GEF-8 PROJECT IDENTIFICATION FORM (PIF)

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General Project Information

Project Title	
Promoting social and ecological resilience in land-water-food systems in blue economy sectors in Benin	
Region	GEF Project ID
Benin	11453
Country(ies)	Type of Project
Benin	FSP
GEF Agency(ies):	GEF Agency ID
AfDB	
Executing Partner	Executing Partner Type
Ministry of Agriculture, Environment and Sustainable Development	GEF Agency
GEF Focal Area (s)	Submission Date
Climate Change	10/18/2023
Project Sector (CCM Only)	
Climate Change Adaptation Sector	
Taxonomy	
Focal Areas, Biodiversity, Fisheries, Mainstreaming, Coastal and Marine Protected Areas, Protected Areas and Landscapes, Biomes, Wetlands, Climate Change Adaptation, Climate Change, Innovation, Climate information, Sea-level rise, Disaster risk management, Livelihoods, Least Developed Countries, Climate resilience, Private sector, Community-based adaptation, Ecosystem-based Adaptation, Acquaculture, International Waters, Freshwater, Sustainable Development Goals, Demonstrate innovative approache, Influencing models, Strengthen institutional capacity and decision-making, Private Sector, Stakeholders, SMEs, Individuals/Entrepreneurs, Local Communities, Type of Engagement, Information Dissemination, Participation, Communications, Awareness Raising, Beneficiaries, Community Based Organization, Civil Society, Gender Equality, Sex-disaggregated indicators, Gender Mainstreaming, Women groups, Gender-sensitive indicators, Gender results areas, Access to benefits and services, Participation and leadership, Knowledge Generation and Exchange, Capacity, Knowledge and Research, Capacity Development, Learning, Theory of change, Adaptive management, Knowledge Generation, Training	
Type of Trust Fund	Project Duration (Months)
LDCF	48
GEF Project Grant: (a)	GEF Project Non-Grant: (b)
8,932,420.00	0.00
Agency Fee(s) Grant: (c)	Agency Fee(s) Non-Grant (d)
848,580.00	0.00
Total GEF Financing: (a+b+c+d)	Total Co-financing
9,781,000.00	41,116,800.00

PPG Amount: (e)	PPG Agency Fee(s): (f)
200,000.00	19,000.00
PPG total amount: (e+f)	Total GEF Resources: (a+b+c+d+e+f)
219,000.00	10,000,000.00
Project Tags	
CBIT: No NGI: No SGP: No Innovation: No	

Project Summary

Provide a brief summary description of the project, including: (i) what is the problem and issues to be addressed? (ii) what are the project objectives, and if the project is intended to be transformative, how will this be achieved? iii), how will this be achieved (approach to deliver on objectives), and (iv) what are the GEBs and/or adaptation benefits, and other key expected results. The purpose of the summary is to provide a short, coherent summary for readers. The explanation and justification of the project should be in section B "project description".(max. 250 words, approximately 1/2 page)

The project document outlines a comprehensive plan to address climate vulnerabilities and transform Benin's fisheries sector to enhance climate resilience.

Benin's fisheries are plagued by climate change impacts, including coastal erosion, saline intrusion, warming inland waters, and extreme weather events, leading to diminished fish production, compromised infrastructure, and at-risk human settlements. Barriers to addressing these challenges include habitat destruction, overfishing, inadequate funding, weak enforcement of regulations, and limited community engagement, among other.

The project objective and the adaptation objective are aligned, which is "To build the climate resilience of fisheries resources by implementing adaptive strategies and bolstering institutional capacities, with a strong focus on local community and woman's empowerment, climate smart technologies and infrastructure, knowledge transfer, and policy reform". The project aims to revitalize aquatic ecosystems and fortify the resilience and sustainability of livelihoods through climate-resilient fishing practices, financial empowerment, and capacity building. Transformation will be achieved by managing 65,000 ha of coastal and marine areas, engaging the private sector in adaptation efforts, and promoting gender-equitable participation.

The project's overarching goal is to amplify the climate resilience of Benin's fisheries resources by implementing a suite of adaptive strategies while reinforcing institutional strengths. This will be actualized by catalyzing community-centric initiatives, with particular consideration for the elevation of women's roles, harnessing climate-smart innovations and resilient infrastructure, channeling knowledge sharing, and instigating pivotal policy reforms. Such a multifaceted approach aspires to cultivate a dynamic and durable fisheries sector, pivotal for bolstering food security, economic robustness, and the collective prosperity of Benin's populace amid the flux of climate variability.

The transformation approach of the project integrates a multi-dimensional strategy, encompassing a hotspot-based intervention targeting key areas such as aquaculture development and biodiversity conservation, collaboration with the Blue Ports Initiative for marine conservation and climate resilience, and multifaceted interventions that weave together climate resilience, community empowerment, gender inclusivity, and ecosystem restoration. This approach is underpinned by a comprehensive policy integration in line with the GEF-8 levers of transformation, aiming to ensure policy coherence and mainstreaming of climate adaptation, while bolstering governance structures to guide the fisheries sector towards resilience and sustainable development.

The project will execute several outputs, including ecosystem restoration, promoting biodiversity, removing invasive species, implementing agroforestry, improving infrastructure at fish landing sites, and establishing a weather and water quality observing network.

By managing 65,000 hectares of coastal and marine areas for climate resilience and reinforcing 8 key policies, plans, frameworks, and institutions for climate adaptation, the project promises substantial local, national and regional impact. It's set to directly benefit 1.2 million beneficiaries and actively involve at least 10 private sector enterprises in climate adaptation efforts. Furthermore, the initiative is committed to enhancing the knowledge and capabilities of 10,000 people, ensuring that women represent half of this empowered group. Through its comprehensive scope, the project not only strengthens resilience but also establishes itself as a paradigm for regional knowledge sharing, collaborative engagement, and blue economy advancement, potentially inspiring replication, and inclusive gender mainstreaming strategies across neighboring countries.

The project's adaptation interventions are designed to foster a resilient fisheries sector in the face of climate change. By restoring fish breeding habitats and ecosystem networks, combating invasive species, and promoting shoreline vegetation, the project aims to safeguard marine biodiversity. Agroforestry practices will be integrated within aquaculture villages, while infrastructural resilience will be boosted through improved water systems and sustainable fishing methods. Water and soil management practices, along with a weather and water quality observing network, will support environmental adaptability. The project will also enhance disaster preparedness through community engagement and institutional capacity building. The implementation of blue transformation and integrated coastal zone management, along with the establishment of protective biological reserves and marine protected areas, are central to preserving the aquatic environment. Local communities will be empowered to manage climate-resilient watersheds, supported by training in sustainable fishing and watershed planning. Financial accessibility for fisheries development will be increased, and a robust framework for knowledge transfer and adaptive management will be established, all while ensuring gender-specific considerations are integrated into regular monitoring and evaluation efforts

Indicative Project Overview

Project Objective

To build the climate resilience of fisheries resources by implementing adaptive strategies and bolstering institutional capacities, with a strong focus on local community and woman’s empowerment, climate smart technologies and infrastructure, knowledge transfer, and policy reform

Project Components

1 – Adaptation measures to restore and build the resilience of ecosystems affecting fisheries resources

Component Type	Trust Fund
Investment	LDCF
GEF Project Financing ($)	Co-financing ($)
4,723,368.00	13,027,200.00

Outcome:

1 - Revitalization and resilience of Benin's aquatic ecosystems, through the restoration of critical marine, freshwater, lagoon, and wetland habitats, to support sustainable fisheries production across inland systems and coastal zones.

Output:

1.1. Fish breeding/spawning grounds restored

1.2. Restore biodiversity reconnecting the Lake Nokoué-Porto-Novo Lagoon complex with other ecosystems

1.3. Invasive weeds are removed in hotspot priority areas

1.4. Over 80 km of vegetation is planted for shoreline protection

1.5. Implementation of agroforestry in aquaculture villages

1.6. Implementation of blue transformation approach in coastal ports, harbours, and fish landing/marketing jetties, and integrated coastal zone management measures across fisheries hotspots

1.7. Water and soil management to support inland aquaculture systems

2. Strengthening capacities, and resilience in aquatic food systems

Component Type	Trust Fund
Investment	LDCF
GEF Project Financing ($)	Co-financing ($)
3,282,900.00	21,589,600.00

Outcome:

2 - Strengthened resilience and sustainability of livelihoods in Benin's fisheries and aquaculture sector through the promotion of climate-resilient fishing practices, policy coherence, financial empowerment, adaptive strategies, community and institutional capacity building, and the active engagement of local communities and women in target regions

Output:

2.1 Strengthen the institutional and regulatory capacity of key governmental fisheries agencies

2.2 Water supply and sanitation services provided at fish landing sites

2.3 Equipment and Freezing infrastructure at pilot landing sites to sustain fisheries value chain and resilience of the fisheries production channel:

2.4 Alternative and complementary rural livelihoods strengthened in selected watersheds

2.5 At least 20 fishing Committees are trained in tackling the cumulative effects of climate change in fisheries

2.6 At least 20 fishing committees are trained in sustainable fishing methods and climate-resilient watershed planning for local fishers and committees, ensuring knowledge transfer for effective management.

2.7 Capacity strengthening for women and youth

2.8 Support aquaculture producers in 5 villages to sustain their productivity as an example for integrative aquaculture for the country

2.9 Pilot weather and water quality observing network established

2.10 Climate change and fisheries monitoring datasets are compiled and shared with all stakeholders

2.11 Provision of Disaster Relief and Climate Insurance

2.12 Increasing financial accessibility for fisheries and aquaculture development

3 - Effective Knowledge management, communications and adaptative management for Benin's fisheries resources

Component Type	Trust Fund
Technical Assistance	LDCF
GEF Project Financing ($)	Co-financing ($)
250,799.00	2,000,000.00

Outcome:

Empowered Fisheries and Aquaculture Sector through Enhanced Knowledge Flow, Adaptive Strategies, and Gender-Inclusive Approaches

Output:

3.1 Enhance the capacity of key stakeholders by implementing targeted knowledge transfer, research, and communication initiatives that incorporate a gender perspective (including of a centralized digital platform)

3.2 Adaptive management strategies, ensuring effective real-time adjustments to project interventions

M&E

Component Type	Trust Fund
Technical Assistance	LDCF
GEF Project Financing ($)	Co-financing ($)
250,000.00	1,500,000.00

Outcome:

Effective and efficient achievement of project objectives, with an enhanced focus on gender inclusivity, while continuously informing and improving future interventions for equitable impact

Output:

Achieve robust monitoring and a comprehensive, gender-sensitive evaluation of the project through regular progress reports, ensuring transparency and effectiveness, and equitable consideration in project activities

Component Balances

Project Components	GEF Project Financing ($)	Co-financing ($)
1 – Adaptation measures to restore and build the resilience of ecosystems affecting fisheries resources	4,723,368.00	13,027,200.00
2. Strengthening capacities, and resilience in aquatic food systems	3,282,900.00	21,589,600.00
3 - Effective Knowledge management, communications and adaptative management for Benin's fisheries resources	250,799.00	2,000,000.00
M&E	250,000.00	1,500,000.00
Subtotal	**8,507,067.00**	**38,116,800.00**
Project Management Cost	425,353.00	3,000,000.00
Total Project Cost ($)	**8,932,420.00**	**41,116,800.00**

Please provide justification

PMC at 5% of project cost.

A. PROJECT RATIONALE

Briefly describe the current situation: the global environmental problems and/or climate vulnerabilities that the project will address, the key elements of the system, and underlying drivers of environmental change in the project context, such as population growth, economic development, climate change, sociocultural and political factors, including conflicts, or technological changes. Describe the objective of the project, and the justification for it. (Approximately 3-5 pages) see guidance here

1. Global environmental problems and climate vulnerabilities

1.1 Current Environmental and Climate Vulnerabilities

Climate-Induced Ecosystem Disruption

Climate change's effects on our oceans and inland waters are undeniable, with rising sea levels triggering a chain reaction that destabilizes entire aquatic ecosystems. Coastal habitats, the nurseries of the sea, are vanishing under the relentless rise of water levels, disrupting the life cycles of many fish species. Saltwater intrusion into freshwater systems alters the salinity balance, jeopardizing freshwater fish populations. The very foundation of marine habitats, like coral reefs and seagrass beds, are threatened by erosion and sedimentation, further exacerbated by altered ocean currents and nutrient flows critical for marine life. These physical changes are matched by biological shifts; temperature increases prompt fish to migrate prematurely, sometimes blocking their traditional migratory routes, thus affecting their growth and survival rates.

Socioeconomic Fallout

The socioeconomic fabric woven around fisheries is fraying as these environmental changes take their toll. Communities dependent on fisheries face lost income, food insecurity, and employment challenges, with storm surges and extreme weather events piling on additional infrastructure damage and stock collapses. The Intergovernmental Panel on Climate Change (IPCC) confirms the severity of these shifts, projecting a future where ocean ecosystem services struggle to maintain their vital roles in carbon mitigation, oxygen provisioning, and supporting biodiversity. Social vulnerabilities deepen as livelihoods wane, resource conflicts erupt, and the pursuit of broader societal goals, including the United Nations Sustainable Development Goals, encounters new hurdles.

Aquaculture in the Climate Equation

Aquaculture, often heralded as a buffer against climate change, is not immune to its impacts. Rising water temperatures, ocean acidification, and erratic precipitation patterns introduce stressors that can stifle growth and reproduction in aquaculture species, particularly shellfish. The availability of freshwater for aquaculture is under threat, necessitating advanced water management solutions. Extreme weather events and sea-level rise pose risks to aquaculture infrastructure, with the potential for farmed species to escape and compete with wild counterparts, while also increasing the risk of disease.

