit and vegetables to produce goods for retail. These organizations have received non-public sector assistance to support their sustainability.

1.29 The Saint Kitts and Nevis Agricultural Transformation and Growth Strategy 2022-2031 acknowledges gender-differentiated realities and needs and provides a mandate for attention to women's empowerment. The updated NDC communicated to the UNFCCC in October 2021 articulates the intention to strengthen coordination with national gender stakeholders, increase institutional capacities on gender mainstreaming, conduct sectoral gender analysis to inform the design and implementation of climate actions, and collect and assess sex-disaggregated data in its monitoring and evaluation systems. It does, however, not specify gender-sensitive targets.

### ***Saint Vincent and the Grenadines***

1.30 Women represent 49% of Saint Vincent and the Grenadines' inhabitants. They make up 41.5% of the total labour force and experience higher levels of unemployment than men (23.4% vs. 19.4%), resulting in more variable and unequal access to financial resources. The Women, Business and the Law 2023 index shows a medium value of 68.1. Relatively low scores were achieved for laws affecting parenthood (20) and women's decision to work (25). A Knowledge, Attitudes, Practices and Behaviour study conducted as part of the EnGenDER Project in Saint Vincent and the Grenadines revealed aspects of bias in gender attitudes. For example, there was high consensus that it is more important for a man than a woman to obtain a university degree and work outside of the home. The Gender Affairs Division within the Government of Saint Vincent and the Grenadines supports the integration and advancement of a gender perspective into national development but does not currently have a gender policy and action plan in place.

1.31 The structure of farming across the multi-island nation is highly gendered but also mixed. A World Bank report states that in 2019 women working in the agriculture sector accounted for 4.7% of total female employment, while men in the agriculture sector accounted for 15% of total male employment, including the forestry, livestock and fisheries subsectors. Analyses suggest that gender norms, physical labour intensity and limited financial resources actively discourage more women from entering the sector. Notwithstanding, there are 3,300 women farmers across three regions and eight districts. Those participating in the agriculture sector tend to be mainly involved in subsistence production, field crop maintenance, post-harvest and marketing activities while having little to no impact on the policy development of agricultural organizations. Some women may co-own land with their husbands while unmarried women tend to rarely own land. It was noted that female farmers' reliance on men for some aspects of physical labour (e.g., use of equipment of tractors and weed hackers) constrains their capacity to innovate and use flexible solutions, although they have found alternatives such as swapping labour as a means of coping.

1.32 In the agriculture sector, Vincentian women are reported to be more organized than men: They have cooperatives and networks and work in the entire value chain. Most men tend to focus on only planting and harvesting. They are also reported to be more strategic in gauging the market and consumer needs. Groups of relevance include Women in Agriculture and Rural Development (WARD), Saint Vincent and the Grenadines Network of Rural Women Producers (SVGNRWP) and Women in Agriculture Langley Park Cooperative (WALCO).

1.33 The consideration of gender issues in agricultural and climate change policies and plans has room for improvement. The National Adaptation Plan (2019) and the Policy Framework and Strategic Plan for Agricultural Development 2012-2018, for example, are generally gender aware and contain some reference to women farmers and their roles and needs, but concrete

guidance is needed on how the status quo can be transformed to a more gender-equitable and socially inclusive approach that also integrates climate change adaptation and mitigation considerations. In recognizing gender-based differences in disaster impacts, Saint Vincent and the Grenadines' NDC (2015) is at least gender-sensitive.

## CLIMATE CHANGE OBSERVATIONS

### *Regional Context*

1.34 Due to their size and location, Caribbean countries are particularly vulnerable to the impacts of climate change. It is an existential threat to economies highly dependent on at risk sectors such as agriculture, fisheries and tourism. Caribbean countries will be increasingly affected by rising sea levels and changes in rain patterns. According to the IPCC AR6 report (2021), the region can expect economic decline and livelihood failures at global temperatures above 1.5°C. There is already evidence (IPCC) showing average temperatures in the region to have increased by 0.1°C to 0.2°C per decade over the past three decades. Rainfall patterns have shifted with the number of consecutive dry days expected to increase. Additionally, sea level rise has occurred at a rate of about two to four centimeters per decade over the past thirty-three years, a trend that presents risks to freshwater resources and to populations dependent on agriculture and tourism.

### *Country Observations*

1.35 Based on observational analyses over the period 1960 to 2006, **Antigua and Barbuda** has been experiencing changes in both atmospheric temperature and rainfall. For temperature, the country has recorded changes of 0.1°C, 0.11°C, 0.16°C and 0.17°C per decade during the DJF, MAM, JJA and SON<sup>11</sup> seasons respectively. For rainfall, changes of +2.9, -5.9, -4.2 and -3.6 mm per decade have been recorded<sup>12</sup>. Climate variability and trends in Antigua and Barbuda over the period 1971 to 2020 are shown in Figure 2a and 2b. Atmospheric temperature and rainfall patterns in **St. Kitts and Nevis**<sup>13</sup>. Historical atmospheric temperatures have shown substantial increases in the number of warm days and nights during the period 1980-2011. Both the maximum number of consecutive dry days and extreme rainfall events have been increasing. Climate variability and trends in St. Kitts and Nevis over the period 1971 to 2020 are shown in Figure 3a and 3b. For **St. Vincent and the Grenadines**, rainfall indices have shown an increase in the number of heavy rainfall events which occur in a year. This is reflected in an increase in the number of days with rainfall between 10-20 mm (R10) and the number of consecutive wet days. This trend is also reflected in the increase in some rainfall intensity indices, including daily intensity, maximum consecutive five-day rainfall and maximum one-day rainfall. However, extremely wet days - R99 (days with rainfall occurring at levels higher than the 99<sup>th</sup> percentile) occur with less frequency as the historical record progresses. Additionally, temperature indices indicate that warm days and nights (TX90) have increased over the last two decades, and cool days and nights (TX10) have decreased<sup>14</sup>. In the Second National Communication, agriculture was identified as one of five key sectors most vulnerable to climate change. Climate variability and trends in St. Vincent and the Grenadines over the period 1971 to 2020 are shown in Figure 4(a) and (b).

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<sup>11</sup> DJF – December, January, February; MAM – March, April, May; JJA – June, July, August; SON – September, October, November

<sup>12</sup> CARIBSAVE (2012)

<sup>13</sup> Government of St. Kitts and Nevis (2015)

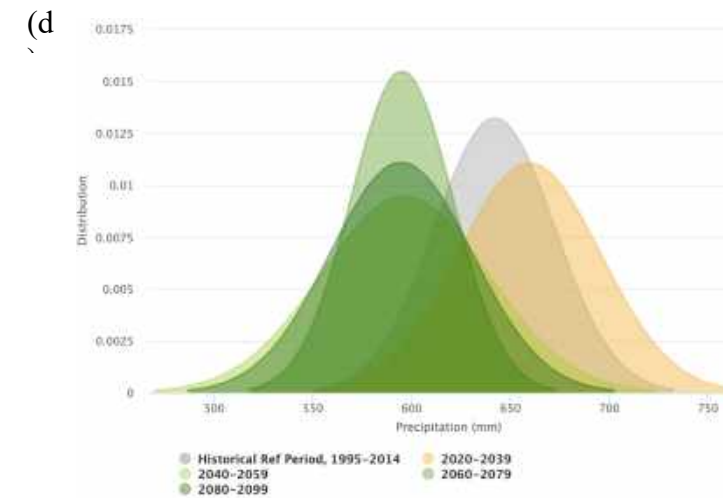
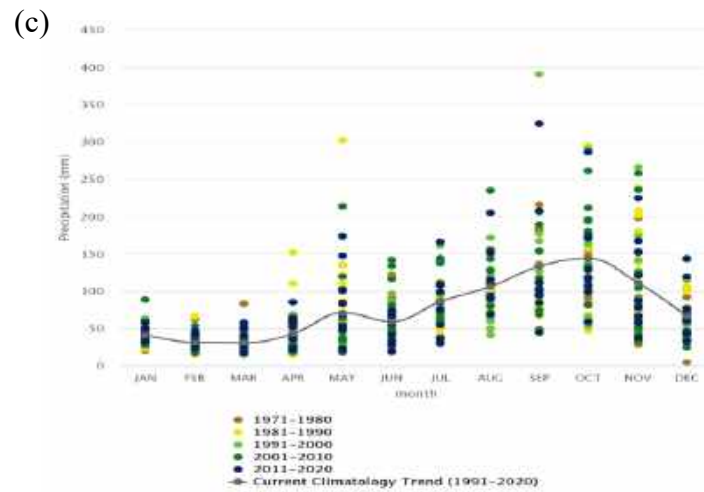
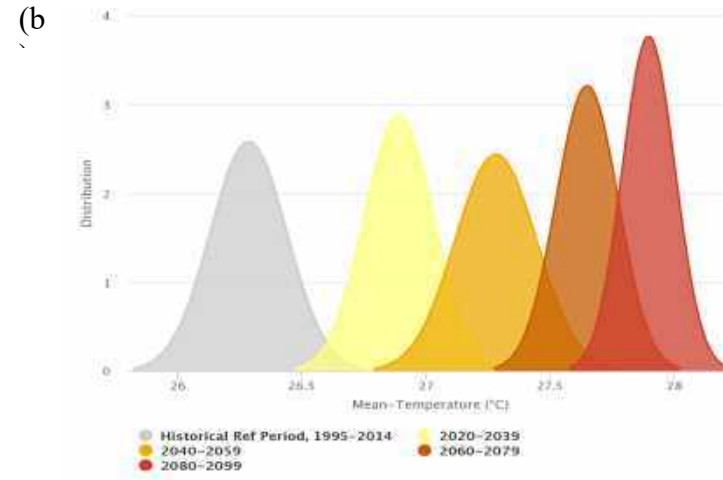
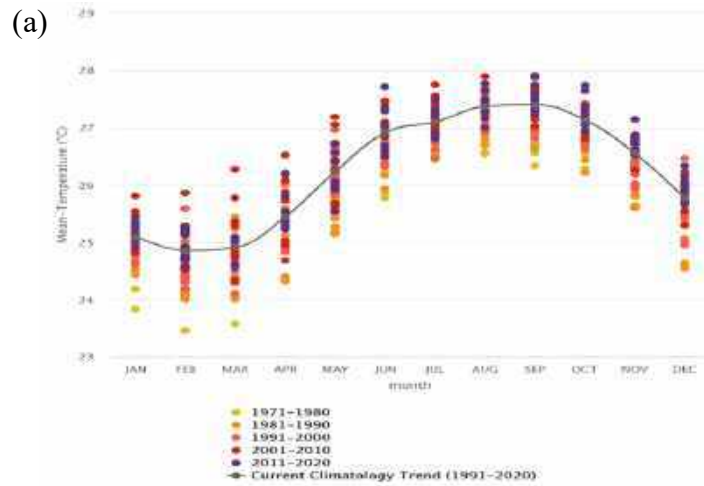
<sup>14</sup> Government of St. Vincent and the Grenadines (2015)

## ***Projections***

### **Atmospheric Temperature and Rainfall**

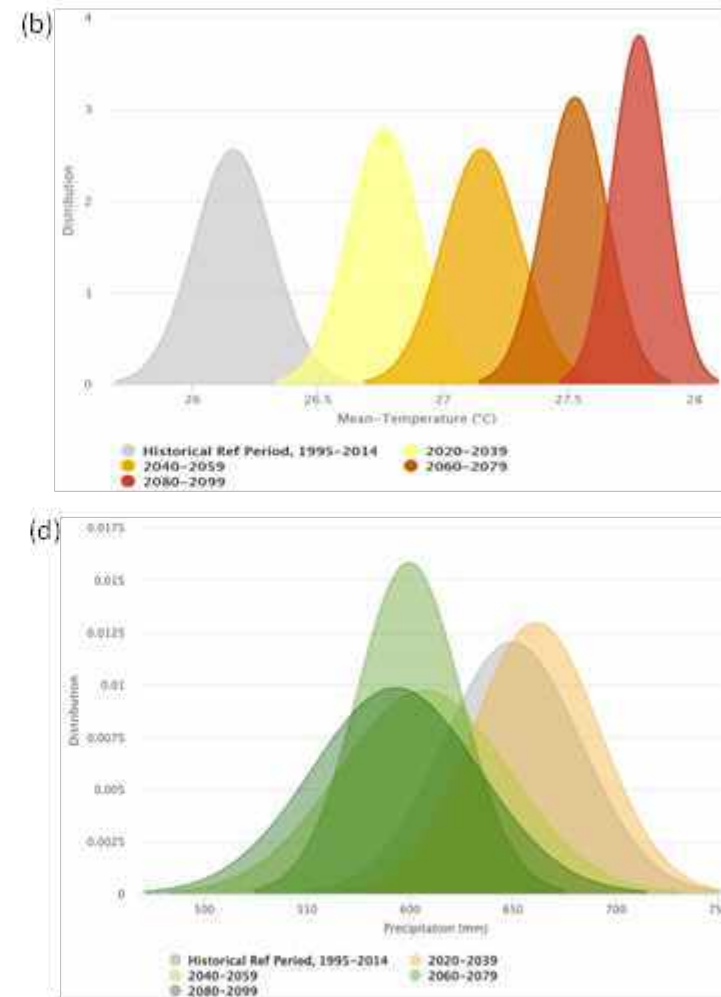
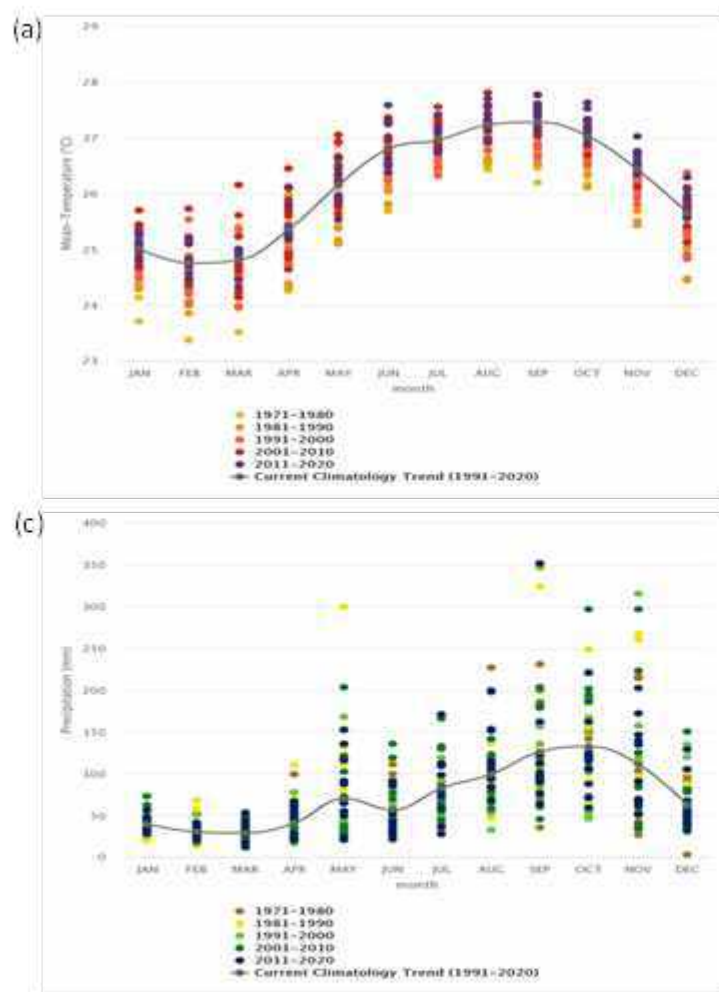
1.36 Projected changes in the distribution of mean temperature for Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and the Grenadines are presented in Figures 2, 3 and 4 respectively. For Antigua and Barbuda shown in Figure 2b, a rightward shift towards progressively higher average temperatures occurring at a greater frequency is projected by the end of the century. The narrowing of the bell shape and higher peak from the 2060s onwards, indicate a decrease in the temperature range and an increased frequency of hotter days. For St. Kitts and Nevis shown in Figure 3b, a similar pattern of increasing temperature is projected. For St. Vincent and the Grenadines shown in Figure 4b, higher ( $\sim 0.5^{\circ}\text{C}$ ) increases are projected in comparison to the other two countries.

1.37 Projected changes in the distribution of rainfall for Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and the Grenadines are presented in Figures 2, 3 and 4 respectively. For Antigua and Barbuda shown in Figure 2d, increased rainfall at a lower frequency is projected during the period 2020 to 2039, in comparison to the baseline period. From the 2040's, a leftward shift towards drier conditions is projected by the end of the century, at varying frequency. A similar pattern of changes in rainfall is projected for St. Kitts and Nevis, shown in Figure 3d. For St. Vincent and the Grenadines, a progressive shift towards drier conditions is projected by the end of the century, in comparison to the baseline period, as shown in Figure 4d.



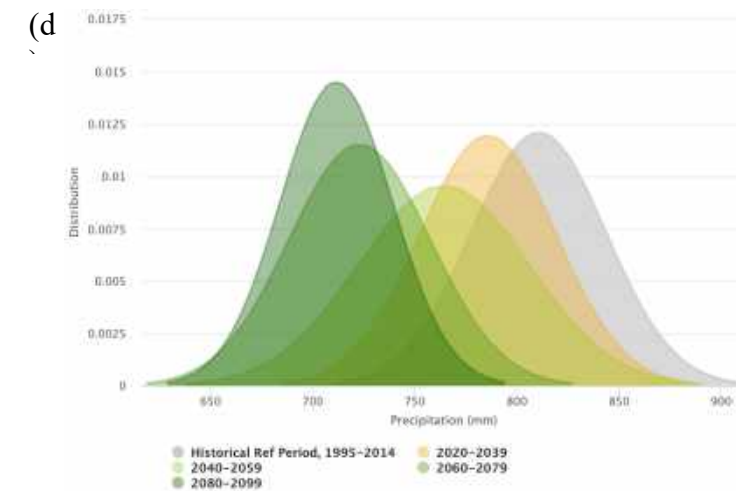
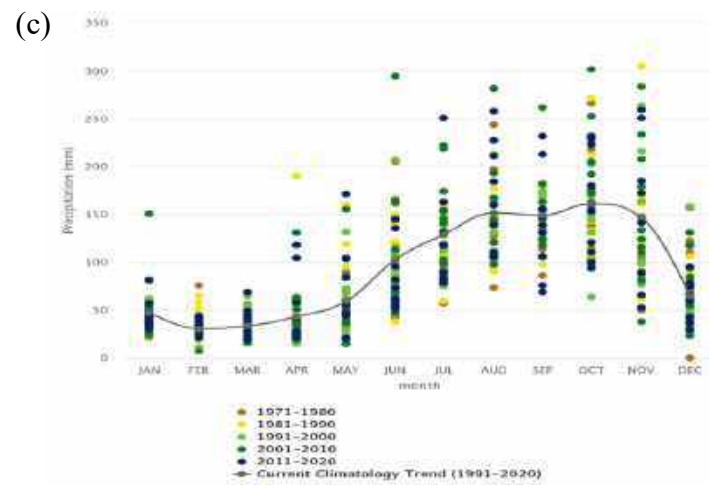
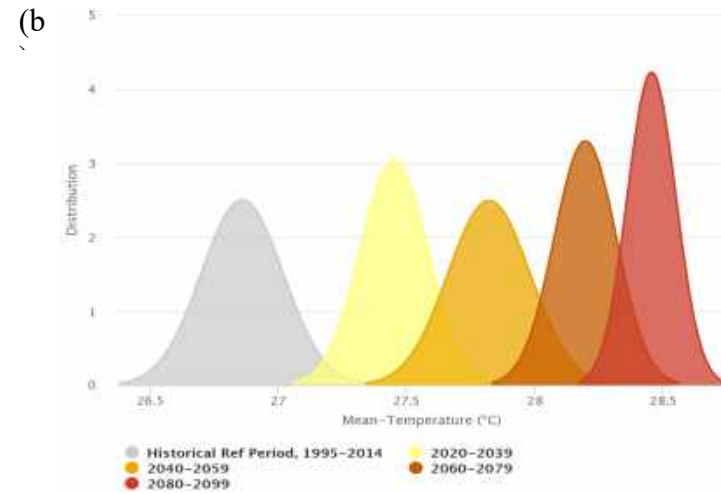
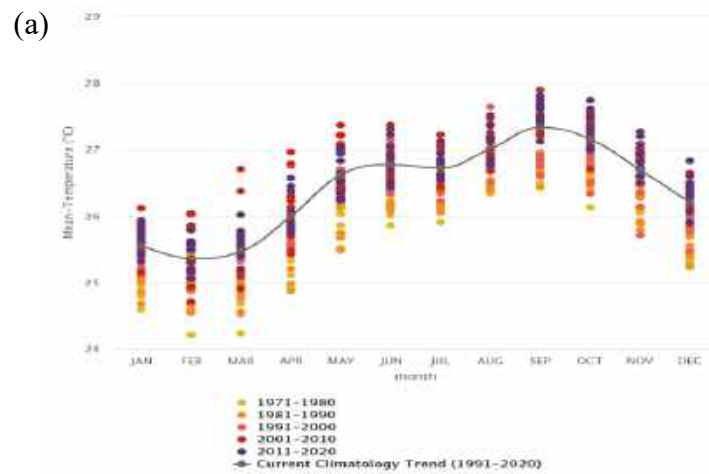
**Figure 2 | Recent and Projected Climate for Antigua and Barbuda.** (a) Monthly climatologies of mean temperature over the period 1971 to 2020, (b) Projected changes in precipitation distribution over the period 2020 to 2099; (c) Monthly climatologies of precipitation over the period 1971 to 2020; (d) Projected changes in precipitation distribution over the period 2020-2099. Projected climate anomalies have been calculated with respect to the historical reference period 1995-2014 using a multi-model ensemble under SSP2-4.5.

