#### **REPUBLIEK SURINAME**







# Sector Adaptation Strategy and Adaptation Plan (SASAP) for Water Resources in Suriname

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IISD

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#### About the NAP Global Network

The NAP Global Network was established in 2014 to support developing countries in advancing their NAP processes and to help accelerate climate change adaptation efforts around the world. To achieve this, the Network facilitates South-South peer learning and exchange, supports national-level action on NAP formulation and implementation, and generates, synthesizes, and shares knowledge. The Network's members include individual participants from more than 155 countries involved in developing and implementing National Adaptation Plans. Financial support for the Network has been provided by Austria, Canada, Germany, Ireland, the United Kingdom, and the United States. Its Secretariat is hosted by the International Institute for Sustainable Development (IISD). For more information, please visit <u>www.napglobalnetwork.org</u>.











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# Acronyms

BGA	Bureau Gender Affairs
EnGenDER	Enabling Gender-Responsive Disaster Recovery, Climate and Environmental Resilience in the Caribbean
IDB	Inter-American Development Bank
IISD	International Institute for Sustainable Development
IWRM	Integrated water resource management
GCCA+	Suriname Global Climate Change Alliance
KPI	Key performance indicator
MEL	Monitoring, evaluation, and learning
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NIMOS	National Institute for Environment and Development
SASAP	Sector Adaptation Strategy and Action Plan
SDGs	Sustainable Development Goals
SMIN	Environmental Information Network of Suriname
so	Strategic Objective
SWRIS	Suriname Water Resources Information System
SWM	Suriname Water Company
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WEF	World Economic Forum
WR	Water resources

# **1.0 Introduction**

To address the impacts of climate change on its people, ecosystems, and economy, the Government of Suriname developed a National Adaptation Plan (NAP) for the period 2019– 2029. The goals of the NAP are to reduce the impacts of climate change through adaptation and resilience building and to integrate adaptation across sectors and levels of governance. The NAP includes strategic and sectoral elements, and outlines guiding principles for all adaptation actions in the country. It provides the overarching framework for the country's efforts to adapt to climate change over the medium and longer terms.

Suriname's NAP and Nationally Determined Contributions (NDCs) to the Paris Agreement both list the water resources sector as a priority sector for climate action, identifying it as one of the most vulnerable productive sectors impacted by climate change and variability in the short term (Government of Suriname, 2019a, 2019b). The NAP in turn identifies strategic priorities, proposed outputs, and KPIs for adaptation in the water resources sector. However, it does not provide details on how these will be achieved. To address this gap, a sector adaptation strategy and action plan (SASAP) is needed to further elaborate the details of priority adaptation actions to be implemented. The SASAP provides actors in the water resources sector, including government bodies as well as non-governmental stakeholders, with a structured plan for integrating adaptation in the sector, as well as a set of concept notes to be elaborated to enable funds to be secured for implementation of priority actions. It was developed with inputs from a broad range of stakeholders representing different government ministries, conservation organizations, private sector actors, and Indigenous and Maroon organizations.

Suriname's NAP recognizes that the impacts of climate change affect people of different genders in different ways, and that they have differing needs and capacities when it comes to adaptation (Masson-Delmotte et al., 2018; UNFCCC, 2018; Vincent et al., 2014;). One of the strategic outcomes for the NAP focuses on climate change adaptation that respects Surinamese values and culture and reduces gender and other social inequities (Government of Suriname, 2019a). The SASAP aims to advance this outcome, placing gender equality and social inclusion at the centre of actions in the water resources sector in a gender-responsive approach. This is in line with Suriname's commitments to gender-responsive climate action in the Paris Agreement and the UNFCCC Gender Action Plan (UNFCCC, 2015; UNFCCC, 2019).

# 2.0 Background: Water Resources, Climate Change, and Gender in Suriname

This section provides an overview of key issues related to water resources, climate change, and gender, as well as the links among the three.

### **Overview of the Water Resources Sector in Suriname**

Suriname has a tropical climate, uniform temperature, high humidity, and abundant rainfall that averages 2,200 mm/year, making it one of the world's most freshwater-rich countries (EnGenDER, 2021; Soulan et al., 2021). Rain feeds the country's many rivers, groundwater aquifers, and swamps; however, the rainfall is not evenly distributed throughout the country (EnGenDER, 2021; Rusticus et al. 2019). Annual averages vary from 1,750 mm/year in the north to about 3,000 mm/year in the centre of the country (Berrenstein & Gompers-Small, 2016). Water sources include rainfall, surface water, and groundwater, with surface water comprising rivers, wetlands and swamps, and human-made lakes (EnGenDER, 2021; Rusticus et al. 2019). Table 1 provides an overview of the key water resources in the country.

Water Resource	Description
Groundwater aquifers: coastal	The coast has an abundance of high-quality groundwater in coastal aquifers that run tens to hundreds of metres deep (Berrenstein & Gompers-Small, 2016). Three of them, the A-sand, the Coesewijne, and Zanderij aquifers, are key sources for fresh water, yet only one, the Zanderij, recharges from rainwater (Suriname Water Resources Information System, n.d. a). The most extensive coastal aquifers are found in the west of the country (Soulan et al., 2021).
Groundwater aquifers: inland	Located in the impermeable Precambrian Shield, which covers 80% of the country, water in inland aquifers is often unfavourable for consumption (Soulan et al., 2021; Suriname Water Resources Information System, n.da).
Rivers and creeks	There are seven main rivers that discharge fresh water into the Atlantic Ocean, the largest of which, the Marowijne (far east) and Corantijn (far west) rivers, drain 58% of the country's fresh water (Suriname Water Resources Information System, n.d. c). The discharge of the Suriname River is regulated by the Afobakka hydropower dam (Berrenstein & Gompers-Small, 2016).

#### Table 1. Suriname's water resources

Water Resource	Description
Constructed lakes	Brokopondo Lake, officially named the Van Blommenstein reservoir, covers an area of about 1,600 km2 behind the Afobakka dam in central Suriname (Berrenstein & Gompers-Small, 2016). The reservoir was created from 1961 to 1964 following construction of a dam across the Suriname River and is primarily used today for electricity generation for Paramaribo (Soulan et al., 2021).
Freshwater wetlands	Numerous freshwater wetlands are found in Suriname's coastal zone, covering an area of roughly 12,000 km2. From east to west, the four major freshwater wetlands are the Surnau, Coesewijne, Coronie, and Nani. The wetlands all function as potential large freshwater reservoirs (Berrenstein & Gompers-Small, 2016). The Nani Swamp is used to irrigate approximately 18,000 ha of agriculture land, which is mostly rice cultivation (Suriname Water Resources Information System, n.d. b). These swamps drain through small rivers and creeks, and evapotranspiration depletes them significantly (Soulan et al., 2021).
Coastal swamps	These ecosystems contain mainly brackish water, mangrove forests, and low vegetation, including succulent salt plants. They are impacted by tides and are responsible for protecting coastlines and riverbanks from erosion and storm surges. The estuarine zone where these swamps are located hosts the nesting sites of several bird and turtle species and feeding grounds for migratory birds (Government of Suriname, 2019a).

Roughly 98% of the population has access to improved sources of drinking water, with 99% having access in urban areas, 98% in rural coastal regions, and 91% in rural interior regions (Soulan et al., 2021). When improved sources are available, households mainly rely on piped water, wells or boreholes, springs, rainwater, or delivered/bottled water. For coastal areas, the main source of drinking water is piped water, while interior districts mainly depend on rainwater collection (EnGenDER, 2021). However, depending on the region, 5% to 21% of the household population report that they are unable to secure drinking water in sufficient quantities (Ministry of Social Affairs and Public Housing, 2019). Until recently, there was only one drinking water treatment plant, in Marowijne district, which extracts water from the Cottica river. A second plant was launched in Commewijne, where people were reliant on a combination of rain and creek water, in December 2021 (Soulan et al., 2021; STVS, 2021).

When improved sources are not available, households tend to rely on surface water, including rivers and ponds, though these are considered unsafe due to the high likelihood of pathogens (Soulan et al., 2021). Overall, 34% of the rural population, including Indigenous and minority Maroon communities, are also highly dependent on surface water sources, such as rivers and creeks, as well as rainwater for domestic and agricultural purposes (FAO, 2015; EnGenDER, 2021). Most households use septic tanks, but few rural villagers have access to toilet facilities or pit latrines, and improper sewage disposal can affect the water quality of the Suriname River.

## Key Climate Change Issues for the Water Resources Sector

The water resources sector is most affected by changes in precipitation, drought, sea level rise, and flooding. While temperatures in Suriname are expected to continue to rise over the medium and long terms, data gaps mean that it is difficult to model expected changes in rainfall across the same period; what is likely, however, is that the country will continue to struggle with changes in rainfall variability, both geographically and temporally. Each of these climate trends will have significant impacts on the country's water resources.

The following sections describe some of these impacts; it is important to note that impacts on the water sector have consequences for other sectors, including energy, agriculture, livestock, and fisheries. For example, the agricultural sector currently relies on outdated technologies that amplify the impact of changes to water resources. Saltwater intrusion is particularly threatening, as it reduces the water available for irrigation and negatively impacts the fertility of affected lands, which could lead to food shortages or decreased export earnings (Government of Suriname, 2019a).

#### Changes in Precipitation: Decreases in precipitation and drought

Decreased precipitation leading to drought can negatively impact water availability and quality. Decreases in precipitation across catchment areas typically result in rivers carrying less water, reduced discharge in freshwater sources such as wetlands, and lower percolation and recharge rates for aquifers (Soulan et al., 2021). A decline in rainfall and increases in evapotranspiration from warmer temperatures will likely reduce the amount of water available for extraction in the Zanderij aquifer (Berrenstein & Gompers-Small, 2016). In addition, a decrease in the upstream flow of rivers and streams in the interior allows for increased saltwater intrusion and salinization downstream (Berrenstein & Gompers-Small, 2016). The combination of higher temperatures and reduced water flows can also result in more standing water with low dissolved oxygen levels and high bacterial growth—ideal conditions for waterborne diseases (Government of Suriname, 2019b; Soulan et al., 2021).

Decreases in rainfall and increases in drought events negatively impact Brokopondo Lake and the energy industry it fuels (Soulan et al., 2021). The water level depends on rainfall, and fluctuating water levels have led to inconsistencies in hydropower output that can impact access to power, with consequent impacts on the broader economy (Berrenstein & Gompers-Small, 2016; Soulan et al., 2021). For example, during the 2005 drought the reservoir's low water levels led to a 4–5-day power failure (Soulan et al., 2021).

#### Changes in Precipitation: Increase in precipitation and flooding

Increased precipitation can cause flooding in both coastal and inland regions and has done so in recent years. Beyond their often-catastrophic human consequences, floods and intense precipitation events all negatively impact the country's freshwater sources, including its rivers, wetlands, and aquifers. The rapid runoff caused by sudden and intense precipitation reduces the amount of water absorbed into the soil, decreasing aquifer recharge and water availability. Above ground, rapid runoff can lead to the erosion of topsoil, landslides, and the contamination of water sources with manure, pesticides, and garbage, creating a need for enhanced drinking water treatment (Soulan et al., 2021).

These events can also damage Suriname's physical infrastructure. High water levels moving through rivers and streams will lead to riverbank erosion and altered river morphology, which threatens infrastructure along the banks, such as settlements, roads and bridges, and docks for transportation and shipping (Berrenstein & Gompers-Small, 2016; Soulan et al., 2021). Increased rainfall leads to high water levels in swamps and wetlands and often results in the flooding of adjacent farmlands and urban areas (Berrenstein & Gompers-Small, 2016). Damage to water infrastructure and the resulting water quality reduction could result in an increase in the price of drinking water (Soulan et al., 2021).

#### Sea Level Rise

Sea level rise threatens Suriname's coast and can lead to flooding, saltwater intrusion, and salinization of coastal soils and aquifers (Government of Suriname, 2019b; Soulan et al., 2021). Saltwater may push into unconfined aquifers, creating a situation where less freshwater can be stored as the aquifer's water table cannot rise freely (Jiménez Cisneros et al., 2014). Moreover, saltwater intrusion leads to salinization of the aquifer, and alarmingly high salt contents have already been recorded in Nickerie, in the north of Paramaribo, and in Commewijne (Waterforum Suriname, 2019). Saltwater moving further upstream from the coast in Suriname's rivers may displace the salt wedge up to 20 km inland, affecting those coastal farms and industries that rely on river estuaries (Berrenstein & Gompers-Small, 2016). Septic tanks in the coastal area, particularly those with poor design and installation, are at considerable risk, and when combined with a lack of enforcement and monitoring of relevant laws, may result in the pollution of coastal water resources, especially unconfined aquifers. Surface water entering septic tanks after flooding events can also lead to overflow into streams, rivers, and unconfined aquifers (Soulan et al., 2021).