Benin’s fisheries baseline

Benin is a relatively well-watered country with an estimated groundwater potential of about 1.87 billion cubic meters and surface water of about 13 billion cubic meters per year . This impressive quantity is generated by four large watersheds that share the country namely: (i) the Beninese portion of the Niger Basin in the northeast (Alibori, Mekrou and Sota), (ii) the Beninese portion of the Volta Basin in the northwest (Pendjari Basin), (iii) the Beninese portion of the Mono Basin in the southwest and (iv) the Ouémé and Yéwa Basin (southeast) which occupies most of the Beninese territory. In addition to these watersheds, there is the coastal fringe made up, in a significant proportion, of wetlands resulting from the low relief (slopes of less than 5%) that is recorded at the terminal continental level, which determines low flood valleys whose set constitutes the coastal lagoon complex made of lakes and lagoons . The major rivers, watersheds and lagoons are presented in table 2:

TABLE 1 MAIN RIVERS, LAKES, AND LAGOONS IN BENIN

Watercourses: Rivers	**Watercourses: Streams**	**Lakes**	**Lagoons**
Rivers (length)	**Streams (length)**	**Lakes (area)**	**Lagoons (area)**
Ouémé: 510 km	Mékrou: 410 km	Nokoué: 150 km2	Ouidah: 40 km2
Niger: 120 km	Pendjari: 380 km	Ahémé: 78 km2	Porto-Novo: 35 km2
Mono: 100 km	Alibori: 338 km	Toho: 15 km2	Grand-Popo: 15 km2
	Sota: 250 km		
	Okpara: 200 km		
	Couffo: 190 km		
	Zou: 150 km		

Source: Benin Biodiversity Strategy and Action Plan 2011-2020

Benin is classified as a lower middle-income country with a GDP/capita of US$1,250. Its gross domestic product (GDP) is estimated at XOF 8,814 billion (USD 15.4 billion) in 2020 with average economic growth rates above 6% in recent years. The country is however making progress particularly in the areas of health and income thanks to this positive economic performance. Between 1990 and 2019, Benin's Human Development Index rose from 0.364 to 0.545, an increase of 49.7%. According to the Ministry of Agriculture, Livestock and Fisheries, the country's economy is mainly based on agriculture and the processing of agricultural products. The fisheries sub-sector (marine, inland and fish farming) employs 15% of the total active population and 25% of the active population in the agricultural sector. This represents more than 600,000 direct and indirect jobs and approximately 40,000 female jobs. The fisheries industry is a vital industry to the country as it provides 30% of the animal protein consumed by the populace. . The fisheries sub-sector plays an important socio-economic role with an estimated contribution of 3% of GDP or about 8% to agricultural GDP[1][1].

In terms of economic policy, fish production and self-sufficiency are ranked among the top priorities on the development agenda of Benin. Indeed, the country spends much of its food budget on fish imports, which accounts for 58% of the country’s needs, with the remaining 42% coming from local fishing and small-scale aquaculture. However, the potential for domestic fish production is very huge, with 125 km of coastline and large and very diversified areas of water and humid ecosystems, constituting mangroves, lagoons, brackish water, catchments, rivers, lakes, etc. Therefore, to boost domestic fish production and reduce expenses on fish imports, the Government has made a political

commitment to develop the country's strong potential in **blue economy** for promoting both aquaculture and fishing development.

Three main types of fishing are practiced in Benin: artisanal fishing, industrial fishing, inland fishing. The centre of Benin's fisheries sector is primarily concentrated along the country's coastal regions. This includes towns and cities such as Cotonou, Porto-Novo, Ouidah, Grand-Popo, and Ganvie. Cotonou, as the largest city and economic centre of Benin, serves as a significant hub for fish processing, distribution, and export. It is home to several fish markets, processing facilities, and storage infrastructure. The city's coastal location provides convenient access to fishing grounds and facilitates the flow of fish products within the country and to international markets. Other coastal towns and communities in Benin also play vital roles in the fisheries sector. These areas are often characterized by fishing villages and small-scale fishing operations. Fishing activities in these regions include both artisanal and industrial fishing, with a focus on species such as sardinella, tilapia, shrimp, and various demersal fish. It is important to note that while the coastal regions are the centre of Benin's fisheries sector, fishing activities also extend to inland water bodies such as rivers, lakes, and reservoirs. These inland fisheries contribute to the overall fish production in the country, albeit on a smaller scale compared to the coastal fisheries.

Inland fishing is essentially lagoon-based (90%) and river-based (10%), while exclusively inland aquaculture remains concentrated in the southern part of the country (about 75%). Marine fishing is not very developed and remains largely artisanal. In recent years, the fisheries sub-sector has been experiencing significant problems. These include the:

- Degradation of aquatic ecosystems
- Strong pressure on resources
- Use of prohibited fishing gear.

Fishing is both intensive and rudimentary, for both nutritional and commercial purposes. People use prohibited forms and methods of fishing that are harmful to the environment (acadjas, fine-mesh nets and others), which pollute and clog up the waters and lead to a depletion of fish stocks. It is carried out without targeting one or a group of species of fish or other fishery products. Two types of fishing are practised. These are inland fishing (in Lake Ahémé, the Mono and Couffo rivers and the coastal lagoon) and small-scale maritime fishing. Fishing is very poorly structured and equipped, and production supplies the urban areas of Cotonou, Calavi, Ouidah, Grand-Popo, Comé, Bopa and Kpomassè.

There is little hunting in the area. However, some mammals (monkeys, pangolins and mongooses), reptiles (monitor lizards, pythons, etc.) and birds are hunted by local people. The use of fishing and hunting resources is unauthorised. However, resources are protected by water divinities. Some places have even been declared sacred and access to them is forbidden to all.

More particularly, in the lagoon and river ecosystems, the main issues reported are related to the:

- Pollution and degradation of fish habitats, spawning grounds, and mangroves (for domestic cooking wood and artisanal salt production) in watersheds, lagoons and marshlands which are critical for the reproduction and replenishment cycles of fish, etc.

- Overexploitation from international illegal fishing practices
- poor management of inland fishery resources
- construction in swampy, floodable, and unhealthy areas,
- Loss and damage due to inadequate coastal fisheries infrastructure and landing sites
- silting up of bottoms because of erosion on the bank.
- use of small-mesh fishing nets and acadja resulting in a continuous decrease in the productivity of the water body (sand and gravel extraction in marine waters and river systems).
- watershed degradation related to agricultural activities and forest degradation.
- organic and chemical pollution from several sources
- fragmentation and destruction of natural fish habitats
- Climate and hydrological changes (increasing water and sea temperature, more frequent and severe hydroclimatic risks (disturbance of water streams, floods, changes in flooding patterns, etc.)) affecting fish stocks and their migration.
- The pollution and filling of wetlands with land-based wastes.

As result, annual national fisheries production hardly exceeds 77,000 tons, including 2,650 tons of aquaculture fish, according to the Direction of the Halieutics Production. While the consumption of fisheries products continues to grow and has reached 183,000 tons in 2021, i.e., a deficit of more than 106,000 tons, the difference is made up by importing frozen fish, at a cost of about XOF 115 billion. Fishing from aquaculture also constitutes a significant source of income for certain vulnerable communities and a significant part of the total amount of animal protein consumed in Benin, particularly by the poor. The regions where aquaculture is practiced, which are mostly rural, are among the areas with the highest poverty rates with an incidence of monetary poverty that has increased from 36.2% in 2011 to 40.1% in 2015 above the national average of 30.2%.

Inland fishing remains a harvesting activity and represents a source of employment, resources, and protein intake for the entire population. It is very important for the riparian communities because of its employment-generating nature[2][2].

In terms of gender equality, the fisheries sector is marked by traditional gender roles. Men are primarily engaged in fishing activities such as offshore fishing, while women are involved in post-harvest activities such as fish processing, marketing, and small-scale fishing in nearshore waters.

Description of the project area: Eastern Complex of Aquatic Ecosystem of Benin

Wetlands, ecosystems with significant importance in Benin are concentrated in the South of Benin. Benin wetlands are made up of a mixture of areas submerged in running water (rivers), wetlands submerged in stagnant water (pools, ponds and lakes), wetlands clogged after submersion (zone of water extension at the periphery of lakes and ponds), wetlands blocked by rising aquifers. These bodies and watercourses are associated with multifaceted habitats such as gallery forests, mudflats, low floodplains, swamp forests, mangroves, marshy savannahs, and floating vegetation. Given their extent and hydrological characteristic, we also encounter flood plains, lowlands, a delta (Ouémé-Sô) and a coastal sea in the Atlantic (ALE & al. 2003).

Lower Ouémé valley composed of Lake Nokoué, Ouémé-Sô, the Cotonou channel, the Totchè canal, the Porto-Novo lagoon, mangroves, and flood plains. Mono floodplain composed of Lake Ahémé, the Aho channel, the coastal lagoon, the lower Mono valley, the natural mangrove, and the mudflats of Gbéhoué Ouatchi. Since 2000, this humid complex is split into two different Wetland Complexes registered as Ramsar sites under the references 1017 and 1018. The Eastern Complex consists of the Lower Ouémé Valley, the Porto-Novo lagoon, Lake Nokoué, with an area of 91,600 Ha, located between 6°21'48' 'N – 6°57'N and 2°20'E – 2°45'E. The West Complex composed of the Lower Valley of Mono and Couffo, the Coastal Lagoon, the Aho Channel, the Ahémé Lake, with an area of 47,500 Ha, located between 6°16'48"N – 6°57'N and 1°40'E – 2°20'E. The current project will be implemented in the Eastern Complex.

1.2 Benin's climatic characteristics and variability

Due to its geographical position, the Republic of Benin is part of the intertropical zone. It is under the influence of the West African monsoon (South-West trade wind) and the flow of North-East trade winds (Harmattan). The interaction of these flows is associated, among other, with disturbances such as squall lines and local thermo-convective cells. The country essentially enjoys a tropical type of climate, characterized by two seasons in the North (one rainy and one dry) and four more or less marked seasons in the South (two rainy and two dry).

The planetary climate system in which Benin is part of, is undergoing large-scale changes which remain amplified by natural and anthropogenic factors, both regional and local. Thus, the Beninese climates are subject to high variability or changes depending on the time and analysis scales, the consequences of which remain harmful for sustainable development. According to the 2008 NAPA, the sectors most affected by climate change are water resources, energy, coastal zones, health, agriculture, and forestry.

1. Global sea level rise

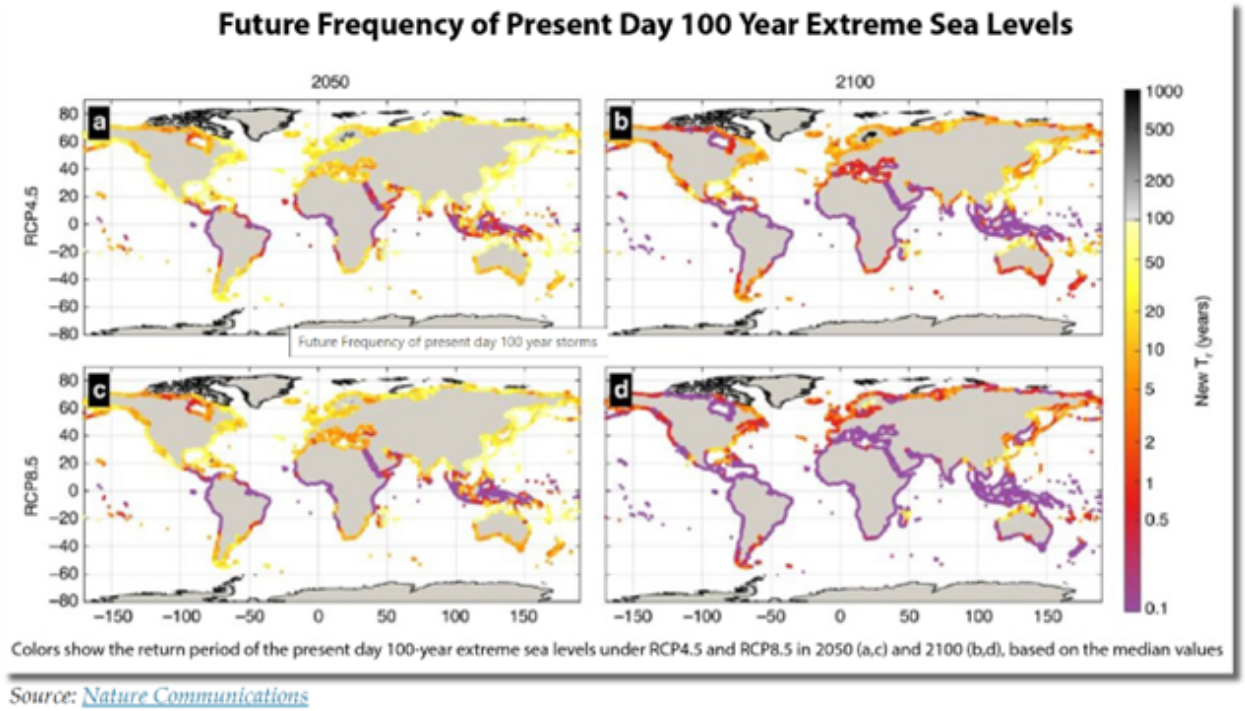
The Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC, 2019) finds that global mean sea levels will most likely rise between 0.29m and 1.1m by the end of this century. These are the most dire sea level rise projections ever made by the IPCC. Global sea level rise, including in the Republic of Benin, is primarily driven by two factors related to global climate change, namely thermal expansion and the melting of ice sheets and glaciers. Local factors can also contribute to the observed sea level rise in specific regions like Benin, such as subsidence (the sinking or settling of

land can exacerbate the effects of global sea level rise, making local sea levels rise faster than the global average), coastal erosion and riverine and estuarine Processes. Countries where large proportions of the population live on the coast–such as Senegal (41 percent), Benin (35 percent), and Liberia (29 percent)–are particularly impacted by sea level rise.

Figure 1 below illustrates the future frequency of what is currently considered a 100-year extreme sea level (ESL) event under two Representative Concentration Pathways (RCPs), RCP4.5 and RCP8.5, for the years 2050 and 2100. This figure is a key piece of evidence that indicates the increasing risks that Benin faces due to global sea-level rise.

Under the RCP scenarios, which represent different levels of greenhouse gas concentrations, the return periods of these extreme sea-level events are expected to shorten. This means that an event that used to happen once in 100 years on average could happen more frequently, potentially even every few years by 2100, especially under the higher greenhouse gas concentration scenario, RCP8.5.

The implications for Benin are significant. As the frequency of extreme sea-level events increases, coastal areas in Benin may face more frequent flooding, coastal erosion, and salinization of freshwater resources. These impacts can have profound effects on communities, local economies, and ecosystems that are already vulnerable to current sea-level extremes.