Source: *The Climate Change Knowledge Portal*



**Figure 3 | Recent and Projected Climate for St. Kitts and Nevis.** (a) Monthly climatologies of mean temperature over the period 1971 to 2020, (b) Projected changes in precipitation distribution over the period 2020 to 2099; (c) Monthly climatologies of precipitation over the period 1971 to 2020; (d) Projected changes in precipitation distribution over the period 2020-2099. Projected climate anomalies have been calculated with respect to the historical reference period 1995-2014 using a multi-model ensemble under SSP2-4.5.

Source: *The Climate Change Knowledge Portal*



**Figure 4 | Recent and Projected Climate for St. Kitts and Nevis.** (a) Monthly climatologies of mean temperature over the period 1971 to 2020; (b) Projected changes in precipitation distribution over the period 2020 to 2099; (c) Monthly climatologies of precipitation over the period 1971 to 2020; (d) Projected changes in precipitation distribution over the period 2020-2099. Projected climate anomalies have been calculated with respect to the historical reference period 1995-2014 using a multi-model ensemble under SSP2-4.5.

Source: *The Climate Change Knowledge Portal*



## CLIMATE CHANGE IMPACTS ON AGRICULTURE

### Overview

1.38 The Caribbean has experienced marked increases in temperature in the few decades (1986-2010), with heavier daily rainfall and an increase in frequency and intensity of hurricanes (Stephenson et al. 2014; CSGM 2017). Droughts have also been very costly to the agriculture sector, especially given the overreliance on rain-fed agriculture (Beckford and Barker 2007; Gamble et al. 2010; Farrell et al. 2010). Sea level rise also poses a threat to the availability of fresh water, which is a vital resource for the sector.

### *Antigua and Barbuda*

1.39 The country is exposed economically, environmentally, and socially to projected climate change impacts, which will result in a greater intensity of hurricanes, more frequent droughts, high temperatures and sea-level rise<sup>15</sup>. Downscaled climate projections to inform detailed risk modelling for Antigua and Barbuda indicate that Antigua stands to lose approximately 26.6 to 35.3 km<sup>2</sup> of low-lying coastal land to sea level rise by 2080. The estimated value of assets on this land is USD 196 to USD 293 million. Similarly, Barbuda is projected to lose between 24.2 and 29.6 km<sup>2</sup> of land, as well as assets valued at between USD 68.9 and USD 123.9 million<sup>16</sup>. Given the relatively small size of Antigua and Barbuda, two of the driest islands in the Caribbean region, drought<sup>17</sup> effects are felt island-wide and are a recurrent feature of the climate<sup>18</sup>. Low levels of rainfall, combined with porous limestone geology, make the islands vulnerable to hydrological drought<sup>19</sup>.

1.40 Antigua and Barbuda have a long history of droughts. Historical records indicate considerable overall decreases in rainfall, with further projected reductions under climate change. In addition, evaporation rates are high and therefore in recent times the impact of drought has become more severe. The agriculture sector is highly vulnerable to climate-related hazards and due to drought conditions, it has suffered extensive crop losses. For example, in 2010 onion and tomato crops decreased by 25 and 30% respectively due to water-stressed conditions<sup>20</sup>. In the past, during periods of severe drought, the nation depleted surface and groundwater reservoirs, has had to resort to installation of expensive desalination plants and importing water from neighbouring islands.

1.41 The agriculture sector is unable to afford water provision through the use of desalination plants, which is costly. Ongoing drought conditions have significantly impacted the country's economy, with particular reference to the agriculture sector. The agriculture sector is also adversely affected by flood hazards. Flooding is mostly due to short duration, high intensity rainfall and has been responsible for significant social and economic loss. For example, due to the passage of Hurricane Earl, an estimated 197.6 mm of rainfall fell within a 24-hour period. This resulted in flooding, as well as damage to road networks in rural areas and crops<sup>21</sup>. In

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<sup>15</sup> Government of Antigua and Barbuda (2020c)

<sup>16</sup> Department of Environment (2020a)

<sup>17</sup> According to the U.S. National Drought Mitigation Center, there are three main types/definitions of drought: *meteorological*, *agricultural* and *hydrological*.

<sup>18</sup> Government of Antigua and Barbuda (2015)

<sup>19</sup> CARIBSAVE (2014)

<sup>20</sup> Status of Disaster Risk Management: Plans for Floods, Hurricanes and Drought in the Agriculture Sector: A Caribbean Perspective (2013)

<sup>21</sup> National Office of Disaster Services (2010)

addition, the agriculture sector has suffered from continued indiscriminate cutting, setting of fires and uncontrolled grazing, which has contributed to severe degradation, accelerated erosion and reduced productivity of the land<sup>22</sup>, which is exacerbated by climate change. Challenges faced by the agriculture sector are both institutional and natural. The main challenges are knowledge dissemination and monitoring of sustainable farm practices to avoid indiscriminate land clearing. In addition, wells become unstable during the dry season due to saltwater intrusion<sup>23</sup>, which may be further exacerbated by sea level rise associated with climate change.

### ***St. Kitts and Nevis***

1.42 Observed changes in the climate in St. Kitts and Nevis have led to increased drought with negative effects on agriculture, decreased water security and flash flooding. The Federation has suffered considerable damage from storm and hurricane events in the recent past. Since 1960, 16 such events have passed within 100 km of the islands, causing loss of life, as well as extensive economic and social disruption. In St. Kitts and Nevis, the greatest risk of flooding and landslides follows periods of intense rainfall, which may be further exacerbated under climate change. Coastal and marine resources are projected to face significant negative effects as global temperatures rise. Sea level rise poses a significant risk to the agriculture sector for St. Kitts and Nevis, as it can result in saline intrusion. In the updated Nationally Determined Contribution (NDC), the Government highlighted the need to implement adaptation measures to reduce the risks of climate change and address loss and damage, which is already being experienced and is projected to increase<sup>24</sup>.

### ***St. Vincent and the Grenadines***

1.43 In St. Vincent and the Grenadines agricultural activities are based on the production of vegetables, tree and root crops, as well as animals on small plots of land. Deep soil tilling, the farming technique used with these crops often on slopes over 30°, leads to frequent landslides during periods of intense rainfall<sup>25</sup>. The Vincentian agriculture system is vulnerable to economic, social, and environmental factors, including climate change, which is considered the most critical due to its intimate relationship and direct dependency on climate. Shifts in the timing and length of the wet-dry season due to climate change have direct effects on the timing of the planting season, while at the same time affecting crops under production. The high reliance of crop production on the timing of seasons means a prolonged dry season increases dependency on on-farm irrigation systems, which many farms lack and can lead to water stress. Conversely, intense rainfall events lead to waterlogged conditions and soil nutrient depletion, with adverse effects on optimum productivity. In addition, these hazards can trigger landslides, particularly at the onset of the wet season, due to enhanced soil exposure from fires during the dry season.

## **PROJECT / PROGRAMME OBJECTIVES:**

1.44 The main objective of this proposed project is to build climate resilience of small-holder farming systems through adoption of climate-responsive innovations for soil and water management, innovative and sustainable financing and improved data management infrastructure. The proposed project will be implemented at specific sites (to be determined

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<sup>22</sup> Government of Antigua and Barbuda (2009)

<sup>23</sup> Government of Antigua and Barbuda (2015)

<sup>24</sup> Government of St. Kitts and Nevis (2021)

<sup>25</sup> Government of St. Vincent and the Grenadines (2015)

during development of the full proposal) in each of the three participating countries. It aims to build resilience of farming systems by addressing four main challenges identified by countries, with the specific objectives outlined below.

1. Improved Water Management (WM) (Access, Use Efficiency, Quality and Reuse)
2. Enhanced Soil Management (SM) and adaptive production systems (Health, Quality and Resilience)
3. Improved Data Management (DM) (Collection, Analysis, Sharing and Transfer)
4. Improved Access to Finance and Financial Management (AFFM) (Insurance, Public-Private Partnerships, Improved Financial Security)

1.45 These objectives are related to the eight outcomes listed under the AF’s Strategic Result Framework (SRF)- Table 1. Addressing the challenges will support attainment of the stated outcomes.

**Table 1: Alignment with the AF’s SRF**

<b>AF’s SRF Outcomes</b>	<b>WM</b>	<b>SM</b>	<b>DM</b>	<b>AFFM</b>
1. Reduced exposure to climate-related hazards and threats				
2. Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses hazards and threats				
3. Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level				
4. Increased adaptive capacity within relevant development sector services and infrastructure assets				
5. Increased ecosystem resilience in response to climate change and variability induced stress				
6. Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas				
7. Improved policies and regulations that promote and enforce resilience measures				
8. Support the development and diffusion of innovative adaptation practices, tools, and technologies				

1.46 The project will therefore consist of three (3) components aimed at addressing these shared challenges across the participating countries. The project will follow an adaptive management approach, with some activities managed at regional level and implemented in all countries and others focused on individual countries depending on their priorities and available budget. This will be further refined at the project preparation stage.

**PROJECT / PROGRAMME COMPONENTS AND FINANCING:**

**Table 2: Project Components and Estimated Financing**

<b>Project Components</b>	<b>Expected Concrete Outputs</b>	<b>Expected Outcomes</b>	<b>Countries<sup>26</sup></b>	<b>Amount (US\$)</b>
1. Improved agricultural water management	<p>Output 1.1: Climate-resilient infrastructure and technologies in place to supply water to the farms in a sustainable manner.</p> <p>Output 1.2: Water Use Efficiency (WUE) of prioritized crops increased through Climate-Smart Agriculture (CSA) technology adoption.</p> <p>Output 1.3: Enhanced capacity of farmers and extensionists to plan, design, install and operate on-farm water management systems.</p> <p>Output 1.4: Enhanced technical and practical capacity for improved water management.</p>	Enhanced water use and conservation and increase in agricultural production and productivity	<ul style="list-style-type: none"> <li>- Antigua and Barbuda</li> <li>- Saint Kitts and Nevis</li> <li>- Saint Vincent and the Grenadines</li> </ul>	8,932,000
2. Increasing farm system adaptive capacity through sustainable soil management (SSM) and protected agriculture	<p>Output 2.1: Soil, crop and climatic data collection and monitoring system installed/upgraded.</p> <p>Output 2.2: Soil/land-based technologies and CSA practices for outdoor and protected agriculture improved.</p>	Improved soil health and functional climate-resilient production systems with sustainable farming practices	<ul style="list-style-type: none"> <li>- Antigua and Barbuda</li> <li>- Saint Kitts and Nevis</li> <li>- Saint Vincent and the Grenadines</li> </ul>	1,932,000

<sup>26</sup> It is expected that the three countries would participate in all components, but not necessarily in all the respective activities. While there would be a few standard measures (e.g., capacity-building, deployment of adaptation tools and technologies, knowledge sharing), certain interventions would be limited to one or two countries. Countries would be given the flexibility to opt out of certain activities based on the results of the feasibility studies to be undertaken at the funding proposal stage and available budget.

	Output 2.3: Improved technical capacity and data management as it relates to SSM and protected agriculture.			
3. Improving the Financial Stability of Small Famers and public-private sector coordination to scale up climate-smart agriculture	Output 3.1 Investment in climate-smart agriculture (CSA) de-risked and offer of financial products and services for CSA upscaling improved.  Output 3.2 Improved financial capacity of smallholders and strengthened public-private sector coordination to scale up climate-smart agriculture.	Increased financial flows and public-private sector coordination towards climate-smart agriculture	- Antigua and Barbuda - Saint Kitts and Nevis - Saint Vincent and the Grenadines	1,000,000
4. Project Execution Cost (9.5% of Total Project Cost)				1,127,080
5. Total Project Cost				11,864,000
6. Project Cycle Management Fee charged by the Implementing Entity (8.5% of Total Project Cost)				1,008,440
<b>Amount of Financing Requested</b>				<b>13,999,520</b>

## PROJECTED CALENDAR:

1.47 The project will be implemented over a period of four (4) years. Expected dates of key milestones are presented in the below table:

Milestones	Expected Dates
Start of Project/Programme Implementation	May 2025
Mid-term Review (if planned)	May 2027
Project/Programme Closing	June 2029
Terminal Evaluation	March 2030

## PART II: PROJECT / PROGRAMME JUSTIFICATION

*Describe the project/programme components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience, and 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.*

2.1 The scope for action will be centred around responding to projected changes in water supply and demand and improving adaptive capacity. The multi-dimensional climate vulnerability and risks presented in the Project Background highlight the continued need for adaptation strategies to reduce these vulnerabilities and achieve climate resilience. There is regional consensus to focus on the agricultural sector because of its multifaceted role in combatting climate change and its impacts. The proposed project will also address some of the barriers to climate change adaptation in these three countries. The proposed project components translate the project objectives into concrete outcomes and outputs, which will enable proactive decision-making and support a climate-resilient agricultural system ensuring food security for Antigua and Barbuda, St. Kitts and Nevis and St. Vincent and the Grenadines, beyond the life of this project.

2.2 A regional approach was chosen as opposed to a country-by-country approach given the fact that the three multi-island states are faced with common climate change hazards and barriers to adaptation, requiring adequate solutions. Introducing and upscaling promising tools, technologies and practices at different locations across the three Caribbean SIDS and stimulating an exchange of positive and negative experiences and lessons learned at the regional level will augment the knowledge base in each country and will strengthen transnational linkages and partnerships among the stakeholders involved. The added value lies in the forums and platforms for continuous exchange of data, information and knowledge on agricultural adaptation, which will allow to capitalize on the combined yet differentiated experience and expertise of each island. It is expected that the regional learning component would greatly benefit agri-food chain actors in each country. The adaptive management approach will allow for certain activities (e.g., capacity-building, deployment of adaptation tools and technologies, knowledge sharing) to be carried out regionally while others (improvement of infrastructure, climate information services) will be targeted to individual countries based on priorities and available budget.

## **Component 1: Improve agriculture water management.**

2.3 The growing competition for the use of water places pressure on the amount of water available for agriculture. Climate change is expected to intensify this pressure, particularly in regions where water security is already a concern. Efforts to develop adaptation strategies for agricultural water management can help to prioritise responses to key risks identified. Water management and security are paramount to achieving food security. Reliable access to water poses a major constraint for many farmers, mostly in rain fed areas but also those involved in irrigated agriculture. Agricultural water management includes the management of water used in crop production (both irrigated and rain fed), livestock production and inland fisheries. It also includes soil, land and ecosystem conservation practices, such as drainage and watershed management. Sustainable management of water resources require technologies which enable sustainable land management to reduce periods of water stress and drought which are becoming more important to policy makers due to climate change. Large numbers of farmers invest in small-scale irrigation systems with limited technical knowledge and support, resulting in inefficiencies and wastage. Contrastingly, many others have limited access to water sources with good quality water for irrigation. There is therefore a great need to strengthen national capacity to adopt and disseminate agricultural water management technologies. Current water demands and water management practices, coupled to projected unreliability of rainfall seasonality and overall decreases due to climate change rationalizes the urgent need for addressing water management in adaptation planning. In response to the need for agricultural water management, this project identifies a series of outputs tailored to national-level circumstances. These are outlined in the following sections.

### **Output 1.1: Climate-resilient infrastructure and technologies in place to supply water to the farms in a sustainable manner.**

#### **Activity 1.1.1 Installation of and evaluation of NEWT and other smart technologies at selected farms**

2.4 Water management is currently constrained by low availability and poor monitoring at the farm level. In response to the needs of the smallholder farmers for increasing water supplies, evaluation of a fit-for-purpose modern water-treatment technology, Nanotechnology Enabled Water Treatment (NEWT) will be performed at specific farm sites. The technology will allow the purification of compromised water sources to suitable quality for agricultural production. This intervention will not only strengthen the water-use monitoring system but also reduce drought and its impact on ecosystems, crops and livestock. The installation of smart water meters will enable water-use monitoring and improve irrigation and water use efficiency. As part of its Technical Cooperation Programme (TCP), FAO, with the support of the Texas Tech University, is currently supporting the Government of Antigua and Barbuda in pilot-testing solar-powered reverse osmosis technology for brackish water desalination. A mobile zero-waste, solar-powered reverse osmosis system is being established to treat brackish water and produce two streams of irrigation water, one with high quality water for cash crops and the other with low levels of salinity for salt-tolerant crops. The study will assess the costs and benefits of this technology for the local agriculture sector. It is expected that this pilot will yield valuable results for potential upscaling within the country and other islands with similar characteristics in the Caribbean.

## **Output 1.2: Water Use Efficiency (WUE) of prioritized crops increased through Climate-Smart Agriculture (CSA) technology adoption.**

### **Activity 1.2.1 Determination of crop water requirements**

2.5 This activity will determine crop water use across agroecosystems, which can be used to project the impact of climate change on future water needs. This is especially important during periods of drought, which is projected to become more prolonged or frequent due to climate change. Smallholder farmers depend on an effective soil moisture balance to aid productivity and raise economic income. Crop water use is a key component for effective water management, as it identifies the requirements, relevance, potential and opportunities for improving the effectiveness of agricultural water management. This assessment will support efficient design of irrigation systems, effective irrigation scheduling and water resource planning.

### **Activity 1.2.2 Installation and evaluation of micro irrigation and fertigation systems at selected farms**

2.6 Micro and drip irrigation systems direct water to plant roots and are designed to conserve soil nutrients and minimize or prevent waste. These systems have several advantages. They can potentially use 30 to 50% less water than conventional irrigation systems and will therefore help conserve water and reduce evaporation in a region that faces reductions in water availability due to climate change. As they deliver water directly to plant roots, less water is available to support weed growth, which deprive plants of water and nutrients, increasing productivity. They are easily adjustable to fit individual crop needs. The installation of these will also ensure vulnerable smallholder farmers are able to co-produce and successfully deliver quality goods to the local and international markets.

2.7 Fertigation is a method of fertilizer application where fertilizer is incorporated within the drip-irrigation system. It is therefore an efficient method of fertilization as it promotes even and direct distribution of nutrients. It also facilitates a greater degree of control over the rate and timing of fertilizer release. This enhances farmer's efficiency in fertilizer use so that more crops of improved quality, can be produced with the same amount of fertilizer. This increases crop yield whilst addressing nutrient deficiency and protects agroecosystems. In addition, the efficiency of the process minimizes the possibility of fertilizer loss during periods of heavy rain or floods.

### **Activity 1.2.3 Soil moisture monitoring using Local Area Network interconnectivity for data collection and use.**

2.8 Soil moisture monitoring devices are available for a wide variety of crops and soil types. They can prevent over-irrigation and resultant diseases, as well as reduce fertiliser and pumping energy waste. In a drying region, water conservation is more important than ever, this technology can track rainfall, as well as the moisture it deposits in the soil, to ensure efficient timing and quantity of irrigation. In periods of agricultural drought, it can ensure deep irrigation is maintained. These devices can enable resilience among smallholder farmer communities.



### **Output 1.3: Enhanced capacity of farmers and extensionists to plan, design, install and operate on-farm water management systems.**

#### **Activity 1.3.1 Identify most suitable rainwater harvesting locations across the island using the AGRI World Sources tool.**

2.9 Rainwater harvesting refers to a process of collection, storage, conveyance and purification of rainwater from surfaces. This system can provide a clean source of water particularly during periods of drought and as an adaptation action to flooding. Rainwater harvesting has the potential to reduce wet season water usage by ~30%. A water tank design rain harvesting system, for example, uses gravity for water flow, thereby reducing energy requirements for pumping. An absorption well design rain harvesting system also promotes water conservation as it can capture rainwater and channel it directly into the ground. The AGRI – World Sources tool<sup>27</sup> (*AGua para Riego* - Water for Irrigation) is a free software and automated GIS-based decision-support system for the identification of suitable sites for rainwater harvesting and river diversion for small farm irrigation systems. It was developed by CIAT (now part of the Alliance Bioversity International and CIAT) with support from the United States Agency for International Development (USAID), CDB and the FAO Investment Centre, and was introduced to several Caribbean countries, including Antigua and Barbuda and Saint Kitts and Nevis.

#### **Activity 1.3.2 Ground-truth suggestions made by the tool.**

2.10 The locations identified by the AGRI tool for rainwater harvesting will be verified and validated by field work in each country in conjunction with local stakeholders. This will ensure that the rainwater harvesting systems are effectively located to maximise adaptation potential.

#### **Activity 1.3.3 Construct new rainwater reservoirs and install green and grey infrastructure and equipment including water meters for effective water-use monitoring.**

2.11 Both green and grey infrastructure can play a critical role in climate-proofing the agriculture sector. These types of infrastructure combine the conservation and restoration of nature, such as rivers and floodplains with conventional approaches, such as reservoirs. Green infrastructure is a nature-based solution to the adverse impacts of climate change on the agriculture sector and includes the strategic use of natural land networks, working landscapes and other open spaces, in order to conserve ecosystem values and functions. It may include high nature value farmland and multi-use forests and other green surfaces which can be used as natural barriers and floodplains for protection from flood hazards. Green infrastructure includes human-engineered infrastructure for water resources such as water treatment plants and reservoirs. These types of infrastructure allow for environmental restoration and maximize ecosystem services. The use of water meters will help promote water conservation and management. Energy requirements for all installations will target renewable sources wherever possible. The ongoing TCP project mentioned in paragraph 2.3 seeks to lay the foundation for enhanced water security and climate resilience in agricultural production in Antigua and Barbuda and therefore also includes the design of the technical specifications and the preparation of an engineering survey, inclusive of an environmental impact assessment, for the construction of a new rainwater reservoir at a selected location. Activity 1.3.3 will capitalize on these outputs.