### **Gender Issues in the Water Resources Sector**

For adaptation actions in Suriname's water resources sector to be gender responsive, they must be based on the recognition that there are gender differences in adaptation needs and capacities. Decision making related to adaptation must involve gender-equitable participation and influence, and the benefits from investments in adaptation must be equitably shared (NAP Global Network & UNFCCC, 2019). The following sections provide an overview of the issues that must be considered for a gender-responsive approach in implementing the SASAP. It is important to note that gender is not the only factor to consider—an intersectional approach is needed to address differing needs of rural and urban areas, Indigenous and Maroon communities, and people of different ages and socio-economic status within these communities.

	% of household	of ehold drinking water for the household? (% of respondents)*			What is the average time per day spent collecting water? (% of respondents)*				
without drinking water on premises		<b>Woman</b> (15 years or older)	<b>Man</b> (15 years or older)	<b>Girl</b> (under age 15)	<b>Boy</b> (under age 15)	Up to 30 min	31 min to 1 hr	Over 1 hr to 3 hrs	Over 3 hours
REGION	REGION								
Brokopondo	4.4	61.3	13.1	0	7.4	(96.6)	(0)	(0)	(0)
Commewijne	2.5	60.8	37.6	0	0	42.8	4	0	0
Coronie	2.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Marowijne	3.3	36.8	56.8	0	0	85.2	3.6	0	0
Nickerie	0.5	(24.7)	(63)	(12.3)	(0)	(87.7)	0	(12.3)	(0)
Para	5.4	67.3	22.3	0	4.6	78.2	4.9	0	0
Paramaribo	1.0	26.5	35.1	1.3	0	56.7	9	30.8	0
Saramacca	2.0	39.2	28.6	0	0	(88.8)	(0)	(0)	(0)
Sipaliwini	16.6	66.3	24.5	0.6	1.2	87.2	0	0	0
Wanica	3.0	45.9	31.4	0	10.2	52.4	0	5.1	17.5

\* This information was not collected from the full sample of respondents, so the figures may not add up to 100%.

 Figures where the sample size was 25–49 respondents N/A Figures where the sample size was less than 25 respondents

	% of household	% of household consultation Who is usually responsible for collecting the drinking water for the household? (% of respondents)*			What is the average time per day spent collecting water? (% of respondents)*				
	without drinking water on premises	<b>Woman</b> (15 years or older)	<b>Man</b> (15 years or older)	<b>Girl</b> (under age 15)	<b>Boy</b> (under age 15)	Up to 30 min	31 min to 1 hr	Over 1 hr to 3 hrs	Over 3 hours
ETHNICITY OF H	ETHNICITY OF HOUSEHOLD HEAD								
Creole	2.1	44.4	37	1.4	0	43.6	7	9.1	0
Hindustani	0.9	20.2	55.9	0	0	66.3	2	0	0
Indigenous/ Amerindian	6.8	48.3	41.4	1.1	0	94.3	0	1.2	0
Javanese	0.7	10.3	34.8	0	0	(90.4)	(6.3)	(0)	(0)
Maroon	6.9	63.5	17.9	0.3	7.7	70.8	1.1	4.4	9.2
Mixed ethnicity	1.0	27.2	59.3	0	0	90	0	0	0
Other	3.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WEALTH INDEX	QUINTILE								
Poorest	9.7	57.4	27.3	0.7	6.4	79.7	0.9	6	0
Second	3.0	55.1	32.5	0	0	35.5	0.7	5.5	25.5
Middle	1.0	12.1	17.1	0	0	N/A	N/A	N/A	N/A
Fourth	0.3	(6.8)	(77.5)	(0)	(0)	55.9	(44.1)	(0)	(0)
Richest	0.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

\* This information was not collected from the full sample of respondents, so the figures may not add up to 100%.

() Figures where the sample size was 25–49 respondents

N/A Figures where the sample size was less than 25 respondents

Source: Ministry of Social Affairs and Public Housing, 2019.

### Gender Differences in Roles and Responsibilities Related to Water Resources

Women and men play different roles in water resource management in Suriname. Survey data from 2018 explored issues related to drinking water based on a sample of respondents from over 7,900 households across the country. It reveals that there are gender differences in responsibilities around securing drinking water, but also that the trend differs across different regions, ethnic groups, and wealth levels, as shown in Table 2. This emphasizes the importance of participatory, locally led approaches to adaptation in the water resources sector in the country.

When it comes to broader water resource management, there is less information available on gender-specific roles; however, the NAP highlights women's important role in managing natural resources (Government of Suriname, 2019). Recent analysis of the gender-disaggregated impacts of climate-related hazards highlighted the issues faced by women during menstruation when water is scarce, as well as the vulnerability of pregnant women to waterborne disease and malnutrition. The increased care burden faced by women during crises was also emphasized (Burke, 2020).

#### **Participation in Governance Structures**

In Suriname, women are recognized as agents of change in relation to environmental sustainability and climate action (Bureau Gender Affairs [BGA], 2019). However, they are still often excluded from planning and decision-making processes. Data from 2015 shows that women made up only 36% of city councillors (Gender Equality Observatory for Latin America and the Caribbean, 2021), 35% of district-level councillors, and 45% of local councils (BGA, 2019). At the national level, 2021 data shows less than 30% women in parliament and only 43% among legislators, senior officials, and managers (World Economic Forum [WEF], 2021). The Global Gender Gap Index for 2021 highlights the gap in political empowerment, with a score of only 0.252 out of 1 (a score of 1 indicates parity) (WEF, 2021). Specifically in the water resources sector, data is limited; however, these figures highlight continuing gender gaps in decision-making structures more broadly, which can be assumed to also exist in the water resources sector.

#### The Impact of Gender-Based Violence

When discussing gendered power dynamics, the influence of gender-based violence cannot be overlooked. Survey data from 2018 found that 32% of women aged 15 to 64 in Suriname who had been in an intimate partnership reported that they had experienced at least one form of violence (physical or sexual) by a male partner in their lifetime, while 6% reported that they had experienced such violence in the year preceding the survey (Inter-American Development Bank [IDB], 2019a). The prevalence of physical violence was higher for women who were employed. Among the same respondents, 44% indicated that their partner wants to know where they are at all times, while almost one-third indicated that their partner does not trust them with any money (IDB, 2019). Early marriage is another important issue that impedes women's rights and opportunities—data from women aged 20–24 shows that 36% of were married before they reached the legal marital age of 18—this rises to 46% in Indigenous/Amerindian-headed households and almost half for girls who have not been educated beyond primary school

(Ministry of Social Affairs and Public Housing, 2019). Gender-based violence is an underlying cause that increases women's vulnerability to the impacts of climate change, across all sectors, including water resources.

#### **Economic Empowerment**

The available evidence indicates that women in Suriname typically do not enjoy the same employment opportunities as men, though the dynamics differ across different cultural contexts. Literacy rates are higher for men than for women—96% vs. 93% based on 2018 data (CIA, 2021). In general, women's participation in the labour force is lower, at 38.4% in 2019 (World Bank, 2021). Estimates of youth unemployment in 2016 found that almost 40% of young women aged 15–24 were unemployed, compared to 19% of young men (CIA, 2021). On average, women earn only 56% of the income earned by men (Statista, 2021). The survey cited above found that 62% of all respondents believe that men should be the head of the family, and 65% indicated that it is a woman's role to take care of the home. Further, 16% of women who had been in a partnership had experienced economic abuse, wherein they were prohibited from earning money, refused available money for household expenses, or had their money taken from them (IDB, 2019). These issues inhibit women's ability to participate in community-level actions and governance mechanisms, meaning they are less likely to be able to influence decision making around water resources.

# 3.0 Context for the Water Resources SASAP

This section provides an overview of the context for the Water Resources SASAP, including relevant policies, existing institutional arrangements, and relevant programs that are already being implemented.

### **Relevant Policies**

#### Water

Suriname has committed to the United Nations Sustainable Development Goal (SDG) 6, which focuses on clean water and sanitation for all. This commitment guides the policy of the Ministry of Natural Resources regarding drinking water, which is to protect water resources from pollution. Based on this commitment, by 2030 every Surinamese will have access to safe, clean, and healthy drinking water. An integrated water resource management (IWRM) approach guides the coordination and conservation of water resources, along with awareness raising among the population.

The relevant legislation is out of date: for example, the Water Supply Act was adopted in 1938. Several acts related to water resources remain in draft form, including standards for drinking water and protection of groundwater extraction areas (Rusticus et al., 2019). A recent situation analysis for the implementation of IWRM found that the update and development of the legislative framework is "an urgent necessity" (Rusticus et al., 2019, p. 27). The Suriname Water Supply Master Plan for 2017-2019 highlighted issues such as water availability, leakage, and capacity limitations in pumping and treatment systems, all of which affect water supply. It calls for investments in upgrading water supply facilities, as well as improved coordination and collaboration between stakeholders (Smith, 2019).

#### **Gender Equality**

Gender equality is enshrined in the Constitution of Suriname, which dictates that no one should face discrimination based on sex, race, religion, or social conditions, among other factors (Republic of Suriname, 2000). Suriname's Gender Vision Policy Document for 2021–2035 envisions a society that is "free of gender discrimination, gender stereotypes and gender-related violence, in the public as well as the private spheres" (BGA, 2019, p. 26). The policy document includes environment and climate change as one of its seven priority areas, with the goal of having women actively involved in decision making, gender perspectives integrated into policies and actions, and mechanisms in place for implementing the gender aspects (MoHA BGA, 2019).

Several of the long-term goals relate to the water resources sector and to climate action, as well as to strengthening gender equality in governance structures—these provide a strong foundation for consideration of gender issues in the SASAP. Further, the implementation of the SASAP will be integral to achieving several of the stated goals. Table 3 presents an overview of the relevant goals and actions, with linkages to the SDGs where appropriate.

#### Table 3. Climate change and water in the Gender Vision Policy Document 2021–2035

Goals	Considerations for Implementation				
ENVIRONMENT AND CLIMATE CHANGE PRIORITY AREA					
Achieve universal and equal access to safe and affordable drinking water for all by 2030 (SDG 6.1).	Particular attention will be paid to women in remote areas who rely on river and creek water.				
Achieve proper and reliable sanitation and hygiene for all and put an end to public defecation.	Focus on women and girls, particularly in the interior, and people in vulnerable situations.				
Strengthen participation and support of local communities in improving water management and sanitation (SDG 6.b).	Integration of Traditional Knowledge, particularly that held by women. Community-level education and awareness raising on water management and sanitation, targeting women.				
Promote mechanisms to increase capacities for effective planning and management linked to climate change, focusing on women, young people, and marginalized communities (SDG 13.b).	Encouraging participation of women in decision making on climate change and disaster risk reduction. Awareness and education programs on climate change and biodiversity, incorporating a gender lens. Gender-based analysis of impacts of climate change and environmental degradation.				
Ensure effective participation of women (particularly rural, Maroon, and Indigenous women) in the formulation and implementation of policy and actions plans to protect biodiversity and lower risks of disasters and climate change.	Policies and action plans must explicitly integrate a gender perspective. Specific knowledge and requirements of women must be considered.				
POWER AND DECISION-MAKING					
Full and effective participation of women and equal opportunities for leadership at all levels of decision making in political, economic, and public life (SDG 5.5).	Creating opportunities for women to take on leadership and decision-making roles in government, civil society, and business. Strategies to support equitable economic and social development for rural, Maroon, and Indigenous women. Ensure full and equal participation of rural, Maroon, and Indigenous women in decision-making processes that affect them. Develop training processes to build leadership capacity for women, particularly oriented toward senior management and technical functions.				
Take temporary, special measures to combat gender discrimination.	Use quotas and other proactive measures to accelerate equal representation of women in decision-making structures such as village and district councils.				
Increase awareness among policy- makers and the general public on gender-responsive budgeting.	Demonstrate the benefits of gender-responsive budgeting.				

Source: MoHA BGA, 2019.

#### **Climate Change**

Suriname's National Climate Change Policy, Strategy and Action Plan for 2014–2021 has provided the guiding policy framework for climate action in the country. Its aim is to "reduce the country's vulnerability through the implementation of climate resilience measures in the coastal area as well as the interior, while bringing development through sustainable and clean technology" (Caribbean Community Climate Change Centre & Directorate for Environment, Ministry of Labour, Technological Development and Environment, 2015, p. 39). The policy outlines Suriname's roadmap for achieving climate-compatible development through multiple government and planning cycles. It provides an overview of climate-related mandates of different government institutions and describes capacity-building needs and opportunities, as well as the country's potential for attracting climate finance. It broadly outlines sectoral strategies for priority sectors, which are further elaborated in the NAP (see Section 4 for details).