Source: Nature Communications

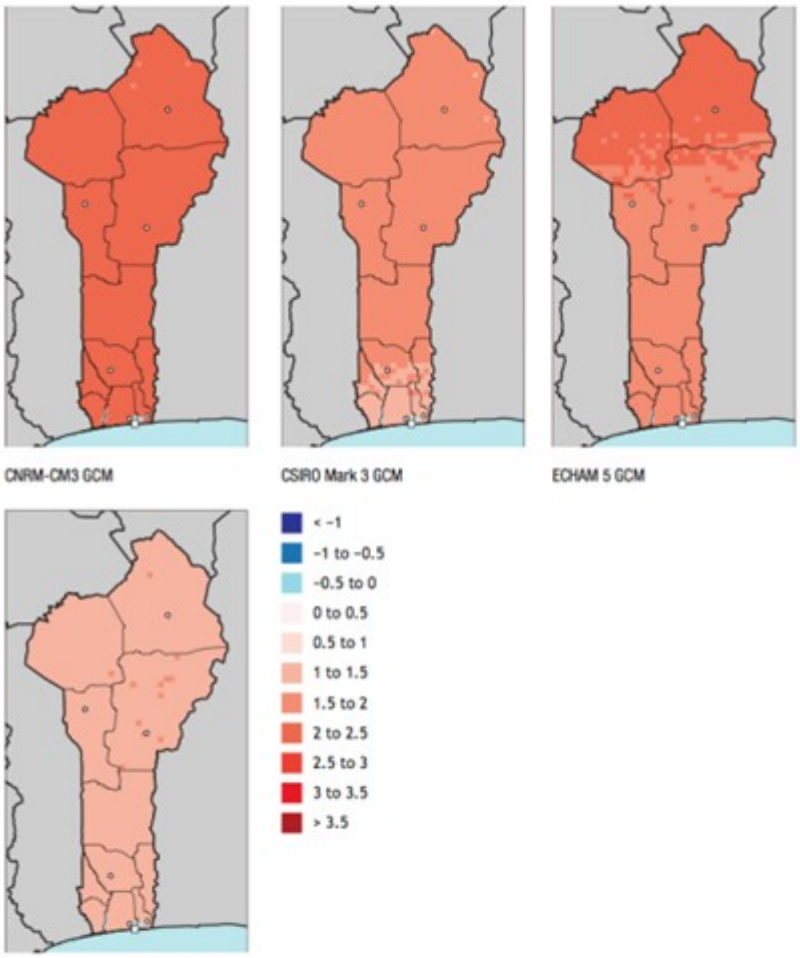
FIGURE 1 FUTURE FREQUENCY OF THE PRESENT DAY 100-YEAR Extreme Sea Level (ESL). COLORS SHOW THE RETURN PERIOD OF THE PRESENT DAY 100-YEAR ESL UNDER RCP4.5 AND RCP8.5 IN 2050 (A, C) AND 2100 (B, D), BASED ON THE MEDIAN VALUES. NOTE THAT THE COLOR SCALE IS NOT LINEAR

2. Rising temperatures

Benin has experienced an increase in average temperatures over the past decades. This rise in temperatures can lead to heatwaves and increased evaporation, affecting agriculture, water availability, and human health. In Benin, the fisheries sector and water resources, encompassing an annual internal and external water input of approximately 13.106 billion cubic meters, are increasingly affected by changing climatic conditions. Rising temperatures have significantly altered precipitation patterns, leading to modifications in the timing, intensity, and distribution of rainfall. This climatic shift has various consequences: rivers, lakes, and lagoons are experiencing changes in their filling patterns; water quality is impacted by anthropogenic activities; and alterations in vegetation cover and land use, including effects on runoff, are becoming more pronounced. Specifically, projections suggest a possible reduction in surface runoff by 2050-2100 across the Ouémé river basin, coinciding with an anticipated decrease in rainfall in the northern regions of Benin. Conversely, an increase in rainfall, likely linked to the same temperature changes, is expected in the north and center of the country, potentially leading to more frequent occurrences of significant hydrological events (Ahamidé et al, 2013).

Rising temperatures have contributed to changing precipitation patterns in Benin, resulting in shifts in the timing, intensity, and distribution of rainfall. Figure 2 and 3 below provide visual evidence of the changing climate in Benin, highlighting alterations in precipitation and temperature patterns due to climate change. Figure 3 depicts the changes in mean annual precipitation in Benin from 2000 to 2050, which assumes a balance across all energy sources and a future world of rapid economic growth, global population that peaks in mid-century, and the rapid introduction of new and more efficient technologies. The map would likely show changes in precipitation patterns, possibly indicating areas where precipitation is expected to decrease or increase, which can have profound effects on agriculture, water resources, and ecosystems. Figure 2 illustrates the projected change in the monthly mean maximum daily temperature in Benin for the warmest month within the same timeframe and scenario. This map is particularly important for understanding heat stress, which can affect human health, agricultural productivity, and overall ecosystem vitality.

Together, these maps underscore the expected rise in temperature and variability in precipitation, signaling that Benin's climate is indeed getting warmer, which is consistent with the broader trends of global climate change. These visual tools serve as a stark reminder of the need for effective adaptation and mitigation strategies to address the impacts of a warming climate on the country's environment, economy, and its people.



Source: Authors' calculations based on Jones, Thornton, and Heinke (2009).

Notes: A1B = greenhouse gas emissions scenario that assumes fast economic growth, a population that peaks midcentury, and the development of new and efficient technologies, along with a balanced use of energy sources; CNRM-CM3 = National Meteorological Research Center–Climate Model 3; CSIRO = climate model developed at the Australia Commonwealth Scientific and Industrial Research Organisation; ECHAM 5 = fifth-generation climate model developed at the Max Planck Institute for Meteorology (Hamburg); GCM = general circulation model; MIROC = Model for Interdisciplinary Research on Climate, developed at the University of Tokyo Center for Climate System Research.

Figure 2 Change in monthly mean maximum daily temperature in Benin for the warmest month, 2000–2050, A1B scenario (°C) (Ministry of Foreign affairs of the Netherlands, 2018)

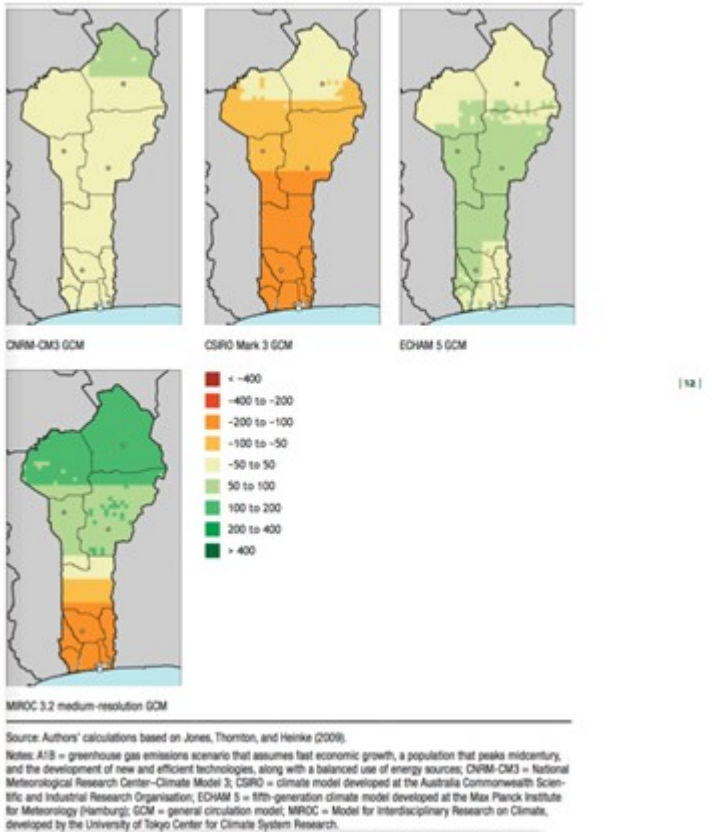


Figure 3 Changes in mean annual precipitation in Benin, 2000–2050, A1B scenario (millimeters) (Ministry of Foreign affairs of the netherlands, 2018)

3. Natural disasters and extreme weather events

The last decades in Benin have been particularly marked by an intensification of climate variability characterized by an increase of extreme weather events and the disruption of seasonal rainfall patterns. It is noticed an increased frequency of rainy events with strong shifts in the rainfall maxima and wetter years in the southern parts of the country, whereas the northern regions have been affected more frequent rainfall deficiencies. The country has been experiencing more frequent storms, strong winds and extreme tide waves. According to the latest climate models, temperatures will further increase. Climate projections also predict very high rainfall variability with an increase in rain across the country in the future, raising fears of more catastrophes and hydro-climatic disasters over the coming decades.

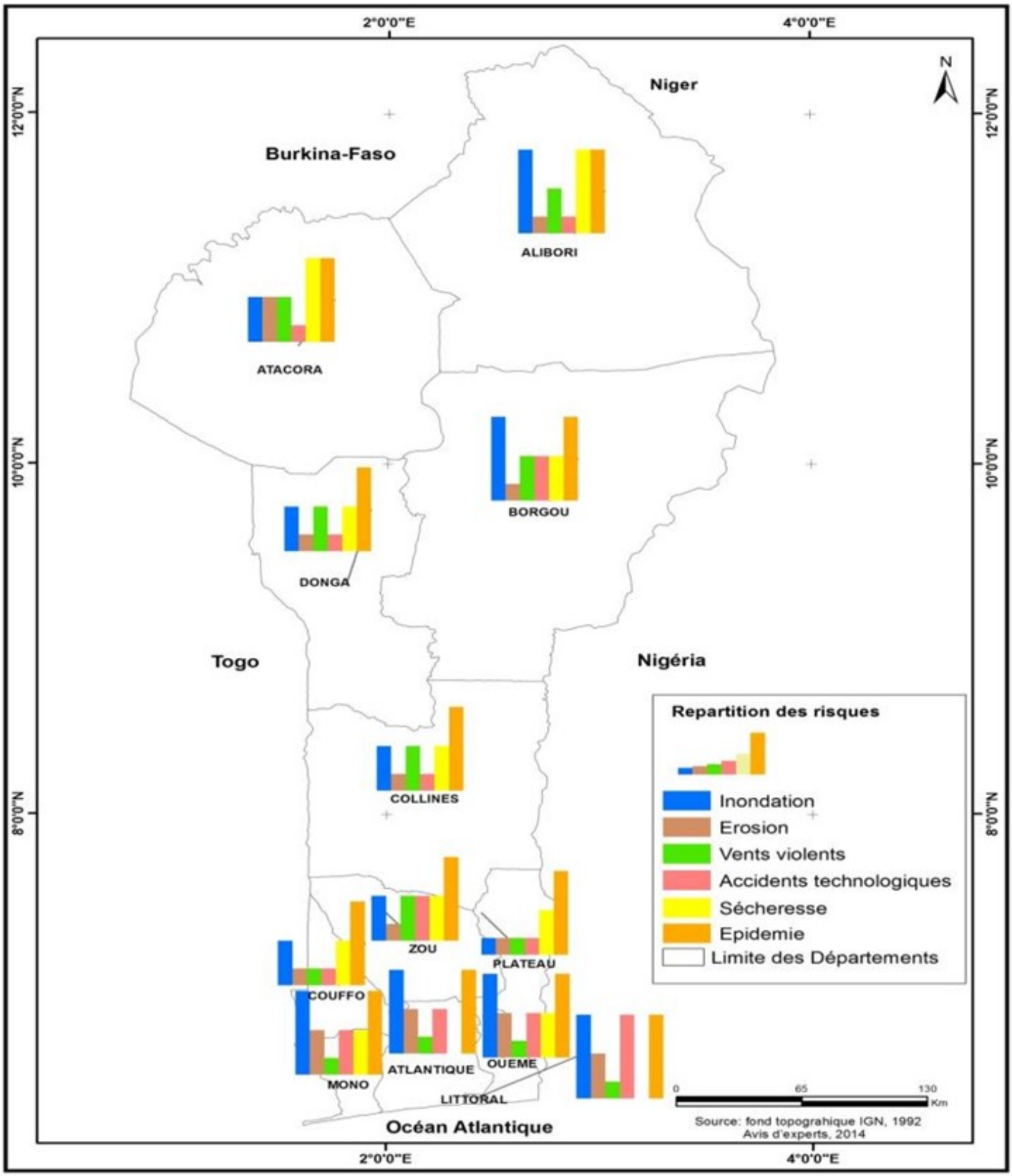
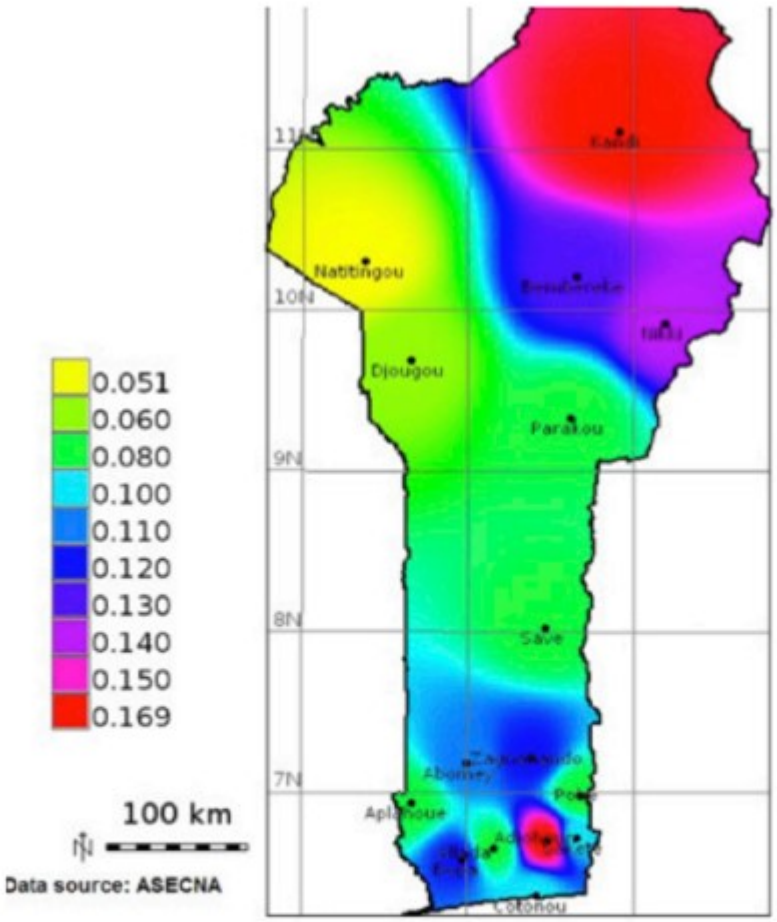


Figure 4 DISASTERS AND CLIMATE RISKS DISTRIBUTION ACROSS BENIN (ORSEC, 2018)

Figure 5 below illustrates the frequency of years with extreme rainfall deficiency in Benin. This map is a clear indicator of the increase in natural disasters and extreme weather events typically linked to droughts, which can have severe consequences for agriculture, water supplies, and the overall

ecosystem. An increase in the frequency of such deficiencies suggests that Benin is experiencing more frequent drought conditions, which is a common consequence of a changing climate. Droughts can lead to crop failures, water shortages, and increased desertification, all of which are disastrous for a country with an economy heavily reliant on agriculture and natural resources.