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<sup>27</sup> <https://alliancebioversityciat.org/tools-innovations/agri-agua-para-riego>

## **Output 1.4: Enhanced technical and practical capacity for improved water management.**

**Activity 1.4.1 Train officers of the Ministry of Agriculture on the use of relevant decision-making support tools** (AGRI World Sources tool for identification of sites with high rainwater harvesting potential).

2.12 In the context of climate change, technically sound open-source decision-support systems can provide valuable guidance to policymakers. They can assist national governments in making climate-responsive investment decisions in a cost-effective and time-saving manner. As extended drought periods are becoming more frequent, effective rainwater harvesting and storage solutions for agriculture, both at the farm level and for communal use, are increasingly a priority within the targeted countries. However, within the Ministries of Agriculture, the human capacity, financial resources, and time that can be dedicated to identifying the most suitable locations based on available data, is limited. It is against this background that the proposed project seeks to equip government officers from the agriculture, water, environment and physical planning sectors with the requisite knowledge and skills to effectively use and capitalize on the benefits of the AGRI – World Sources tool. This decision-support system integrates data and information on terrain, soil and climate with mathematical and hydrological models, and reduces from months to just a few days the time needed to identify suitable sites for rainwater catchments. Initial training sessions were carried out in Antigua and Barbuda and Saint Kitts and Nevis as part of the project “Addressing the Water-Energy Nexus in Agriculture” under the Mexico-CARICOM-FAO Initiative “Cooperation for Adaptation and Resilience to Climate Change in the Caribbean”, but follow-up meetings are needed to reinforce the countries’ technical capabilities and train additional officers. The tool is yet to be configured for Saint Vincent and the Grenadines. Therefore, a more comprehensive training programme will be implemented there.

**Activity 1.4.2 Train farmers in the use and implementation of selected water use efficiency and CSA interventions.**

2.13 While training policymakers and technical officers on tailored decision-support systems, the proposed project will work directly with farmers to support them in adopting agricultural water conservation practices as well as technologies augmenting water use efficiency. A capacity needs assessment will be undertaken, and a capacity development plan prepared to design tailored Farmer Field School (FFS) curricula for each country. FAO’s FFS methodology is a proven people-centred and participatory learning-by-doing approach that regularly brings together a group of farmers for practical field exercises involving direct observation, discussion, and decision-making. Through this approach, vulnerable producers will receive hands-on training on ecosystem-based adaptation practices that are proven to increase the infiltration and water retention capacity of soils and yield multiple other environmental benefits, including zero or minimal tillage, covering of soils with organic mulch or cover crops, crop rotation and association, composting, contour planting, strip cropping, and use of drought-tolerant crop varieties, amongst others. Furthermore, the trainees will receive guidance on farm-level solutions for rainwater harvesting, proper drainage systems, effective irrigation scheduling and efficient irrigation systems, such as sprinklers and drippers. The latter aspect will be linked to the assessment of crop water requirements under Activity 1.2.1, the soil moisture monitoring devices to be provided under Activity 1.2.1 and the potential of integrating renewable energy (e.g., solar-powered water pumps). The training will also cover water-efficient closed-loop systems for soilless food production including hydroponics and aquaponics.

## **Component 2: Increasing farm system adaptive capacity through sustainable soil management (SSM) and protected agriculture.**

2.14 Soils are an essential and non-renewable natural resource hosting goods and services vital to ecosystems and human life. Sustainable soil management (SSM) is an integral part of sustainable land management, as well as a basis for addressing poverty eradication, agricultural and rural development, promoting food security and improving nutrition<sup>28</sup>. Tropical soils are inherently poor, unhealthy and of low quality in relation to agricultural use. These characteristics impart low resilience and vulnerability to degradative processes, mainly erosion. SSM provides multifaceted benefits to meeting the SDGs<sup>29</sup>, as well as the objectives of the Paris Agreement through its implications for climate change adaptation and mitigation. Integrated soil fertility management (ISFM) is a widely promoted approach to improve agricultural productivity and input use efficiency, as well as reduce the impacts of climate change on low-input systems.

2.15 Protecting, conserving and enhancing soil health is critical to climate resilience and food security noting the dependence on extensive agriculture. However, alternatives production systems that afford greater control and management are important in securing livelihoods and strengthening adaptation. Protected agricultural systems are recognized adaptation technologies that compliment and facilitate improved agricultural water management, depends on environmental monitoring and integrates crop nutrition.

### **Output 2.1: Soil, crop and climatic data collection and monitoring system installed/upgraded.**

#### **Activity 2.1.1 Upgrade existing weather stations and install additional stations for sufficient coverage.**

2.16 The upgrading of existing weather stations and installation of additional ones will not only expand the density of the observational network coverage but also enhance the accuracy of climate observations through the use of technologically advanced and automated equipment. This will improve the climatic data monitoring system at farm level, which can be used to develop early warning systems, facilitate adaptation planning and reduce barriers to adaptation.

#### **Activity 2.1.2 Demonstration and Training in the use of agricultural drones**

2.17 An agricultural drone refers to an unmanned aerial vehicle used in agriculture operations for data collection mainly to optimize yield and monitor crop growth and production. Farmers and agribusiness owners can use these services for land and crop imaging, surveying topography and boundaries, soil and irrigation monitoring, as well as identifying locations for soil sampling. This will involve raising awareness of the technology and its benefits, particularly in the aftermath of natural disasters when accessibility and transportation routes to farms may be compromised.

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<sup>28</sup> Food and Agriculture Organization (2017)

<sup>29</sup> Food and Agriculture Organization (2018), Hou et al. (2020)

### **Activity 2.1.3 Assess existing and where necessary develop SMS agrometeorological and agroecological information systems in collaboration with the National Meteorological Services.**

2.18 The development and launch of SMS agrometeorological and agroecological information systems in collaboration with the National Meteorological Services (NMS), will enhance communication and connectivity among the NMS and farmers, as well as researchers and policymakers. When coupled with agricultural systems, these application tools can be useful for climate change adaptation within agricultural communities, through the provision and dissemination of agrometeorological and agroecological information. They can also promote secure and sustainable agricultural productivity.

### **Activity 2.1.4 Train farmers in data collection, monitoring and analysis of agro-climatic, soil and crop data.**

2.19 Farmers will be trained in data collection, monitoring and analysis of relevant climatic parameters, and soil and crop data. This would allow for data driven decision making at the farm level.

## **Output 2.2: Soil/land-based technologies and CSA practices for outdoor and protected agriculture improved.**

### **Activity 2.2.1 Assessment of Soil and Land Management Practices**

2.20 This will involve the assessment of present soil and land management practices in the context of climate change adaptation, to identify gaps, constraints and shortcomings, allowing for improvement. Assessment will also spatially differentiated land units to allow for baseline and post-intervention characterization.

### **Activity 2.2.2 Enhancing Integrated Soil Fertility Management**

2.21 Integrated soil fertility management (ISFM) includes a set of site-specific practices related to cropping, fertilizers and organic resources on smallholder farms, with the aim of enhancing soil fertility, crop productivity, input-use efficiency and the incomes of smallholder farmers. ISFM recognizes the need to target nutrient resources within crop rotation cycles, thus going beyond single crop options and may include the use of improved seeds, planting dates and densities, as well as organic and inorganic fertilizers. ISFM is a useful tool in climate change adaptation as it enhances yield stability in rain fed systems and supports food security. Site specific ISFM plans will be developed from the baseline assessment and implemented on selected farms to demonstrate applicable technology and build capacity. SSM indicators and implementation of the Global Soil Doctors Programme will also be included.

### **Activity 2.2.3 Circularizing agricultural waste management**

2.22 Under this activity an agricultural waste management system (AWMS) will be developed and implemented. An AWMS involves the installation and management of by-products of agricultural production in a sustainable manner, which enhances soil, crop, water and air quality. This system will focus on organic matter management, which includes various agricultural practices to maintain and increase the organic matter status of soils with the aim of improving soil health, in particular by providing, storing and releasing nutrients as well as by improving the soil structure, which in turn increases the infiltration and retention capacity

of the water in the soil. Together, adoption of these techniques will support crop productivity, rejuvenate and maintain healthy soil ecosystem services particularly during periods of drought.

#### **Activity 2.2.4 Site specific assessment of protected agricultural structures**

2.23 Water management at either end of the spectrum presents the greatest climate change hazard for tropical countries of the Caribbean. Increasing unpredictability of rainfall increases the agronomic and economic risk of extensive production, which sadly often results in loss of livelihood and increasing disenchantment with agriculture. Protected cultivation systems provide some control over the growing environment, particularly of environmental conditions allowing the grower more management control and when properly executed greater yield and quality. While these systems are not new their function related to design and purpose has not been properly evaluated nor has suitability assessment determined best models and systems for production. The project aims to evaluate and recommend protected systems based on local conditions and requirements.

#### **Activity 2.2.5. Installation and Operation of Site-Specific Protected Agriculture Structures**

2.24 Protected agricultural structures will be designed and installed and farmers supported through experiential training and capacity building in operations and management.

### **Output 2.3: Improved technical capacity and data management as it relates to SSM and protected agriculture.**

#### **Activity 2.3.1: Training farmers in Soil/land-based technologies and CSA practices**

2.25 Further to Activity 1.4.2, farmers will receive hands-on training in sustainable soil and land management practices (including integrated soil fertility management), agricultural waste management and installation and optimal use of site-specific protected agricultural structures. Based on the outcome of Activity 2.2.1, farmers will be trained on practices like soil conditioning, soil restoration, integration of trees into croplands (including as natural shade and vegetative wind breaks to mitigate soil erosion), integrated nutrient management, use of precision technologies like Variable Rate Nutrient Application (VRNA), integrated pest management, organic farming, no-burn agriculture with shredding as a sustainable alternative to slash-and-burn agriculture, integrated crop-livestock systems, use of agricultural residues as inputs for animal feed or soil amendments, processing of manure for production of organic fertilizers, as well as greenhouse and shade house farming, amongst others. Appropriate adult and peer-to-peer learning methodologies such as FFS will be applied and study visits to model farms organized to foster practical knowledge acquisition and uptake of the solutions.

### **Component 3: Improving the Financial Stability of Small Farmers and public-private sector coordination to scale up climate-smart agriculture.**

2.26 Lack of financial resources, farm labour shortage and limited influence over global markets are just a few of the challenges facing the agricultural sector, coupled with heavy reliance on imported foods within the tourism sector and a shift in domestic consumption patterns to imported foods. To increase the capacity of small-scale farmers for climate change adaptation, it is important that they are able to access financial products and services that are geared towards climate resilience and their specific needs. The development of financing mechanisms and instruments such as farmers' insurance, farm-level insurance policies and

climate-resilient business plans, in collaboration with financial intermediaries and insurance providers, and public-private partnerships will increase financial resilience for farmers and agricultural lending. This project aims to facilitate measures which will improve the capacity of smallholder farmers to access targeted financial products and services, aligned with the national development plans and policies to actively support poverty reduction strategies. The project also recognises the importance of data management and use throughout the value chain and appropriately communicated to consumers and other stakeholders.

**Output 3.1: Investment in climate-smart agriculture (CSA) de-risked and offer of financial products and services for CSA upscaling improved.**

2.27 Small-scale farms are characterised by subsistence farming mostly by small and marginal holders, rudimentary production tools and technologies, as well as vulnerability to climate hazards, declining farm output and poor access to inputs. Achieving climate resilience within the agricultural sector will require significant transformation and modernisation, including adoption of climate-responsive technologies and farm infrastructure, which are dependent upon empowerment of farmers through agriculture finance. The project will comparatively assess existing products and services to other productive regions to inform on alternatives and improvements and improve access.

**Activity 3.1.1 Strengthen the capacity of financial institutions to develop and deploy targeted financial products and services aligned to CSA adoption.**

2.28 Collaborative efforts could yield many great results for the development of targeted, site-specific financial products and services for farmers. In response to the demand to partner with financial service providers to foster recognition of the concrete financing needs of smallholder farmers in the context of climate change, this project will work with financial institutions in each of the three countries to evaluate existing portfolios and produce targeted products and services aligned to CSA adoption. The project will provide technical assistance to development banks, credit unions and interested commercial banks to help them (i) adjust their risk management models for agricultural lending and to incorporate climate change risks, (ii) improve their readiness for and use of Information and Communication Technology (ICT) for greater efficiency (e.g., a shared digital interface to assimilate data and information on the operations of small farmers, such as production and cash flow data), (iii) centralize and systematize institutional know-how for accelerated and sustained learning, (iv) implement comprehensive and sound data management for informed client segmentation and more customized design of financial products and services targeting the agriculture sector. Financial institutions also have the opportunity to access concessional resources for lending to farmers/others for climate-smart agricultural investments. Once the financial institutions are capable of developing ad-hoc products and services aimed at the adaptation solutions showcased in Components 1 and 2, they will be able to continue the process on their own, using their own resources as long as there is demand. This technical assistance component would provide the ideal interface for sensitizing local financial institutions to the root causes of gender-based differences in access to financial products and services for CSA, and to help them remove barriers on the supply side that currently affect the adaptive capacity of female farmers and agroprocessors.

### **Activity 3.1.2 Develop a portfolio of farm level insurance products, including a framework for access to financial support.**

2.29 In line with priorities to promote integrated farming systems to maximise smallholder farmer returns, the project will consult with relevant national and regional insurance and financial agencies to deepen relationships and engender willingness to support financial needs of smallholder farmers, whilst advocating for the development of the agriculture sector. Sources and types of farmers' insurance will be identified and catalogued e.g., the Caribbean Catastrophe Risk Insurance Facility (CCRIF) which is designed to expand strategic public-private partnerships to increase financial security for farmers through provision of financial products, tools and services, such as risk financing and financial solvency regarding natural disasters related to climate change. Additionally, the project will evaluate the existing incentive and financial support systems available to farmers to adapt and build resilience to climate change. Revisions to existing systems to include public-private partnerships and explore alternative sustainable financing would be pursued.

### **Output 3.2: Improved financial capacity of smallholders and strengthened public-private sector coordination to scale up climate-smart agriculture.**

#### **Activity 3.2.1 Assess through value chain analysis the size and diversity of the domestic market to inform production quotas and crop planning.**

2.30 Challenges within the agricultural sector not only include weak market linkages between small farmers and larger public and private buyers, but also the islands' heavy reliance on imported foods for domestic consumption. There is a need to increase capacity of rural producers to facilitate collaborative production and supply of foods to meet consumer demand. Activity 3.2.1 will assess the size and diversity of the respective domestic markets to inform production quotas and crop planning for smallholder farmers. This will provide producers with information in support of crop planning as well as post-harvest storage and value addition.

#### **Activity 3.2.2 Broker market agreements between small farmers and public institutions (schools, universities, hospitals, jails)/private enterprises (hotels, restaurants, private universities, agroindustry) to foster the long-term supply of healthy and sustainably produced food.**

2.31 The proposed project will explore ways to support the establishment of agreements and conditions to reach quality and quantity quotas between farmers and public institutions, including schools, universities, hospitals, jails, as well as private enterprises, such as hotels, restaurants, private universities, and agroindustry actors. Activity 3.2.2 will capitalize on the enhanced knowledge, skills, products, and services resulting from the above activities and will create agency among small farmers to negotiate the terms and conditions of long-term market agreements as well as to build sustainable business relationships with relevant buyers. Such agreements can benefit the National School Feeding Programmes, which often rely on imported food items of lower nutritional value. While the focus will be on domestic agricultural production in support of national food security, the project will also support beneficiary farmers to explore strategic regional and international export markets. This will enable them to build up a diversified client base, which can support their financial stability in the face of climate change.

**Activity 3.2.3 Support farmer associations, particularly centred on women and youth, to meet established quotas and access local, regional and international markets.**

2.32 Activity 3.2.3 seeks to support farmer associations, particularly women and youth associations, to meet established quotas and access local, regional and international markets. The proposed project will provide tailored support geared towards capitalizing on co-production capacities, achieving economies of scale, increasing revenues, and sharing benefits among peers. This may include the strengthening of governance procedures, guidance on how to meet quality and quantity quotas, the identification of suitable financiers, the development of marketing strategies, mentorship and strategic advice in business plan development and implementation, amongst others. Activity 3.2.3 will also help revitalize associative processes that may have been discontinued, provide support with legal registration, and encourage the formation of new associations. Due consideration will be given to encouraging the representation of women and youth in decision-making processes, thus reinforcing their role in sector leadership. To refine the proposed actions, an in-depth assessment of the associative landscape within the agriculture sector in each of the participating countries will be carried out at the funding proposal stage.

**Activity 3.2.4 Train farmers (who participate in project activities) to develop sustainable business models to access loans for investments in climate-resilient technologies and production systems.**

2.33 Shifting to climate-resilient production patterns requires financial investments that often exceed the capacities of smallholders. The reasons are manifold. Among farmers, a key barrier is their weak business acumen and record-keeping skills. Therefore, supporting adaptation, business and financial planning processes at the individual level is essential. This activity will focus on equipping farmers with the knowledge and skills to develop sustainable business models based on the CSA solutions showcased under Components 1 and 2, as well as to prepare corresponding investment plans for presentation to local financial institutions. The beneficiary farmers will be guided in establishing their individual short-, medium- and long-term adaptation plans, and they will be trained to better understand cash flow patterns, the importance of savings, the relation between profitability and borrowing, the finances of machinery/technology ownership, financial record-keeping, how to manage risks and how to use financial services, amongst others. The trainings will be needs-based and designed to foster financial inclusion, ensuring that none of the targeted farmers are left behind. Activity 3.2.4 will contribute to supporting subsistence farmers in transitioning to commercial operations, thereby strengthening their financial stability as well as national food security. This activity will also target backyard gardeners, agroprocessors and small agribusiness owners to accommodate the fact that women are more represented in these roles than in primary production and to address demand-side barriers in access to finance for sustainable and climate-resilient business operations.

**Activity 3.2.5 Implement regional CSA knowledge sharing forums for public and private agri-food chain actors and disseminate best practices and lessons learned through relevant web-enabled platforms.**

2.34 Scaling up CSA solutions calls for strong partnerships between a wide range of public and private actors involved in agri-food systems at local, national, regional and global scales. Knowledge sharing forums and web-enabled platforms can help forge these partnerships while promoting the exchange of relevant data and information on best practices and lessons learned. At least one regional knowledge sharing forum will be implemented each year to strengthen



these linkages and support continuous learning and improvement on agricultural adaptation. The results will be carefully documented and fed into existing and soon-to-be-launched knowledge-to-action networks and platforms such as the Caribbean Climate-Responsive Agriculture Forum (CCRAF) founded by the Inter-American Institute for Cooperation on Agriculture (IICA), the Caribbean Resilience Knowledge Platform launched by the Caribbean Natural Resources Institute (CANARI)<sup>30</sup>, CDB’s Climate Smart Agriculture Knowledge and Information Platform (CSAKIP) and the Global Alliance on Climate-Smart Agriculture (GACSA) hosted by FAO. Target group-oriented, gender-sensitive communication products showcasing the project’s results, experiences and lessons learned will also be created (e.g., fact sheets, infographics, short videos, case studies, policy briefs, manuals) and disseminated through the above-mentioned channels.

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

2.35 The following table lists the potential adaptation solutions to be implemented at country level and characterizes the interventions in terms of their application: innovation, technology, tool or best practice.

Type of agricultural intervention	Illustrative resilience-building actions	Type
Agricultural water provision or improvement	AGRI World Sources decision-support tool	Tool
	Grey-green infrastructure for rainwater harvesting	Innovation/best practice
	Zero-waste solar-powered desalination technology	Innovation/Technology
	Assessment of crop water requirements	Best practice
	Micro and drip irrigation and fertigation systems powered by renewable energy	Innovation/Technology
	Soil moisture monitoring devices	Tool
	Water meters for effective water-use monitoring	Tool
	Mulching/Composting	Best practice
	Raised beds	Best practice
	Restoration of riparian habitat	Best practice
	Improved hydrological monitoring and weather forecasting capacity	Tool/Innovation
Environmental improvement technologies	Agroforestry	Best practice
	Contour cropping	Best practice
	Terracing	Best practice
	Agroecosystem analysis	Tool
	Wildland/Bush fire management	Innovation
	Individual Basins	Innovation
	Grass Barriers	Innovation
	Riparian Strips	Innovation
	Integrated pest management	Innovation
	Organic matter enhancement/soil restoration	Innovation
	Zero/Minimum/Conservation tillage	Best practice
	Soil compaction management	Best practice
	Fallowing	Best practice
Use of perennial crops and grasses	Best practice	

<sup>30</sup> <https://resiliencecanari.org/>

	Agricultural drones for land and crop imaging, surveying topography and boundaries	Technology
Crops and animal management and improvement technologies and practices	ACCEPT Agri Crop Suitability Modelling tool	Tool
	Climate-Smart Agriculture Farmer Field Schools	Tool
	Integrated nutrient management	Innovation
	Precision agriculture, e.g. Variable Rate Nutrient Application (VRNA)	Innovation/Technology
	Crop diversification	Innovation
	Cover crops	Best practice
	Drought-tolerant, early maturing, water-efficient, pest and disease resistant varieties and breeds	Innovation
	Intercropping with legumes	Best practice
	Pasture shade management	Innovation
	Silage management/Supplemental feed/Fodder crops	Innovation
	Seed and germplasm banks	Innovation
	Protected agriculture (e.g., shade houses)	Innovation
	Closed-loop systems for soilless food production (e.g., hydroponics, aquaponics)	Innovation
	Rotational grazing	Innovation/Best practice
	Manure management	Innovation/Best practice
Farm planning and management practices	Upgrading of network of agrometeorological stations	Tool
	Climate advisory services and bulletins/early warning systems	Innovation/Tool
	Cash flow analysis	Tool
	Improved agricultural calendars	Tool
	Record keeping	Best practice
	Farm plan	Tool
	Mixed crop-livestock production systems	Best practice
	Crop diversification	Best practice
	No-burn agriculture with shredding	Best practice
	Green manuring	Best practice
	Organic and inorganic fertilizers	Best practice
	Crop rotation	Best practice
	Crop/Livestock insurance	Innovation
Post-harvest management	Best practice	

***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 of the Adaptation Fund.***

### Economic Benefits

2.35 This project is expected to address the issue of access to agricultural finance and insurance options related to climate hazards, with specific reference to farmers in vulnerable areas. The expected reductions in crop losses due to extreme climate events, coupled to increased income generation through adoption of more efficient climate-responsive technologies and enhanced climate services (e.g. SMS agrometeorological and agroecological information systems), which facilitate early warning can help farmers to plan ahead and manage climate variability and risk. Together these provide economic benefits by avoiding investment losses through crop loss and failure, as well as maximised crop productivity. Effective climate services, combined with adaptation and business plans to reduce the adverse impacts of climate change will significantly reduce farmers' input and loss costs. Reductions in production costs through the adoption of integrated farming systems will maximise resource use, while at the same time increasing financial returns from all activities. Recurring cultivation costs are reduced, thereby maximising profits in comparison to mono-cropping systems, for example. Climate-proofing agricultural assets will address risks along the agricultural value chain, which will include enhancing farmer capacity and increasing income.