### Institutional Arrangements for Gender-Responsive Adaptation in the Water Resources Sector

In Suriname, the main government institutions involved in water management are as follows (Rusticus et al., 2019):

- The Ministry of Natural Resources controls the exploitation and management of all natural resources, including water and energy. Under the authority of this ministry, the Suriname Water Supply Company (SWM) is responsible for the water supply in the coastal areas and in the Para, Marowijne, and Brokopondo districts. The Water Supply Department of the ministry is responsible for the rest of the country.
- The Ministry of Public Works is responsible for monitoring of water resources quality and quantity through its Hydraulic Research Division. Its Drainage Works Service maintains drainage structures. Further, the ministry is responsible for producing knowledge on climate and weather, through the Meteorological Service.
- The Ministry of Agriculture, Animal Husbandry and Fisheries is responsible for water management for the agriculture sector and aquaculture.
- The Ministry of Health oversees all water quality-related issues as they relate to human health.
- The Ministry of Spatial Planning, Land and Forest Management has responsibility for protected areas and nature reserves, and therefore also for the water resources in those areas.
- The Ministry of Regional Development and Sport is responsible for improving living conditions of the residents of the (rural) districts and the interior and coordinates participatory decision-making processes at district and sub-district levels.
- The National Institute for Environment and Development (NIMOS) is the lead agency for the NAP process, and as such is responsible for coordinating the integration of adaptation across all sectors.

At the sub-national level, the local government in Suriname is defined by the 1987 constitution, with two levels: the districts and the administrative jurisdictions (sub-district). They do not have direct legal competencies for water management yet.

With respect to gender, the Bureau Gender Affairs (BGA) in the Ministry of Home Affairs (MoHA) is responsible for coordinating and monitoring implementation of the Gender Vision Policy Document. The BGA is tasked with developing and implementing annual workplans for the implementation of the vision, including integrating relevant gender aspects in national development plans and the work of the different ministries. Though gender focal points exist in all ministries, this approach has not found to be effective, and a review of the institutional arrangements is planned (MoHA BGA, 2019). The General Bureau for Statistics holds the responsibility for data collection and management on water resources; however, there are challenges in this process, including a lack of household-level data from the interior regions. Some sex-disaggregated data is collected, and a Gender Statistics document is published every 2 years. However, gender analysis of this data is not typically done (Republic of Suriname, 2018).

### **Existing Programs in the Water Resources Sector**

A number of existing programs in the water resources sector include components that are aligned with the objectives of the SASAP. The implementation of the SASAP should therefore be coordinated with these programs to ensure complementarity and efficient use of resources. Major programs include:

- Water Supply Modernization Program: Financed by a loan from the IDB, the program aims to "improve efficiency, quality, and financial and environmental sustainability of the potable water services provided by SWM" (IDB, 2019b, p. 5). There are three components, focusing on non-revenue water reduction, upgrading water production infrastructure, and institutional strengthening. A social and environmental analysis will help ensure that gender considerations are integrated into the activities (IDB, 2019b). The program was approved in 2020 and is being implemented.
- Sustainable Agricultural Productivity Program: This project, also funded through a loan from the IDB, aims to increase agricultural productivity in Suriname specifically by improving the physical infrastructure and management of irrigation and drainage systems. It recognizes the risks that climate change poses to water use, irrigation, and drainage through more severe and frequent disasters with the potential to impact agricultural outputs. There is an operational policy to ensure gender equality in program development and equity in participation (IDB, 2018). The program was approved in September 2018 and is being implemented.
- Suriname Global Climate Change Alliance: The second phase of this GCCA+ project aims to build Suriname's resilience to climate change impacts through IWRM, sustainable water use, and managing coastal ecosystems in ways that increase the well-being of coastal communities via gender-responsive capacity enhancement. The project has two target outputs: 1) to increase the resilience of coastal ecosystems and communities in the Nickerie and Coronie districts through gender-responsive climate actions; and
   to improve national governance in the areas of IWRM and Integrated Coastal Zone Management. Gender-focused actions include preparing a Gender Action Plan and hiring

a part-time senior gender advisor for the 4-year duration of the project and supporting gender-responsive entrepreneurship in the nature tourism industry (UNDP, n.d.). The program was approved in April 2020 and is currently being implemented.

- Improving Drinking Water Supply and Sanitation in Coastal Suriname: Implemented by SWM, this project aims to supply Suriname's growing urban population with safe drinking water through sustainable water management. As climate change impacts alter rainfall patterns, it is critical that Suriname services develop sustainable water resource management to meet growing urban demand. There are two components: 1) improve the water supply system by increasing the system's treatment and distribution capacities; and 2) strategic water supply planning. It will also expand water services to newly connected villages, improving living and health conditions in these areas (Agence Francaise de Developpement, n.d.). The project started in December 2014 and continues to be implemented.
- Improving Environmental Management in the Mining Sector of Suriname, with Emphasis on Gold Mining: This project seeks to promote the successful application of environmentally responsible mining techniques in artisanal and small-scale gold mining (ASGM), contributing to biodiversity conservation, climate change mitigation, and the reduction of land degradation. For water resources, this means reimagining the current ore processing practices away from rinsing and releasing tailings back into smaller tributaries and causing significant water pollution. For gender, legislation and policies around mining will be assessed and revised to better reflect gender-specific challenges, create opportunities for gender equality, and define gender-relevant development avenues (GEF, 2018). Women and women's groups will be actively consulted throughout and will be encouraged to participate in trainings and mining itself. The project started in February 2018 and is currently being implemented.

A full list of relevant projects and programs is included in Annex 1.

# **4.0 Suriname's NAP Process**

Suriname submitted its NAP to the UNFCCC in June of 2020. The NAP is structured around strategic components and priority sectors, with objectives, expected results, and KPIs identified for each. It describes the mechanisms for management and implementation of the NAP, including existing capacities and institutional arrangements. It also outlines the strategy for funding implementation of the NAP and provides a monitoring & evaluation framework for the strategic components and priority sectors. The NAP is defined as a 10-year process subdivided into three phases, representing the near term, medium term, and long term.

The NAP states that adaptation actions will be aligned with the following guiding principles (Government of Suriname, 2019a):

- Manage risk, build resilience, and explore opportunities
- Legislate
- Equitable participation
- Educate and train
- Inform and report
- Commit resources to goals
- Partner with private sector and prioritize technology
- · Science and research-based decision making

These guiding principles were developed through consultation workshops with stakeholders.

The strategic component of the NAP is organized around six strategic outcomes, each of which has one or more strategic objectives associated with it. These are presented in Table 4.

Strategic outcome	Strategic objectives
1 Institutional arrangements,	1.1 Develop and strengthen climate action-related laws, regulations, and standards.
capacities able to lead and coordinate national and sub-	1.2 Align existing and future national policies to be more effective in taking climate action.
national climate change adaptation.	1.3 Design, implement, and enforce suitable governance procedures and processes to forward the national climate adaptation agenda.
	1.4 Expand institutional arrangements and partnerships to encompass industry, community, and international partners.
2 Data and information collection systems to	2.1 Provide the resources required for ministries to improve climate forecasting for short, medium, and long terms.
and sub-national climate change impacts, vulnerability and adaptation	2.2 Provide the necessary resources to ministries to modernize and expand facilities, tools, and equipment for their climate-related mandates.
decision making.	2.3 Develop and maintain cooperative intra-ministerial agreements on the usage, ownership, storage, and communication of data and information.
	2.4 Increase the capacity for wider partnership involvement in collecting and using national data and information.
3 The integration and institutionalization	3.1 Designation and strengthening of a national lead implementation focal point for the NAP.
adaptation in broader Surinamese economic development policies	3.2 Alignment and reinforcement of climate-related implementation mandates among ministries.
plans, and programs.	3.3 Mainstreaming of climate action across other policy implementation spheres and down through governance levels.
	3.4 Operationalization of climate action across government and partners in international and local community, industry, and civil society.

Strategic outcome		Strategic objectives			
4	National technical capacity that is fully trained and skilled at leading and implementing Suriname's climate change adaptation actions.	4.1	Identify and strengthen knowledge, skills, and experience gaps in the NAP implementation focal point.		
		4.2	Identify and strengthen knowledge, skills, and experience gaps in ministries and programs that contribute to climate action.		
		4.3	Provide the necessary resources for the development and use of tools and systems to support climate action, and to provide opportunities for training relevant to NAP implementation.		
		4.4	Focus on strengthening formal and informal education systems for climate action in Suriname including national retention of capacity.		
5	Climate change adaptation that	5.1	Equitable participation by vulnerable and underrepresented constituents in climate adaptation implementation.		
	values and culture and reduces gender and other social	5.2	Incorporation of local knowledge, experiences, and practices in climate actions.		
	inequities.	5.3	National behavioural, attitudinal, and lifestyle transformation to support climate adaptation activities.		
6	Identify and access financing and investment especially for innovation- driven climate change adaptation technologies.	6.1	Mobilize national and international financial resources.		
		6.2	Create a national enabling environment for financing adaptation.		
		6.3	Introduce market-based incentives for climate financing to encourage private investment in climate adaptation.		
		6.4	Build investment-friendly environment for technology transfer and technology-driven adaptation solutions.		

Source: Government of Suriname, 2019a.

At the sectoral level, three categories of sectors are identified for prioritized adaptation action (Government of Suriname, 2019a):

- **Productive capacity sectors**, which are those driving economic development. These are: water resources, agriculture, forestry, mining, energy, tourism, infrastructure, and housing.
- **Cross-foundational support sectors**, which are the foundation for sustainable development and resilience, namely education and health.
- **Cross-cutting integrative sectors**, which underpin the productive sectors, but require specific attention: environment, disaster risk reduction, and spatial planning.

The water resources sector is identified as a "now" sector, meaning that it is one of the most vulnerable and requires action in the near term. Table 5 presents the strategic objectives and adaptive measures identified for the water resources sector.

 Table 5. NAP strategic objectives (SOs) and adaptive measures for the water resources (WR)

 sector

Strategic outcome		Strategic objectives			
1	Comprehensive national research program on social, environmental, and economic baselines, climate science, vulnerability, impacts, and risk management	1A	Undertake in-depth studies and establish an observation network and monitoring system to enhance water management and sustainable use of water resources.		
2	2 Develop and implement law, policy, and regulation to ensure sustainable exploitation and use of	2A	Develop additional laws, policies, and regulations to support addressing water and climate links, including the law on meteorological services after formal approval of the water law; and development of surface water law.		
and w	and wastewater management	2В	Assess options for the establishment of an institutional organization for the enhancement of water management.		
		2C	Develop robust land management and waste management policies.		
		2D	Develop policy, regulations, standards, and best practice guidance to support national water resource management that is adaptive to climate change.		
3	3 Water management program to increase resilience of water supply		Consider current IWRM approaches and future proposals with the intent of mainstreaming climate change adaptation processes into these frameworks.		
		3В	Identify and implement wastewater recycling schemes, including in the mining and forestry sectors.		
4	Climate-resilient infrastructure	4A	Develop and upgrade infrastructure for water supply and irrigation.		
	availability of drinking water and other uses of water	4B	Develop and upgrade water infrastructure to cope with the effects of climate change.		

Source: Government of Suriname, 2019a.

The NAP recognizes that gender differences, including differences in time use around resources, access to assets and credit, and treatment by markets and formal institutions all influence people's vulnerability to the adverse impacts of climate change. Like in many other developing countries, women in Suriname also play a significant role in natural resources management and other productive and reproductive activities at the household and community levels, making them effective agents of change for adaptation to climate change. Strategic Outcome 5 of the NAP explicitly addresses gender and social equity in adaptation. KPIs for this outcome address engagement of women and vulnerable groups, sustainable livelihoods, particularly for women,

and use of local knowledge, among others (Government of Suriname, 2019). These commitments provide a solid starting point for a gender-responsive SASAP for the water resources sector.

The SASAP builds on the NAP, providing additional context to guide gender-responsive adaptation in the management and use of Suriname's water resources sector. It provides further details on priority adaptive measures and how they should be implemented to yield results that are sustainable and equitable. It should be viewed as a supplementary document to the NAP, to be implemented in concert with overarching adaptation efforts in the country. The document is designed on this basis, with cross-references to the key elements of the NAP, including the strategic objectives and key performance indicators (KPIs).