Source: Yabi and Afouda (2011), retrieved from Konrad Adenauer Stiftung, Les Enjeux du Changement Climatique au Bénin

Legend: The clearer colours (upper halve of legend) indicate a high number of 'bad' years where the pluvial-metric deficit is higher than or equal to 30%. Years: 1951 – 2010.

Figure 5 Frequency of years of extreme rainfall deficiency in benin (Ministry of Foreign affairs of the netherlands, 2018)

1.3 Benin's climate risks and impacts

According to the NAPA (2008), the main climate risks likely to affect the fisheries resources in Benin are droughts, floods, high winds and strong water currents and increased salinity due to coastal erosion and saline inclusion in inland waters, decreasing water availability, and increasing temperatures of inland waters.

Sea level rise

Rising sea levels pose a direct threat to Benin, precipitating coastal erosion, flooding, and the intrusion of saline water into rivers and freshwater systems, leading to the degradation of the coastal ecosystems. Benin's strategic location along the Gulf of Guinea coastline (a relatively small geographical area) capable of major economic and social impacts, such as the loss of critical habitats and increased salinity in coastal waters, makes it acutely susceptible to these changes. These disruptions have already made their mark on human settlements, essential public infrastructure, fishing activities, and the nation's rich biodiversity. Sea-level rise exacerbates erosion, leading to the loss of land, infrastructure, and habitats, as well as displacing coastal communities. Notably, Benin's coastal communities, including Cotonou and Porto-Novo, face heightened risks, endangering infrastructure, livelihoods, and biodiversity. These changes can have deleterious effects on fish populations and interrupt traditional fishing practices, which is particularly concerning for regions along the Gulf of Guinea coastline, underscoring the pressing need for comprehensive climate resilience and adaptation measures to mitigate these significant environmental and socio-economic challenges.

1. **Coastal erosion**

The advance of the Atlantic Ocean is visible in Benin. A rise in sea level linked to global warming is a factor that will considerably aggravate coastal erosion. The Beninese coast therefore constitutes a fragile ecosystem in the face of the harmful effects induced by climate change. The rising waters and the ebb and flow of the waves have already washed away several houses in the past, several villages like Docloboé in the Department of Mono have completely disappeared; Thousands of people living in coastal areas have been forced to flee, and experts say disaster is inevitable unless preventive measures are taken immediately. To take the measure of the danger, note that the advance of the sea on the Beninese coast can go up to 10 or 15 meters in some years, due to the collapse of infrastructures. In Cotonou, more than 400 meters of land, in places, have already been swallowed by the sea, which has engulfed houses and washed away hotel infrastructure such as the Hotel Palm Beach. About 56 percent of the coastline in Benin, Côte d'Ivoire, Senegal, and Togo is exposed to an average erosion of two meters per year, reflecting a broader regional challenge posed by coastal erosion[1].

1. **Saline intrusion**

Saline intrusion affects inland waters. Lagoon ecosystems (intermediate biotopes between the continent and the ocean) particularly attract the attention of the scientific community because of their rich ecology, diversity, and originality. However, saline intrusion into freshwater waters will permanently alter the hyaline characteristics of these waters, which could cause the freshwater fish fauna to disappear. The water table will undoubtedly become brackish and will be the source of many diseases for the populations living in the area. The increase in the salt content in the soil will modify the resistance of the quality of the materials (civil engineering) in the major beds and in the flood plain of the Djessin in the localities of Djegbadji , Azizakouè, Djègbamè and Tohou villages, especially since the organization of the habitat does not correspond to a development master plan or a land use plan. The same impact (natural risk) will be recorded in other areas. The sharp increase in the chloride salt content will destroy part of the flora of the embankments and the slopes of the plateaus, thus leading to a significant ecological modification of the littoral zone.

Groundwater quality is affected by saline intrusion.

Along the Benin coast, groundwater is under several threats coming from both human activities and climate change. the extent of urbanization and industrialization in these areas also impacts the quality of groundwater. Groundwater pollution is often attributed to the uncontrolled use of chemical compounds. Agricultural activities such as the application of chemical fertilizers and manure, have been identified as the main sources of surface and groundwater pollution. Also the impact of human activities on the quality of the groundwater in the Cotonou region and have reported relatively high levels of nitrates . There is also an increase in salinity levels in groundwater near Lake and lagoons (lake Nokoué). The salinity of the Lake Nokoué exhibits a marked seasonal cycle between wet season and the dry season.

Rising temperatures

Rising temperatures in Benin have the potential to instigate intense and successive periods of drought and floods, which pose a substantial threat to food security. Climate change has altered precipitation patterns in Benin, resulting in shifts in the timing, intensity, and distribution of rainfall. This climatic evolution is poised to disrupt agriculture by creating unpredictable growing seasons, directly impacting food security and exacerbating the risk of extreme weather events. If the community does not undertake adaptive measures, the consequences could be stark, with projections indicating that food production may diminish by as much as 6% by 2025 . Furthermore, this unpredictability in precipitation affects agriculture, water availability, and heightens the risk of droughts and floods. The availability of water resources, crucial for both agriculture and fisheries, is anticipated to fall by 40% to 60% , compounded by a decline in precipitation. Such a significant drop in water availability will not only affect the food production landscape but will also have a pronounced adverse effect on Benin's fisheries resources, which are deeply dependent on the availability and quality of water.

3. Water availability

In Benin Average annual rainfall is relatively high, but varies considerably by season as well as across the country. In northern and central Benin, it has been reported the drying-up of dams, boreholes and shallow wells during the dry season of November to April. The south of Benin, in particular, has good surface water resources in perennial rivers, but groundwater is widely used across the country in rural and urban areas for domestic water supply. The capital Cotonou depends extensively on groundwater.

4. Warming of inland waters

Increased air temperature is causing the warming of inland waters, stagnant waters such as lakes and ponds which constitute the hotspots of aquaculture production in Benin.

Natural disasters and extreme weather events

Over the last two decades, Benin has experienced an increased frequency of hydroclimatic disasters, characterized by cycles of drought and/or flooding that profoundly affect production and community life. Climate change has contributed to more frequent and severe extreme weather events in Benin, such as storms, hurricanes, cyclones, and heavy and delayed rainfall. These events not only disrupt the socio-economic fabric of communities but also inflict significant damage on fishing infrastructure and equipment, agriculture, and

human settlements, leading to economic losses and, tragically, loss of lives. The fishing communities are especially vulnerable to these calamities. While a national warning system for floods has been established, the challenges of preventing and managing risks related to agricultural cycles and the complex hydrological dynamics of water bodies and the marine environment persist, compounded by the limited resources of the state.

5. Flooding

In 2010, the Ouémé flood affected 55 of Benin's 77 departments, causing around a hundred deaths, the displacement of 680,000 people, the destruction of more than 55,000 homes, and the loss of 128,000 hectares of crops and 81,000 head of livestock.

Flooding is ranked as the major climate risk affecting Benin. In 2010, the country has experienced one its historic flood event that has displaced more than 680,000 people in 55 out of 77 districts, with 46 deaths, the destruction of more than 55,000 homes and 100,000 people left homeless. The flooding destroyed 128,000 hectares of crops and 81,000 head of livestock crops, as well as stocks of essential food products. Estimated damage to infrastructure, agriculture, and assets, as well as economic losses, was amounted USD 262 million, or 0.8% of Benin's GDP . Since then, the probability of recording a flood is almost recurrent in Benin, a devasting flood event is recorded once every two years.
In October-November 2019, the floods, which were less intense but extended over several weeks, also caused extensive damage and affected tens of thousands of households (Alexis Chaigneau et al, 2020).

According to the National Civil Protection Agency, the number of districts at high risk of flooding in Benin has increased from 22 districts in 2010 to 35 districts in 2022, showing the extent of the flooding phenomenon and its rapid rate of expansion. In addition, the intensity of flooding and the volumes of water collected within watersheds, and particularly in districts at high risk of flooding increase considerably from year to year. Whereas climate projections predict very high rainfall variability across the country in the future, there are raising fears of more catastrophes and climatic disasters over the coming decades due to heavy flooding.

6. Drought across the country

Even though it does not occur a lower frequency than floods, drought causes significant damage to people and Benin’s economy which mainly depends on agriculture sector. Combined with the impact high temperature and evaporation, it affects crop productivity and production through water deficit at farm level, while reducing water flows and availability in river, lakes, and ponds. Droughts have significantly decreased water flows and delph of lakes and ponds used for intensive fish production in several aquaculture hotspots in southern parts of country, causing asphyxia and massive deaths of fish populations.

7. Storms and heavy rain

Recent last years have seen an increased frequency of events of storm and strong winds and tide waves in Benin. These climate risks affect people through damage to public infrastructures such as schools, and health centers, human settlements and socio-economic activities, and particularly marine fishing in this case. Indeed, it has become frequent to see winds and storms events blew the roofing of schools, health centers and houses of vulnerable people across the country, or destroy fishing and aquaculture equipment and settlements in

fishing/aquaculture hotspots. Strong tide waves have significantly raised fears among coastal fishers, who have significantly reduced their activities during certain periods of year.

1.4 Exacerbation of environmental degradation

The main current environmental problems of Benin are due to rapid population growth, especially in the south, to widespread poverty, to the mismatch between the consumption of resources and their rate of renewal and the low consideration of environment in sectoral plans and programs. The most visible manifestations of the degradation of the environment are the loss of forest cover, the spread of erosion in all its forms and everywhere, in particular on the coasts of the Gulf of Guinea, the filling of water bodies and streams which poses a problem of availability of water resources, the general decline in water quality, the loss of fertility of soils, the decline in the capacity for fisheries regeneration of the country's bodies and waterways and unbalanced urban development. Studies have also pointed out the environment threat caused by the proliferation of invasive plant (water hyacinth) and nutrient pollution to the fishing resources and aquatic biodiversity in South-Benin aquatic ecosystems. An initial analysis of the main economic costs linked to this environmental degradation showed that it costs the nation 3 to 5% of its GDP annually (PAE, 2001).

Environmental drivers of degradation further underpin compound the abovementioned climate vulnerabilities (e.g., loss of mangroves and coastal habitats, water pollution and eutrophication) and vice versa. Climate change poses risks to Benin's rich biodiversity and ecosystems. Shifts in temperature and rainfall patterns can disrupt ecosystems, leading to habitat loss and affecting plant and animal species. This loss of biodiversity can have far-reaching consequences for ecosystem services, such as pollination, soil fertility, and natural resource availability. This can also impact the country's natural resources, ecotourism, and overall ecological balance.

Groundwater

Pollution is affecting groundwater quality on the coastal zone and there is a high dependency on groundwater resources by aquaculture operations. Several studies have evaluated the impact of human activities on the quality of the shallow groundwater in the Cotonou region and have reported relatively high levels of nitrates and increased salinity levels due Lake Nokoué and the Atlantic Ocean are therefore a major concern in terms of the source of salinization of groundwater resources in the coastal zone (Alassane et al., 2015). Due to the groundwater pollution problems, shallow groundwater is excluded from the official supply of drinking water to the city of Cotonou.

1.5 Climate induced vulnerabilities affecting Benin's fisheries resources and aquatic food systems vulnerabilities

Benin ranks 152nd out of 181 countries on the extreme climate vulnerability index (based on the ND-GAIN index (2020), developed by the university of Notre Dame. In the agro-ecological zones of the south, water resources, biodiversity, and small-scale farmers and fishermen are most exposed to climate risks. Fishing activities are impacted by climate change, which manifests itself in a number of ways, such as the scarcity of fish in rivers, the migration of fish from fishing areas, the stunted growth of fry, the arduous nature of fishing activities, the death of fish, the proliferation of ichthyotoxic plants (water hyacinth) and, at the same time, small species of fish, in particular paralia pelucida and Mysidaceae.

1. Vulnerabilities to fisheries production and productivity

Under the increasing strain of climate change, Benin's aquatic ecosystems and fisheries resources are confronting vulnerabilities that have far-reaching socio-economic implications. Changes in climate such as rising temperatures and altered precipitation patterns have been linked to reduced fish stocks and shifts in species composition. These ecological disturbances pose a severe threat to the livelihoods of small-scale farmers, fishermen, and herders, who rely on these resources for their sustenance and economic stability. Predominantly, it is these social groups in rural communities who bear the brunt of the impact, finding themselves at the frontline of climate risks, with their socio-economic vulnerability only exacerbating the situation.

The ripple effects extend to critical aquatic habitats, including breeding nurseries and mangrove forests, which are integral to the health of the marine ecosystem. The loss of these habitats contributes not only to a decline in biodiversity but also impairs the natural reproduction of fish populations, which in turn affects food supply chains. Concurrently, terrestrial agricultural systems are not immune to these climatic challenges. Projections indicate a significant decrease in agricultural yields, with an expected drop of between 3 to 18% by 2025, which will likely lead to a corresponding decline in fishery productivity. Such a downturn in fisheries could culminate in reduced catches and a scarcity of fish products across the nation, further straining the food security and economic well-being of Benin's population.