2.36 The use of enhanced water usage methods and sustainable soil management systems will allow farmers to step into a more sustainable agricultural future allowing farmers to work smarter instead of working harder using modern climate-smart techniques, which safeguard the environment whilst also boosting the economy. This project also enables access to multiple financial products and services that can aid in improving the overall financial stability of farmers, thus improving the socio-economic status of farmers. The economic status of farmers will also be increased through activities such as capacity building and improved access to domestic markets and is therefore aligned with the Adaptation Fund which encourages access and equity specifically for marginalized or vulnerable groups such as small-scale farmers. Through the establishment of linkages with existing financial institutions and services, farmers in vulnerable areas will be better able to manage and adapt to larger and more frequent climate hazards, which will be cost-effective.

2.37 The system of co-production will allow gender equality in disaster risk preparedness and management through availability of reliable public information. This is expected to foster practical approaches towards achieving sustainable land use with economic empowerment of at least 40% of women and youth farmers under the project in support of increasing income generation. The project will further leverage regional knowledge-sharing advantages of combined and improved climate and weather data related to climate and agricultural advisories. The focus on institutionalising lessons learned through a regional approach provides an opportunity to innovate sustainable practices far beyond the project lifespan. This will build comparative advantages of all partnering countries and encourage relevant agricultural research to expand the understanding of targeted cropping systems. Stakeholder engagement will harness the benefits of agricultural research and draw on regional expertise and feedback. Lessons learned will be directly fed into events, such as regional forums, which provide field reviews and case studies with in-depth feedback to add value to disseminated information and

encourage scaling up of activities to meet demands for fresh food in the domestic market, tourism and the hospitality sector.

### Social and Gender Benefits

2.38 This project will utilise a participative approach, directly involving farmers, government and non-government entities, as well as the private sector and researchers at every stage of the process. It will therefore foster positive relationships (vertical cohesion), trust and a greater propensity for dialogue. The bottom-up, evidence-based approach to climate change adaptation will facilitate enhanced ownership to support the increased desire for collaborative agricultural production, which promotes sustainability. It will also ensure the voices of vulnerable and frequently marginalised groups are heard, in relation to the provision of climate services and adaptation planning. Gender analysis is a useful tool in adaptation planning.

2.39 One of the main objectives of this project is the provision of support for farmer associations, particularly centred on women and youth associations allowing for greater access to local and international markets. The project will provide opportunities to enhance gender equality and activities will be designed to accommodate women, youth, persons with disabilities, as well as consideration of their tailored care and responsibilities. This will result in enhanced leadership roles, as well as reduce dependency and vulnerability. Climate change can bring about changes in gender relations and roles, particularly within the agricultural sector. Therefore, particular importance will be placed on the provision of education and training in the use of climate-smart techniques and agriculture to men, women and youth alike. Providing access and equal opportunity to women and youth can substantially strengthen the adaptive capacity of the agricultural sector. This can in turn empower women and encourage growth within the agricultural sector. The project supports capacity building and provides open access for men and women to the resources, rights and opportunities needed for climate change adaptation.

### Environmental Benefits

2.40 The project is likely to have limited adverse environmental impacts. These impacts will be site specific and can be easily addressed by employing known mitigation measures. This project will be largely beneficial to the environment as it will adopt climate-responsive technologies and practices, including micro and drip irrigation, sustainable soil and land management, organic matter and agricultural waste management, which will encourage water-use efficiency, prevent depletion of strained water sources, increase primary production and nutrient cycling from organic matter and sustainable practices aimed at fostering natural resource management. Sustainable land management practices, including sustainable agriculture, provide important national and regional benefits. They contribute positively to fundamental ecosystem services such as water cycle regulation, carbon sequestration and aiding in the preservation of agrobiodiversity. It increases food security, primarily for smallholder farmers; provides local energy; provides local fresh and clean water. It preserves biodiversity at the farm level through agroforestry, intercropping, fallow and preservation of locally adapted seeds. Together they can also enhance ecosystem health and functionality.

2.41 The use of the AGRI World Sources tool<sup>31</sup>, construction of rainwater reservoirs, installation of green and grey infrastructure and the use of nature-based climate adaptation solutions all have positive impacts on the environment and will help to reduce the impacts of

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<sup>31</sup> More information can be accessed [here](#).

climate change. Sustainable soil, soil fertility and land management, by improving soil health, will also prevent soil and land degradation and increase soil moisture enabling soil development. The project will also contribute to sustainable livelihoods, as improved land management will reduce deforestation and pressure on the natural environment. It is expected that the project will help bring at least 5% of the combined total agricultural land area (i.e., 110,035 ha<sup>32</sup>) under more sustainable production practices. The expected co-benefits in terms of carbon sequestration and GHG emission avoidance will be quantified at the funding proposal stage, using internationally accepted methods such as FAO's EX-Ante Carbon-balance Tool (EX-ACT).

### Adaptation Impact Potential

2.42 Based on preliminary calculations, it is expected that the proposed project would directly benefit around 14,942 persons. The below table details this estimate and the underlying assumptions.

	Antigua and Barbuda	Saint Kitts and Nevis	Saint Vincent and the Grenadines
<b>50% of total registered crop and livestock farmers + household members</b>	1,650 <i>As of January 2024, the Agricultural Extension Division estimates the total number of registered farmers at 1,000-1,200. According to the 2011 Population and Housing Census, the average household size is 3.0.</i>	878 <i>Based on data shared by the Department of Agriculture in January 2024, the total number of registered farmers is 649. According to the 2011 Population and Housing Census, the average household size is 2.7.</i>	12,000 <i>As of January 2024, the Ministry of Agriculture estimates the total number of registered farmers at 8,000. According to the 2012 Population and Housing Census, the average household size is 3.0.</i>
<b>50% of total agroprocessors + household members</b>	75 <i>The Antigua and Barbuda Investment Authority estimates the total number of agroprocessors at 50.</i>	46 <i>Based on recent policy documents.</i>	45 <i>There are two major agro-processing companies in the country. It is estimated that each of them employs around 15 agroprocessors.</i>
<b>Extension officers</b>	16 <i>Data on website of Ministry of Agriculture.</i>	15 <i>Data shared by Department of Agriculture in January 2024.</i>	22 <i>Data on website of Ministry of Agriculture.</i>
<b>Other government personnel</b>	40 <i>Estimated based on similar projects.</i>	30 <i>Estimated based on similar projects.</i>	40 <i>Estimated based on similar projects.</i>
<b>3 representatives each of 50% of financial service providers</b>	44 <i>Based on the website of the Financial Services Regulatory Commission and other sources, there are 9 credit unions, 4 domestic banks, 9 licensed</i>	21 <i>Based on the website of the Financial Services Regulatory Commission, there are 4 credit unions, 4 domestic banks, 5 licensed international</i>	20 <i>Based on the website of the Financial Services Authority and other sources, there are 5 credit unions, 3 domestic banks and 5</i>

<sup>32</sup> Based on World Bank open data, the combined total agricultural land area of the three selected countries is 2,200,700 ha.

	<i>international banks, 1 development bank and 6 microfinance companies.</i>	<i>banks and 1 development bank.</i>	<i>licensed international banks.</i>
<b>Total per country</b>	1,825	990	12,127
<b>Grand total</b>	14,942		

2.43 As stated previously, at least 30% of the total number of direct beneficiaries would be women (4,483) and youth (4,483).

2.44 Indirect beneficiaries would include other members of the farming and agroprocessing community who can use the SMS agrometeorological and agroecological information systems as a decision-making aid; consumers who have better access to sustainably produced local agricultural produce (including students enrolled in National School Feeding Programmes that enter into formal agreements with local smallholders through the project); as well as the general public who gains actionable knowledge about climate-smart food production thanks to the knowledge products disseminated via traditional and online media. The total number of indirect beneficiaries is estimated to be at least 25% of the total population of all three islands (i.e., 61,342<sup>33</sup>).

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

2.45 This project is aligned with cost-effective measures for the implementation of strategies aimed at achieving climate resilience. The regional approach of this project, involving the sharing of expert resources and innovations at different levels, builds on best practices and enhances the existing regional and national capacity, as well as promotes educational capacity. The project encourages regional technical assistance and capacity building that will result in better contextualization of methodologies and strategies used in this project. The significant shared learning-by-doing between countries will promote tools developed to facilitate co-production in partnering countries and customized to deal with similar challenges in other territories.

2.46 A key element of the cost-effectiveness in this regional approach will be to deepen the understanding of best practices and leverage shared reliable climate information that can be readily translated into advisories and disseminated to public users. Specific regional capacity building will generate reliable product forecasts to reach all levels of community users. Hands-on training under the facilitation of regional experts will generate reliable climate information that can be scaled alongside dialogue with experts to understand market demands and promote informed decision making. Sharing skills and expertise will enable the meteorological agencies and other stakeholders in the countries to piggyback on the skill sets and experience of peers across the agricultural sector.

2.47 Under Component 1, NEWT using innovative solutions such as the solar -powered, zero waste reverse osmosis technology for brackish water desalination is seen as a promising cost-effective measure to address the declining water availability in the agriculture sector in the long run. The results of the solar powered reverse osmosis technology pilot in Antigua and Barbuda are currently outstanding but feasibility studies at other locations have shown that its operating costs are significantly reduced when compared to conventional desalination systems powered by fossil fuels. Additionally, this technology yields multiple environmental and

<sup>33</sup> Based on World Bank open data (2022), the combined total population of the three countries stands at 245,368.

climatic co-benefits as it is a zero-waste and chemical-free mechanism with low energy requirements and limited contribution to greenhouse gas emissions.

2.48 Expanding rainwater harvesting and storage structures to capture excessive rainfall and make it accessible during periods of drought through installation of grey-green infrastructure constitutes a viable and cost-effective alternative to conventional seawater desalination. Rainwater reservoirs not only address a pressing adaptation need among small farmers in drought-prone areas but also help restore biological cycles and favour the establishment of a microclimate. A 500 m<sup>3</sup> reservoir can meet the water needs of 80 heads of cattle or up to 2500 m<sup>2</sup> of vegetable crops during the dry season. During this period and on such an area it is possible to harvest 60,000 plants, which, if sold on the market for US\$ 0.60 each, would bring in an annual revenue of US\$ 3000 to US\$ 5000.

2.49 Installing micro and drip irrigation systems on farmlands will allow to make more efficient use of available water resources as they deliver the optimal amount of water directly to plant roots, thereby helping to reduce water wastage through evaporation and to minimize weed growth through overwatering, which deprives plants of water and nutrients. When compared to conventional irrigation techniques such as center pivot irrigation systems, micro and drip irrigation systems are more expensive. However, their water conservation potential and the expected productivity increases among smallholders clearly outweigh the costs. The advantages increase in significance when the micro and drip irrigation systems are powered by renewable energy.

2.50 Ecosystem-based adaptation measures for agriculture, including soil conditioning, soil restoration, integration of trees into croplands, integrated nutrient management, integrated pest management, no-burn agriculture with, integrated crop-livestock systems, use of agricultural residues as inputs for animal feed or soil amendments, processing of manure for production of organic fertilizers, as well as greenhouse and shade house farming all bear significant environmental benefits when compared to conventional farming methods which often involve use of environmentally harmful synthetic fertilizers and slash-and-burn practices, among others. Several studies, including an assessment undertaken as part of the UNEP project “Microfinance for Ecosystem-based Adaptation”, have demonstrated the cost-effectiveness of such measures.

*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.*

2.51 This project contributes to a number of international goals, including the SDGs, specifically SDG 2 “Zero Hunger” and SDG 6 “Clean Water and Sanitation”. Additionally, the project is aligned with the Paris Agreement which seeks to establish commitments towards adaptation and resilience to climate change. The consistency with national and regional policies, strategies and plans is described below.

#### Antigua and Barbuda

2.52 Antigua and Barbuda’s **Updated Nationally Determined Contribution (2021)** for the period 2020-2030 reflects the country’s firm commitment to take ambitious climate action in several key economic sectors. SMART targets such as “100% education, health, food security,

and emergency shelter facilities powered by their own grid-interactive renewable energy sources” illustrate the high importance the Government attaches to renewable energy for both adaptation and mitigation. The requested grant would allow CDB and FAO to support Antigua and Barbuda on this path by enabling renewable energy based interventions and other agricultural adaptation measures that build on a number of the projects listed in Annex 1 to the NDC.

2.53 Antigua and Barbuda has elaborated a **Water Sector Adaptation Plan (2021)**, which focuses on providing access to safe, reliable, and resilient water supply services and reducing operational risks associated with climate change and variability. It seeks to ensure that its operations can meet the required levels of service during extreme weather events and future climate change. It is supported by an investment programme, which focuses on creating an enabling environment for climate-resilient water supply; water resources management and planning; climate-resilient water infrastructure; efficiency and demand management; developing the water-energy nexus; and disaster recovery and risk management. The proposed project directly addresses the needs expressed in this Plan by upscaling proven water-energy-food nexus interventions and implementing innovative technologies bearing high potential to address the dwindling availability of water resources on a larger scale.

2.54 The **Food and Nutrition Security Policy (2012)** targets the critical food and nutrition security problems in Antigua and Barbuda. The Policy addresses constraints and aligns food availability with recommended per capita food consumption targets through specific strategies and interventions in domestic food production and food imports. It presents a portfolio of government interventions, both direct and indirect, to be utilized in promoting agriculture and food sector objectives. The policy seeks to:

- a) Promote the sustainable production of safe, affordable, nutritious, good quality, Caribbean food commodities/products.
- b) Ensure access of households and individuals to nutritious, safe and affordable food at all times with special attention to the food insecure and nutritionally vulnerable groups.
- c) Promote healthy lifestyles and the commercialization and consumption of safe, affordable nutritious and good quality food commodities / products.
- d) Create an effective disaster preparedness and management system that can efficiently deal with the immediate and short-to-medium term food and nutrition security consequences of economic and financial shocks and natural disasters (hurricanes, drought, flooding, and earthquakes) while at the same time strengthen the resilience to those consequences among the most vulnerable population groups.

2.55 In addition, one of the guiding principles in the preparation of the policy framework includes Agriculture and Food Production: Recognizing the vital role of the food and agriculture sector in the quest for national food and nutrition security and the need to strengthen its ability to attract youth and entrepreneurship as well as adequate investment in agricultural production, post-harvest handling, storage, distribution and exchange as an integral part of the private sector and a major source of employment and incomes for a large segment of the population.

#### St Kitts and Nevis

2.56 This project aligns with key government policies and strategies in St. Kitts and Nevis within the areas of agriculture, rural development, climate change adaptation and gender



equality according to national policies, legislation, strategies, priorities and objectives. The government aims to achieve regional development goals that support improvements in climate resilience related to building institutional capacities, increasing agricultural productivity and improving sustainable management.

2.57 The **Revised Nationally Determined Contribution of St. Kitts and Nevis (2021)** explicitly emphasizes strategies to enhance food and water security, and notes over US\$700 million in economic damages following extreme weather and climate impacts. Amid ongoing mitigation and adaptation measures the government prioritizes climate change adaptation actions that include:

- a) Expanding smart aquaponics and aquaculture systems.
- b) Developing alternative livelihoods and training and diversity away from at-risk crops.
- c) Introducing drought resistance technologies and species in animal husbandry.
- d) Identifying and supporting methods to expand water supply and storage capacities.
- e) Improving operational efficiencies.
- f) Modelling and mapping coastal assets to support adaptation planning.
- g) Develop and implement an emergency response plan for sargassum stranding.

2.58 The proposed project is consistent with the **St. Kitts and Nevis Agricultural Transformation and Growth Strategy (ATGS) 2022-2031** and contributes to its implementation in many respects. The ATGS recognizes the climate change induced challenges affecting the nation's agrifood systems and speaks to key adaptation measures, including grey-green infrastructure for rainwater harvesting, energy- and water efficient irrigation systems powered by renewable energy, sustainable soil management and agroforestry, among others. The ATGS emphasizes agricultural productivity and income growth; food import reduction; nutrition, health and food security; decent employment and livelihoods; and sustainable ecosystems. It suggests several implementation approaches and ways of working that are embedded in the envisaged interventions, such as public-private partnerships; increased interinstitutional and cross-sectoral coordination and cooperation; gender equality, youth and social inclusion; strategic capacity development and training; as well as information, communication and public awareness programmes.

2.59 The **Land Degradation Neutrality High-Level Note (2019)** addresses the need to strengthen resilience of affected community livelihoods impacted by recent hazards to help achieve land degradation neutrality on a national scale toward generating communal environmental and social benefits that are key in addressing poverty, food security, availability of resource and income equality. The key project actions are supportive of achieving Land Degradation Neutrality by 2030 and reducing the rate of soil erosion by 15% by 2030 through sustainable land management practices and soil erosion prevention methods. Achievable through the environmental conservation activities proposed, the project aims at reducing the rate of soil degradation to improve land productivity on agricultural lands.

2.60 The **National Climate Change Policy (2017)** provides a policy framework for climate action in St. Kitts and Nevis whilst the **National Climate Change Adaptation Strategy (2018)** operationalizes the National Climate Change Policy through seven programmes of action. The Strategy details specific adaptation objectives and actions across eight sectors including Agriculture and Water as well as five cross-cutting areas. Adaptation measures included in the programme of action on CSA include several of those that the proposed project seeks to implement, namely installation of agrometeorological stations and early warning

systems; technical and organizational capacity-building for agricultural extension services, national authorities and farmer organizations; identification of feasible insurance options; promotion of proven climate-smart practices and technologies through demonstration projects, among others. Additionally, the programme of action on integrated water resources management speaks to desalination and sewage treatment for agricultural purposes. As such, the proposed project activities are consistent with Saint Kitts and Nevis' National Climate Change Adaptation Strategy and would clearly contribute to its implementation.

2.61 The **National Environmental Summary (2010)** for the Government of St. Kitts and Nevis, the regional Comprehensive Disaster Management (CDM) initiative incorporates disaster management in national development. This strategy along with other national efforts is used to minimize the impact of future disasters on the country. This summary highlights the lack of the financial resources for policy implementation and makes recommendations for various components of the current framework to be strengthened. The project is in alignment with some of these recommendations, which include provision of requisite training for staff; provision of relevant regulatory and enforcement capabilities of institutions; maintenance of a baseline of programmatic activities such as data collection and monitoring; the ability to use information from various sources for decision making; and the development of fiscal policies to stimulate corporate environmental stewardship, as well as to incentivise new business models that focus on the sustainable utilization of natural capital to attract foreign exchange. These are reinforced under this project in response through the provision of support to rural communities, resilience strategies for alleviating poverty by revamping the agriculture sector and reducing the impact of natural disasters on the poor through preparedness, adaptive farming practices and access to necessary social services.

#### St. Vincent and the Grenadines

2.62 The **National Adaptation Plan (2019)** seeks to prioritize climate change adaptation in national planning. It identifies agriculture as a key sector for climate change adaptation, emphasizing the urgent need. The agriculture sector was selected for the elaboration of the dedicated sectoral strategy and investment plan, to identify the main climate change impacts and associated vulnerability of the sector and potential adaptation options. The NAP also highlights the incorporation of new areas for adaptation, which may include a modified and improved agriculture system with technological support for new plants and possibly animal species. It also included the results from a gaps and needs assessment, several of which will be addressed through the implementation of this project. Some of these include: gender mainstreaming, data collection (climate projections, vulnerability, capacity) and technical adaptability. The specific objectives of the NAP are as follows:

- a) To promote an enabling environment to facilitate the mainstreaming of climate change adaptation in the planning, budgeting, and implementation processes, by strengthening the governance structures to enhance synergies between adaptation and DRR26, including the identification, implementation, monitoring and evaluation and communication of adaptation actions.
- b) To improve the capacity for data and information collection, management and sharing, determination of climatic risk and access to technology and financing for adaptation; and
- c) To implement adaptation actions toward an increased resilience of the most vulnerable Vincentians.

2.63 The **Intended Nationally Determined Contribution (2015)**, highlights agriculture as one of the largest economic activities, which contributes significantly to the economic and social development of rural livelihoods in particular. This project is aligned with a number of climate change adaptation planning goals for the agricultural sector, which include support for small-scale farmers from the government in production technologies, agri-business management, good agricultural practices and pest and disease control; policy initiatives to address climate change issues, environmental protection, risk mitigation and fisheries development; and a national plan for dealing with food security. Alignment also occurs through enhancing the adaptive capacity of rural economies and natural resources to climate change through the management and protection of land based natural resources and agricultural production systems. There are also a number of adaptation plans for the water resource sector and these that are aligned with this project, and these include rooftop rainwater harvesting and the provision of potable drinking water when there is water scarcity or shortage of water available.