# 5.0 Process for Developing the Water Resources SASAP

The water resources SASAP was developed over the course of 6 months. As an initial step, the team conducted a literature review on gender and water resources in Suriname, as well as a detailed review of the NAP and other relevant policy documents. This informed development of the background sections of this document. At the same time, the relevant adaptive measures identified for the water resources sector were compiled and descriptions prepared for the first step in the stakeholder engagement process, which focused on prioritizing the adaptive measures identified in the NAP. These adaptive measures were organized into three groups: institutional arrangements, technologies and infrastructure development, and research and assessments.

For this step, stakeholders were consulted through five separate consultation meetings in late September and early October 2021. The meetings targeted the following groups:

- International organizations working in Suriname with environment/climate change in their respective programs
- National and local government
- Government technical institutions and academia
- Conservation organizations
- Civil society, Indigenous groups, and the private sector

Due to the COVID-19 pandemic, face-to-face meetings were not possible. Consequently, the stakeholder engagement process relied on videoconferencing for all meetings. The virtual meetings used the Microsoft Teams platform, while the Mentimeter tool was used for participatory engagement in the process of establishing priorities. The Mentimeter facilitated the following steps:

- Participants were presented with a list of four to six adaptive measures for each grouping (with two sub-groupings for technologies and infrastructure development, as many measures fell within this category). They were asked to rank each measure in terms of how important they believe it is to build resilience in Suriname's water resources sector.
- The top three or four adaptive measures were carried forward to the next step.
- Each prioritized adaptive measure was then assessed against eight criteria: financial feasibility (upfront costs); financial feasibility (operation and maintenance costs); technical feasibility; institutional feasibility; social acceptability; environmental sustainability; benefits for particularly vulnerable groups; and contribution to gender equality. For each criterion, participants indicated whether they feel the measure has low, medium, or high potential to contribute.

The results of the Mentimeter prioritization allowed the team to consolidate the perspectives of the different groups to determine a list of the priority adaptive measures to be included in the SASAP. The results of this step are presented in Annex 2. The annex also includes notes on the findings of the multicriteria analysis, which provide insights on issues that should be considered in the design and implementation of the adaptive measures.

Next, the team began drafting concept notes for projects that would facilitate implementation of the prioritized adaptive measures. These were shared with stakeholders in advance of a final validation workshop held in December 2021. All stakeholders who participated in the prioritization exercise were invited to the validation workshop. At this workshop, stakeholders had the opportunity to provide feedback on the concept notes, again using the Mentimeter tool. Written feedback on the concepts was also provided by some stakeholders. The feedback received has been incorporated in the concept notes presented in Section 8.

A list of all stakeholders who participated in the prioritization process and/or the concept note validation workshop is presented in Annex 3.

The inability to engage stakeholders through in-person interactions represents a limitation of this process; however, the feedback received on the Mentimeter as a tool for engagement was positive. It will be essential for all actors engaged in implementing the SASAP to build on these initial steps to actively engage stakeholders in all aspects of design and implementation of the priority adaptive measures. This is reflected in the concept notes, which emphasize inclusive, gender-balanced stakeholder engagement as key activities within the projects.

# 6.0 Strategic Outcomes for the Water Resources Sector

This section describes how the implementation of the SASAP will contribute to the achievement of the strategic outcomes described in the NAP document.

# Strategic Outcome #1: Institutional arrangements, policies, and capacities able to lead and coordinate national and sub-national climate change adaptation.

The SASAP includes actions that focus on establishing governance systems for integrated, climate-resilient, and gender-responsive management of water resources—see Project Concept #3 in Section 8 for details. By connecting these mechanisms with broader structures for coordination of climate change adaptation at both the national and sub-national levels, the contribution to this strategic outcome can be maximized.

#### Strategic Outcome #2: Data and information collection systems to fully support national subnational climate change impacts, vulnerability, and adaptation decision making.

Project Concept #2 is focused on the establishment of climate change data and information systems to guide decision making in the water resources sector. Given the interconnectedness of water resources with other sectors, and the need for a coordinated approach at the national level, these systems will be embedded in broader climate information systems.

# Strategic Outcome #3: The integration and institutionalization of climate change adaptation in broader Surinamese economic development policies, plans, and programs.

Several of the projects presented in the concept notes will contribute to this outcome by strengthening knowledge, capacities, policies, and institutional arrangements for adaptation in Suriname's water resources sector. This will inform and influence future policies, plans, and programs in the sector and beyond.

# Strategic Outcome #4: National technical capacity that is fully trained and skilled at leading and implementing Suriname's climate change adaptation actions.

Capacity development underpins several of the projects included in this SASAP. The process of analyzing risks and vulnerabilities to climate change and the establishment of climate change data and information systems will provide national actors with the evidence needed to inform decision making. Building on this, the training and capacity development activities integrated throughout the projects will enhance capacities of government staff and partners to plan and implement adaptation actors in the water sector, skills that will hopefully also be applicable as adaptation actions are prioritized, planned, and implemented in other economic sectors.

# Strategic Outcome #5: Climate change adaptation that respects Surinamese values and culture and reduces gender and other social inequities.

Adaptation in the water resources sector must be aligned with national and local values and be culturally appropriate while also aiming to address gender inequality and social exclusion. There are several ways that this will be addressed in the implementation of the SASAP:

- Adaptation actions will be designed and implemented based on a comprehensive and participatory vulnerability and risk assessment for the water resources sector that analyzes gender and social differences in exposure to climate risks and adaptive capacity.
- The vulnerability and risk assessment process will engage a wide range of stakeholders, including representatives of vulnerable groups, women's groups, and Indigenous, Maroon, and remote communities.
- Local and Indigenous knowledge will be combined with scientific knowledge in the design and implementation of adaptation actions.
- Investments will be targeted where they are needed most, to benefit vulnerable groups, and budgets will include specific allocations for gender-related activities.
- Non-governmental actors, including women's groups and Indigenous and Maroon communities, will be engaged as partners in implementing, operating, monitoring, and maintaining water resources infrastructure.
- The specific needs and capacities of people of different genders will be considered in the design and implementation of adaptation actions.
- Efforts will be made to ensure gender balance and inclusivity in decision-making processes and structures throughout the design, implementation, and operation of adaptive measures.
- Monitoring and evaluation will track equity in benefits for people of different genders and social groups.

These issues are integrated throughout the concept notes in Section 8.

#### Strategic Outcome #6: Identify and access financing and investment especially for innovationdriven climate change adaptation technologies.

The concept notes included as part of this SASAP are designed to enable mobilization of resources for implementation of the priority adaptive measures; each includes a budget estimate developed at the concept note validation meeting. These concept notes can be further developed into full proposals that match the requirements of different development partners and international climate funds. They can also serve as a basis for government budgeting and engagement of private sector actors to invest in adaptation in the sector.

# 7.0 Monitoring, Evaluation, and Learning (MEL) Framework

The SASAP MEL framework builds on the indicative outputs and KPIs identified in the NAP document. It addresses both sectoral and strategic results that are envisioned from the implementation of priority adaptation actions in the water resources sector. It comprises three inter-connected components: monitoring, evaluation, and learning, each with its own framework and approach, as described below.

### **Component 1: Monitoring**

The monitoring framework is organized around the expected outputs, providing indicators to track progress toward achieving these shorter-term results. The indicators at this level are mostly quantitative, focusing on the results of completed activities. Most come from the KPIs identified in the NAP; however, some additional indicators are proposed to address gaps. An overview of this framework is provided in Annex 3. As noted, some of the KPIs from the NAP require additional consideration to ensure that they are measurable.

The monitoring data will be collected from a range of sources, including:

- Data provided by ministries
- Review of documentation, including vulnerability and risk assessment reports
- Water monitoring records
- Records of infrastructure constructed, as well as operation and maintenance records
- Government budgets
- Participation records from stakeholder meetings, training programs, etc., disaggregated by gender
- Surveys and interviews
- Meeting minutes and reports

Ideally, monitoring data will be compiled, reviewed, and reported on a bi-annual basis. If this is not feasible, it should be done annually.

### **Component 2: Evaluation**

The evaluation framework aims to assess the effectiveness of the SASAP in achieving the expected outcomes, using a medium-term perspective (Federal Democratic Republic of Ethiopia, 2020). Evaluation of the SASAP can be structured around a set of key questions, supported by quantitative measures that enable assessment of effectiveness. In this case, the overarching question to guide the evaluation is: Are the adaptive measures that have been

planned and implemented effective in supporting adaptation and resilience building in the water resources sector?

To answer this question, the following may be considered (Federal Democratic Republic of Ethiopia, 2020; Price-Kelly et al., 2015):

- Do decision-makers at different levels in the water resources sector have the information and knowledge they need to integrate adaptation in decision making?
- Are the necessary human, financial, and technical resources in place for integrated, climate-resilient, and gender-responsive water resource management?
- Are governance structures for water resource management designed to support the SASAP's implementation and objectives? Are they gender balanced and socially inclusive? Are they accountable to the communities they serve?
- Do stakeholders in the water resources sector have access to resources for locally led actions? Are they able to influence government decision making?
- Do the targeted communities have improved access to safe water during "normal" times? During droughts? During floods?
- Do other actors (agriculture/industry) have improved access to water during "normal" times? During droughts? During floods?
- Has water quality increased as a result of the adaptive measures?
- Are the benefits of adaptive measures shared equitably across and within districts? Are they addressing the needs of remote Indigenous and Maroon communities?
- Are the adaptive measures providing equitable benefits to people of different genders and social groups?
- Do women/men/girls/boys spend less time fetching drinking water due to the adaptive measures in "normal" times? During droughts? During floods?

Evaluation should be reviewed as a process of dialogue and reflection, supported by the data and information gathered through ongoing monitoring. An important element of evaluation is capturing the perspectives of the intended beneficiaries of the different adaptive measures. Their perceptions of the actions and how their lives have changed as a result are fundamental to assessing the measure's effectiveness. This requires participatory processes such as focus group discussions and semi-structured interviews to engage different gender and social groups in the evaluation process.

Alongside these qualitative assessment methods, some additional quantitative measures assessing progress toward SASAP outcomes may be useful to inform the evaluation, including for example:

- % of stakeholders reporting improved access to climate information (by gender/ institution/district/type of stakeholder)
- % of stakeholders indicating increased capacity to use climate information in decision making (by gender/institution/district/type of stakeholder)
- % of households in targeted communities reporting improved access to safe water in normal times, during droughts and during floods (by district/gender of household head/ type of community)

- *#* of other actors reporting improved access to water in normal times, during droughts and during floods (agriculture/industry)
- % reduction in time spent fetching drinking water (for women/men/girls/boys)
- # of communities benefitting from reduced pollutant loads in water sources (by district/ type of community)
- % reduction in time spent fetching drinking water during droughts and floods (for women/ men/girls/boys)

The above data can be collected through more traditional data collection methods such as surveys, ensuring disaggregation by gender and other relevant social factors. Analysis of the disaggregated data is essential, to understand differential benefits and identify communities or groups that may not be benefitting from the adaptive measures, as well as those that are.

Evaluation is best done at regular intervals that align with key decision points, for example at the end of each phase of the NAP implementation period. The application of the results is an important element of the process – evaluation should lead to adjustments in implementation approaches that address weaknesses, increase equity, and build on successes.

## **Component 3: Learning**

The learning framework aims to facilitate reflection on what is working well, what needs adjustment, and what needs to be done in the future to ensure sustainable outcomes. In this case, the learning framework is aligned with the guiding principles for the NAP. It consists of key questions for each guiding principle, as shown in Table 6.