2. Vulnerabilities to fisheries infrastructure and equipment

Benin's fisheries infrastructure and equipment are at considerable risk due to the multifaceted threats posed by climate change. The fisheries sector faces the potential for severe damage to its infrastructure and equipment from various climatic risks. These include the increasingly frequent and intense weather events, such as storms and floods, which can harm the physical structures critical for fisheries operations. Similarly, equipment vital for the harvest and processing of fish could be compromised. Such impacts not only disrupt the immediate availability of fish products but also impede the natural replenishment of fish stocks, leading to a longer-term reduction in fisheries yields. As a result, the productivity of both natural fisheries and fish farming systems is threatened, which could result in a decline in catches and a scarcity of fish products at the national level, further exacerbating the socio-economic vulnerabilities of small farmers, fishermen, and herders who depend on these resources.

3. Vulnerabilities of aquaculture systems

Aquaculture systems in Benin are facing heightened vulnerabilities due to climate risks, which pose a significant threat to the structural integrity and functionality of aquaculture infrastructure and equipment. Climate change-induced factors such as extreme weather conditions, changing water temperatures, and varying salinity levels can cause damage to fish habitats and affect biophysical characteristics of the water, hence making it improper for fish production. Climate change induced factors affect diversely aquaculture systems in Benin. Aquaculture production in Benin is primarily concentrated/developed around lakes and ponds through cage fish farming. Lakes and ponds systems are stagnant water bodies; as such, they do not flow out and are therefore more exposed to environmental degradation and climate risks such as increased water temperature, salt concentration, invasive plant proliferation, chemical pollution, drought, etc. These environmental and climate risks have been significantly production and productivity of cage aquaculture systems developed around major lakes of complex of aquatic ecosystems of South Benin, including lake Aheme and lake Toho. Since the last decade it has recorded several events of massive deaths of tens of tons of fish, due to various causes of pollution, poor oxygenation, temperature chocks, drop in water availability, etc.

Because of these events of massive deaths affecting the lake-based aquaculture systems, farmers there is shift and a growing stakeholders' interest in developing floodplains, riverbanks, or lagoon based-aquaculture. But floodplain and riverbanks are most critical hotspots of floodings that are becoming more frequent in Benin.

This can lead to a decrease in the availability and renewal of fish stocks that are critical for both natural fisheries and aquaculture production. Consequently, there is a risk of reduced yields and overall productivity

in fish farming systems, which are integral to the national supply of fish products. Such disruptions in aquaculture systems could have substantial socio-economic impacts, particularly for rural communities heavily reliant on fishing for their livelihoods, compounding the vulnerability of small farmers, fishermen, and herders who are already socio-economically disadvantaged and most susceptible to climate risks.

Furthermore, there is a high dependency on polluted groundwater resources by aquaculture operations in Benin and the main type of ponds used are the non-drainable pond in which pond water is derived from shallow underground water and cannot be drained by gravity.

4. Vulnerabilities to human settlements and public infrastructure

Benin's human settlements and public infrastructure are increasingly vulnerable to the adverse effects of climate change, notably due to the rising sea levels along the Gulf of Guinea coastline. This vulnerability is manifesting as coastal flooding and the encroachment of saline water into freshwater sources, such as rivers and water tables, jeopardizing water bodies, land, and biodiversity. Such saline intrusion and flooding are threatening not only the ecological balance of coastal and inland waters but also the livelihoods of communities, with fishermen migration becoming a stark indicator of this distress. The erosion and loss of land, as sea levels rise, are undermining subsistence agriculture, fisheries, and public infrastructure, leading to human displacement and amplified economic and social impacts. The fisheries zone in southern Benin, crucial for both food security and economic activity, stands as the most susceptible area, facing significant threats to its sustainability and resilience

The populations of the Ouemé region are very much affected by the climate change phenomenon, insofar as more than 60% of the population lives directly or indirectly off the benefits of inland fishing. At a social level, INRAB studies estimate that climate change is one of the main causes of the fall in people's incomes, the drop in food availability, the worsening of poverty in these fishing areas, and the increase in vector-borne diseases.

1.6 Underlying Drivers of Environmental Change

Figure 7 provides a holistic, but general representation of the fisheries system and its drivers. It is a complex and interconnected system that involves a diverse range of elements including ecosystems, marine species, human communities, and markets. As observed in Benin’s fisheries system, it is made up of a plexus of sub-systems, such as the ecological system where marine species thrive and are caught, the socioeconomic system, and the regulatory systems. Moreover, the fisheries system is subject to feedback loops, for example, overfishing, can deplete fish populations and damage ecosystems, leading to lower catches in the future. Conversely, sustainable fishing practices and effective regulation can lead to healthier marine and freshwater ecosystems and more abundant fish stocks over time. Benin’s fisheries system is dynamic and interconnected, and its health and sustainability depend on the balance and interaction among its various components.

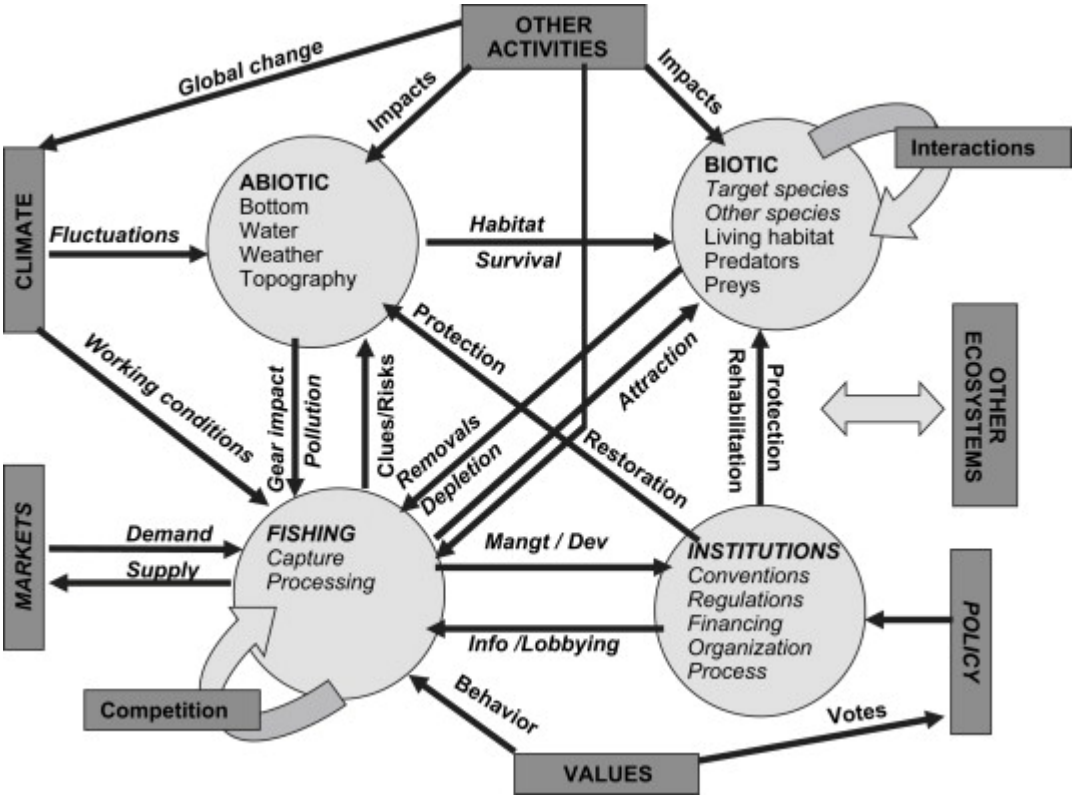


FIGURE 1 HOLISTIC REPRESENTATION OF THE FISHERY SYSTEM [3]

In Benin, we are currently seeing a deterioration of marine habitats, depletion of fisheries resources and reduced fisheries productivity. Some of the main causes for this trend is rapid population growth, in the absence of:

- Full and productive employment for all, including women and youths.
- An integration of social and environmental costs in economic decision-making
- Effective government action to increase resource efficiency in consumption and production and committed and ambitious efforts to decouple economic growth from damage to the environment.
- Adequate flow of investments into the fisheries and aquaculture relevant infrastructure
- Uncontrolled overfishing (and bycatch) and illegal fishing

Within this context, several additional trends are currently being observed (Table 1).

TABLE 1 OBSERVED TRENDS IN BENIN'S FISHERIES SECTOR

Trends	Description
1. Changing climate patterns	Rising temperatures, changing rainfall patterns, sea-level rise and coastal erosion, and increased frequency and intensity of extreme weather events, ocean acidification
2. Increasing fish consumption	Benin has experienced a rise in fish consumption due to population growth, urbanization, and changing dietary habits. This has led to an increased demand for fish products, putting pressure on fisheries resources and fish imports to meet the growing needs.
3. Decline in wild fish stocks.	Like many other countries, Benin has faced challenges with declining wild fish stocks due to overfishing, illegal fishing practices, and habitat degradation. This decline has highlighted the need for sustainable fisheries management

	practices and the development of aquaculture as an alternative source of fish production.
4. Growing importance of aquaculture	Aquaculture has gained prominence to supplement declining wild fish stocks and meet the increasing demand for fish. Tilapia farming has been a particularly important aquaculture activity in Benin, contributing to domestic fish production.
5. Efforts to strengthening regulatory frameworks	Benin has been working on strengthening its legal and regulatory frameworks to promote sustainable fisheries management. This includes implementing measures to combat illegal, unreported, and unregulated (IUU) fishing, improving surveillance and enforcement capabilities, and establishing partnerships with regional and international organizations to enhance fisheries governance.
6. Efforts to promote value addition and market access	Efforts have been made to improve the value chain of fish products in Benin. This includes investments in processing and storage facilities to reduce post-harvest losses, enhance product quality, and increase market access both domestically and internationally.
7. Efforts towards addressing environmental and climate change challenges	Benin has recognized the importance of addressing environmental challenges such as pollution, habitat degradation, and climate change impacts on the fisheries sector. Efforts have been made to promote sustainable fishing practices, protect marine ecosystems, and strengthen resilience to climate change through adaptation measures.

The specific drivers that are underpinning the deterioration of marine habitats, depletion of fisheries resources and reduced fisheries productivity in Benin, include:

- Habitat loss
- Climate change and insufficient resilience to the effects of climate change
- Informal fisheries and aquaculture sector, underpinned by weak fisheries governance system, outdated systems and technologies, and insufficient infrastructure development.
- Lack of awareness, advanced knowledge, and access to financing for actors in the fisheries resources sector

2. Uncertain Future and System Interactions

The future of Benin's fisheries resources stands at a precarious intersection of environmental uncertainty and socioeconomic necessity. As climate change intensifies, the once-thriving marine and inland water ecosystems are facing a surge of disruptions. Rising sea levels not only erase coastal habitats but also upset the salinity of freshwater systems, leading to a dramatic reshuffling of fish populations. The erosion of coral reefs and seagrass beds, coupled with changes in ocean currents and nutrient flows, threatens the foundation upon which marine life depends. With habitats in flux, fish species may migrate erratically or find their traditional paths blocked, resulting in stunted growth and reduced survival rates.

This ecological turmoil ripples through to the socioeconomic realm, unraveling the fabric of communities that rely on fisheries for their sustenance and economic stability. As incomes dwindle and food security becomes tenuous, the societal goals of sustainability and development are jeopardized. The IPCC's projections paint a grim picture, with essential ocean services like carbon mitigation and biodiversity support under strain. The pursuit of the United Nations Sustainable Development Goals becomes an uphill battle amid these environmental adversities.

Aquaculture, largely considered as an adaptation solution, faces its own set of challenges in the wake of climate change. Fluctuating water temperatures, acidifying oceans, and unpredictable weather patterns bring about stress that hampers the productivity of farmed species. The threat to infrastructure from extreme weather and sea-level rise, along with the risk of farmed species escaping into the wild, adds to the complexity of sustainable aquaculture practices.

The environmental issues that Benin currently grapples with — deforestation, erosion, water body encroachment, and urban sprawl — are symptomatic of broader challenges. Rapid population growth, poverty, resource consumption outpacing renewal, and inadequate environmental consideration in planning underscore the urgency of addressing these problems. The economic toll of environmental degradation, estimated to cost the nation up to 5% of its GDP annually, cannot be ignored.

Considering these challenges, fisheries resource management is at a crossroads. The call to action is clear: innovate, adapt, and act. Sustainable fishery management plans must be developed, prioritizing the resilience of both ecosystems and communities. Education and empowerment are key to bolstering community resilience, as is the investment in climate-resilient infrastructure. Nonetheless, the success of any applied adaptation strategies hinges on robust governance and institutional frameworks, capable of steering Benin's fisheries resources through the uncharted waters of a changing climate.

Baseline Scenario Without the Project

In the absence of intervention, Benin's future under the influence of climate change and environmental degradation appears increasingly precarious. The nation's fisheries resources, once a cornerstone of both economy and diet, faces a cascade of hydroclimatic disasters. Frequent droughts and floods, exacerbated by human-induced calamities, challenge the community life and productivity. Despite efforts such as the national flood warning system, the management of these risks remains hampered by limited state resources.

The water bodies that are vital to Benin's fisheries are under relentless pressure. Annual water inputs, not accounting for the significant contribution of the Niger River, are influenced by the silting of rivers, degradation of water quality, shifts in vegetation cover, and changes in land use that affect runoff. Projections suggest a worrisome trend: a potential decrease in surface runoff by the mid to late 21st century due to reduced rainfall, particularly impacting the Ouémé river basin. Conversely, an increase in rainfall in the north and center may lead to more frequent flooding events.

Climatic risks poised to impact the fisheries resources include not only droughts and floods but also rising temperatures, high winds, strong water currents, and increased salinity from coastal erosion and saltwater intrusion into freshwater systems. These factors collectively imperil fish populations, fisheries infrastructure, and the very fabric of traditional fishing practices. The availability and renewal of fish stocks face potential decline, while aquaculture yields may drop due to these environmental stressors.