2.64 The **Policy Framework and Strategic Plan for Agricultural Development (2012-2018)** also supports the goals of this project, as there are a number of visions and goals outlined for rural sectors which include to:

- a) Promote economic growth in rural areas while protecting the physical environment
- b) Support the development of human and social capital.
- c) Assist in the creation of an environment that will facilitate investment in service and infrastructure in rural area
- d) Assist in the promotion of good governance
- e) Reduce poverty and unemployment markedly

2.65 These are all in alignment with many of the goals of this project focused on the agricultural sector. In terms of Agricultural Lands, the goals of the policy (policy framework 8.6- the role of the agriculture sector and 8.7- agricultural land) include the following:

- a) Ensuring the availability and accessibility of quality agricultural land for productive
- b) use by the present and future generations
- c) Motivating improved rates of productive utilization of agricultural land
- d) Promoting the conservation of soil and water resources

2.66 There are also goals aligned with agricultural credit (policy framework 8.9) which focus on improving the environment for increased lending to the agricultural sector by financial institutions. These types of systems aim to provide long term credit for farmer to finance capital investments. Policy Framework 8.12 is also aligned with this project as it focuses on Youth in Agriculture and intends to increase the attractiveness of agriculture to young people by reducing the constraints to involvement of youths in agriculture and highlighting and raising the profile of career paths in agriculture, agribusiness and conservation.

2.67 The **Food and Nutrition Security Policy and Action Plan (2014)** specifically includes the strategic approach to achieving food and nutrition security. Policy goal 4.1 focuses on Food Availability and seeks to ensure that consistent/stable supplies of affordable, nutritious, high quality food commodities are available to all people in St Vincent and the Grenadines, through the development of competitive and diverse domestic food production systems and sustainable level of food imports build primarily upon mutually collaborative links with CARICOM countries. The Strategic Objectives have a primary focus on ensuring the availability and accessibility of quality agricultural land and water resources for productive

use. Additionally, there is focus on the creation of a competitive and diverse agricultural sector that would provide commodities for domestic consumption and for export (crops, livestock). These are both in alignment with the goals of this project. Under Strategic Objective B there is focus on stimulating greater involvement of Youth in Agriculture which is also one of the objectives and goals of this project.

### Regional plans and strategies

2.68 By supporting a considerable number of farmers in three Caribbean multi-island nations to adopt climate-smart practices and technologies for more sustainable and more efficient agricultural production in the face of climate change, the proposed project would contribute to curbing the region's rising food import bill. This is the central goal of the "Vision 25% by 2025 Initiative" of the Caribbean Community (CARICOM), a long-term social and economic partnership between CARICOM member states, the CARICOM Private Sector Organization, producer groups, development partners and the civil society to transform the regional agri-food system. Among the Initiative's priorities are, for example, securing of greater private sector participation, provision of alternative financing and insurance, human resource development as well as adaptation and introduction of climate-smart production mechanisms – all of which form part of the proposed interventions.

*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.*

2.69 The proposed project aligns with the following key national technical standards:

#### Antigua and Barbuda:

- **Physical Planning Act (2003).** In Antigua and Barbuda, any intervention in sensitive ecosystems that includes alteration or modification of wetlands requires an Environmental Impact Assessment (EIA) in accordance with the Third Schedule of the Physical Planning Act of 2003. The Act further provides the timing and responsibilities of the various stakeholders throughout an EIA process.
- **Environmental Protection and Management Act (EPMA, 2019).** The EPMA's Part VI "Environmental Management and Monitoring", in Section 39, provides for Environmental Management Systems (EMS). This Section mandates that the Department of Environment promotes the adoption and implementation of EMS, and that it assists the Bureau of Standards in this regard. The EMS will guide compliance with the objectives of the Environment Act, including compliance with permissible levels of pollution, protection of waterways, efficient use of resources, and other environmental principles established by the Act. The project seeks to fulfil the water quality requirements established under Schedule VII of the EPMA.
- **Public Utilities Act (1973).** Section 5 (1) of the Public Utilities Act 1973 outlines that the Antigua and Barbuda Public Utilities Authority ('Authority') possesses the exclusive right to supply, distribute, maintain and sell water and electricity. Permission for off-grid renewable energy generation and use from the Authority would be required.
- **Renewable Energy Act (2015).** The Minister of Public Utilities, Civil Aviation and Transport is responsible for issuing renewable energy generation licences under section 11 of the Renewable Energy Act. As the proposed project includes renewable energy-based interventions, the Act is a relevant point of entry for the project to legally be applied to sustainable farming projects in Antigua and Barbuda.

### Saint Kitts and Nevis:

- **Development Control and Planning Act (2000).** Section 26, in accordance with the Third Schedule, stipulates that an EIA is required for several applicable interventions such as the construction of dams and reservoirs, desalination plants, water purification plants and any development in sensitive environmental areas such as wetlands. Section 26 outlines the process flow and associated timelines and requirements to which the proposed project will adhere.
- **National Conservation and Environmental Protection Act (1987).** This Act declares all ghauts to be a special area of concern. According to Section 37, written permission from the Minister is required for the construction of any structure in this special area. It should be noted that the National Conservation and Environmental Protection Act (1987) is under revision. A draft National Conservation and Environment Management Act (NCEPA) was prepared before mid-2021 and could be passed by the time the project comes into operation (if approved).
- **Agricultural Development Act (1973).** Section 12 of this Act states that the Minister may, with the approval of Cabinet, enter into agreements on behalf of the Government with the Caribbean Development Bank (or with such other Bank as may be designated by Cabinet for the purpose) providing for the undertaking by or on behalf of the Government or by any agency thereof with the financial assistance of the Caribbean Development Bank (or of such other Bank) of projects for the development and conservation of water supplies for agricultural purposes and for soil improvement and conservation that will enhance efficiency in any area of the State specified in the Agreement.
- **St. Christopher Electricity Supply Act (2011), Amendment (2015); Nevis Revised Electricity Ordinance (2009).** While both islands operate with self-regulated centralized utilities established through this Act and Ordinance, both have legislations which authorize private electricity generation and provide a degree of flexibility for scaling up each grid.

### Saint Vincent and the Grenadines:

- **Town and Country Planning Act (1992).** Under Article 29, an EIA is required for environmentally sensitive projects and activities. The Physical Planning Unit (PPU) has the legal authority for environmental management in general under this Act, including the evaluation of the need for and level of EIA required. In Saint Vincent and the Grenadines, there is no grading system for projects requiring EIA, but the scope of the EIA is determined through discussion with the PPU. The proposed project will follow this procedure. Additionally, due consideration will be given to the content of the Environmental Management Act (2009) and the Environmental Impact Assessment Regulations (2009).
- **Waste Management Act (2000).** Activity 2.2.3, which involves the development and implementation of an agricultural waste management system, will be carried out in accordance with the Saint Vincent and the Grenadines Waste Management Act. A waste management license it to be obtained from the Minister responsible for Health and the Environment.
- **Central Water and Sewerage Act (1978).** This Act serves to make better provision for the conservation, control, apportionment, and use of water resources of Saint Vincent and the Grenadines. All interventions related to desalination and rainwater harvesting will be undertaken in accordance with its content.

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

2.70 There are a number of projects in each country and at the regional level that target similar areas of work. However, none of these currently duplicates the activities proposed in this concept note. Many of them lay the foundation for upscaling of proven adaptation solutions. Others are complementary. Ensuring close cooperation with these during project design will allow to maximize impact at the national and regional levels. The below table summarizes the results of a preliminary mapping undertaken in consultation with the respective Governments:

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
<b>National: Antigua and Barbuda</b>					
An integrated approach to physical adaptation and community resilience in Antigua and Barbuda's northwest McKinnon's watershed	2017-2024	9,970,000	Adaptation Fund	DoE, Ministry of Health and the Environment	This Adaptation Fund grant allows Antigua and Barbuda to implement an integrated approach to physical adaptation and community resilience in one of its watersheds. The three-pronged intervention encompasses the installation of natural and physical drainage systems, the disbursement of concessional loans through a revolving fund mechanism to support vulnerable households in meeting new adaptation guidelines and standards for built infrastructure, as well as community-awarded contracts and climate-resilient community-built infrastructure. The project is relevant to the proposed one since livelihoods in the McKinnon's area are, inter alia, dependent on farming. Should this concept note and subsequently the funding proposal be approved by the Adaptation Fund, beneficiary selection would take into consideration the previous support provided to individuals in the McKinnon's area. The climate-resilient community centers could be used for training sessions or public outreach events at the local level.
Innovative technologies for improved water availability to increase food security in Antigua and Barbuda	2020-2023	250,000	Adaptation Fund	DoE, Ministry of Health and the Environment	This small grant awarded to Antigua and Barbuda under the Programme on Innovation enabled the demonstration of solar-powered reverse osmosis technology and solar-powered water pumps for agricultural production, as well as the conduction of an agriculture technology assessment as well as a study of the potential for market mainstreaming

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					of new technologies for the agriculture sector. As with the Technical Cooperation Project (TCP) described below, the results of these pilots and studies are of major importance for the planned Adaptation Fund project. They form the basis for upscaling.
IICA Covid-19 Response for the Caribbean: Mitigating the impacts of COVID-19 through the supply of fresh food to rural households	2021	25,000	Inter-American Institute for Cooperation of Agriculture (IICA)	IICA	This project was a small, yet important initiative aimed at boosting the productive capacity of small farmers in rural communities of Antigua and Barbuda. It supported the improvement of irrigation technology and the provision of enhanced planting material to mitigate the impact of the Covid-19 pandemic on national food and nutrition security. Four farmers benefitted from these inputs. Achievements (e.g., observed benefits of drip irrigation, data on harvest yields) as well as challenges (e.g., dry spell coupled with reduced water supply for irrigation, market gluts) were carefully recorded and will inform the detailed design of the proposed project.
Laying the foundation for enhanced water security and climate resilience in agricultural production	2023-2025	200,000	FAO	FAO	FAO, with the support of Texas Tech University is currently supporting the Government of Antigua and Barbuda in pilot-testing solar powered reverse osmosis technology for brackish water desalination. A mobile zero-waste, solar-powered reverse osmosis system is being established as part of this TCP to study the costs and benefits of this technology for the local agriculture sector. It is expected that this pilot will yield valuable results for potential upscaling within the country and other islands with similar



Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					characteristics in the Caribbean. Results will be integrated at project preparation stage.
<b>National: Saint Kitts and Nevis</b>					
St. Kitts and Nevis Enhancing Agricultural Adaptive Capacity to Climate Variability Project	2018-2022		Taiwan International Cooperation and Development Fund (ICDF)	Taiwan Technical Mission in Saint Kitts and Nevis	This project supported the installation of four agricultural weather stations in priority areas across Saint Kitts and Nevis; the creation of an agricultural information platform, a crop suitability map and annual climate risk calendar; as well as technical training for agricultural officers in basic weather forecasting and for farmers in the use of agricultural information. The proposed project will continue this work by further upgrading the existing network of agrometeorological stations, feeding additional data into the agricultural information platform, developing SMS-based farm advisories; and expanding farmer training in collection, monitoring and analysis of relevant climatic, soil and crop data.
Improving Environmental Management through Sustainable Land Management in St. Kitts and Nevis	2020-2025	3,015,982	Global Environment Facility (GEF)	Implementing – United Nations Environment Programme (UNEP); executing – International Union for the Conservation of Nature (IUCN)	Among other key activities, this GEF-6 project supports the updating/revision of Saint Kitts and Nevis' National Physical Development Plan; the production of baseline digital land use maps of areas of high environmental concern; capacity-building for relevant institutions, civil society organizations and communities for more coordinated and effective action on sustainable land management and CSA; and the provision of water storage tanks and accompanying distribution lines to approximately 100 farmers for more sustainable and climate-friendly agricultural

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					production. The proposed AF project will utilize the digital land use maps during the delimitation of the target areas and will seek collaboration with UNEP, IUCN and the Department of Agriculture to obtain a better understanding of the post-intervention CSA adoption capacity of the 100 beneficiary farmers.
Greenhouse Village Project (Brotherton's Estate region on the outskirts of Newton Ground)	From 2024	TBD	Ministry of Agriculture, Fisheries, Marine Resources and Cooperatives	Ministry of Agriculture, Fisheries, Marine Resources and Cooperatives	The first phase of this project will involve building 15 cutting-edge greenhouses with a focus on mass-producing priority crops like broccoli, cucumbers, tomatoes, peppers, and leafy greens so that the residents of St Kitts and Nevis can have access to them throughout the year, hence lowering the country's import dependency. This initiative is consistent with the imperatives posed by the climate crisis and the rising food import bill. Depending on the pace of the undertaking, its results would be taken into consideration during funding proposal design to ensure synergies where possible. If the model proves effective, it may qualify for replication in Nevis and/or the other two participating countries.
<b>National: Saint Vincent and the Grenadines</b>					
Conserving Biodiversity and Reducing Land Degradation Using a Ridge-to-Reef Approach	2019-2023	3,757,102	GEF	Implementing – United Nations Development Programme (UNDP); executing - Ministry of Agriculture, Rural Transformation, Forestry, Fisheries and Industry	Amongst other things, this GEF-6 project is to enhance SLM practices in three upper watersheds in and surrounding the Central Mountain Forest Reserve; develop and initiate implementation of a watershed management plan for the Buccament watershed; establish national CSA and SLM learning centers and demonstration sites; create new sustainable livelihoods through the

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					<p>establishment of a sustainable livelihood programme for farmers and others in the target watersheds; ensure that technical knowledge is captured, and experiences and lessons are learned and disseminated; and enhance public awareness of SLM and CSA through environmental education. In addition to aligning the proposed interventions locally with the technical outputs of this GEF project and harnessing the infrastructure, knowledge and relationships built, due consideration will be given to the results of the mid-term evaluation, which revealed significant operational challenges and articulated a set of useful recommendations to be taken into account during full funding proposal preparation.</p>
Resilient Recovery Rapid Readiness Support in St. Vincent and the Grenadines	2021-2022	299,839	Green Climate Fund (GCF)	FAO	<p>The key output of this small project was a resilient recovery strategy and accompanying investment plan and project concept note to address the combined adverse impacts of the Covid-19 pandemic, the volcano eruption and climate change. The work undertaken on the health-agriculture-climate change nexus will inform the final selection of the adaptation measures to be implemented in Saint Vincent and the Grenadines.</p>
Promoting Livelihoods Recovery and Resilience Through Youth and Women-led Resilient Value Chain Development and Entrepreneurship in St. Vincent and the Grenadines	2022-2023	160,000	FAO	FAO	<p>This TCP financed technical assistance in two priority areas of the Ministry of Agriculture, namely (i) a soil analysis to determine soil rehabilitation and/or management requirements and commodity value chain suitability by agro-ecological zone and (ii) the increased involvement of women and youth in resilient value chain development and entrepreneurship. Both aspects</p>

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					are highly relevant to the proposed project: The soil analysis will yield valuable information for the envisaged training component and the entrepreneurs supported can function as trainers for the next cadre of young and female agro-entrepreneurs to be built under the proposed project.
<b>Regional (with participation of at least one of the targeted countries)</b>					
Mexico-CARICOM-FAO Initiative “Cooperation for Adaptation and Resilience to Climate Change in the Caribbean” (“Resilient Caribbean Initiative”)	2018-2024	5,578,354	Government of Mexico	FAO	This 14-country initiative comprising of three components and 4 subprojects is providing a small group of farmers in Antigua and Barbuda and Saint Kitts and Nevis with solar-powered drip irrigation systems and associated training, among other activities such as the introduction of the AGI tool. It is also supporting the expansion of aquaculture and aquaponics in Saint Kitts and Nevis (some of the systems are solar powered) and the development of a more resilient school feeding programme in Saint Vincent and the Grenadines. These pilot interventions do not duplicate the proposed activities; they will yield valuable results and lay the foundation for replication and upscaling through donors like the Adaptation Fund. The ongoing final evaluation will yield a list of stakeholders’ key lessons learned, good practices, strengths and weaknesses of the project structure, etc. which would inform the design of the proposed project.
Strengthening the foundation for a climate	2020-2022	1,199,943	GCF	IICA	Several outputs of this regional-level readiness project will inform and be utilized by the proposed components. As such, case studies of

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
responsive agricultural sector in the Caribbean					on-farm and in-field good and climate-responsive agricultural practices, tools, methods, systems, innovations, technologies and pilot projects across the region and the associated open access knowledge management portal will be integrated into technical training for agricultural stakeholders. Also, the roster of youth volunteers may aid in identifying young persons in Saint Kitts and Nevis and Saint Vincent and the Grenadines, who are eager to engage in the project's CSA interventions as agents of change.
Innovative Protected Cultivation Systems in the Caribbean	2021-2023	500,000	FAO	FAO	This project helped several Caribbean countries, including Antigua and Barbuda and Saint Kitts and Nevis, to optimize and adapt protected cultivation systems for seedling and vegetable production (e.g., greenhouses, net-houses, hydroponics) given their resilience against extreme climatic events. The requested Adaptation Fund grant would capitalize on the improvements made, build on the enhanced knowledge base of smallholders and extension staff, and contribute to implementing the upscaling plan.
CSIDS-SOILCARE Phase 1: Caribbean Small Island Developing States (SIDS) multi-country soil management initiative for Integrated Landscape Restoration and climate-resilient food systems	2021-2025	7,271,963	GEF	Implementing - FAO; Executing - Partnership Initiative for Sustainable Land Management (PISLM)	This multi-country project supports the strengthening of the national and regional technical capacity and coordination on soil information and analysis, the rehabilitation of land and soil degraded areas, the development of regional guidelines on CSA for Caribbean SIDS, and the mobilization of the private sector in support of land degradation neutrality. The outputs of CSIDS-SOILCARE Phase 1 will not

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					duplicate but enable and facilitate the upscaling of the envisaged adaptation measures under the proposed project.
Driving innovative financing and sustainable investments toward food system transformation and achieving SDGs in the Caribbean	2023-2025	300,000	FAO	FAO	This 13-country FAO-led TCP is consistent with the objective of Component 3. Among its key outputs are a strategic investment framework and a resource mobilization strategy and stakeholder engagement plan to build more resilient and competitive agricultural and fisheries value chains and increase value chain actors' access to innovative finance and investment for transforming food systems in the Caribbean. While this TCP is an important macro-level intervention targeting a larger number of Caribbean countries and stakeholders, the proposed project intends to place more emphasis on technical assistance to selected local financial institutions and smallholder farmers at the local level to address deeply entrenched supply and demand side barriers. It is expected that the outputs of the two projects will mutually reinforce each other.
Caribbean Agricultural Productivity Improvement Activity (CAPA)	2023-2026	5,300,000	United States Agency for International Development (USAID)	Improving Economies for Stronger Communities (IESC)	CAPA targets small-scale farmers and other actors in the fruit and vegetable industry in the Eastern and Southern Caribbean and promotes the use of market-driven agricultural practices and technologies to enhance their connection with domestic and regional markets. It seeks to strengthen their knowledge, skills and access to agricultural inputs and technologies, with an emphasis on women and youth. The programme also helps farmers meet quantity and quality

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					requirements, establish formal agreements with buyers, and improve their bankability to access financial services. As such, this regional project takes a very similar approach to the one chosen in the present concept note. However, adaptation to climate change is not its core priority and the challenges associated with declining water availability are not comprehensively addressed. To avoid any form of duplication, USAID and IESC will be consulted during detailed project design to identify potential synergies and opportunities for co-financing.
GCAF Caribbean: Gender-responsive Climate-smart Agriculture and Food systems in the Caribbean	From 2024	7,355,125.75	Government of Canada	FAO	GCAF has not yet started but is expected to become operational in Q2/Q3 2024. It targets eight Caribbean countries, including Saint Vincent and the Grenadines, and has a strong focus on women and youth in climate-smart agrifood systems. It seeks to design and disseminate knowledge products to policy makers to improve the enabling environment for adoption of gender-responsive climate-smart technologies, innovations and practices; improve the operations and climate resilience of production and/or agroprocessing facilities; strengthen the organizational capacity of women and youth producer organizations to develop viable business models and tools to improve market access and finance; establish agreements between farmers/agroprocessors and local businesses, institutional buyers and other markets for supply of locally produced foods; and deploy gender-responsive decision-support tools for multi-hazard

Project title	Duration	Total cost (USD)	Main donor	Main implementing and/or executing entity	Lessons learned to be taken into consideration; areas of overlap and complementarity
					<p>risk management. GCAF will leverage the experience and lessons learned of the Resilient Caribbean Initiative described above. The proposed Adaptation Fund project would specifically build on GCAF by harnessing the partnerships established with women and youth producer organizations in Saint Vincent and the Grenadines, carrying CSA interventions supported by GCAF to the next level and/or scaling up successful adaptation approaches to other areas/beneficiaries within the country or beyond.</p>



***If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.***

2.71 Regular exchange and careful documentation of experiences and lessons learned as well as target group-oriented knowledge products and user-friendly channels for broad dissemination of relevant information are critical for continuous learning and improvement on climate change adaptation. While learning through targeted capacity-building for farmers and other agri-food chain actors will form an integral part of all project components, Activity 3.2.5 will place particular emphasis on exchanging knowledge, documenting it, translating it into tailored gender-sensitive communication products and sharing it.