Table 6. Key	/ learning	questions	for the	WR	SASAF
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Guiding principle		Learning questions	
1	Manage risk, build resilience, and explore opportunities	<ul> <li>Are the adaptive measures responding to changing risks?</li> <li>Is resilience being built at a systemic level in the WR sector?</li> <li>Are there missed opportunities to advance adaptation in the sector?</li> </ul>	
2	Legislate	<ul> <li>Is the policy context conducive to adaptation in the WR sector? If not, what needs to change?</li> <li>Are WR sector laws, policies, and plans aligned with other relevant commitments, including those related to gender equality?</li> </ul>	
3	Equitable participation	<ul> <li>Are adaptive measures benefitting those who need them most?</li> <li>Are people of different genders and social groups benefitting equitably? If not, what needs to change?</li> <li>How can the participation of underrepresented and vulnerable groups in decision making in the WR sector be increased?</li> </ul>	

Gu	iding principle	Learning questions
4	Educate and train	<ul> <li>Have education and training programs for actors in the WR sector evolved to integrate adaptation to climate change?</li> <li>What new skills and capacities are needed to effectively implement the SASAP?</li> <li>How can education and training programs be adapted to ensure equitable access for all genders and social groups?</li> </ul>
5	Inform and report	<ul> <li>Are results and lessons from SASAP implementation being communicated to stakeholders?</li> <li>Is access to this information equitable for people of different genders and social groups?</li> </ul>
6	Commit resources to goals	<ul> <li>Do resource gaps persist for effective implementation of the SASAP?</li> <li>What additional resources are needed to address gender and social dimensions?</li> </ul>
7	Partner with private sector and prioritize technology	<ul> <li>Has private sector investment been leveraged to support implementation and financing of the SASAP? If not, how can this be achieved?</li> <li>What are the technological gaps that must be filled?</li> <li>Is access to technologies gender-equitable?</li> </ul>
8	Science- and research-based decision making	<ul> <li>Is the evidence base adequate for adaptation decision making? If not, what is needed to fill gaps?</li> <li>Is local and Indigenous knowledge combined with scientific information for decision making?</li> <li>What efforts are being made to ensure gender balance and representation of diverse social groups within the climate science community?</li> </ul>

# 8.0 Concept Notes for Priority Adaptive Measures

The following concept notes have been developed to elaborate on the adaptive measures that were identified as priorities during the stakeholder consultations (see Annex 2). The concept notes have been designed to align with the specific strategic objectives for adaptation in the water resources sector, as well as the core strategic objectives identified in the NAP. They have been developed with inputs from affected stakeholders, including on budgets and timelines, through the consultation and validation meetings. The expected outputs in the concept notes also draw on the NAP—these are identified by "WR" for those from the water resources sector, and by "SO" for those that relate to the core strategic objectives. Similarly, the KPIs include indicators from the NAP (in bold), as well as additional indicators. Expanding upon these concept notes by developing them into full proposals and subsequently securing financing for them will be central to the achievement of the adaptation and resilience objectives of the water SASAP.

### Project Concept #1: Vulnerability and risk assessments for different water uses

#### RATIONALE

Changes in precipitation patterns, sea level rise, and increases in extreme weather events such as droughts and floods will all affect the availability and quality of water available to the people of Suriname, particularly those in remote, Indigenous, and Maroon communities. To effectively plan and implement adaptive measures in the water resources sector, government actors and other stakeholders need to better understand where the risks and vulnerabilities lie. This will provide decision-makers, including those at sub-national levels, with an informed basis to design investments, allocate resources, and work with stakeholders to ensure ongoing and equitable access to water for different uses as the impacts of climate change become more severe. To be effective, this process must be participatory, creating opportunities for a broad range of stakeholders, including community representatives, local organizations, and Indigenous and Maroon organizations to contribute their knowledge and experiences. Gender-equitable and inclusive participation must be a priority to ensure that the results of the assessments reflect and address differential vulnerability by gender and social group.

#### DURATION

3 years

#### NAP OBJECTIVE(S)

- Establish a comprehensive national research program on social, environmental, and economic baselines, climate science, climate vulnerability, impacts, and risk management (NAP WR Strategic Objective [SO] 1).
- Incorporation of local knowledge, experiences, and practices in climate actions (NAP SO 5.2).

#### EXPECTED OUTPUT(S)

- Water needs and sources assessed for different uses, including drinking water, irrigation, waste treatment, industrial use, and fisheries (WR SO 1 A3).
- Vulnerabilities and risks from climate change to drinking water and other uses assessed (WR SO 1 A2).
- A variety of appropriate methods and techniques utilized to incorporate local knowledge, experiences, and practices of men and women (SO 5.2 A1).
- Increased recognition of the value of local ways of adapting recorded in assessment reports (SO 5.2 B1).

#### KPI(s)

- District-level risk maps developed
- Number of citations of local knowledge in decision-making forums
- Comprehensive water needs and source assessment completed
- # of stakeholders engaged in analysis of vulnerabilities (by gender/district/type of stakeholder)
- *#* of stakeholders reached with results of vulnerability and risk assessment (by gender/ district/type of stakeholder)
- Differential vulnerability by gender/district/type of stakeholder assessed

#### ACTIVITIES

- Assessment of water needs for different uses including drinking water, irrigation, waste treatment, industrial use, and fisheries, considering differences by gender, district, and socio-economic status.
- Assessment of water resources (including aquifers, coastal swamps, rivers and creeks, lakes, and freshwater swamps), matching sources with needs.
- Analysis of current and future climate risks to water resources, based on existing climate models and historical data.
- Analysis of interdependencies across districts in terms of water sources.
- Focus group discussions, key informant interviews, and workshops to gather stakeholder perspectives and experiences, ensuring equitable representation by gender and social group.
- Based on the above, vulnerability and risk assessments of water resources to identify those that are most at risk from the impacts of climate change, and the implications for different water uses and users, with a particular focus on remote, Indigenous, and Maroon communities and vulnerable groups in urban areas (including disaggregation by gender, district, and socio-economic status).
- Assessment of time spent on water management by individual household members (building on existing data from the 2018 Multiple Indicator Cluster Survey).
- Development of district-level risk maps.
- Development of comprehensive vulnerability, risk, and impact assessment reports, as well as policy briefs and other supporting materials to communicate the results of the assessment.
- Organization of workshops with key stakeholders to share results and discuss next steps.

#### **INTENDEND BENEFICIARIES**

- Decision-makers in the water resources sector who are working to integrate climate change in their work.
- Stakeholders in the water resources sector, including the private sector.
- Remote, Indigenous, and Maroon communities who are vulnerable to water scarcity.
- · Groups in urban areas who are vulnerable to water scarcity.

#### **GENDER CONSIDERATIONS FOR IMPLEMENTATION**

- Collect disaggregated data and use intersectional gender analysis to ensure that differences among genders, districts, and people of different socio-economic status are captured.
- Establish gender-balanced teams for data collection and analysis.
- Hold targeted focus group discussions by gender and social group.
- Ensure that gender and social dimensions are included in key messages in all reports, policy briefs, and communication materials.

#### **RESPONSIBLE ACTORS**

Ministry of Natural Resources; Ministry of Public Works; Ministry of Regional Development and Sport

#### INDICATIVE BUDGET

USD 1 million

### Project Concept #2: Establishment of systems for managing climate change data and information in the water resources (WR) sector

#### RATIONALE

Adaptation to climate change is an ongoing process, requiring monitoring of changes and extremes and adjustment of strategies over time. For this process to be effective, adaptation actors, including those at sub-national and local levels, require access to data and analysis on climate change impacts and vulnerabilities to inform decision making on a continuing basis. To support government ministries, as well as other stakeholders, in accessing this information, systems are needed to enable climate change data collection, processing, analysis and management. The most efficient way to achieve this is by supporting operationalization and/or upgrading of existing systems, notably the Environmental Information Network of Suriname (SMIN) and the Suriname Water Resources Information System (SWRIS). This includes investments in technologies and equipment, information systems, and human resources to collect, store, analyze, and manage data. It also includes investments in capacity development to ensure that all actors managing and using the system have the necessary knowledge and skills for it to run effectively. Central to this is collection, generation, and analysis of data at district and local levels, including downscaling of national-level data and disaggregated by gender and socio-economic status. Stakeholders, including sub-national and local actors, will also require capacity development to effectively apply the information in decision making. These efforts must build on existing actions related to IWRM supported by the GCCA+ project.

#### DURATION

3.5 years (initial phase to establish systems)

#### NAP OBJECTIVE(S)

- Comprehensive national research program on social, environmental, and economic baselines, climate science, vulnerability, impacts and risk management (NAP WR Strategic Objective 1).
- Provide the necessary resources to ministries to modernize and expand facilities, tools, and equipment to facilitate achievement of their climate-related mandates (NAP Strategic Objective 2.2).
- Increase the capacity for wider partnership involvement in collecting and using national data and information (NAP Strategic Objective 2.4).

#### **EXPECTED OUTPUT(S)**

- Climate change-related data collection, capacity building, institutional strengthening, data processing and analysis, and data management (WR SO 1 A1).
- Improved data and information collection and monitoring from the installation of new and upgraded weather measurement stations and other equipment requested and justified by relevant ministries and agencies (SO 2.2 A1).
- Reduced gaps in the statistical data on the sub-national/village level (SO 2.2 B1).
- Reduced gaps in data on water and sanitation and natural disasters (SO 2.2 B2).

- National-level data disaggregated or downscaled to provide estimated information for district plans (SO 2.4 A1).
- Primary data sets acquired through surveys and other means for district-level planning (SO 2.4 A2).
- All national data collection and research will emphasize gender sensitivity and investigate gender issues as a central feature moving forward (SO 2.4 A3).

#### KPI(s)

- Critical data and information variables for adaptation in the WR sector identified
- Required technical capacities for operationalization of the data and information systems assessed
- Number of ministries attaining required technical capacity
- Quality and quantity of data on identified critical variables collected
- Quality and quantity of local/district-level data sets, including gender-disaggregated data sets
- Reduction of gaps in current data sets
- Quality of downscaled models developed
- # of new people hired by ministries to support climate change data systems (by gender/ social group)
- % of critical variables and local/district data sets where gender-disaggregated data has been collected
- Number of information products produced (disaggregated by target user)

#### ACTIVITIES

- Undertake a data and information needs assessment for all stakeholders involved in climate change adaptation in the WR sector, disaggregating by gender and type of stakeholder.
- Conduct a stocktaking exercise of existing data and information systems (including SMIN and SWRIS) to identify gaps and opportunities, particularly with respect to availability of information at district and local levels.
- Participatory process to design the climate change data and information systems to address needs of all stakeholders (including at district and local levels), filling data gaps and building on existing systems.
- Technical design of the system, identifying necessary equipment and technologies for its operation, as well as knowledge and capacities needed by system managers, contributors, and users.
- Purchase of equipment and technologies.
- Hiring of people to implement the data and information systems.
- Training of system managers and contributors (such as people involved in data collection) in its operation and management.
- Capacity development for system users to access the information they need and apply it in decision making.

- Creation of a publicly accessible climate information platform.
- Develop proposals to donors such as the Green Climate Fund to sustain the data and information systems over the medium to longer terms.

#### **INTENDEND BENEFICIARIES**

 Adaptation actors at all levels, including ministries involved in WR management, subnational authorities, Indigenous and Maroon organizations, communities, and private sector actors.

#### GENDER CONSIDERATIONS FOR IMPLEMENTATION

- Create opportunities for people of all genders and social groups to participate in the design of the data and information systems.
- Ensure equity in hiring and training processes.
- Build systems to accommodate collection, analysis, and use of disaggregated data for different genders and social groups.
- Ensure that the climate information platform accounts for differing information needs and inequalities in access to technologies for different gender and social groups, using alternative communication methods to ensure equitable access to the information.

#### **RESPONSIBLE ACTORS**

Ministry of Natural Resources; Ministry of Public Works; General Bureau of Statistics; Ministry of Regional Development and Sport

#### INDICATIVE BUDGET

USD 1.5 million

#### Project Concept #3: Establishment of institutional structures for integrated, climateresilient, and gender-responsive management of water resources (WR)

#### RATIONALE

Mainstreaming of adaptation in the WR sector requires new institutional structures and capacities across the different actors involved. These structures must be designed and operationalized in a way that ensures that IWRM actions are also climate resilient and gender responsive. A need has been identified for both a national water governance body and additional water boards, to ensure effective coordination of climate change stakeholders and a coherent approach to integrating adaptation across the different actors. A strong legislative framework will be needed to ensure the legitimacy and effectiveness of these bodies, building on the work that has already been done in this area. As well, they will need to be adequately resourced with staff and funding and will require capacity development to implement their mandate.

#### DURATION

3.5 years

#### NAP OBJECTIVE(S)

- Develop and implement law, policy, and regulations to ensure sustainable exploitation and use of drinking water resources and wastewater management (NAP WR Strategic Objective 2).
- Design, implement, and enforce suitable governance procedures and processes to forward the national climate change adaptation agenda (NAP Strategic Objective 1.3).

#### **EXPECTED OUTPUT(S)**

- Study to indicate the required WR governance and administration system best suited to Suriname (WR SO2 B1).
- Establishment of more water boards and a national water authority (WR SO 2 B2).
- Coordination of national climate change stakeholder institutions (SO 1.3 A1).
- Promotion of climate change adaptation and mitigation mainstreaming (SO 1.3 A3).