In southern Benin, the agro-ecological zones where food crops, land, water resources, human health, and biodiversity are intertwined, the community—comprising small-scale farmers, fishermen, and herders—is at a heightened risk from climate events. The anticipated drop in agricultural yields by 2025 could lead to another corresponding fall in fishery productivity, resulting in decreased catches and a national scarcity of fish products. Such an outcome would not only affect the food security of the nation but also its economic stability, as the fisheries sector is a critical source of income and employment.

This baseline scenario, without proactive and sustainable project interventions, outlines a future where the compounded effects of climate change and environmental mismanagement lead to a decline in Benin's

fisheries resources, with far-reaching implications for its people and their livelihoods. The need for comprehensive, adaptive strategies and investments in resilient infrastructure and practices is thus essential for safeguarding the future of Benin's fisheries and the communities that depend on them.

3. Project Objectives and Justification

The project's adaptation objective is to enhance the resilience of the fisheries sector to climate change by implementing comprehensive adaptive strategies, strengthening institutional capacities, and advancing community-driven approaches. This will be achieved through the empowerment of local communities, with an emphasis on women's participation, the adoption of climate-smart technologies and resilient infrastructures, the facilitation of knowledge transfer, and the enactment of policy reforms. The desired outcome is a robust, adaptable, and sustainable fisheries sector that contributes to food security, economic stability, and the overall well-being of Benin's population in the face of climate variability and change.

The justification for this project lies in addressing the multifaceted threats posed by climate change to Benin's fisheries resources—a sector vital to the nation's food security and economic health. Given the anticipated increase in hydroclimatic disasters, the degradation of critical marine habitats, and the socioeconomic challenges facing vulnerable communities, a strategic response is essential. By prioritizing adaptive measures and inclusive, community-based management plans, the project will address immediate and long-term climate risks. The project is justified as it aligns with the urgent need to sustain livelihoods, protect biodiversity, and ensure the continuity of ecosystem services upon which the people of Benin depend.

To ensure the project's success, it is essential to reinforce policy coherence by aligning environmental goals with financial strategies. This alignment will facilitate the mobilization of additional resources and foster a supportive policy environment for innovative financing. By integrating climate finance into national development plans, we can enhance the project’s enduring results, to support a better financial robustness, ensuring that the climate resiliency objectives are supported by sustainable financial mechanisms moving forward.

Building upon the baseline understanding of Benin's fisheries, the project will invest in strengthening institutional capacities to manage and scale up finance for enduring results. This entails developing the capabilities of local institutions to access and deploy innovative financial instruments, such as green bonds or climate funds, which are essential for the long-term sustainability and expansion of the fisheries sector in the face of climate change.

A key component of the project's approach to scaling up finance for enduring results is enhancing tools and metrics that serve as enablers for measuring and maximizing adaptation impact. Investment in data collection and analysis systems will inform evidence-based decision-making, ensuring that financial resources are directed towards interventions with the highest return on adaptation investment, both in terms of ecological benefits and socio-economic development.

In the face of escalating environmental and climate vulnerabilities, it is imperative to integrate strengthening innovation and private sector engagement. Advancing technology transfer and innovation within the fisheries sector is crucial for adapting to the changing climate. Private sector engagement is essential, not only for enabling the conditions for action but also for utilizing grant finance mechanisms to share risks and catalyze significant investments. The incubation and acceleration of Micro, Small, and Medium Enterprises, as well as the promotion of inclusive microfinance, will create a more robust and innovative fisheries industry, equipped to overcome the socioeconomic and ecological impacts of climate change.

The project adopts a holistic approach to climate change adaptation in Benin, recognizing the interconnected nature of ecosystems, human communities, and economic systems. This approach integrates the restoration of natural habitats with the development of climate-smart technologies and infrastructure, ensuring that adaptation measures are both ecologically sound and technologically advanced. It emphasizes the empowerment of local communities, particularly women, to engage in the stewardship of fisheries resources, fostering resilience at the grassroots level. Through knowledge transfer, stakeholders will be equipped with the necessary skills and information to respond to climate challenges effectively. Policy reform will support these efforts by creating a conducive environment for adaptive strategies to thrive. Collectively, these strategies form a cohesive response to climate adaptation, ensuring that resilience is built into the very fabric of Benin's fisheries sector.

Ensuring resilience to future change

The project approach to ensuring resilience to future changes is multifaceted. It incorporates local community involvement in decision-making, emphasizing strategies and actions that are rooted in local contexts and experiences, thereby making them inherently more resilient to future uncertainties. The project actively promotes gender inclusivity, recognizing the vital role of an entire demographic, ensuring a broader base of support, knowledge, and resilience. Furthermore, the project commits to the restoration and reinforcement of marine and freshwater ecosystems, serving as a buffer against potential ecological shifts due to future climate changes. By aligning with the Sustainable Development Goals and the Paris Agreement, the project aims to mitigate the risks associated with potential policy conflicts. Additionally, the project employs integrated water resource management, ecosystem-based fisheries management, and a value chain approach, all of which contribute to building resilience to the impacts of climate change. The baseline scenario is focused on sustainability under current conditions, while incremental activities emphasize resilience to climate risks and restoration of negative effects from climate impacts. There is also a comprehensive approach to building climate resilience in Benin's fisheries sector, focusing on community involvement and sustainable practices. The project aims to revitalize aquatic ecosystems and fortify resilience and sustainability of livelihoods through climate-resilient fishing practices, financial empowerment, and capacity building. Finally, the project's transformation approach integrates a multi-dimensional strategy encompassing hotspot-based intervention, collaboration for marine conservation and climate resilience, and multifaceted interventions that combine climate resilience, community empowerment, gender inclusivity, and ecosystem restoration, all while ensuring policy coherence and mainstreaming climate adaptation.

Barriers and Enablers to Project Outcomes

The project aims to address the climate risks on fisheries resources through sustainable fishing practices, various environmental management strategies, and climate change adaptation measures. The transformation of the current baseline scenario in Benin requires a set of outcomes to be achieved, which were identified during key stakeholder consultations. Improvements in the monitoring and regulation of fisheries activities, establishment of marine protected areas, promotion of community-based adaptation initiatives, and awareness-raising about the impacts of climate change on fisheries are central to the project design. Further information on the consultations that took place to inform the project design are presented in sections on stakeholder engagement.

Outcome 1: Revitalized and resilient aquatic ecosystems supporting sustainable fisheries production in Benin’s inland system and coastal zone

The barriers to achieving this outcome include habitat destruction, overfishing, climate change, lack of funding, and competition for space and resources from other sectors. Weak enforcement of environmental regulations and insufficient community involvement are also notable challenges. Enablers such as adopting an

ecosystem-based management approach, implementing various management plans (e.g. integrated coastal zone management, multi-species management plans and watershed management plans), “blue port approach” and emphasizing scientific data in decision-making are crucial. Engaging local communities and enhancing technical capacity, alongside effective governance and financial incentives for sustainable practices, will be imperative for ecosystem restoration.

Outcome 2: Strengthened resilience and sustainability of livelihoods in Benin's fisheries and aquaculture sector through the promotion of climate-resilient fishing practices, policy coherence, financial empowerment, adaptive strategies, community and institutional capacity building, and the active engagement of local communities and women in target regions
For the second outcome, barriers include the direct impacts of climate change on fisheries and aquaculture operations, such as poor water quality and disease outbreaks, restrictive regulations, conflicts over resource rights, and resistance to change from traditional practices. To overcome these, enablers include reinforced policy coherence through governmental support, manifested in clear, aligned policies and incentives that bridge environmental objectives with economic development strategies. Strengthening institutional capacity is also crucial, ensuring that entities responsible for managing fisheries and aquaculture are equipped with the skills and systems necessary for effective governance and resource mobilization. Enablers further include local community participation, timely access to climate data, tailored adaptation measures, and capacity-building initiatives that enhance institutional and stakeholder competencies in financial management and sustainability. Financial empowerment is an additional enabler, addressing barriers faced by aquaculture entrepreneurs through government-backed policies that promote coherence across various funding mechanisms, availability of affordable finance, and training programs for sustainable and modern aquaculture practices.

Outcome 3: Empowered Fisheries and Aquaculture Sector through Enhanced Knowledge Flow and Adaptive Strategies
The barriers to the third outcome include limited data on fisheries and climate impacts, lack of technical expertise, ineffective communication, and short-term economic interests. Enablers for this outcome are ensuring access to reliable data, providing training and capacity-building, establishing integrated information systems, leveraging technology for better data analysis and communication, and promoting collaboration. Developing adaptive governance frameworks, creating learning networks, and allocating financial resources for knowledge and adaptive management initiatives are also essential.

The project outcomes are interconnected, creating a comprehensive approach to building climate resilience in Benin's fisheries sector with an emphasis on community involvement and sustainable practices.

By addressing such barriers and leveraging such enablers, governments, communities, and stakeholders can work together to enhance the resilience of Benin’s fisheries resources, ensuring its sustainability and ability to adapt to future challenges. During the PPG phase a more detailed barrier analysis will be undertaken to fully consider the conditions, needs, barriers, and enablers, specific to the selected project sites and communities.

4. Stakeholder Engagement and Roles

The project will engage all actors involved in the conservation, stewardship, and deterioration of fisheries resources operating along the targeted value chains, from production to final consumption, through the stages of processing, transport, provision of services (inputs, seeds, equipment and materials, training) and marketing of fish, to varying extents. These will include artisanal fishermen, conservationists, fish farmers, fish merchants and fish market traders and marine stewardship organisations. Particularly local actors form the

backbone of the fisheries resources sector in Benin, contributing to the local economy, food security, and livelihoods of the coastal and inland communities.

Addressing the identified outcome barriers and reinforcing the identified enablers requires a comprehensive and collaborative approach involving government authorities, conservation agencies, fishing communities, non-governmental organizations, researchers, and other stakeholders. By identifying and overcoming these challenges, Benin can work towards building more resilient ecosystems that support the sustainable growth and development of its fisheries resources.
A more detailed stakeholder list and their roles, and how they will be critical to deliver on the GEBs, adaptation benefits, and other proposed outcomes is provided in the sections on stakeholder engagement. During the PPG phase a detailed stakeholder analysis will be carried out, as well as a detailed stakeholder engagement plan for the project implementation. The stakeholder engagement plan will detail the roles and means of engagement for all stakeholders, including the private sector (roles and type), CSOs, vulnerable groups and Indigenous Peoples and Local Communities.

5. Investment Landscape and Incremental Cost Reasoning

Current Landscape of Investments

The objective of the AfDB-financed project (the baseline project) is to increase the contribution of the fisheries and aquaculture sector to local and national economies and food security by promoting aquaculture, fisheries governance, and fish value addition. The specific objectives of the project are (i) sustainable development of the production and productivity of the aquaculture sector, (ii) sustainable management of inland and marine fisheries; and (iii) development of climate change resilient fisheries value chains.
The project is national in scope and its implementation will focus on three main areas of the national territory: (i) the coastline (Mono, Atlantic, Littoral and Ouémé departments); (ii) continental bodies and rivers, shallows, artesian boreholes and floodplains scattered in the southern and central watersheds (Mono, Atlantic, Ouémé and Zuz); and (iii) reservoirs and watercourses in the Centre and North (Collines, Zou, Alibori, Atacora, Donga and Borgou).

The project is expected to benefit all actors operating directly or indirectly along the targeted value chains, from production to final consumption, through the stages of processing, transport, provision of services (inputs, seeds, equipment and materials, training) and marketing of fish. These will be artisanal fishermen, fish farmers, fish merchants and fish market traders and the inter-union of fish farmers. The other beneficiaries are the managers and agents of the Ministry of Agriculture, Livestock and Fisheries (MAEP) (executing agency) and partner structures (financing institutions, Institution in charge of standards and health safety) of the Project who would see their human, financial and logistical resources strengthened. The total number of direct and indirect beneficiaries expected from the programme is estimated at about 672,601 people, including 62,601 in aquaculture (6,394 direct) and 610,000 in fisheries (62,305 direct).

The baseline project has three central components:
- **Component 1: Development of competitive and resilient aquaculture in changing climate:** a) development of aquaculture infrastructures; b) implementation of aquaculture villages; c) promoting the cooperation and business linkages between fish farmers and SMEs, and d) support to R&D in aquaculture and the fishery sector, and training.

- **Component 2: Development of commercial value chains and strengthening transboundary fisheries management:** a) support market access and infrastructures development; b) development of low-

carbon fish processing, storage, and cooling systems/equipment; c) building the capacity of fishery value chains actors; d) support certification and normalization system including promoting green certification in fishery and aquaculture sector; e) development and implementation of fishery management plans, f) construction of fish landing infrastructures, and g) implementation of 10 biological reserves in inland and regional water.

Component 3: Promoting social and ecological resilience in fragile blue economy systems: a) support innovative practices that optimize the mobilization of ecological processes in fisheries production to improve food and nutrition security; b) identify and implement opportunities to manage fragile ecosystems and capacity building, and c) support infrastructure development, such as hydro-agricultural structures for water and soil conservation and protection of ponds against water erosion, floods and other effects of climate change and improvement of water management; Equipment for monitoring water quality/flow.

The baseline project is in line with the 'skills and technologies' pillar of the ten-year strategy 2013-2022, the High 5s on 'Feed Africa' and 'improving the quality of life of the people of Africa', the Youth Employment Strategy (2016-2025), the Capital humain (2014-2018) and Gender (2021-2025) strategies. Thus, it will ensure better participation of women and youth in the project and the economic empowerment of women.

The project interventions are aimed at the development of agricultural value chains and agro industry in economically and socially disadvantaged areas with significant fishing and aquaculture potential, through support for target groups, the management of fisheries resources and the development of production support infrastructures, processing, and access to basic services. The project will cover potential areas for the development of fisheries and aquaculture as identified in the agricultural development poles defined by the Government, namely: 33,300 ha of brackish water and 200,000 ha of floodplains; 200 water reservoirs and an EEZ of 27,750 km², i.e., the extent of Benin's territory.

Incremental cost reasoning

The proposed project has been designed to fully leverage the AfDB co-financing and the incremental cost-reasoning is very strong.

The baseline project will promote sustainable economic growth at the local level by leveraging the potential of fisheries, aquaculture, and integrated water resource management. This project also aims to integrate these with broader agro-food value chains and embed them into local planning frameworks, ensuring holistic development and knowledge management. The baseline project is aimed at integrating different aspects of sustainable resource management and maximizing the overall value from the water resources, fisheries ecosystem, and associated value chains.