2.72 Annual knowledge sharing forums at the regional level will bring together diverse public and private actors involved in agri-food systems across the three countries to discuss their experiences with the project interventions and make recommendations going forward. These events will be repeated every 12 months to encourage periodic reflection on the interventions and allow for corrective action where needed. They will be implemented in collaboration with relevant existing networks such as IICA's Caribbean Climate-Responsive Agriculture Forum (CCRAF), which helps translate knowledge into practical actions on the ground. Best practices and lessons learned will be carefully documented and fed into relevant knowledge sharing platforms, such as the Climate-Smart Agriculture Knowledge and Information Platform (CSAKIP) currently being built by CDB. This web-based platform will enhance regional agri-food chain actors' access to information on new climate-smart technologies and validated research. CSAKIP will host gender-responsive, multi-media agriculture extension aids responding to stakeholders' immediate capacity-building needs. The proposed project will complement these instructional materials by supporting the creation of additional gender-sensitive knowledge products (e.g., fact sheets, infographics, short videos, case studies, policy briefs, manuals) on agricultural water management, sustainable soil management, protected agriculture, and access to private adaptation finance, among others. Information on proven tools and approaches supporting climate resilience in farming, as well as stories capturing voices from communities and practitioners on the ground will be shared through the Caribbean Resilience Knowledge Platform. This online hub, launched by the Caribbean Natural Resources Institute (CANARI) in August 2023, fosters knowledge sharing, learning and collaboration among civil society organizations and their public and private sector partners to scale up action for climate justice and resilience across the region. To enrich the global knowledge on suitable interventions for climate change adaptation in agriculture from a SIDS perspective, collaboration will also be sought with the Global Alliance for Climate-Smart Agriculture (GACSA). GACSA is an inclusive, voluntary, and action-oriented multi-stakeholder<sup>34</sup> platform hosted by FAO which facilitates dialogue, knowledge exchange and partnerships to scale up CSA.

2.73 The knowledge products will also be disseminated and promoted via CDB's and FAO's websites, social media channels (e.g., Facebook, Instagram, Twitter), television, radio, and face-to-face showcasing events ranging from local meetings to international conferences. Opportunities to highlight success stories of women in agriculture will be harnessed to raise public awareness of women's contribution to the sector and encourage more women to become a part of it.

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<sup>34</sup> It is open to governments, international and regional organizations, institutions, civil society, farmers' organizations, and businesses who agree with the GACSA vision and Framework Document.

2.74 During the entire project duration, the regional executing entity will be tasked to actively encourage and facilitate close coordination and collaboration among the national executing entities and in-country stakeholders. A multi-layered monitoring and evaluation framework and reporting system will be developed in the project start-up phase to ensure accurate monthly recording of experiences and lessons learned at the local, national, and regional levels. Provisions will be made for collection of sex- and gender-disaggregated data.

***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.***

2.75 Caribbean countries that participated in the 37<sup>th</sup> session of the FAO Regional Conference for Latin America and the Caribbean endorsed the regional initiatives including “sustainable and resilient agriculture” and further requested integrated support and implementation of priority areas under the regional initiatives. This high-level consultation provided the framework for technical discussions and project idea definition. The project’s focus on agricultural water management, particularly improving farm water use efficiency (WUE), sustainable soil management, farmers’ financial stability and data and information management, was defined through a participatory approach where stakeholders selected and ranked climate related constraints to small farm crop production and commodity chains. A broad cross section of stakeholders was identified through existing networks, previous and ongoing projects, and interactions with respective national competent authorities. Digital tools and platforms were used to maximize reach and participation across the five countries initially considered (Antigua and Barbuda, Grenada, Jamaica, Saint Kitts and Nevis, Saint Vincent and the Grenadines).

2.76 The process started with a desktop study and targeted online survey of key stakeholders across the five countries to identify the most important adaptation issues in food systems and the most critical gaps for building resilient food systems in a changing climate and to gather information about current and planned national initiatives and suggested interventions to address these gaps. The responses to one of the key questions are presented below:



2.77 Subsequently, a regional inception meeting was held on 15 March 2022. The objective was to share and discuss key findings of the study and survey, broadly scope potential interventions and project partners, capture stakeholders’ suggestions and concerns, and identify country focal points. Key technical aspects discussed during this meeting pertained to

desalination technology; crop and seedling suitability under climate change; farm-level data collection without network connectivity; soil mapping and testing; agrometeorological data and equipment; agricultural waste management and circular economy; insurance options for farmers; land lease and land tenure for vulnerable groups; carbon credits. Based on this first consultation, Antigua and Barbuda, Saint Kitts and Nevis, and Saint Vincent and the Grenadines were selected for the proposed initiative.

2.78 To continue the dialogue with representatives from these three SIDS at the national level, discuss the proposed interventions in more detail, and agree on objective site selection criteria (topography, soil health, annual precipitation, water security, non-water utilities, site access, current land use, land degradation beneficiaries, community vulnerability), country-specific technical meetings took place on 28 July 2022. They were followed by additional discussions with in-country stakeholders to facilitate completion of the site selection template.

2.79 During the validation meeting on 24 November 2022, stakeholders ratified the priority areas of focus and reaffirmed that these are critical in responding to national adaptation needs in the agriculture sector. This resulted in the development of the present concept note. Between late November 2022 and January 2023, follow-up communication occurred with stakeholders at the national level to fill remaining data gaps.

2.80 At all levels the outcomes of consultations were reflected in the development of the concept note. A detailed list of the stakeholders who participated in the different stages of the consultation process is presented below. The table shows that due consideration was given to engaging stakeholders of both genders in each country. Several farmer organizations were invited to participate in the consultation process, but their attendance was relatively low<sup>35</sup>.

Name	Country	Affiliation	Position
<i>Targeted online survey</i>			
Mr. Trevor Thompson	Grenada	Ministry of Agriculture and Lands, Forestry and Marine Resources	Chief Agricultural Officer (Acting)
Ms. Marcia Lord	Grenada	Ministry of Agriculture and Lands, Forestry and Marine Resources	Extension Officer
Ms. Nyasha Moore-Regis	Grenada	Physical Planning Unit, Ministry of Finance	Physical Planner/Architect
Mr. Gerard Tamar	Grenada	Grenada Airports Authority	Senior Meteorological Technician
Ms. Athea Dowden	Grenada	Grenada Chamber of Industry and Commerce	Business Development Officer
Ms. Tessa Barry	Grenada	The University of the West Indies	Assistant Lecturer
Mr. Evans Gooding	Grenada	North-East Farmers Organization Inc.	President
Mr. Bevon Chadel Charles	Grenada	Akata Farms	CEO/Founder

<sup>35</sup> The reason for this could have been the online format. CDB and FAO propose to conduct a series of additional consultations with farmers and other relevant stakeholders prior to the next Adaptation Fund Board meeting. Country-level consultations will continue at the funding proposal stage.

Mr. Derek Charles	Grenada	Inter-American Institute for Cooperation on Agriculture (IICA)	National Specialist
Mr. John Marryshow	Grenada	Communal Cooperative Credit Union	General Manager (Acting)
Ms. Ingrid Goretti Lewis	Grenada	KIDO Foundation	Project Coordinator
Mr. Raheem Smith	Grenada	Caribbean Youth Environment Network (CYEN)	Member
--	Grenada	St Patrick Environmental and Community Tourism	Coordinator
Ms. Joyce Thomas	Grenada	--	Independent consultant on climate change adaptation
Mr. Grady Johnson	Jamaica	Ministry of Agriculture, Fisheries and Mining	Agricultural Economist
Ms. Selvine Stephenson	Jamaica	Agro-Investment Corporation	Strategic Planning Manager
Ms. Jacqueline Spence-Hemmings	Jamaica	Meteorological Service of Jamaica (MSJ)	Head, Climate Branch
Ms. Donnette Henry	Jamaica	National Water Commission	Assistant Vice President, Business Planning and Research
Ms. Wendy Harrison-Smith	Jamaica	National Water Commission	Research and Development Manager
Ms. Lili Ilieva	Jamaica	United Nations Environment Programme (UNEP), Regional Office for Latin America and the Caribbean	Climate Adaptation Specialist
Ms. Tracey Edwards	Jamaica	--	Environmental sustainability coach
Mr. Livingstone Samuel	Antigua and Barbuda	Antigua Public Utilities Authority (APUA)	Supervisor
Ms. Ruth Spencer	Antigua and Barbuda	Marine Ecosystems Protected Areas (MEPA) Trust	Chair
Ms. Refica Attwood	Antigua and Barbuda	Wallings Nature Reserve	Executive Director
Mr. Kelso Clarke	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy (Nevis)	Livestock Officer
Mr. Emile Pemberton	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Deputy Director, Department of Marine Resources
Ms. Cheryl Jeffers	Saint Kitts and Nevis	Ministry of Sustainable Development, Environment, Climate Action and Constituency Empowerment	Conservation Officer
Mr. Meshach Alford	Saint Kitts and Nevis	Ministry of Sustainable Development, Environment, Climate Action and Constituency Empowerment	NDC In-Country Facilitator

Mr. Brian Dyer	Saint Kitts and Nevis	Nevis Disaster Management Department	Director
Ms. Diannille Taylor-Williams	Saint Kitts and Nevis	Saint Kitts Sustainable Destination Council	Chair
Ms. Laurence Knight	Saint Kitts and Nevis	Caribbean Agricultural Research and Development Institute (CARDI)	Technician
Ms. Nerissa Gittens	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Permanent Secretary
Mr. Colville King	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Deputy Chief Agricultural Officer
Mr. Rafique Bailey	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Senior Agricultural Officer, Research and Development
Ms. Donowa Jackson	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Agricultural Officer
Ms. Nyasha Antrobus	Saint Vincent and the Grenadines	Fisheries Division - Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Climate Change Specialist/Environmentalist
Ms. Janeel Miller-Findlay	Saint Vincent and the Grenadines	Ministry of Tourism, Civil Aviation, Sustainable Development and Culture	Director, Sustainable Development Unit
Mr. Neri James	Saint Vincent and the Grenadines	Environmental Health Division – Ministry of Health, Wellness and the Environment	Environmental Health Consultant
Ms. Michelle Forbes	Saint Vincent and the Grenadines	National Emergency Management Organisation	Director
Ms. Tasheka Haynes	Saint Vincent and the Grenadines	United Nations Development Programme (UNDP)	National Coordinator, GEF Small Grants Programme
Ms. Stina Herberg	Saint Vincent and the Grenadines	Richmond Vale Academy	Director
Mr. Deniston Douglas	Saint Vincent and the Grenadines	SCW Producers Cooperative	President
Ms. Lekisha Ernest	Saint Vincent and the Grenadines	Dominica State College	Lecturer
<b><i>Regional inception meeting - 15 March 2022</i></b>			
Mr. Joseph Noel	Grenada	Ministry of Agriculture and Lands, Forestry and Marine Resources	Land Use Officer
Ms. Marcia Lord	Grenada	Ministry of Agriculture and Lands, Forestry and Marine Resources	Extension Officer
Ms. Lindonne Glasgow	Grenada	St. George's University	Associate professor
Ms. Joyce Thomas	Grenada	--	Independent consultant on climate change adaptation
Mr. Winston Shaw	Jamaica	Rural Agricultural Development Authority (RADA)	Senior Director, Technology, Training and Technical Information

Mr. Dwayne Henry	Jamaica	Rural Agricultural Development Authority (RADA)	Director, Project Management and Coordination
Ms. Jacqueline Spence-Hemmings	Jamaica	Meteorological Service of Jamaica (MSJ)	Head, Climate Branch
Ms. Debbie-Ann Gordon-Smith	Jamaica	University of the West Indies (UWI)	Researcher and lecturer, Faculty of Science and Technology
Mr. Ainsworth Riley	Jamaica	Inter-American Institute for Cooperation on Agriculture (IICA)	Agribusiness Specialist
Ms. Tracey Edwards	Jamaica	--	Environmental sustainability coach
Mr. Kenney Manning	Saint Kitts and Nevis	Ministry of Tourism, Labour, Civil Aviation and Urban Development	Sustainable Tourism Coordinator
Mr. Lemuel Pemberton	Saint Kitts and Nevis	--	--
Ms. Sharon Jones	Saint Kitts and Nevis	Inter-American Institute for Cooperation on Agriculture (IICA)	Technical Specialist
Ms. Deborah Daniel	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Agricultural Planning Officer
Mr. Garnet Jeffers	Saint Vincent and the Grenadines	Richmond Vale Academy	
<b><i>Country-specific technical meetings - 28 July 2022</i></b>			
Ms. Denise Knight	Antigua and Barbuda	Ministry of Finance, Corporate Governance and Public Private Partnerships	Senior Economist, Head of the Macro Fiscal Unit
Ms. Maudvere Bradford	Antigua and Barbuda	Ministry of Agriculture, Fisheries and Barbuda Affairs	Senior Research Officer
Mr. Ika Fergus	Antigua and Barbuda	Ministry of Agriculture, Fisheries and Barbuda Affairs	Extension Officer
Mr. Brent Georges	Antigua and Barbuda	Ministry of Agriculture, Fisheries and Barbuda Affairs	Project Coordinator
Mr. Anik Jarvis	Antigua and Barbuda	Department of the Environment - Ministry of Health, Wellness and the Environment	Data Consultant
Ms. Aaliyah Tuitt	Antigua and Barbuda	Department of the Environment - Ministry of Health, Wellness and the Environment	Technical Data Officer - Monitoring, Evaluation and Data Management Unit
Mr. Vekash Khan	Antigua and Barbuda	Department of the Environment - Ministry of Health, Wellness and the Environment	Technical Officer (Renewable Energy)
Ms. Thelma Richard	Saint Kitts and Nevis	Government of Saint Kitts and Nevis	Head of the Civil Service

Ms. Roché Mahon	Saint Kitts and Nevis	Caribbean Institute for Meteorology and Hydrology (CIMH)	Social Science Lead
Mr. Andrew Satney	Saint Kitts and Nevis	--	Trade and Business Policy Consultant
Ms. Sharon Jones	Saint Kitts and Nevis	Inter-American Institute for Cooperation on Agriculture (IICA)	Technical Specialist
Ms. Nikkita Browne	Saint Kitts and Nevis	International Union for Conservation of Nature (IUCN)	Project Coordinator
Ms. Karen Douglas	Saint Kitts and Nevis	Ministry of Sustainable Development, Environment, Climate Action and Constituency Empowerment	Project Accountant
Ms. Teslyn Morris	Saint Kitts and Nevis	Ministry of Sustainable Development, Environment, Climate Action and Constituency Empowerment	Economist II
Mr. Randy Elliott	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Director, Department of Agriculture (Nevis)
Mr. Floyd Liburd	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Deputy Director, Department of Agriculture (Nevis)
Mr. Corey Maynard	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Deputy Director, Department of Marine Resources (Nevis)
Ms. Donna Duncan-Williams	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Agricultural Instructor
Mr. Philbert Gould	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Agricultural Officer
<b><i>Validation meeting - 24 November 2022</i></b>			
Mr. Aldrin Willrock	Antigua and Barbuda	Ministry of Agriculture, Fisheries and Barbuda Affairs	Assistant Lands Officer
Mr. Owolabi Elabanjo	Antigua and Barbuda	Ministry of Agriculture, Fisheries and Barbuda Affairs	Chief Extension Officer
Ms. Petranilla Estreada-Joseph	Antigua and Barbuda	Agricultural Extension Division - Ministry of Agriculture, Fisheries and Barbuda Affairs	Agricultural Assistant III
Mr. Victor Harris	Antigua and Barbuda	Ministry of Agriculture, Fisheries and Barbuda Affairs	Agricultural Assistant

Mr. Oraine Nurse	Antigua and Barbuda	Department of the Environment - Ministry of Health, Wellness and the Environment	Technical Data Officer
Mr. Adolph Audain	Antigua and Barbuda	Southern Farmers' Association	Farmer
Mr. Leon Richardson	Antigua and Barbuda	Hawksbill Agro Industry	Sole proprietor
Mr. Craig Thomas	Antigua and Barbuda	Inter-American Institute for Cooperation on Agriculture (IICA)	National Specialist
Ms. Vashti Ramsey-Casimir	Antigua and Barbuda	Ministry of Tourism and Investment	Senior Tourism Officer
Ms. Ruth Spencer	Antigua and Barbuda	Marine Ecosystems Protected Areas (MEPA) Trust	Chair
Ms. Casey Roberts	Antigua and Barbuda	Antigua and Barbuda National Training Agency	Chief Executive Officer
Mr. Kevin Edwards	Antigua and Barbuda	--	--
Mr. Ian Chapman	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Agricultural Officer
Ms. Aisha Howell	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Senior Project Officer
Ms. Shania Harris	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Extension Officer
Mr. Kevin Jeffers	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Extension Officer
Mr. Reiner Ferdinand	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Extension Officer
Ms. Tonisha Weekes	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Institutional Liaison Officer
Mr. Kyle Flanders	Saint Kitts and Nevis	Ministry of Agriculture, Fisheries and Marine Resources, Cooperatives, Entrepreneurship and Creative Economy	Assistant Secretary



Ms. Thema Ward	Saint Kitts and Nevis	Nevis Island Administration	Senior Environmental Officer
Mr. Glenn Amory	Saint Kitts and Nevis	Ministry of Public Infrastructure, Energy and Utilities; Domestic Transport; Information, Communication and Technology; and Posts	Senior Assistant Secretary
Mr. Sylvester Belle	Saint Kitts and Nevis	Ministry of Health	Health Planner
Ms. Shenel Nisbett	Saint Kitts and Nevis	Ministry of Health (Nevis)	Health Statistician
Ms. Lavern Queeley	Saint Kitts and Nevis	Ministry of Finance	Senior Director
Ms. Sharon Jones	Saint Kitts and Nevis	Inter-American Institute for Cooperation on Agriculture (IICA)	Technical Specialist
Ms. Nerissa Gittens	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Permanent Secretary
Ms. Donawa Jackson	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Agricultural Officer
Ms. Deborah Daniel	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Agricultural Planning Officer
Ms. Donna Duncan-Williams	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Agricultural Instructor
Ms. Jennifer Cruickshank-Howard	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Chief Fisheries Officer
Mr. Fitzgerald Providence	Saint Vincent and the Grenadines	Ministry of Agriculture, Forestry, Fisheries and Rural Transformation	Director, Forestry Department
Ms. Janeel Miller-Findlay	Saint Vincent and the Grenadines	Ministry of Tourism, Civil Aviation, Sustainable Development and Culture	Director, Sustainable Development Unit
Mr. Neri James	Saint Vincent and the Grenadines	Environmental Health Division – Ministry of Health, Wellness and the Environment	Environmental Health Consultant
Ms. Tawakie Richards	Saint Vincent and the Grenadines	Secondary School	Teacher, Integrated Science

2.81 A fair, inclusive, and documented stakeholder engagement process is critical to ensure that the needs, priorities and constraints of individuals, groups, entities, and communities, who will benefit from, influence or be affected by the proposed interventions, inform project design. Should the concept note be approved, a detailed country- and regional-level stakeholder mapping will be undertaken at the beginning of the funding proposal design phase, followed by the preparation of a stakeholder needs matrix and a power-interest grid to determine the expectations and the level of influence and interest of relevant parties. The latter will form the basis for the development of a stakeholder engagement plan for the funding proposal design and project implementation phases in line with the Adaptation Fund’s Environmental and

Social Policy. Considering the nature of the proposed interventions, consultative meetings at the local level will form an integral part of the further elaboration of the proposal to obtain a more nuanced understanding of the specific gaps and barriers vulnerable farming communities, including indigenous peoples (IP), are facing in the context of climate change. At the national level, meetings with relevant government entities, financial institutions, private sector representatives and civil society groups will be conducted and at least one regional multi-stakeholder consultation workshop and one validation meeting will be organized. The stakeholder engagement plan will accommodate gender-based roles, opportunities, and constraints, and will be socially inclusive. In Saint Vincent, a small and geographically isolated Kalinago community can be found at the extreme north-east tip of the island. Given that the villages are among the poorest, and that there have been instances, in which they have been excluded from agricultural projects, CDB and FAO will place particular emphasis on consulting with their representatives. Based on the outcome of these meetings and the results of the climate vulnerability assessment, concrete suggestions as to how they can benefit from the proposed project will be put forward. This is critical since IP are often disproportionately exposed and less equipped to address climate change. To our knowledge, Antigua and Barbuda and Saint Kitts and Nevis do not have notable IP communities. This will however be verified with the competent national authorities during the stakeholder mapping process.

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

2.82 The project addresses a broken link in the agricultural value chain at the stage of production. Traditionally low yields<sup>36</sup> (sometimes below average) are associated with inadequate and inefficient crop management of which water and soil play critical roles. These resource inputs are also related and strongly integrated into climate systems. Regional climate change projections include impacts on water and land resources that require adaptation interventions, particular on small islands with small economies and low resilience.

2.83 Limited attention has been directed at soil management in the region. While island states are small, large variability exists requiring data driven decisions. The infrastructure and systems for data and information are less developed for soil resources and restricted to water resources authorities and regulators for water. Interventions fostering integration and harmonization, access and use of data in a changing climate is essential for sustainability. The alternative scenario with Adaptation Fund support is presented in the table below.