#### KPI(s)

- WR governance study completed
- [National water governance body] established
- Review/update of terms of reference for water boards
- More water boards established
- Number of active climate adaptation stakeholders (by gender/type of stakeholder)
- Reference to climate adaptation in non-climate change policies, plans, and budgets for the WR sector
- Number of staff trained/level of training budget (by gender/institution)
- Gender balance in key decision-making structures (% of women/men)

#### ACTIVITIES

- Undertake institutional capacity and governance assessment to identify gaps and opportunities within existing structures.
- Design of governance structures, including the Water Resource Authority and water boards, defining their mandates, composition, resourcing, and terms of reference for operations, taking existing draft legislation into consideration.
- Engagement of high-level decision-makers to secure endorsement for proposed governance structures.
- Establish Water Resource Authority, water boards, and any other structures deemed necessary for effective governance of adaptation and IWRM.
- Hold meetings and establish communication channels and other operational mechanisms to support the functions of the governance structures.
- Development of guidance and training materials on climate change adaptation mainstreaming for all actors involved in WR management.
- Capacity building on climate change adaptation, IWRM, gender equality, and other relevant issues to all actors involved in WR management.
- Integrate climate change in budgets and plans for the actors involved in WR management.

#### **INTENDEND BENEFICIARIES**

 Adaptation actors at all levels, including ministries involved in WR management, subnational authorities, Indigenous and Maroon organizations, communities, and private sector actors.

#### **GENDER CONSIDERATIONS FOR IMPLEMENTATION**

- Ensure gender balance among stakeholders engaged in the design of the governance structures.
- Integrate gender issues into all guidance, training materials, and capacity-building processes.
- Structure decision-making bodies in ways that ensure gender-equitable participation and include gender experts as central actors.

#### **RESPONSIBLE ACTORS**

Ministry of Spatial Planning and Environment; Ministry of Public Works; Ministry of Regional Development and Sport; Water Forum Suriname

#### INDICATIVE BUDGET

USD 1.75 million

### Project Concept #4: Implementation of land management solutions to protect water resources (WR)

#### RATIONALE

Land management solutions will be developed and implemented to reduce the discharge of pollutants into water resources, including aquifers, coastal swamps, rivers and creeks, lakes, and freshwater swamps. This project is closely linked to broader efforts to prevent pollution; however, it specifically focuses on protecting water resources that are vulnerable to climate change as well as affected by pollution. The purpose is to ensure availability of safe water, even when communities are affected by climate impacts including droughts, floods, and sea level rise. Land management solutions may include efforts to create buffer zones around critical water sources, where industrial and urban development are prohibited. It may also include measures such as construction of settlement ponds, erosion and sediment control, concurrent reclamation, and controlled sites for dumping and treatment of pollutants. Respect for land rights is essential to any action in this area, and the solutions must be supported by effective spatial planning, zoning guidelines, and enforcement.

#### DURATION

4 years

#### NAP OBJECTIVE(S)

• Water management program to increase resilience of water supply (WR Strategic Objective 3).

#### **EXPECTED OUTPUT(S)**

 Land management solutions to reduce discharge of pollutants into water resources (WR SO 3 A1).

#### KPI(s)

- WR governance study completed
- [National water governance body] established
- Review/update of terms of reference for water boards
- More water boards established
- Number of active climate adaptation stakeholders (by gender/type of stakeholder)
- Reference to climate adaptation in non-climate change policies, plans, and budgets for the WR sector
- Number of staff trained/level of training budget (by gender/institution)
- Gender balance in key decision-making structures (% of women/men)

#### ACTIVITIES

- Review of vulnerability and risk assessments to identify areas that are vulnerable to both climate impacts and pollution.
- Identification of sources of pollutants and establish baselines for pollutant loads.
- Engagement with actors responsible for pollution (e.g., mining and oil companies, among others) to secure their support and collaboration in protecting water sources from pollution.
- Engagement with land-use planning processes to ensure appropriate provisions to address pollution and climate risks to water resources.
- Capacity development for NIMOS and other relevant actors to enforce existing pollution control legislation, such as the Environment Framework Act.
- Participatory process to design land management solutions that address both pollution and climate risks, guided by the appropriate engineering and ecological knowledge and expertise.
- Implement land management solutions.
- Education and awareness activities to ensure that land management solutions are sustainable.
- Establish community-level structures for management of land management solutions.
- Engagement with local government and actors responsible for pollution to ensure ongoing access to funds for maintenance of land management solutions.
- Management and maintenance of land management solutions.
- Monitoring and reporting of pollutant loads in water sources.

#### **INTENDEND BENEFICIARIES**

- Communities and households affected by water pollution and climate change.
- Government actors responsible for water supply.
- Productive sectors using water resources, such as fisheries, aquaculture, and agriculture.
- Industrial sectors using water resources, including mining, to reduce their liabilities and improve corporate performance.

#### **GENDER CONSIDERATIONS FOR IMPLEMENTATION**

- Include gender expertise within project team.
- Ensure gender balance among participants in participatory design process.
- Ensure gender-equitable and inclusive participation and influence in community management structures for land management solutions.

#### **RESPONSIBLE ACTORS**

Ministry of Natural Resources; Ministry of Public Works; Ministry of Land Policy and Forest Management

#### INDICATIVE BUDGET

USD 2 million

### Project Concept #5: Development of infrastructure for flood protection and drainage

#### RATIONALE

With increasingly erratic precipitation patterns, Suriname now faces more heavy rainfall events, which can lead (and have led) to flooding. At the same time, sea level rise is causing saltwater intrusion in coastal aquifers and swamps and increased salinity in rivers, with implications for agriculture and other uses. Infrastructure development can protect key water resources such as coastal aquifers and reduce flood risks in the interior. To protect groundwater from saltwater intrusion, a key approach is to situate wells further from the coast and ensure they are not deep enough to extend into the saltwater wedge. Once wells are in operation, pumps should run at different times and at low volume to minimize drawdown (Government of British Columbia, 2016). In the interior, investments will include a mix of nature-based, "green" infrastructure and built infrastructure such as dams and drainage canals to protect agricultural land and other assets from flooding. This project must build on the vulnerability and risk assessments, which should enable identification of priority areas for investment (Project Concept #1). Areas that are vulnerable to flooding and saltwater intrusion should be prioritized.

#### DURATION

4 years

#### NAP OBJECTIVE(S)

• Climate-resilient infrastructure development to ensure availability of drinking water and other uses of water (NAP WR SO 4).

#### **EXPECTED OUTPUT(S)**

- Mechanisms developed to reduce intrusion of sea water (WR SO 4 B1).
- Increased area of land and water resources protected from flooding.

#### KPI(s)

- Increased budget for water-related infrastructure
- Reduced salinity in coastal aquifers
- Area of land benefitting from protective structures to reduce flooding (in hectares, by district)

#### ACTIVITIES

- Review of vulnerability and risk assessments to identify areas that are vulnerable to saltwater intrusion and flooding.
- Engagement of groundwater experts to advise on where new wells are dug and the continued operation of existing ones.
- Engagement with land-use planning processes to ensure appropriate provisions for flood protection and drainage infrastructure.
- Participatory process to design flood protection and drainage infrastructure to protect agricultural land and other key assets from flooding, saltwater intrusion, and other climate hazards.

- Build flood protection and drainage infrastructure, focusing on vulnerable sites.
- Drill new wells and rehabilitate existing ones.
- Establish community-level structures for management of wells and flood protection/ drainage infrastructure.
- Engagement with local government to ensure ongoing access to funds for maintenance of wells and flood protection/drainage infrastructure.
- Management and maintenance of flood protection infrastructure/drainage.
- Implement flood early warning systems.
- Monitoring and reporting of salinity in aquifers.

#### INTENDEND BENEFICIARIES

- Households that are dependent on coastal aquifers for their water supply.
- Communities and individual households in areas that are vulnerable to flooding, including fisherfolk, farmers, and beekeepers.
- Water transport users.

#### **GENDER CONSIDERATIONS FOR IMPLEMENTATION**

- Include gender expertise within project team.
- Use gender-responsive communication strategies to raise awareness of flood risks and in early warning systems.
- Ensure gender balance in the design process for the flood protection and drainage infrastructure.
- Ensure gender-equitable and inclusive participation and influence in community management structures for the flood protection and drainage infrastructure.

#### **RESPONSIBLE ACTORS**

Ministry of Natural Resources; Ministry of Public Works; Ministry of Spatial Planning and Environment; National Disaster Management Committee; district governments

#### INDICATIVE BUDGET

USD 4.5 million

### Project Concept #6: Improvement and rehabilitation of infrastructure for better water management

#### RATIONALE

Though Suriname has a well-developed water supply system, particularly in urban areas, there are improvements that can be made in terms of increasing efficiency of water use and reducing leakages in the system. These improvements are particularly important as the country faces potential reductions in the availability of water due to the impacts of climate change. Investments in improving and rehabilitating existing infrastructure will therefore ensure its sustainability and resilience into the future as the impacts of climate change become more pronounced. This project must build on the vulnerability and risk assessments, which should enable identification of priority areas for investment (Project Concept #1). This project focuses on critical water infrastructure that is affected by existing and potential inefficiencies and leakages.

#### DURATION

4 years

#### NAP OBJECTIVE(S)

• Climate-resilient infrastructure development to ensure availability of drinking water and other uses of water (NAP WR SO 4).

#### **EXPECTED OUTPUT(S)**

- Increased efficiency of water use, including storage and distribution, without compromising sanitation systems (WR SO 4 A2).
- A leakage management program, including mains rehabilitation, to reduce water leakage from distribution and supply networks (WR SO 4 B2).

#### KPI(s)

- Increased budget for water-related infrastructure
- % of water loss reduced
- Reduced incidence of leakages

#### ACTIVITIES

- Review of vulnerability and risk assessments to identify critical water infrastructure that is affected by existing and potential inefficiencies and leakages.
- Review of emerging technologies and best practice in water resource infrastructure to identified potential improvements and investments.
- Participatory process to prioritize systems for improvement/rehabilitation, considering different water uses (drinking water, irrigation, etc.).
- Implementation of improvement/rehabilitation processes.
- Awareness raising for stakeholders on efficient water use.

- Training for new/existing management structures for water systems on maintenance and operation of improved/rehabilitated systems.
- Engagement with relevant local authorities to ensure allocation of budget for ongoing maintenance and operation of improved/rehabilitated systems.
- Monitoring and reporting of water losses and leakages.

#### **INTENDEND BENEFICIARIES**

- Current and potential users of existing water systems.
- SWM.

#### **GENDER CONSIDERATIONS FOR IMPLEMENTATION**

- Include gender expertise within project team.
- Ensure gender-balanced participation in process of prioritizing systems for improvement/ rehabilitation.
- Use gender-responsive communication methods to raise awareness on strategies for efficient water use.
- Engage people of all genders and social groups in monitoring and reporting of water losses and leakages.

#### **RESPONSIBLE ACTORS**

Ministry of Public Works; Ministry of Natural Resources, Ministry of Spatial Planning and Environment; Ministry of Regional Development and Sport

#### INDICATIVE BUDGET

USD 4.5 million

### Project Concept #7: Establishment of water storage mechanisms to build resilience to drought and flooding

#### RATIONALE

When droughts and floods occur, water supplies are affected. Droughts typically result in reduced availability of water, while floods often increase contamination of freshwater sources, particularly surface water sources. This means that communities—particularly those dependent on rivers and creeks for water—are at risk of reduced access to safe drinking water during these events. This can mean that the family members responsible for securing water for household use spend additional time and energy to fulfill this responsibility. Recognizing that climate change is expected to increase the frequency and intensity of extreme weather events, investments in water storage mechanisms in strategic locations represent an important adaptive measure, to ensure stable and equitable access to water for drinking and domestic use, as well as for agriculture and industry. Storage mechanisms may include ground reservoirs, water towers, and bottled water reserves. This project must build on the vulnerability and risk assessments, which should enable the identification of priority areas for investment (Project Concept #1). Areas struggling to access water for drinking and household use should be prioritized..

#### DURATION

4 years

#### NAP OBJECTIVE(S)

• Water management program to increase resilience of water supply (NAP WR SO 3).

#### **EXPECTED OUTPUT(S)**

- Construction of water storage mechanisms for use of water in times of drought [and flooding] in strategic locations throughout the country (WR SO 2 D1).
- Drinking water storage mechanisms in place for use in times of drought and flooding (WR SO 3 A2).
- Water storage mechanisms in place for other water uses in times of drought and flooding (WR SO 3 A3).

#### KPI(s)

- · Increased numbers and volume of reservoirs
- Increased budget for water-related infrastructure
- % of households in targeted communities with access to secure stored water for drinking when droughts and floods occur (disaggregated by gender of household head).
- *#* of other actors (agriculture/industry) with access to secure stored water during droughts and floods.