The GEF project aims to complement the AfDB baseline project by developing resilience in social and ecological systems and build synergies around the land-water-food nexus as an approach for reducing vulnerabilities in the blue economy and maintaining a circular economy in the development of aquaculture and fisheries. The specific project objectives are to:

- Strengthen socio-ecological synergies in catchment aquaculture and lagoon and wetland ecosystems management.
- Build resilience to climate change in fishing systems through nature-based solutions (NbS) and climate insurance schemes.
- Support women and youth empowerment through the creation of jobs in the blue economy value chains with tourism and fisheries.
- Promote co-management and community conservation of fish habitats, marine biodiversity, inland waters, and catchments.

The project's incremental reasoning in precented in the table below.

TABLE 3 THE PROJECT'S INCREMENTAL REASONING

AfDB financed project	Proposed LDCF project	Incrementality
Development of commercial value chains		The baseline project will increase fish production and productivity using TAAT/Aquaculture Compact technologies that promote the diffusion of low-carbon and environmentally friendly technologies. The proposed project will contribute to reducing climate vulnerability and building resilience by establishing climate-resilient fish infrastructure and facilitating the conversion of fishermen to more intensive fish farming systems that are less vulnerable to climate hazards.
Fisheries management and infrastructure development foster development at the local level by integrating fish and other agro-food value chains and rural economic activities into new planning frameworks of local institutions.	Adaptation measures to build the resilience of fisheries resources , with a focus on gender equality and youth empowerment.	The proposed project will implement specific measures to build the resilience of the aquaculture and fishing operations, against assessed climate change threats. This will provide the Benin's commercial fishing and aquaculture value chains with added resilience helping its expansion, increased investments, and productivity. While the baseline project will strengthen the formalization of the sector, improve the organization of the system and development missing infrastructure, specific climate change adaptation needs, such as developing protection against rising sea levels, extreme weather events and climate variability, where not considered, but will be through the GEF project
Aquaculture entrepreneurship % Research and Development	Scaling up finance for aquaculture entrepreneurship, with a focus on gender equality and youth empowerment	The baseline project will link cooperatives and SMEs to commercial banks and creating commercial investment and innovation clusters. The proposed GEF project will identify and support areas for scaling up such investments even more. Additional investments in infrastructure developments are needed to raise investor interest and confidence

		The incremental activities directly address the vulnerabilities and risks that come with climate change and aim to make ecosystems more resilient to these impacts. The baseline scenario is about managing resources in their current state for sustainability. The incremental activities emphasize resilience to climate risks and restoring some negative effects from climate impacts. The incremental activities seek to ensure that the value derived from fisheries (as considered in the baseline's value chain approach) is not eroded due to the adverse impacts of climate change.
Integrated Water Resource Management; ecosystem-based fisheries management and a value chain approach	Adaptation measures to restore and build the resilience of ecosystems affecting fisheries resources, with a focus on gender equality and youth empowerment.	While the baseline scenario ensures sustainability under current conditions, the incremental activities ensure that sustainability persists even as the climate changes, securing the resources and the industries they support for the future. While the baseline scenario provides a foundation for sustainable management of water and fisheries resources, the incremental activities introduce measures specifically tailored to address the challenges and threats posed by climate change, ensuring the long-term resilience and sustainability of ecosystems affecting the fisheries industry.
Knowledge management, communications, M&E	Effective Knowledge management, communications, adaptative management for fisheries resources, with a focus on gender equality and youth empowerment	While the baseline project emphasizes knowledge management, communications, and M&E, the proposed incremental activities refine and deepen these components to specifically address the challenges and needs of climate change adaptation for Benin’s fisheries resources. The GEF project will particularly focusing on climate change adaptation knowledge for fisheries resources and will specifically target the communication of climate

		change impacts and adaptation strategies in the context of fisheries and aquaculture. Instead of merely monitoring and evaluating, the incremental approach ensures that the project is flexible and can adjust to the changing conditions, ensuring resilience in the face of climate change.
Project management	Project management	The project management unit will expand on the exiting project management unit of the baseline project.

All these combined actions will contribute to increasing productivity, processing fish products, and improving the distribution and market access of fishery and aquaculture products. In addition, the project will seek to strengthen women's participation, skills, and capacities in the governance of fish value chains. For each propose intervention area, the activities will include gender considerations and opportunities for improving gender equality. Equal opportunities will be given to both men and women. Gender actions as part of project activities; results framework For more information kindly see the annex on gender analysis at PIF stage. A complete gender assessment will be undertaken during the PPG phase of the project. Equal opportunities will be given to both men and women. During PPG consultations with beneficiaries and equal opportunities will be provided to all stakeholders.

Coordination with other partners

The Bank is positioned as one of the key players in the agriculture sector. Since 2021, the Bank has been mobilizing other partners on gender and blue economy issues through its studies. There are synergies between the project and ongoing or future interventions of other partners, in the form of parallel co-financing. At the evaluation phase of PROMAC, in the fisheries/aquaculture sector, some partners were implementing their project cycle, including (a) FAO (capacity building for fisheries statistics), (b) JICA (aquaculture training). JICA is currently examining a new fisheries project and (c) the ACMA Project (Communal Approach to the Agricultural Market) which has interventions in the aquaculture sub-sector.
The GEF project in Benin is designed to build on the foundation of previous and ongoing initiatives, leveraging lessons learned and experiences from these investments. It follows the trajectory of several fisheries programs financed by development banks and partners, such as the Mono Integrated Rural Development Project, the Support Programme for the Participatory Development of Artisanal Fisheries, and the Support Project for the Development of Mono and Couffo. A detailed knowledge management plan will be developed to extend the current approach of an African Development Bank financed baseline project, aiming to enhance the project's overall impact. The plan includes learning from relevant previous and ongoing projects, with proposed tools and methods for knowledge exchange and learning, including strategic communication and a comprehensive budget and timeline. Additionally, the project will incorporate data and findings from other projects into a shared repository to ensure real-time data availability and synchronization. Moreover, the GEF project is set to work in coordination with ongoing initiatives, identifying key areas of collaboration and synergy with the baseline project and related efforts by various development partners. This includes engagements with the National Institute of Agricultural Research of Benin, the Benin Center for Scientific Research and Innovation, and others. This interconnected approach ensures that the project is not operating in isolation but is instead maximizing the value of past experiences and current efforts to create a resilient, sustainable fisheries sector in Benin.

Justifying the Project Selection

This project, entitled “Promoting social and ecological resilience in land-water-food systems in blue economy sectors in Benin” has been developed in response to a direct request from the President of Benin, highlighting the underdeveloped stewardship of fisheries resources, decline in fisheries production, increasing national reliance on imported frozen fish and impending climate change risks.

The GEF project is a compelling and necessary intervention for Benin, designed to overcome the limitations of the baseline project and propel the country's fisheries and aquatic systems into a future resilient to climate change. Unlike the foundational yet partial measures of the baseline project, the GEF project delivers a holistic, integrated adaptation approach, addressing climate change's direct impacts on fisheries through innovative strategies such as climate-resilient infrastructure and adaptive aquaculture practices.
By restoring fish breeding grounds and removing invasive species, the GEF project goes beyond mere habitat protection, ensuring ecosystems are robust enough to support fisheries amidst environmental pressures. It tackles socio-economic barriers with targeted strategies, involving the private sector and communities, and underscores the importance of gender and youth empowerment—a leap forward from the baseline project.
The synergy between the baseline project and the GEF project is instrumental in maximizing the benefits achieved in bolstering the climate resilience of Benin's fisheries and aquatic food systems. The baseline project serves as a critical enabler for the GEF project, providing a foundational platform without which the advanced interventions proposed by the GEF project would not be as cost-effective or feasible. It is the groundwork laid by the baseline project—in terms of established infrastructure, initial community engagement, and basic institutional frameworks—that allows for the seamless and efficient integration of the GEF project’s innovative strategies.

This interdependency is pivotal; the baseline project has already set in motion a series of actions and policies which the GEF project can build upon, thus avoiding duplication of efforts and ensuring a more effective use of resources. With the baseline project already addressing certain key areas, the GEF project is poised to launch its initiatives from a higher starting point, leveraging existing structures and expanding their scope to achieve a greater impact.

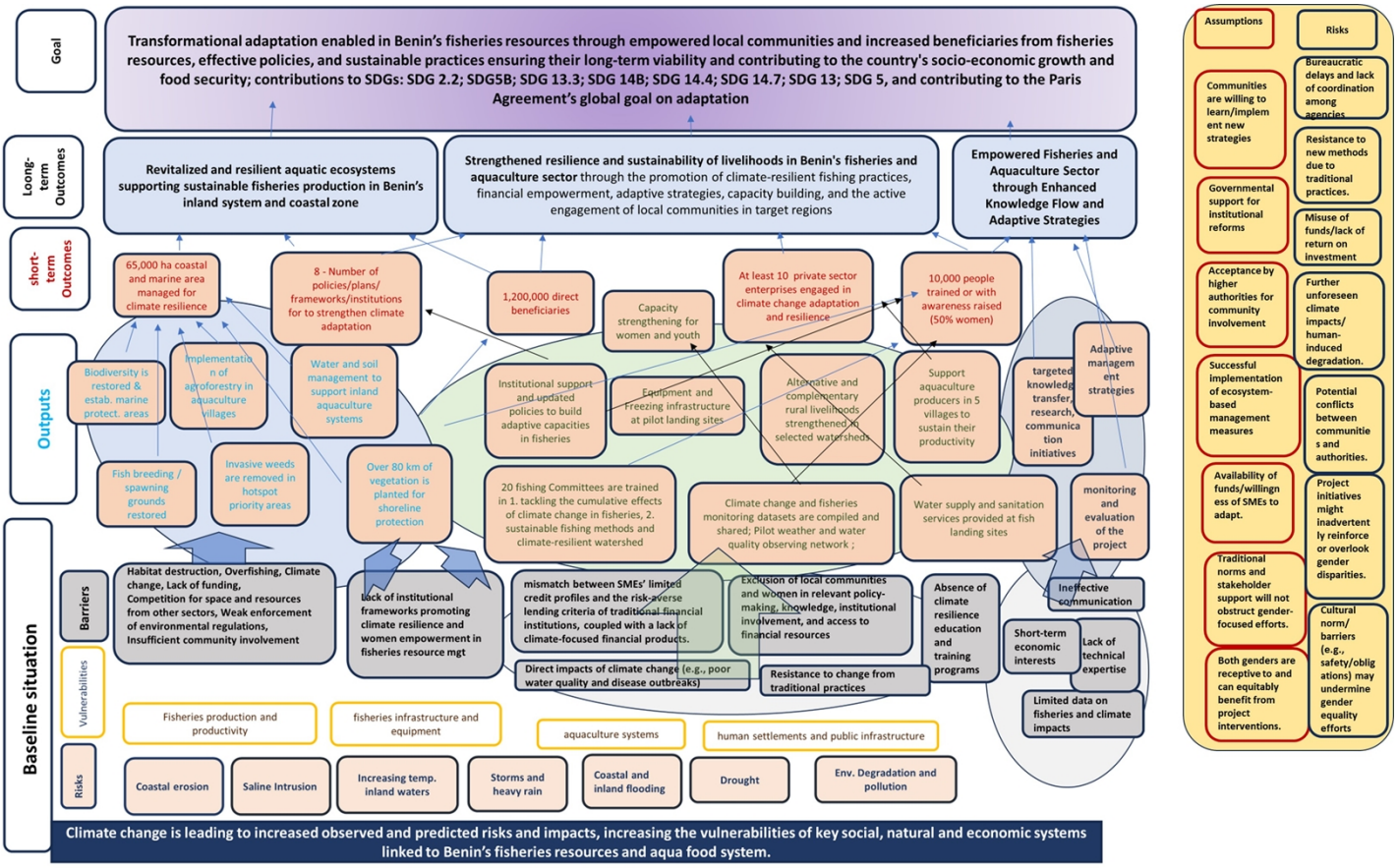
By jointly implementing both projects, the benefits are not only additive but also multiplicative. The baseline project's focus on sustainable management and productivity creates an environment conducive to the introduction of the GEF project’s climate resilience measures. In turn, these measures feed back into the baseline project’s objectives, enhancing overall sustainability and creating a robust framework for long-term ecological and socio-economic development.
While alternative options like afforestation and sustainable urban planning serve broader environmental objectives, they lack the tailored impact of the GEF project, which directly confronts the unique challenges of Benin's fisheries. These general measures do not offer the same transformative capacity to handle issues like saline intrusion and the intricacies of marine ecosystem management, nor do they provide the direct, multi-layered benefits to the fisheries sector that the GEF project promises.
The GEF project goes beyond the traditional scope of environmental measures by integrating a comprehensive and integrated approach to adapt Benin's fisheries and aquatic systems to climate change. It specifically targets the unique challenges faced by the fisheries sector, which are not directly addressed by alternative options.
The GEF project stands out for its potential to create transformative change, incorporating local knowledge systems and fostering resilience in a sector critical to national well-being. It aligns with Benin’s National Adaptation Programme of Action (NAPA), addressing multiple adaptation needs and presenting a solution to the nation's fishing product deficit, which impacts the trade balance and food security.
Crucially, the GEF project presents cross-cutting benefits across various domains, from enhancing the trade balance to promoting social inclusion. It includes a suite of mechanisms like stakeholder engagement and knowledge management to ensure the achievement of project outcomes, safeguarding environmental and

social integrity while integrating gender considerations and ensuring the project's sustainability beyond its lifespan, supported by co-financing mechanisms like the African Development Bank.
The GEF project is not merely a progressive step but a transformative leap for Benin's fisheries sector, equipped to address the specific, pressing challenges of climate change with an innovative and comprehensive suite of strategies, ensuring long-term ecological, economic, and social resilience.