**Table 3: Justification for AF funds**

<b>Project Component</b>	<b>Baseline without Adaptation Funds</b>	<b>Alternative Scenario with</b>
Improved agricultural water management	Across the participating countries efforts have been actioned to improve on-farm and community water management. Rainwater harvesting is a best practice addressing availability. However, attention has not been directed at increasing WUE. Many farmers who use stored water are unaware of the sufficiency of supply	With AF support the assessment of crop water use and use efficiency across agro-ecological zones will be conducted. This information will be supplemented by other climatic data and used to create a decision-making unit informing the required storage capacity of rainwater harvesting units and production capacity. The

<sup>36</sup> FAO and CDB. 2019. Study on the State of Agriculture in the Caribbean Rome. 212 pp. License: CC BY-NC-SA 3.0 IGO

	<p>relative to crop water demands. Where alternative sources of water are used, no consideration is given to water quality and its impacts on crop productivity and safety.</p>	<p>information will allow assessment of projected changes in crop water use and WUE under future climate scenarios, allowing for adjustments. The implementation of modern water purification technology will address issues of poor water quality of alternative sources and also serve to supplement rain harvested water.</p>
<p>Increasing farm system adaptive capacity through sustainable soil management (SSM) and protected agriculture</p>	<p>Soil management is largely restricted to land preparation using either hand or conventional tillage. Soil properties, particularly physical and biological are not monitored and included into management plans. Noting the importance of soil fertility to productivity, chemical properties are assessed, but outside of monitoring programmes and an understanding of the principles and application of ISFM. This has resulted in low return on investment and fertilizer use efficiency (FUE) on tropical soils with high nutrient loss capacities. The low FUE contributes to low yield and environmental pollution and addressing this will serve both adaptation and mitigation objectives.</p>	<p>Building capacity at the farm level for SSM and integrating it through proof-of-concept approaches will provide a programme-based strategy for climate change adaptation and mitigation. The AF support would strengthen the ability of technical stakeholders as well as farmers to conduct soil testing and develop site specific SSM and ISFM plans. Farmers will be guided by suitability analysis from soil and climatic data collection and benefit from management interventions including carbon sequestration. Successful demonstration of the cost effectiveness of selected SSM and ISFM practices coupled with improved farm water management will provide evidence for replication and up scaling. Combined with other projects (SOILCARE) data would be collected, stored and accessed under the Caribbean Soil Information System (CARSIS), while country analytical capacity improved through the Caribbean Soil Laboratory Network (CARSOLAN)</p>
<p>Improving the Financial Stability of Small Famers</p>	<p>No participating country has an agricultural marketing information system. Where such systems are absent farmers and value chain actors depend on traditional linkages and relationships to market produce. This ad-hoc approach limits commodity value chain development as it fosters little confidence in investors with no control of uncoordinated production on small farms. While multiple markets including specialty markets are present, there is a disconnect between market requirements and produce type and quality. A detailed analysis of accessible markets is required.</p>	<p>An assessment of the size and diversity of local markets and the availability and access to market information will support crop planning and production quotas. Further development of data and information systems will strengthen investor confidence and contribute to market sustainability. Such systems are important to climate change adaptation as they allow for analysis of market structure and variability. Additionally, it will work in tandem with outputs of Components 1 &amp; 2 to reveal opportunities for commodity value chains. Through the strengthening of farmer organizations</p>

	<p>Farm operation and development pivots on access to finance. This remains a challenge as small farm size limits traditional sources of finance. The products and services mainly focus on operational costs with limited consideration for developmental and adaptation financing. Most farmers depend on developmental banks and microfinance institutions which are buffered against the high-risk agricultural portfolio. Farmers are mostly responsible for risks associated with climate variation and change</p>	<p>and cooperatives, a sustainable solution to establishing and maintaining delivery agreements can be possible. AF will facilitate the establishment and/ or strengthening of farmer organizations allowing a collective approach to ensuring crop yields and quality.</p> <p>The project will sensitize and support financial institutions to align their products and services to support climate resilience building at farm level. A key aspect of climate resilience is farm insurance. Assessing the scope and conditions of available products would form the basis for developing a collaborative framework of farm level insurance products.</p>
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***Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project/programme.***

2.84 The sustainability of the project outcomes has been considered by ensuring the following:

- a) There is adequate financial support, financing mechanism and management for follow-up activities in the project. In order to optimize resources and to guarantee optimal financial management of the project, FAO has well established grant management and oversight procedures that mitigate these risks associated with financial management. FAO guarantees the operational efficiency, transparency, accountability and financial support, according to its policies and standards for financial management. Sustainable financial mechanisms will be promoted (Activity 3.1.1) and the capacity of small-scale farmers will be improved to access those (Activity 3.2.4), which will allow to scale sustainable and climate-resilient investments for climate change adaptation. The development banks, commercial banks, microfinance companies and credit unions supported under Activity 3.1.1 will play a core role in the project's exit strategy since their updated portfolio of financial products, services and funding programs will enable diverse actors to become or remain part of the region's agrifood system transformation. Farmers and other value chain actors with strengthened capacity in adaptation, business and financial planning thanks to Activity 3.2.4 will be able to access varied types of financial support and impart the knowledge and skills acquired to others within their communities, thereby encouraging continued growth and development of climate-responsive agricultural operations across the three countries. Increased private sector engagement in adaptation is seen as a key pillar for sustaining the results of the proposed project. Additionally, the implementation of best practices and proven technological interventions for climate change adaptation will increase effectiveness of investments and decrease overall cost of production.

- b) There is stakeholder buy-in to the project and direct involvement of key stakeholders at the regional and national levels including the participation of the relevant Ministries of the participating countries, local communities and small farmers from the outset of the project. Harnessing the longstanding experience and expertise of technical officers in the relevant ministries will help to ensure that the interventions are not stand-alone and short-term but integrated into an active portfolio of climate-smart agriculture initiatives and part of a long-term, holistic vision of climate-responsive agrifood systems supporting local and regional production and consumption. As outlined in the previous sections, the proposed interventions are directly aligned with key policy statements and international commitments and will build on several pilot interventions in each country and help upscale their results for maximum impact. Also, the deployment of decision-making tools such as *AGRI Word Sources* will strengthen inter-institutional coordination and cross-sectoral stakeholder collaboration for integrated long-term climate-resilient planning. The knowledge gained by stakeholders, including farmers and other local community members through training in the various areas of the project as well as the experience gained in their application, will be invaluable in ensuring that these approaches are actively adopted and hence contribute to the sustainability of the project outcomes. Particular emphasis will be placed on strengthening the technical and managerial capacity of the extension services so that they can provide more effective guidance to the farmers under their purview and accompany them in adopting changes and handle associated challenges. Furthermore, innovative learning-by-doing methodologies and “Train the Trainer” approaches will be employed to maximize knowledge transfer and foster ownership of adaptation improvements within the countries. The documentation of lessons learned and good practices through linkages with established knowledge platforms will support scaling up of the existing project as well as future projects by allowing for better planning to anticipate and mitigate issues that may arise. Further support for the sustainability of the project results will come from the strong project partnerships with well-established national and regional entities (e.g., CARICOM, FAO, IICA, CARDI, CANARI), which share similar aims and mandates regarding sustainable and climate-resilient agrifood systems.
- c) The infrastructure of the project including reservoirs and demonstration sites will be planned, designed, constructed, operated and maintained with day-to-day involvement of the communities they are intended to serve. The communities will have equitable access and be part of the decision-making on how these infrastructures are managed. Co-management arrangements for post-project operation and maintenance of communal infrastructure deployed by the project will be agreed upon during funding proposal design. Similarly, inter-institutional arrangements will be supported in each country to ensure compliance with the country-specific standard procedures and responsibilities and ensure that the costs of regular maintenance are included as part of the expenditure for regular maintenance. For example, in Saint Kitts and Nevis, the Department of Agriculture would liaise with the Public Works Department in this regard. The implementation of these infrastructures will have minimum or no negative environmental impact and will support the economic, financial, and social development of the communities over the entire infrastructure life cycle.
- d) The project implementation and operation will adhere to local policies and governance arrangements in a manner that ensures there are continuous flow of net

benefits to the communities and continued community involvement especially if policy or governance arrangements changes are needed.

- e) The project was designed with scaling up and sustainability in mind. There is a commitment on the part of the participating countries to take the lessons from field-based activities implemented during the project and to replicate in other areas of the country. The lessons provided through implementation of various activities of the project could be used as the basis for upscaling the project.

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

2.85 This project was developed in compliance with the fifteen (15) environmental and social principles of the Environmental and Social Policy of the Adaptation Fund and in compliance with CDB's Environmental and Social Review Procedures (ESRP). A preliminary environmental and social assessment was conducted for the project concept note concluding that the project is likely to be classified under Category B of risk. The results are presented in the table below. A detailed environmental and social impact assessment, including mitigation measures and environmental and social management framework, will be conducted during the stage of proposal development.

<b>Checklist of environmental and social principles</b>	<b>No further assessment required for compliance</b>	<b>Potential impacts and risks – further assessment and management required for compliance</b>
Compliance with the Law	Adherence to national laws and regulations, including environmental and social requirements in Borrowing Member Countries, is imperative for all projects and activities financed by CDB. In cases where national requirements for environmental and social areas are absent or in the process of development, CDB relies on established rules, international best practices, and directives as reference documents. In support of the Proposal, the Bank's environmental and social assessment will, when relevant, provide a comprehensive description of the legal and regulatory framework associated with any project activity necessitating prior authorization. This may include, but is not limited to, planning permission, environmental permits, construction permits, permits for water extraction, emissions, and the use or production/storage of harmful substances.	N/A
Access and Equity	There is a low risk that the beneficiary might have no access to project benefits because of existing institutional mechanisms that may pose a barrier to ensuring the participation of communities, marginalized and vulnerable groups, and stakeholders of the project. Poverty and vulnerability reduction are central to the objectives of the Bank's work and as such its investment financing operations are required to promote and enhance equity of development benefits, increase equitable access to basic goods and services, and promote inclusion and greater social cohesion.	N/A
Marginalized and Vulnerable Groups	The project activities will benefit vulnerable and marginalised groups as these populations are concentrated in farming communities. None of the activities planned are expected to negatively affect members of the communities engaged in other types of livelihoods. None of the activities are expected to create negative changes in food security or traditional cultural practices. Members of the community, apart from the direct beneficiaries will continue to be included in the consultative process in the development of the project.	N/A
Human Rights	St. Vincent and the Grenadines, Antigua and Barbuda, and St. Kitts and Nevis are signatories for Universal Declaration of Human rights, and they continue to observe and promote all the rights enshrined in the obligations emerging from the Declaration. There is no aspect of the project which will minimise any of these rights.	N/A

	Furthermore, provisions are made in domestic law for the three countries for upholding of these rights.	
Gender Equality and Women's Empowerment	The project will provide opportunities to enhance gender equality and activities will be designed to accommodate women, youth, persons with disabilities, as well as consideration of their tailored care and responsibilities. This will result in enhanced leadership roles, as well as reduce dependency and vulnerability. Climate change can bring about changes in gender relations and roles, particularly within the agricultural sector. Therefore, particular importance will be placed on the provision of education and training in the use of climate-smart techniques and agriculture to men, women and youth alike. Providing access and equal opportunity to women and youth can substantially strengthen the adaptive capacity of the agricultural sector. This can in turn empower women and encourage growth within the agricultural sector. The project supports capacity building and provides open access for men and women to the resources, rights and opportunities needed for climate change adaptation. For the design of this concept note, a preliminary gender analysis has been carried out. However, a more thorough assessment will be conducted by a subject matter expert in the early stages of the full proposal preparation phase. This will help to obtain a more nuanced understanding of the specific gender-based roles, opportunities, and constraints affecting adaptive capacity in the project areas, and to ensure that the proposed interventions are truly gender-sensitive / -responsive.	N/A
Core Labour Rights	The project was developed with full consideration for the national laws guided by International Labour Organisation core labour standards of which Antigua and Barbuda, St. Vincent and the Grenadines, and St. Kitts and Nevis is a party.	N/A
Indigenous Peoples	The project does not involve any indigenous groups, as such this concern is not relevant in respect of further assessment for ESP compliance.	N/A
Involuntary Resettlement	Based on the nature of the activities described throughout this project, no resettlement is foreseen in the undertaking of any of the project activities.	N/A
Protection of Natural Habitats	N/A	It is impossible to determine whether the project intervenes in any natural habitats given that project sites are not yet to be



		identified. As such it is impossible to determine 1) the presence in or near the project/programme area of natural habitats, and 2) the potential of the project/programme to impact directly, indirectly, or cumulatively upon natural habitats. An initial screening will be required to determine if such habitats exist and whether there is a potential for the project/programme to impact such habitats.
Conservation of Biological Diversity	N/A	As the project sites are currently unknown, it is challenging to ascertain: 1) the presence of important biological diversity in or near the project/programme area; 2) the potential for a significant or unjustified reduction or loss of biological diversity; and 3) the likelihood of introducing known invasive species. A comprehensive screening of the sub-projects will be essential to evaluate the risk of adverse impacts on significant biodiversity or the introduction of unknown invasive species.
Climate Change	N/A	The project aims to build climate resilience of small-holder farming systems through the adoption of climate-responsive innovations for soil and water management, innovative and sustainable financing, and improved data management infrastructure. The three countries that are included in the project are vulnerable to the impacts of climate variability and climate change. Depending on the project/programme area, the site may be exposed to intense rainfall, strong winds, and drought. Consistent with CDB's guidelines, the project will be screened for climate risks and impacts, and resilience measures recommended for integration into project designs.
Pollution Prevention and Resource Efficiency	N/A	There is a potential risk that the project/programme could be implemented in a manner that does not meet applicable standards for minimizing material resource use, waste generation, and the release of pollutants. CDB's Environmental and Social Review Procedures (ESRP) recognises the need to establish appropriate measures to protect human health and ecosystem functions, avoid, prevent, eliminate or minimise air, land, water pollution, reduce greenhouse gas emissions and promote improved resource efficiency as essential elements of improving environmental and social

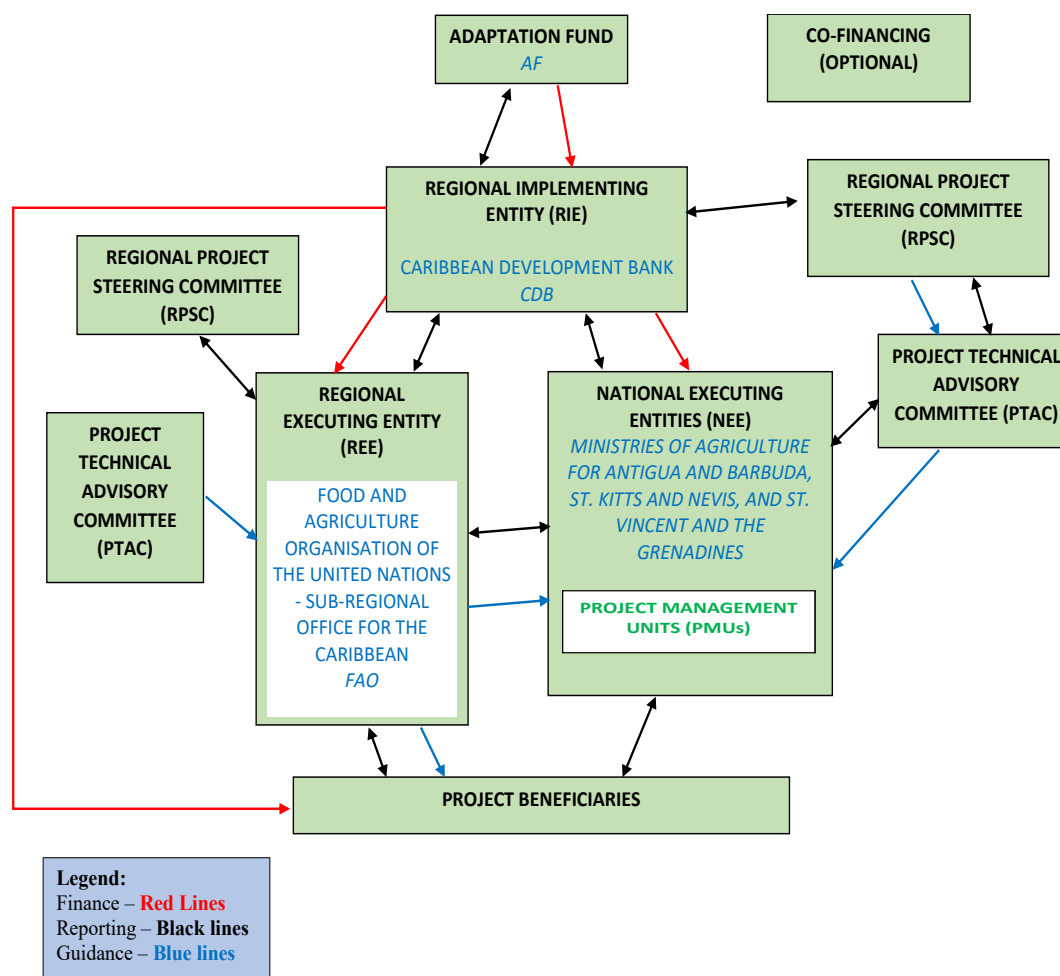
		sustainability of projects, financed by CDB and to meet international best practices. Therefore, CDB will ensure that the project activities do not generate pollution and loss of resources. Hence, the project will contribute to sustainable land management, efficient water use and pest and disease control.
Public Health	As described in the project document, the project will not use any practices that impact negatively on health. The project will contribute to a healthier environment and safer food by using organic matter and agricultural waste management, which will encourage water-use efficiency, prevent depletion of strained water sources, increase primary production and nutrient cycling from organic matter, and sustainable practices aimed at fostering natural resource management.	N/A
Physical and Cultural Heritage	The project activities are mainly improvements on traditional knowledge practices and are not expected to alter, damage, or remove any physical and cultural practices. Therefore, there is no indication that the project will interfere with existing access and use of important physical and cultural resources. CDB-financed operations are guided by applicable international conventions ratified by the countries as well as by national legislation and regulations to avoid adverse impacts on cultural resources. The application of this requirement is designed to promote awareness and appreciation, encourage their protection, conservation and sound management and applies whether the cultural heritage has been legally protected, internationally recognised or previously disturbed.	N/A
Lands and Soil Conservation	N/A	The areas where the project will be implemented are yet to be identified. However, the objective of the project is to promote sustainable land management and sustainable agriculture practices. This includes the adoption of climate-responsive technologies, including micro and drip irrigation, soil and land management, organic matter and agricultural waste management, which will encourage efficient water-use, prevent depletion of strained water sources, increase primary production and nutrient cycling from organic matter and sustainable practices aimed at fostering natural resource management.

## PART III: IMPLEMENTATION ARRANGEMENTS

### *Arrangements for Project Implementation*

3.1 Project management, financial monitoring and reporting to the AF will be coordinated by CDB, the Regional Implementing Entity (RIE). CDB will provide technical, fiduciary, and managerial support throughout all stages of project implementation. According to their respective areas of technical expertise and knowledge of the local conditions and stakeholder landscape, a part of the project activities will be executed by the Ministries of Agriculture in the participating countries and another part by FAO. As a regional executing entity, FAO will also provide overall technical support to the national executing entities.

3.2 A regional Project Steering Committee (RPSC) will be established with representatives from each country. The committee will have as its main task to provide climate policy direction and support to the executing agencies and to comment and review the results of the project from a policy perspective. Similarly, a Project Technical Advisory Committee (PTAC) will be established with representatives from participating countries. The purpose of the PTAC is to provide on-going technical advice to the executing entities. The PTAC will report to the RPSC. Project Management Units (PMUs) will be established in each of the participating countries and will be headed by a project manager.



***Describe the measures for financial and project / programme risk management.***

3.3 The following table will be developed further following discussions with partners during the preparation of the full funding proposal.

<b>Type</b>	<b>Risk</b>	<b>Risk Management</b>	<b>Rank</b>
<b>Financial</b>	Disbursements not received on time.	Ensure the that disbursements are properly aligned with project implementation time.  Ensure that equipment required is procured from initial disbursements.	<b>Medium</b>
<b>Financial</b>	Institutional protocols regarding transfer of funds from execution to implementing agencies.	Ensure a robust structure is in place that satisfies the requirements of respective agencies prior to project implementation.	<b>Low</b>
<b>Social</b>	Limited participation at the community level.	Sustained Engagement with community groups from selected sites during the project development phase .	<b>Low</b>
<b>Institutional</b>	Fragmentation amongst state agencies amongst and within various countries.	Project Manage Unit will consist of persons from all state ministries involved. Quarterly meetings will be convened to ensure all parties are appropriately informed and involved.	<b>Medium</b>

***Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.***

3.4 This section will be built out in line with the Environmental and Social Policy of CDB and the Adaptation Fund. The environmental and social impacts will then be fully determined and categorized.

***Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan, in compliance with the ESP and the Gender Policy of the Adaptation Fund.***

3.5 A Monitoring and Evaluation (M&E) Framework will be developed and will incorporate a regional approach. The M&E framework will be developed and used to measure accountability and performance, assess results, effectiveness, processes and partner performance as well as to facilitate and assess learning, feedback, and knowledge sharing based

on results and lessons learned. The use of this framework will also help the project to determine whether the activities address the different priorities and needs of women, men, youth and indigenous people as well as to assess the impact on gender relations. The design of the M&E Framework will follow SMART goals setting techniques as well as the Gender Policy of the Adaptation Fund. To ensure the effectiveness of the 'gender-specific monitoring and evaluation' system it will be essential that all data is collected, presented and analysed in a sex-disaggregated manner. In addition, regular evaluations of the project (including independent midterm review and terminal evaluation), and ongoing monitoring will be conducted by CDB. The M&E framework arrangements will be fully built out during the full project design stage.