#### ACTIVITIES

- Review of vulnerability and risk assessments to identify vulnerable areas requiring water storage mechanisms for drinking water, domestic use, agriculture, and industry (prioritizing drinking water and domestic use).
- Review of best international practice in water storage infrastructure, and applicability to the Suriname context.
- Participatory process to design water storage mechanisms, including ground reservoirs, water towers, and bottled water reserves.
- Construction/establishment of water storage mechanisms.
- Establish community-level structures for management of water storage mechanisms, working with industry and agriculture actors where appropriate.
- Engagement with local government to ensure ongoing access to funds for maintenance of water storage mechanisms.
- Management and maintenance of water storage mechanisms, including monitoring of water quality.
- Monitoring and reporting access to stored water and time spent fetching drinking water.

#### **INTENDEND BENEFICIARIES**

- Households in remote, Indigenous, and Maroon communities that are at risk of drinking water shortages when droughts and floods occur, including those that are dependent on river and creek water.
- Women, men, girls, and boys who are responsible for fetching drinking water for their households.
- Actors in agriculture and industry who face water shortages during droughts and floods.

#### **GENDER CONSIDERATIONS FOR IMPLEMENTATION**

- Prioritize investments in areas where girls and women spend significant time securing water for household use.
- Include gender expertise within project team.
- Ensure gender balance in the design process for water storage mechanisms.
- Ensure gender-equitable and inclusive participation and influence in community management structures for water storage mechanisms.

#### **RESPONSIBLE ACTORS**

Ministry of Public Works

#### INDICATIVE BUDGET

USD 3 million

# 9.0 Budget for Implementation

This section provides information on the budget required for implementation of the SASAP and how to ensure that allocation of resources is gender responsive.

### **Indicative Budget**

The following is an indicative budget for implementation of the SASAP over the coming 8 years, 2022 to 2029. This timeframe recognizes that not all projects will start immediately, so although the maximum timeline for an individual project is 4 years, some may not be launched until later in the life of the NAP. Further, some sequencing of projects is required—for example, several of the projects will build on the vulnerability and risk assessments described in Project Concept #1.

This is an estimated budget: more information and time would be required to do a detailed costing for each of the adaptation measures described in the concept notes. Developing fully costed proposals for each of the measures will be crucial to the implementation of the SASAP.

Pro	ject	Estimated Budget (USD)
1	Vulnerability and risk assessments for different water uses	1,000,000
2	Establishment of systems for managing climate change data and information in the water resources sector	1,500,000
3	Establishment of institutional structures for integrated, climate-resilient, and gender-responsive management of water resources	1,750,000
4	Implementation of land management solutions to protect water resources	2,000,000
5	Development of infrastructure for flood protection and drainage	4,500,000
6	Improvement and rehabilitation of infrastructure for better water management	4,500,000
7	Establishment of water storage mechanisms to build resilience to drought and flooding	3,000,000
Toto		18,250,000

#### Table 7. Indicative budget for SASAP implementation

### **Gender-Responsive Budgeting**

A key consideration for the SASAP is ensuring that the detailed budgeting process is gender responsive. This involves several key elements that must be considered in every project, including (Budlender & Hewitt, 2003; NAP Global Network & UNFCCC, 2019):

- Targeted allocations of resources for different gender groups, considering specific barriers faced by women, particularly those in remote, Indigenous, and Maroon communities. This will be informed by the vulnerability and risk assessments, which will include disaggregated analysis by gender, district, and type of stakeholder. This analysis is essential for determining who should be targeted by adaptive measures, and how to ensure equitable benefits.
- Promoting equal opportunities, including with respect to employment, training, and participation in decision-making structures that are established to plan and implement projects, as well as in the MEL for the SASAP. This may require targeted efforts to address imbalances.
- Tracking of gender-differentiated results from implementation of the SASAP, which is enabled by the MEL framework described in Section 7. This framework includes the collection of disaggregated data, which will enable analysis of differential benefits for people of different genders and social groups. Where these benefits are not equitable, adjustments to the budget may be needed to ensure that resources are allocated appropriately, including for targeted activities as described in the first element.

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# Annex 1. Existing Projects in the Water Resources Sector

#### Table A1.

Project title	Funded by	Implemented by	Total budget	Status
Water Supply Modernization Program	IDB	Suriname Water Company (SWM)	USD 25 million	Approved March 2020, in implementation
Support to the Suriname Water Company (SWM) Modernization Program and Sanitation Improvement in Suriname	IDB	IDB's Water and Sanitation Division (INE/ WSA)	USD 200,000 (technical assistance)	Approved August 14, 2019, in implementation
Precision Farming	IDB	Stichting Green Wings	USD 674,250, of which USD 341,250 is country counterpart funding (technical cooperation)	Approved December 13, 2018, in implementation
Sustainable Agricultural Productivity Program	IDB	Ministry of Agriculture, Animal Husbandry and Fisheries	USD 30 million (loan)	Approved September 26, 2018, in implementation
Community Conservation of Mangroves	IDB	Green Heritage Fund Suriname	USD 302,548, of which USD 152,548 country counterpart funding (technical cooperation)	Approved 19 Nov. 2020; in implementation
Assessment of Aquifer Potential and Groundwater level	IDB	SWM	USD 520,000 of which USD 20,000 country counterpart funding (technical cooperation)	Approved 21 May 2014; closed

Project title	Funded by	Implemented by	Total budget	Status
Suriname Global Climate Change Alliance (GCCA+): Output 1: IWRM & Water Governance	United Nations Development Programme (UNDP); Swedish International Development Cooperation Agency (Sida); European Union	UNDP	USD 2,512,886 (for both Output 1 & 2 below)	April 2020; in implementation
Suriname Global Climate Change Alliance (GCCA +): Output 2: Climate Actions Nickerie	UNDP; Sida; European Union	UNDP	USD 2,512,886 (for both Output 1 above & 2)	April 2020; in implementation
Strengthening national capacities of Suriname for the elaboration of the national REDD+ strategy and the design of its implementation framework	UNDP; Forest Carbon Partnership Facility (FCPF)	National Institute for Environment and Development in Suriname (NIMOS)	USD 7,160,000	July 2014; probable closing December 2021
Improving Drinking Water Supply and Sanitation in Coastal Suriname – Output 1: Water Supply System Improvement	Agence Francaise de Developpement; European Union; Caribbean Investment Facility (CIF)	SWM; Ministry of Public Works	EUR 16,000,000 (for both Output 1 & 2 below)	2014; in implementation
Improving Drinking Water Supply and Sanitation in Coastal Suriname – Output 2: Strategic Water Supply Planning	Agence Francaise de Developpement; European Union; CIF	SWM; Ministry of Public Works	EUR 16,000,000 (for both Output 1 above & 2)	2014; in implementation

Project title	Funded by	Implemented by	Total budget	Status
REGIONAL PROJ	ECTS			
Improving Environmental Management in the Mining Sector of Suriname, with Emphasis on Gold Mining	Global Environment Facility; UNDP	Ministry of Natural Resources (MNR2) (Implementing Partner) and National Institute for Environment and Development in Suriname (NIMOS) (responsible party)	USD 29,721,041 of which USD 22,132,000 is country counter funding	Approved February 14, 2018; in implementation
Implementation of the Strategic Action Programme to Ensure Integrated and Sustainable Management of the Transboundary Water Resources of the Amazon River Basin Considering Climate Variability and Change	GEF	United Nations Environment Programme; Amazon Cooperation Treaty Organization, Ministry of Foreign Affairs (Suriname);		Approved 2019
CReW+: An Integrated Approach to Water and Wastewater Management Using Innovative Solutions and Promoting Financing Mechanisms in the Wider Caribbean Region	Global Environment Facility	United Nations Environment Programme; IDB; UN Environment Secretariat to the Cartagena Convention; National Pilot Executing Agencies		Approved 2019

# Annex 2. Priority Adaptive Measures From Stakeholder Consultations

The adaptive measures that emerged as priorities during the stakeholder consultations are presented below, organized by category.

#### Table A2.

Priority adaptive measure	Prioritized by	Notes from multicriteria analysis		
RESEARCH AND ASSESSMENTS				
Vulnerability and risk assessments for different water uses	All groups	<ul> <li>High potential for environmental sustainability, benefits for particularly vulnerable groups, social acceptability.</li> <li>Lower potential for financial feasibility (upfront costs), financial feasibility (operation and maintenance costs), and institutional feasibility.</li> </ul>		
Water needs and source assessments for different water uses	All groups	<ul> <li>Potential for benefits for particularly vulnerable groups, environmental sustainability, and social acceptability were assessed as high.</li> <li>Less potential for financial feasibility (upfront costs), financial feasibility (operation and maintenance costs), and institutional feasibility.</li> </ul>		
Capacity building for climate change data management	<ul> <li>Government technical institutions and academia</li> <li>Civil society, Indigenous groups, and private sector</li> <li>Conservation and environmental organizations</li> </ul>	<ul> <li>Potential for environmental sustainability rated highest among the criteria.</li> <li>Also high potential for financial feasibility (upfront costs) and benefits for particularly vulnerable groups.</li> <li>Rated lower in terms of potential for contribution to gender equality, financial feasibility (operation and maintenance costs), and institutional feasibility.</li> </ul>		
Establishment of systems for managing climate change data	<ul> <li>International organizations</li> <li>National and local government</li> </ul>	<ul> <li>Highest potential for social acceptability and environmental sustainability.</li> <li>Low potential for financial feasibility (upfront costs) and contribution for gender equality.</li> </ul>		

Priority adaptive measure	Prioritized by	Notes from multicriteria analysis		
INSTITUTIONAL ARRANGEMENTS				
Institutional mechanisms for IWRM	All groups	<ul> <li>Potential for social acceptability, environmental sustainability, and benefits for particularly vulnerable groups rated highest.</li> <li>Lowest potential for financial feasibility (operation and maintenance costs).</li> <li>Institutional feasibility was also rated low.</li> </ul>		
Institutional assessment for water resource governance	All groups	<ul> <li>Potential for environmental sustainability was rated highest.</li> <li>Social acceptability and benefits for particularly vulnerable groups were also rated high.</li> <li>Lowest potential for financial feasibility (operation and maintenance costs) and institutional feasibility.</li> </ul>		
Establishment of national water authority	All groups	<ul> <li>Highest potential for social acceptability, environmental sustainability, and benefits for particularly vulnerable groups.</li> <li>Lowest potential for financial feasibility (operation and maintenance costs), contribution to gender equality, and financial feasibility (upfront costs).</li> </ul>		
TECHNOLOGIES AND INFR	ASTRUCTURE DEVELOP	MENT		
Land management solutions to reduce discharge of pollutants into water resources	All groups	High potential for social acceptability, environmental sustainability, and benefits for particularly vulnerable groups. Low potential for institutional feasibility, financial feasibility (operation and maintenance costs), and contribution to gender equality.		
Development of flood protection infrastructure	<ul> <li>Civil society, Indigenous groups, and private sector</li> <li>Conservation and environmental organizations</li> <li>National and local governments</li> </ul>	Potential for social acceptability, environmental sustainability, and benefits for particularly vulnerable groups rated highest. Potential for financial feasibility (operation and maintenance costs), financial feasibility (upfront costs), and contribution to gender equality rated lowest.		

Priority adaptive measure	Prioritized by	Notes from multicriteria analysis
Development of drainage infrastructure	<ul> <li>International organizations</li> <li>Conservation and environmental organizations</li> </ul>	<ul> <li>Highest potential for benefits for particularly vulnerable groups, social acceptability, and environmental sustainability.</li> <li>Low potential for financial feasibility (operation and maintenance costs) and contribution to gender equality.</li> </ul>
Infrastructure improvements to increase the efficiency of water use	All groups	<ul> <li>Potential for environmental sustainability and benefits for particularly vulnerable groups rated highest.</li> <li>Social acceptability was also rated high.</li> <li>Lower potential for financial feasibility (upfront costs) and institutional feasibility.</li> </ul>
Rehabilitation of water infrastructure to reduce leakages	<ul> <li>International organizations</li> <li>Governments and academia</li> <li>Civil society and Indigenous groups</li> <li>National and local governments</li> </ul>	<ul> <li>Highest potential for environmental sustainability.</li> <li>Social acceptability and benefits for particularly vulnerable groups were also rated high.</li> <li>Low potential for contribution to gender equality and financial feasibility (upfront costs).</li> </ul>
Construction of drinking water storage mechanisms for use in times of drought and flooding	<ul> <li>Conservation and environmental organizations</li> <li>National and local governments</li> </ul>	<ul> <li>Potential for social acceptability, environmental sustainability, and benefits for particularly vulnerable groups rated highest.</li> <li>Potential for financial feasibility (upfront costs) and financial feasibility (operation and maintenance costs) rated lowest.</li> </ul>
Construction of water storage mechanisms for other water uses in times of drought and flooding	<ul> <li>International organizations</li> <li>Governments and academia</li> <li>Civil society, Indigenous groups, and private sector</li> <li>Conservation and environmental organizations</li> </ul>	<ul> <li>Potential for social acceptability, environmental sustainability, and benefits for particularly vulnerable groups rated highest.</li> <li>Lowest potential for financial feasibility (operation and maintenance costs), institutional feasibility, and financial feasibility (upfront costs).</li> </ul>

# Annex 3. List of Stakeholders Who Participated in the Development of the SASAP

The following stakeholders participated in the prioritization process and/or the validation workshop for the concept notes.