*Include a results framework for the project proposal, including milestones, targets and indicators, including one or more core outcome indicators of the Adaptation Fund Results Framework, and in compliance with the Gender Policy of the Adaptation Fund.*

<b>Table 4: PRELIMINARY RESULTS FRAMEWORK</b>	
<b>EXPECTED RESULTS</b>	<b>INDICATORS</b>
<b>Goal 1: Improving agricultural water management</b>	
<b>Impact:</b> Reduced strain on water resources through enhanced on-farm water management including storage, treatment of communal water sources of low quality and improved water distribution, application and use efficiency. These interventions address the impact that drought and heat waves are exerting on ecosystems, crops and livestock.	
<b>Output 1: Climate-resilient infrastructure and technologies in place to supply water to the farms in a sustainable manner.</b>	
<b>Target 1.1:</b> Determine of the suitability of water treatment options in each community	1.1 Assessment report on need for water treatment.
<b>Target 1.2:</b> Installation of NEWT and other selected smart technologies at selected sites.	1.2. Number of installations
<b>Output 2: Water Use Efficiency (WUE) of prioritized crops increased through Climate-Smart Agriculture (CSA) technology adoption.</b>	
<b>Target 2.1:</b> Determine Crop water requirements	2.1 Database of crop water requirements for selected crops.
<b>Target 2.2:</b> Installation and evaluation of Micro irrigation and fertigation systems at selected sites.	2.2 Number of installed irrigation systems in communities.
<b>Target 2.3:</b> Soil moisture monitoring using LAN interconnectivity for data collection and use	2.3 Number of soil monitoring probes installed. Report on the operationalization of the LAN.
<b>Output 3: Enhanced capacity of farmers and extensionists to plan, design, install and operate on-farm water management systems.</b>	
<b>Target 3.1</b> Identify sites suitable for rainwater harvesting using the AGRI World Sources tool	3.1 Number of potential sites identified. Map showing identified sites.

**Table 4: PRELIMINARY RESULTS FRAMEWORK**

EXPECTED RESULTS	INDICATORS
<b>Target 3.2</b> Ground Truthing of AGR World sources tool outputs	3.2 Validation of selected sites
<b>Target 3.3</b> Construct rainwater harvesting reservoirs and install green and grey infrastructure.	3.3 Number of rainwater harvesting reservoirs constructed.
<b>Output 4: Enhanced technical and practical capacity for improved water management</b>	
<b>Target 4.1</b> Train all relevant personnel in the installation, use and management of WUE interventions	4.1 Number of persons trained. Training workshop report
<b>Goal 2: Increasing farm system adaptive capacity through sustainable soil management (SSM) and protected agriculture.</b>	
<b>Impact:</b> Increased production of agricultural produce by expanding area of production and productivity	
<b>Output 1: Soil, crop and climatic data collection and monitoring system installed/upgraded</b>	
<b>Target 1.1</b> Upgrade existing weather stations and install additional stations for sufficient coverage	1.1 Number of automated weather stations installed. Database for storing and retrieving information.
<b>Target 1.2</b> Demonstration and Training in the use of agricultural drones	1.2 Workshop report on demonstration and training in the use of agricultural drones. Number of drones purchased.
<b>Target 1.3</b> Assess and develop where necessary SMS agroecological and agroecological information systems in collaboration with National meteorological services	1.3 Data sharing agreement with Met Offices. Development of an agricultural met forecasting system.
<b>Output 2: Soil/land-based technologies and CSA practices for outdoor and protected agriculture improved</b>	
<b>Target 2.1</b> To be completed	2.1 To be completed

**Table 4: PRELIMINARY RESULTS FRAMEWORK**

<b>Table 4: PRELIMINARY RESULTS FRAMEWORK</b>	
<b>EXPECTED RESULTS</b>	<b>INDICATORS</b>
<b>Target 2.2</b> To be completed	2.2 To be completed
<b>Target 2.3</b> To be completed	2.3 To be completed
<b>Output 3 Improved technical capacity and data management as it relates to SSM and protected agriculture</b>	
<b>Target 3.1</b> Train all relevant personnel in the use and soil/land-based technologies and CSA practices	3.1 Number of persons trained (workshop attendance). Workshop report.
<b>Target 3.2</b> Develop data sharing policy and knowledge sharing platform for agricultural data and information	3.2 Draft regional data sharing policy.
<b>Goal 3: Improving the Financial Stability of Small Famers and public-private sector coordination to scale up climate-smart agriculture</b>	
<b>Impact:</b> Improved livelihood of farmers and farming communities.	
<b>Output 1: Investment in climate-smart agriculture (CSA) de-risked and offer of financial products and services for CSA upscaling improved</b>	
<b>Target 1.1</b> Train farmers to develop sustainable business models to access loans for investments in climate- resilient technologies and production systems	1.1 Number of farmers with sustainable business models. Training workshop report
<b>Output 2: Improved financial capacity of smallholders and strengthened public-private sector coordination to scale up climate-smart agriculture</b>	
<b>Target 2.1</b> To be completed	2.1 To be completed



*Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund*

Project Objective(s) <sup>37</sup>	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
1. Improved agricultural water management	<ul style="list-style-type: none"> <li>• Reports on the status of agricultural water resources in participation countries.</li> <li>• Map and report identifying suitability of communities for irrigation interventions</li> <li>• Assessment report on need for water treatment.</li> <li>• Number of installations</li> <li>• Database of crop water requirements for selected crops.</li> <li>• Number of installed irrigation systems for in communities.</li> <li>• Number of soil monitoring probes installed. Report on the operationalization of the LAN.</li> </ul>	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	8,932,000
2. Increasing farm system adaptive capacity through sustainable soil management (SSM) and protected agriculture	<ul style="list-style-type: none"> <li>• Number of automated weather stations installed. Database for storing and retrieving information.</li> </ul>	Outcome 6: Diversified and strengthened livelihoods and sources of income for	6.1 Percentage of households and communities having more	1,932,000

<sup>37</sup> The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply.

	<ul style="list-style-type: none"> <li>• Workshop report on demonstration and training in the use of agricultural drones. Number of drones purchased.</li> <li>• Data sharing agreement with Met Offices. Development of an agricultural met forecasting system.</li> <li>• Assessment reports for SLM and protected agricultural structures.</li> <li>• Productivity of farms with SSM and ISFM interventions</li> <li>• Number of farmers that incorporate agricultural waste management into their operations</li> <li>• Number of protected agricultural structures installed and operational</li> <li>• Number of persons trained (workshop attendance). Workshop report.</li> <li>• Draft regional data sharing policy.</li> </ul>	vulnerable people in targeted areas	secure access to livelihood assets.  6.2. Percentage of targeted population with sustained climate resilient alternative livelihoods	
3. Improving the Financial Stability of Small Famers and public-private sector	<ul style="list-style-type: none"> <li>• Number of new financial products and services available to farmers (Special services for</li> </ul>	Outcome 6: Diversified and strengthened livelihoods and sources of income for	6.1 Percentage of households and communities having more	1,000,000

coordination to scale up climate-smart agriculture	females and youth clearly identified) <ul style="list-style-type: none"> <li>• Number of farmers with resilient business plans</li> <li>• Completed framework</li> <li>• Value chain assessment report</li> <li>• Draft framework agreement</li> <li>• Number of farmers with sustainable business models.</li> <li>• Training workshop report</li> </ul>	vulnerable people in targeted areas	secure access to livelihood assets.  6.2. Percentage of targeted population with sustained climate resilient alternative livelihoods	
4. Total Project Cost				11,864,000
5. Project Execution Cost (9.5% of Total Project Cost)				1,127,080
6. Project Cycle Management Fee charged by the Implementing Entity (8.5% of Total Project Cost)				1,008,440
<b>Amount of Financing Requested</b>				<b>13,999,520</b>

***Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.***

3.6 This section to be completed during preparation of the full funding proposal.

***Include a disbursement schedule with time-bound milestones.***

3.7 This section to be completed during preparation of the full funding proposal.

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

**A. Record of endorsement on behalf of the government<sup>38</sup>** *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:*

<i>(Enter Name, Position, Ministry)</i>	<i>Date: (Month, day, year)</i>
<i>(Enter Name, Position, Ministry)</i>	<i>Date: (Month, day, year)</i>
<i>(Enter Name, Position, Ministry)</i>	<i>Date: (Month, day, year)</i>

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<sup>6</sup> 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.

**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*

<p>I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (.....list here.....) and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>	
<p><i>Name &amp; Signature</i> Implementing Entity Coordinator</p>	
Date: <i>(Month, Day, Year)</i>	Tel. and email:
Project Contact Person:	
Tel. And Email:	



## GOVERNMENT OF ANTIGUA AND BARBUDA

Department of Environment  
Ministry of Health, Wellness and the Environment  
#1 Victoria Park, Botanical Garden  
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April 20, 2023

The Adaptation Fund Board  
c/o Adaptation Fund Board Secretariat  
Email: [afbsec@adaptation-fund.org](mailto:afbsec@adaptation-fund.org)  
Fax: 202 522 3240/5

**Subject: Endorsement for “Building Climate Resilience of Agriculture Sector”**

In my capacity as designated authority for the Adaptation Fund in Antigua and Barbuda, I confirm that the above regional project proposal is in accordance with the government's regional priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Caribbean.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Caribbean Development Bank (CDB) and executed by the Food and Agriculture Organization of the United Nations (FAO) and the Ministries responsible for Agriculture in Antigua and Barbuda, Saint Kitts and Nevis, and Saint Vincent and the Grenadines.

Sincerely,

A handwritten signature in blue ink, appearing to read "D. Black-Layne".

Mrs. Diann Black-Layne  
Director of Environment and Ambassador for Climate Change  
Department of Environment, Ministry of Health and the Environment  
Antigua and Barbuda

Tel: (869) 467-1177/1178  
Email: [environment@gov.kn](mailto:environment@gov.kn)



Ministry of Environment, Climate Action,  
and Constituency Empowerment  
Unit C2, Sands Complex  
Bay Road  
Basseterre

## SAINT CHRISTOPHER AND NEVIS



### Letter of Endorsement by Government

24<sup>th</sup> May 2023

To: The Adaptation Fund Board  
c/o Adaptation Fund Board Secretariat  
Email: [afbsec@adaptation-fund.org](mailto:afbsec@adaptation-fund.org)  
Fax: 202 522 3240/5

#### **Subject: Endorsement for “Building Climate Resilience of Agriculture Sector”**

As designated authority for the Adaptation Fund in Saint Kitts and Nevis, I confirm that the above regional project proposal is in accordance with the government’s regional priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Caribbean.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Caribbean Development Bank (CDB) and executed by the Food and Agriculture Organization of the United Nations (FAO) and the Ministries responsible for Agriculture in Antigua and Barbuda, Saint Kitts and Nevis, and Saint Vincent and the Grenadines.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Sharon Rattan', followed by a dotted line.

Ms. Sharon Rattan  
Permanent Secretary  
Ministry of Environment, Climate Action,  
And Constituency Empowerment





**Ministry of Finance,  
Economic Planning, & Information Technology**

Telephone: (784) 456-1111  
Facsimile: (784) 457-2943  
E-Mail: [office.finance@gov.vc](mailto:office.finance@gov.vc)

P.O. Box 608, Kingstown  
St. Vincent & the Grenadines

August 28, 2023

Mr. Mikko Ollikainen  
Manager of the Adaptation Fund Secretariat  
Mail stop: N 7-700  
1818 H Street NW  
Washington DC 20433  
USA

Dear Mr. Ollikainen,

**Subject: St. Vincent and the Grenadines: Designated Authority to the Adaptation Fund**

Please be advised that in my capacity as the Minister of Finance, Economic Planning and Information Technology and in compliance with Paragraphs 21-23 of the Adaptation Fund's Amended Operational Guidelines for 2022, nominates on behalf of the Government of St. Vincent and the Grenadines, Mr. Ricardo Frederick, Director of Economic Planning as the Designated Authority to the Adaptation Fund. Mr. Frederick's contact information is as follows:

Ministry: Ministry of Finance, Economic Planning and Information Technology  
Address: 1<sup>st</sup> Floor Administrative Building  
Bay Street, Kingstown  
Saint Vincent and the Grenadines  
Tel: 1-784-457-1746  
Email: [cenplan@svgcpd.com](mailto:cenplan@svgcpd.com), [rfr frederick@svgcpd.com](mailto:rfr frederick@svgcpd.com)

Thank you for your cooperation.

Yours sincerely,

Hon. Camillo Gonsalves

Minister of Finance, Economic Planning and Information Technology



## Project Formulation Grant (PFG)

Submission Date: 06/30/2023

**Adaptation Fund Project ID:**

**Country/ies:** Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and the Grenadines

**Title of Project/Programme:** Building Climate Resilience of Agriculture Sector

**Type of IE (NIE/MIE):** Regional

**Implementing Entity:** Caribbean Development Bank

**Executing Entity/ies:** Food and Agriculture Organization of the United Nations – Sub-regional Office for Caribbean, and ministries responsible for Agriculture in Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and the Grenadines (National)

**A. Project Preparation Timeframe**

Start date of PFG	<b>February 1, 2024</b>
Completion date of PFG	<b>August 31, 2024</b>

**B. Proposed Project Preparation Activities (\$)**

Describe the PFG activities and justifications:

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p>a. Assess the climate change problem (observed and projected changes) as well as other relevant conditions in each of the three partner countries, define sub-projects, identify project sites, and undertake feasibility analysis to inform sub-project design.</p> <p>b. Under this Activity the consultants/firm will lead the process of identifying the sub-projects to be implemented in each partner country. To accomplish this, the consultants/firm will:</p> <p>c. work with government stakeholders, smallholder farming communities, indigenous peoples, and other relevant actors, including women and youth, to</p>	<ol style="list-style-type: none"> <li>Stakeholder engagement plan.</li> <li>Baseline study (inclusive of climate modelling report) and climate change vulnerability and impact assessment report.</li> <li>Project area and implementation site selection report, inclusive of maps with georeferenced information.</li> <li>Description of clearly defined sub-projects and</li> </ol>	40,000	CDB – <i>amount to be determined.</i>

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p>identify and prioritise specific sites for the sub-projects based on agreed selection criteria.</p> <p>d. based on outputs of relevant projects led by Food and Agriculture Organization (FAO) and other agencies (e.g., Green Climate Fund Readiness project in Saint Vincent and the Grenadines), study the vulnerability to climate change in each country, with a specific emphasis on the agriculture sector, and assess the observed and projected impacts of climate change on local production systems as well as barriers to effective adaptation, define the key climate change challenges and opportunities in regard to the project sites (justification for choosing these sites).</p> <p>e. based on outputs of relevant projects led by FAO and other agencies (e.g., SOILCARE Phase 1, project addressing the water-agriculture nexus in Antigua and Barbuda, project under FAO's Technical Cooperation Programme), collect baseline information to inform the design of the sub-projects. This will include assessing soil health and crop suitability as well as conducting water balance studies, analyzing current agricultural water supply and management systems as well as water use efficiency of prioritized crops with a view to identifying gaps and improving infrastructure and technical capacity, amongst others.</p> <p>f. scope and evaluate potential interventions, in particular soil-based technologies and climate-smart agricultural practices for open field and protected cultivation.</p> <p>g. based on outputs of relevant projects led by FAO, carry out the necessary</p>	<p>recommended adaptation solutions per country.</p> <p>5. Consolidated feasibility study that is informed by individual country studies (inclusive of crop suitability assessments and water balance studies) completed.</p>		

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p>feasibility studies in each partner country to inform sub-project design. This will include technically appraising the proposed adaptation solutions, analyzing the cost-benefit ratio and cost-effectiveness of these; assessing the regulatory, policy and institutional environment and private sector landscape; and undertaking a project financial analysis.</p> <p>h. develop a stakeholder engagement plan.</p>			
<p>a. Undertake a Gender Assessment, prepare a Gender Action Plan, conduct an Environmental and Social Impact Assessment (ESIA) and develop an Environmental and Social Management Plan (ESMP) for the project/programme in the three countries. This will be done according to the Adaptation Fund (AF) requirements and those of the Implementing Entity and will inform the design of the project/programme. The preparation of a separate Indigenous Peoples Plan will be part of this activity if the climate change vulnerability assessment and the outcome of the consultations lead to the conclusion that project activities will be undertaken in areas under the jurisdiction.</p> <p>b. Under this activity the consultants/firm will:</p> <p><b>Gender Assessment and Gender Action Plan:</b></p> <p>a. Undertake desk review of all relevant documents.</p> <p>b. Using differential participatory and consultative (qualitative) as well as quantitative methodologies, conduct a comprehensive gender analysis of the</p>	<ol style="list-style-type: none"> <li>1. Consolidated Gender Assessment completed and Gender Action Plan prepared.</li> <li>2. Consolidated ESIA and ESMP (+ Indigenous Peoples Plan if needed) completed and informed by the Gender Assessment.</li> </ol>	25,000	CDB – amount to be determined.

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p>project. This will include examining the different roles, rights, needs and opportunities of women and men in the context of the proposed project and the respective partner countries; their access to resources, services, and capacity development; their activities; and the constraints they face relative to each other. This assessment will specifically consider the baseline knowledge, attitudes and practices (KAP) of females and males with regards to climate change, climate variability and adaptation in the agriculture sector and draw on data and information produced under relevant initiatives (e.g. the EnGenDER project in Antigua and Barbuda and Saint Vincent and the Grenadines). The analysis will adopt an intersectionality perspective which will allow cross-referencing of intersecting variables such as age, disability, and geographic location.</p> <p>c. Design and implement a post evaluation assessment of primary and secondary (institutional) beneficiaries, disaggregated by sex, to measure changes in KAP.</p> <p>d. Recommend project design features that help address existing gender disparities and foster gender equality.</p> <p>e. Undertake public consultations.</p> <p>f. Define gender-sensitive/-responsive indicators and associated mid-term and final targets to be included in the logical framework at impact, outcome and output level; determine the budgetary allocations for undertaking each of the proposed gender-sensitive/-responsive activities; and recommend mechanisms to ensure implementation of the gender action plan.</p>			

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p><b>ESIA and ESMP:</b></p> <ul style="list-style-type: none"> <li>a. For each partner country, identify the nature and magnitude of any actual or potential changes to the physical, biological, climatic and socio-economic and cultural environment that may result from the proposed project, and rate the probability of these risks occurring.</li> <li>b. Determine the environmental and social impacts of the project construction and operational impacts, both negative and positive.</li> <li>c. Develop an ESMP that identifies measures to avoid, minimise or mitigate and compensate the potential negative environmental and social risks. Specifically, the ESMP will provide details on the project outputs, environmental and social project impacts, mitigation measures being proposed, their estimated costs, parameters to be measured, frequency or timing of measurements and responsibilities for monitoring and reporting during the project's life cycle.</li> <li>d. Undertake public consultations of potentially affected groups and civil society organisations in a culturally appropriate, non-discriminatory and gender sensitive manner to improve the understanding of local conditions and stakeholders' concerns and enable the co-development of appropriate risk mitigation measures.</li> <li>e. Outline the institutional arrangements for implementing the ESMP, including provisions for supervision and regular monitoring.</li> </ul>			

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p>Formulate the project/programme full funding proposal guided by the outline and requirements of the AF – “Fully Developed Proposal for Regional Project/Programme” template. A summary of the requirements of the template is provided below:</p> <p><b>PART I: PROJECT/PROGRAMME INFORMATION</b></p> <ul style="list-style-type: none"> <li>a. Project/Programme Background and Context</li> <li>b. Project/Programme Objectives</li> <li>c. Project/Programme Components and Financing</li> </ul> <p><b>PART II: PROJECT/PROGRAMME JUSTIFICATION</b></p> <ul style="list-style-type: none"> <li>a. Describe the project/programme components, particularly focusing on the concrete adaptation activities.</li> <li>b. Describe how the project/programme would promote new and innovative solutions to climate change adaptation.</li> <li>c. Describe how the project/programme would provide economic, social and environmental benefits.</li> <li>d. Describe or provide an analysis of the cost-effectiveness of the proposed project/programme.</li> <li>e. Describe how the project/programme is consistent with national or sub-national sustainable development strategies.</li> <li>f. Describe how the project/programme meets relevant national technical standards.</li> <li>g. Describe if there is duplication of project/programme with other funding</li> </ul>	<ul style="list-style-type: none"> <li>1. Completed Funding Proposal with all necessary annexes and terms of references for consultancies to support project implementation.</li> </ul>	<p>35,000</p>	<p>CDB – <i>amount to be determined.</i></p>

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p>sources.</p> <p>h. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.</p> <p>i. Describe the consultative process, including the list of stakeholders consulted, undertaken during project/programme preparation.</p> <p>j. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.</p> <p>k. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project/programme.</p> <p>l. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project/programme.</p> <p><b>PART III: IMPLEMENTATION ARRANGEMENTS</b></p> <p>a. Describe the arrangements for project/programme management at the regional and national level, including coordination arrangements within countries and among them.</p> <p>b. Describe the measures for financial and project/programme risk management.</p> <p>c. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.</p> <p>d. Describe the monitoring and evaluation arrangements and provide a budgeted M&amp;E plan.</p>			



List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount	Co-financing (USD)
<p>e. Include a results framework for the project/programme proposal, including milestones, targets and indicators.</p> <p>f. Demonstrate how the project/programme aligns with the Results Framework of the Adaptation Fund.</p> <p>g. Include a detailed budget with budget notes, broken down by country as applicable, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.</p> <p>h. Include a disbursement schedule with time-bound milestones.</p>			
<b>Total Project Formulation Grant</b>		<b>100,000</b>	

### C. Implementing Entity

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation.

Implementing Entity Coordinator, IE Name	Signature	Date (Month, day, year)	Project Contact Person(s)	Telephone	Email Address
Ms. Valerie Isaac Caribbean Development Bank			Mr. Luther St. Ville	1 246 539-1688	<a href="mailto:Luther.stville@caribank.org">Luther.stville@caribank.org</a>
			Mr. Derek Gibbs	1 246 539-1928	<a href="mailto:Derek.gibbs@caribank.org">Derek.gibbs@caribank.org</a>