#### Table A3.

#	Organization	Last Name	First Name
1	UNDP country office Suriname	Rosiek	Faryal
2	UNDP country office Suriname	Malone	Haidy
3	UNDP country office Suriname	Wip	Gianni
4	UNDP country office Suriname	Satimin	Vanessa
5	UNDP country office Suriname	Babb	Gillian
6	UNFPA office in Suriname	Brielle	Judith
7	World Wildlife Fund Guianas (WWF-Guianas)	Singh	David
8	World Wildlife Fund Guianas (WWF-Guianas)	Hausil	Farzia
9	Inter-American Institute for Cooperation on Agriculture (IICA) Suriname office	Tirtopawiro	Laurenzo
10	Ministry of Home Affairs Bureau of Gender Affairs	Towikromo	Yvonne
11	Ministry of Home Affairs Bureau of Gender Affairs	Gajadhar Sukul	Nesha
12		Podrono	Pamela
13		Williams	Darmilla
14	Ministry of Spatial Planning and Environment (ROM) Directorate for Environment	Patterzon	lvette
15	Ministry of Spatial Planning and Environment Directorate for Environment	Kasandiredjo	Jiechel

#	Organization	Last Name	First Name
16	Ministry of Spatial Planning and the Environment Policy Advisor	Gersie	Glenn
17	Ministry of Natural Resources	Chin A Lin	Thania
18	Ministry of Natural Resources	Pika	Rene
19	Ministry of Land Policy and Forest Management	Tajib	Kaminie
20	Ministry of Public Works	Chote	Saskia
21	Ministry of Public Works Water Department	Kosso	Frits
22	Ministry of Agriculture, Animal Husbandry and Fisheries Fisheries Department	Asraf	Radjes
23	Ministry of Agriculture, Animal Husbandry and Fisheries Agricultural Research, Marketing and Processing Department	Samoender	Iwan
24	National Institute for Environment and Development (NIMOS)	Nelom	Cedric
25	National Institute for Environment and Development	Griffith	Gina
26	REDD+ project	Elliot-Banai	Carmen
27	National Coordination Centre for Disaster Relief (NCCR)	Slijngard	Jerry
28	Anton de Kom University of Suriname (AdeKUS)	Satnarain	Usha
29	Anton de Kom University of Suriname	Huisden	Max Christiaan
30	Anton de Kom University of Suriname	Verwey	Oclaya
31	Anton de Kom University of Suriname Institute for Graduate Studies and Research (IGRS)	Kartopawiro	Joelle
32	Environmental Services & Support	Landburg	Chantal
33	Tropenbos Suriname	Van Kanten	Rudi
34	Tropenbos Suriname	llahibaks	Nafiesa
35	Tropenbos Suriname	Hok	Vanessa

#	Organization	Last Name	First Name
36	Amazon Conservation Team Suriname	Ronosemito	Rouche
37	Conservation International Suriname (CIS)	Balsemhof	lfor
38	Green Heritage Fund Suriname	Simons	Desire
39	Green Heritage Fund Suriname	Pool	Monique
40	Green Heritage Fund Suriname	Dipowirono	Vijona
41	Water Forum Suriname (WFS)	Mendeszoon	Naomi
42	Water Forum Suriname	Patandin	Ravi
43	Green Growth Suriname	Smit	Gwendolyn
44	Projekta Foundation	Sonnenveld	Marijke
45	NGO Services Bureau (BFN)	Ketwaru	Sheila
46	Association of Indigenous Traditional Leaders (VIDS) Bureau of the Association	Artist	Marie-Josee
47	Association of Saamaka Traditional Leaders (VSG) and Association of Tribal Maroon Peoples (KAMPOS) Bureau of the Association	Simson	Renatha
48	Suriname Water Supply Company (SWM)	Sitaram-Tjin A Soe	Florence
49	Suriname Water Supply Company (SWM)	Hemai	Ashwintie
50	Suriname Business Association	Ganesh	Kamlesh
51	Suriname Hospitality and Tourism Association (SHATA)	Ang	Sylvia
52	Newmont Suriname Mining Company	Wielson	Winston
53	lamgold Mining Company Suriname	Agwense	Marijke
54	Personal interest	Essed-Fernandes	Monique
55		Flabbert	Eric
56	Ministry of Natural Resources	Boston	Jill
57		Asin	Malcolm
58		Amato	Christine
59		Arifin	Nur

# Annex 4. Overview of Monitoring Framework for Water Resources SASAP

Table A4.

NAP strategic objectives		Expected outputs	KPIs	Data sources	Notes on KPIs	
WAT	WATER RESOURCES STRATEGIC OBJECTIVES					
1	Establish a comprehensive national research programme on social, environmental, and economic baselines, climate science, vulnerability, impacts, and risk management	Climate change-related data collection, capacity building, institutional strengthening, data processing and analysis, and data management (A1)	# of new people hired by ministries to support climate change data systems (by gender/social group)	Data on teams to be provided by ministries.	This may include new hires, or existing staff with a percentage of their time reassigned to support climate change data systems (data should reflect these percentages).	
		Vulnerabilities and risks from climate change to drinking water and other uses assessed (A2)	District-level risk maps developed Differential vulnerability by gender/district/type of stakeholder assessed	Review of district-level documentation, including maps and vulnerability and risk assessment reports		
		Water needs and sources assessed for different uses, including drinking water, irrigation, waste treatment, industrial use, and fisheries (A3)	Comprehensive water needs and source assessment completed	Water needs assessment report	To be considered comprehensive, this should cover all areas of the country and the full range of water needs.	

NAP strategic objectives		Expected outputs	KPIs	Data sources	Notes on KPIs
2	Develop and implement law, policy and regulation to ensure sustainable exploitation and use of drinking water resources and wastewater management	Study to indicate the required water resource governance and administration system best suited to Suriname (B1)	Water resources governance study completed	Water governance study report	The report must include clear and concrete recommendations for water resources governance.
		Establishment of more water boards and a national water authority (B2)	Water Resource Authority established More Water Boards established Gender balance in key decision-making structures (% of women/men)	Records of water governance structures provided by ministries	
3	Water management programme to increase resilience of water supply	Land management solutions to reduce discharge of pollutants into water resources (A1)	Pollutant loads in [water sources] are lower (aquifers/ coastal swamps/rivers and creeks/lakes/freshwater swamps)	Water monitoring records	
		Drinking water storage mechanisms in place for use in times of drought and flooding (A2)	Increased numbers and volume of reservoirs % of households in targeted communities with access to stored water for drinking when droughts and floods occur (disaggregated by gender of household head)	Records of reservoirs constructed and storage spaces for bottled water created Access records for water storage mechanisms	When mechanisms are operational, it will be important to keep records of who is accessing the water during drought and flood events, ensuring disaggregation of data by gender of household.

NAP strategic objectives	Expected outputs	KPIs	Data sources	Notes on KPIs
	Water storage mechanisms in place for other water uses in times of drought and flooding (A3)	Increased numbers and volume of reservoirs # of other actors (agriculture/industry) with access to stored water during droughts and floods	Records of reservoirs constructed Access records for water storage mechanisms	When mechanisms are operational, it will be important to keep records of who is accessing the water during drought and flood events, ensuring disaggregation of data by type of actor.
	Construction of water storage mechanisms for use of water in times of drought [and flooding] in strategic locations throughout the country (D1)	Increased budget for water- related infrastructure	Annual budgets for relevant government actors	Budget data should be gathered for both construction and operation/ maintenance.
4 Climate-resilient infrastructure development to ensure availability of drinking water	Increased efficiency of water use, including storage and distribution, without compromising sanitation systems (A2)	% of water loss reduced	Water monitoring records	Budget data should be gathered for both construction and operation/ maintenance.
water	Mechanisms developed to reduce intrusion of sea water (B1)	Increased budget for water- related infrastructure Reduced salinity in coastal aquifers	Annual budgets for relevant government actors Water monitoring records	Budget data should be gathered for both construction and operation/ maintenance.

NAP strategic objectives	Expected outputs	KPIs	Data sources	Notes on KPIs
	A leakage management program including mains rehabilitation, to reduce water leakage from distribution and supply networks	Increased budget for water- related infrastructure % of water loss reduced Reduced incidence of leakages	Annual budgets for relevant government actors Water monitoring records	Budget data should be gathered for both construction and operation/ maintenance.
	Increased area of land and water resources protected from flooding	Increased budget for water- related infrastructure Area of land protected from flooding (in hectares, by district)	Annual budgets for relevant government actors Records of flood protection and drainage infrastructure constructed	Budget data should be gathered for both construction and operation/ maintenance.
CORE STRATEGIC OBJEC	TIVES			
1.3 Design, implement, and enforce suitable governance procedures and processes to forward the national	Coordination of national climate change stakeholder institutions (SO 1.3 A1).	Number of active climate adaptation stakeholders (by gender/type of stakeholder) Gender balance in key decision-making structures (% of women/men)	Records from stakeholder meetings and membership of stakeholder platforms and other decision-making structures	Need to determine what is considered "active" for different types of stakeholders and ensure that gender-disaggregated data is collected.
adaptation agenda	Promotion of climate change adaptation and mitigation mainstreaming	Number of staff trained/ level of training budget (by gender/institution) Reference to climate adaptation in non-climate change policies, plans, and budgets for the water resources sector	Records of training programs Review of policies, plans, and budgets	Ensure gender- disaggregated data is collected for all training programs.

NAP strategic objectives		Expected outputs	KPIs	Data sources	Notes on KPIs
2.2	Provide the necessary resources to ministries to modernize and expand facilities, tools, and equipment for their climate-related mandates	Improved data and information collection and monitoring from the installation of new and upgraded weather measurement stations and other equipment requested and justified by relevant ministries and agencies (A1)	Number of ministries attaining required technical capacity	Data on technical capacity to be provided by ministries	Need to determine what the "required technical capacity" is and how it can be assessed.
	munuates	Reduced gaps in the statistical data on the sub-national/ village level (B1)	Quality and quantity of local/district-level data sets including gender- disaggregated data sets	Data to be collected through surveys and interviews and stored in climate change data systems	Need to agree on benchmarks for data quality and disaggregation
		Reduced gaps in data on water and sanitation and natural disasters (B2)	Quality and quantity of data on identified critical variables collected Reduction of gaps in current datasets	Data to be collected through surveys and interviews and stored in climate change data systems	Need to agree on benchmarks for data quality and disaggregation

NAP strategic objectives		Expected outputs	KPIs	Data sources	Notes on KPIs
2.4	Increase the capacity for wider partnership involvement in collecting and using national data and information	National-level data disaggregated or downscaled to provide estimated information for district plans (A1)	Quality of downscaled models developed	Review of downscaled models	Need to agree on benchmarks for quality of models
		Primary data sets acquired through surveys and other means for district-level planning (A2)	Quality and quantity of local/district-level datasets including gender- disaggregated datasets	Data to be collected through surveys and interviews and stored in climate change data systems	Need to agree on benchmarks for data quality and disaggregation
		All national data collection and research will emphasize gender sensitivity and investigate gender issues as a central feature moving forward (A3).	% of critical variables and local/district datasets where gender-disaggregated data has been collected	Data to be collected through surveys and interviews and stored in climate change data systems	Need to agree which are critical variables for collecting disaggregated data
5.2	Incorporation of local knowledge, experiences, and practices in climate actions	A variety of appropriate methods and techniques utilized to incorporate local knowledge, experiences, and practices of men and women (A1)	# of stakeholders engaged in analysis of vulnerabilities (by gender/district/type of stakeholder)	Participation records for vulnerability and risk assessment process	
		Increased recognition of the value of local ways of adapting recorded in assessment reports (B1)	Number of citations of local knowledge in decision making forums # of stakeholders reached with results of vulnerability and risk assessment (by gender/district/type of stakeholder)	Meeting minutes and reports Participation records for vulnerability and risk assessment workshops with stakeholders	