B. PROJECT DESCRIPTION

Project description

This section asks for a theory of change as part of a joined-up description of the project as a whole. The project description is expected to cover the key elements of good project design in an integrated way. It is also expected to meet the GEF's policy requirements on gender, stakeholders, private sector, and knowledge management and learning (see section D). This section should be a narrative that reads like a joined-up story and not independent elements that answer the guiding questions contained in the PIF guidance document. (Approximately 3-5 pages) see guidance here



Theory of Change narrative

The baseline situation is marked by a precarious balance where climate change leads to coastal erosion, saline intrusion, warming inland waters, and extreme weather events that exacerbate the vulnerabilities of social, natural, and economic systems linked to Benin's fisheries. These vulnerabilities manifest in decreased fisheries production and productivity, compromised fisheries infrastructure, and at-risk human settlements and public infrastructure.

Several barriers stand in the way of addressing these challenges, including habitat destruction, overfishing, climate change itself, and socio-economic factors such as insufficient funding, competition for resources, weak enforcement of environmental regulations, and limited community involvement. Additionally, a lack of institutional frameworks and financial products tailored to small and medium-sized enterprises (SMEs) that address climate resilience further complicates the situation.

To overcome these barriers, a series of outputs have been designed. These include the restoration of fish breeding grounds and biodiversity, removal of invasive species, agroforestry implementation, and strengthening water and soil management. Institutional capacities will be fortified, with improved infrastructure and equipment at fish landing sites and the establishment of a pilot weather and water quality observing network. Moreover, the blue port approach leverages policy reforms and community involvement to enhance sustainable operations and conservation efforts. This is in line with the international call for multifaceted adaptation strategies, including finance and capacity building, where the risks and implications of climate change for ports are most acute. These outputs are essential building blocks toward achieving the desired outcomes.

Within the duration of the project, the project aims to manage 65,000 ha of coastal and marine area for climate resilience, engage private sector enterprises in adaptation efforts, and raise awareness among 10,000 people, half of whom are women. By the end of the project, the project's results are expected to directly benefit 1.2 million beneficiaries. These efforts are anticipated to revitalize aquatic ecosystems and strengthen resilience and sustainability of livelihoods through climate-resilient fishing practices, financial empowerment, and capacity building.

Looking toward the long-term with enduring effects, the outcomes of the project will be a revitalized, resilient ecosystem that supports sustainable fisheries production and an empowered fisheries and aquaculture sector enhanced by knowledge flow and adaptive strategies. The goal is transformative adaptation, enabling local communities to benefit from effective policies and sustainable practices that ensure the long-term viability of fisheries resources, contributing to socio-economic growth, food security, and global climate adaptation goals.

The project operates under several assumptions: communities are willing to learn and implement new strategies, governmental support for institutional reforms is present, higher authorities accept community involvement, and funds are available for SMEs to adapt. It also acknowledges gender dynamics, assuming that traditional norms will not obstruct efforts focused on women's empowerment and that both genders will equitably benefit from the interventions.

There are also risks such as bureaucratic delays, resistance to new methods due to traditional practices, potential misuse of funds, further unforeseen climate impacts, and possible conflicts between communities and authorities. These risks may also include reinforcing or overlooking gender disparities due to cultural norms. By engaging stakeholders throughout the project lifecycle will ensure that risks are managed collaboratively and that solutions are widely supported and effectively implemented.

The Theory of Change thus presents a structured approach to building climate resilience in Benin's fisheries, weaving together the various elements of baseline conditions, risks, vulnerabilities, and barriers with strategic outputs and outcomes, all aimed at achieving transformative adaptation and empowerment.

Project description

The Benin fisheries sector project is a strategic initiative tailored to address the pressing climate change vulnerabilities threatening the socio-economic and ecological stability of the region, with a keen focus on

addressing gender disparities. It serves as a defensive front against coastal erosion, saline intrusion, and extreme weather, with a suite of outputs designed to reinforce the fisheries and aquaculture systems against several specific vulnerabilities while promoting gender equality and women's empowerment.

For **Fisheries Production and Productivity**, the project implements critical restoration and biodiversity conservation measures such as re-establishing fish breeding habitats and reconnecting ecosystem networks. It combats invasive species, promotes shoreline vegetation, and integrates agroforestry practices in aquaculture villages, all of which are essential for preserving productive fisheries and supporting food security. These efforts are encapsulated in outputs 1.1 to 1.5, and the innovative blue transformation approach in Output 1.6. Additionally, women's roles in fisheries are being recognized and enhanced, particularly in areas like fish processing and marketing.

In addressing the **Vulnerabilities to Fisheries Infrastructure and Equipment**, the project focuses on enhancing infrastructural resilience through improved water supply and sanitation services, advanced freezing infrastructure at landing sites, and education on sustainable and climate-resilient fishing methods. Outputs 2.2, 2.3, and 2.6 directly support this, while Output 2.11 and 2.12 expand financial accessibility and provide disaster relief measures, fortifying the value chain. Special attention is given to improving access to resources and assets for women, who may face limitations in accessing fishing gear, boats, credit, and technology.

To tackle **Aquaculture System Vulnerabilities**, the project supports producers with integrative and sustainable water and soil management practices, and establishes a weather and water quality observing network to anticipate and respond to environmental fluctuations, as described in Outputs 1.7, 2.8, and 2.9. Output 2.12 also plays a role in enhancing financial accessibility for aquaculture development and in addressing the specific health and safety challenges faced by women in fish processing activities

The project's dedication to mitigating **Vulnerabilities to Human Settlements and Public Infrastructure** is evident in its comprehensive approach, which includes strengthening institutional capacities, community engagement, and disaster preparedness. Outputs such as 2.1, 2.4, 2.7, and 2.10 are geared towards building robust governance frameworks, diversifying livelihoods, and empowering marginalized groups, including women and youth. Output 1.6 also addresses these vulnerabilities through the promotion of blue transformation and integrated coastal zone management. The project also ensures the explicit tracking of female beneficiaries to guarantee gender inclusivity.

The project's multifaceted strategy not only targets immediate adaptive needs but also lays the foundation for long-term resilience and sustainability. It aligns with global goals like the Sustainable Development Goals and the Paris Agreement, fostering a resilient ecosystem that supports sustainable fisheries production, climate-resilient practices, and financial empowerment. Gender-sensitive indicators and sex-disaggregated targets are included to monitor and assess the project's impacts on both men and women.

Each output is strategically crafted to build resilience in identified areas of vulnerability, contributing to a robust and sustainable fisheries sector. They address climate impacts, promote ecosystem health, enhance capacity, and empower communities with a focus on inclusivity and sustainable practices. Stakeholder engagement, especially with women's organizations, is emphasized to integrate gender perspectives into development initiatives.

In essence, the project is poised to catalyze policy enhancement and development by addressing gaps in fisheries resource management, advocating for climate-resilient, gender-inclusive policies, and harmonizing existing policies for greater coherence. It sets a precedent for regional transformation by sharing best practices, modeling replication, and fostering partnerships across sectors. The Blue Ports Initiative complements these efforts by promoting sustainable port operations in line with integrated coastal zone management to bolster marine conservation and coastal resilience. Partnerships with local women's

organizations and government entities focused on gender ensure the project's gender considerations are locally relevant and culturally appropriate.

Detailed project components

Component 1 – Adaptation measures to restore and build the resilience of ecosystems affecting fisheries resources

Outcome: Revitalized and resilient aquatic ecosystems supporting sustainable fisheries production in Benin's inland system and coastal zone

Component 1 will proactively address and fortify the resilience of ecosystems that are crucial to Benin's fisheries resources. This component encompasses a broader range of interventions aimed at ensuring the sustainability and robustness of fish populations, the vitality of marine and freshwater habitats, and the economic well-being of communities reliant on these resources. The scope includes establishing protective biological reserves, restoring biodiversity, eradicating invasive species, reinforcing shoreline vegetation, and integrating agroforestry practices, all of which are pivotal for safeguarding against the present and future impacts of climate change.

Given the baseline scenario, it's evident that fisheries resources is facing ecological vulnerabilities, with degraded ecosystems affecting fish stock health and productivity. Current efforts, as captured in the baseline project, have been insufficient to holistically address the environmental challenges exacerbating these vulnerabilities. The achievement of this outcome will ensure the comprehensive restoration and bolstering of ecosystems connected to fisheries resources, going beyond mere short-term fixes to lay the groundwork for a sustainable and resilient management of fisheries resources in Benin, which is essential not only for environmental balance but also for the livelihoods dependent on this sector.

The activities under this component are strategically designed to restore and revitalize key aquatic ecosystems such as Lake Nokoué, the Porto-Novo lagoon, and Lake Ahémé. Through extensive planting, community-based management, and the development of water and soil conservation strategies, the component aims to enhance ecological balance and improve fisheries productivity. The component will not only rejuvenate degraded ecosystems but will also establish a foundation for enduring and sustainable fisheries management in Benin. This holistic approach underscores the shift towards ecosystem-centric management, ensuring the sustainable coexistence of species and the conservation of essential habitats. By addressing barriers such as overfishing, unsustainable practices, and ecosystem degradation, and by enabling enablers like data collection, local participation, policy support, and conservation initiatives, this component stands to significantly contribute to the country's environmental and economic resilience.

The success of this component hinges on the active participation of a diverse array of stakeholders, including fisheries management bodies, local communities, non-governmental organizations, small and medium enterprises, and women's cooperatives. Their involvement is critical to fostering an integrated, community-driven approach to environmental conservation and sustainable fisheries management, forming the bedrock for a resilient future for Benin's aquatic ecosystems.

Intervention areas:

Outputs 1.1. to 1.5 provides a comprehensive approach to address the broader marine, freshwater, lagoon, and wetland environments. Emphasizing a shift from single-species fisheries management to an ecosystem-centric perspective, the objective is to ensure the sustainable coexistence of various species. At the same time, it accentuates the conservation and revitalization of essential habitats like lagoons and wetlands, which play a

pivotal role in fish breeding. Through these efforts, the outputs aim to augment overall ecosystem resilience, fostering healthier fish stocks, balanced aquatic ecosystems, and sustainable fisheries practices that can withstand climate change impacts. Barriers such as overfishing, lack of comprehensive ecosystem data, unsustainable fisheries practices, and ecosystem degradation pose challenges. Nevertheless, several enablers are in place to counter these obstacles, including the initiation of comprehensive fisheries data collection, active participation of local communities in fisheries and habitat management, policy shifts supporting sustainable fishing, and grassroots conservation initiatives bolstered with gender equality measures.

Key players pivotal to the realization of this vision include fisheries management bodies, local fishing communities, environmental and conservation NGOs, local SMEs, and women's cooperatives. Their engagement ensures an integrated, ground-up approach to fisheries and environmental conservation.

Interventions relating to the restoration of ecosystems will be concentrated mainly in 03 ecosystems, namely Lake Nokoué and the Porto-Novo lagoon (RAMSAR site 1018) and Lake Ahémé (RAMSAR site 1017). These three ecosystems communicate directly with the Atlantic Ocean. The restoration of biodiversity in these bodies of water through the creation of “Biological Reserves” which are protected areas, protected from all exploitation and which contribute to the conservation, concentration of fishery resources and repopulation of these ecosystems.

This output encapsulates the restoration of essential fish breeding and spawning grounds within the project area. This is achieved through a detailed mapping and inventory of key nursery, breeding, and spawning sites, the establishment of 21 biological reserves across various lagoons and lakes including Lake Ahémé, Lake Nokoué, and Porto-Novo lagoon, and the implementation of community-based restoration and monitoring efforts to ensure the conservation and revitalization of these critical marine habitats.

Adaptation activities will include:

Output 1.1. Fish breeding/spawning grounds restored

This output encapsulates the restoration of essential fish breeding and spawning grounds within the project area. This is achieved through a detailed mapping and inventory of key nursery, breeding, and spawning sites, the establishment of 21 biological reserves across various lagoons and lakes including Lake Ahémé, Lake Nokoué, and Porto-Novo lagoon, and the implementation of community-based restoration and monitoring efforts to ensure the conservation and revitalization of these critical marine habitats.

Adaptation activities will include:
- Mapping and inventory of critical fisheries spawning/nursery and breeding grounds in project area
- Establish 21 biological reserves in lagoons and wetlands including 08 on Lake Ahémé, 10 on lake Nokoué et 03 on Porto-Novo lagoon who are dedicating zones for marine life breeding and conservation.
- Implement community based restoration and monitoring of critical spawning/nursery and breeding grounds

Output 1.2. Restore biodiversity reconnecting the Lake Nokoué-Porto-Novo Lagoon complex with other ecosystems to ensure ecological continuity

This output reflects a concerted effort to restore biodiversity by developing multi-species management plans for sustainable fish stock resilience, reconnecting the Lake Nokoué-Porto-Novo Lagoon complex with other ecosystems to ensure ecological continuity, and establishing marine protected areas. These strategies are bolstered by community-led conservation initiatives, underpinning the broader goal of safeguarding and revitalizing marine habitats and their biodiversity.

Adaptation activities will include:
- Develop 3 multi-species management plans to fortify sustainability and resilience across diverse fish stocks.
- Restoration of communication channels between the Lake Nokoué-Porto-Novo Lagoon complex and other ecosystems;
- Establish marine protected areas to safeguard key marine habitats and biodiversity, further supported by community-led initiatives.

Output 1.3. Invasive weeds are removed in hotspot priority areas
This output focuses on the removal of invasive weeds from priority hotspot areas, engaging local communities in the identification and eradication process. It has been noted that most of the communication channels between the bodies of water in the south, which provide almost 70% of the production of continental fishing, are blocked by proliferating plants (water hyacinth and other vegetation), silting due to the construction of dwellings and deforestation of the banks. Opening or clearing these channels will facilitate the migration of species for reproduction and the enrichment of biodiversity, increase catches per unit of effort and the income of fishermen, exchange and purify water between waters and aquaculture sites, and improve ecological conditions on the Toho Lagoon, which is currently home to more than 90% of floating cages in Benin. Restoration efforts include replanting native species to regain ecological balance and exploring viable options for the transformation and utilization of the invasive weeds from lakes and lagoons. Additionally, the development of community-led manuals for managing introduced weeds will provide a sustainable framework for ongoing environmental stewardship.

Adaptation activities will include:
- Identify and engage communities to remove invasive weeds in selected areas (to be determined during PPG) and in other lake shore.
- Restore with communities the selected locations and plant native species
- Identify potential transformation and valorisation of invasive weeds in lakes, lagoons and test it
- Develop community led manuals regarding management of introduced weeds

Output 1.4 Over 80 km of vegetation is planted for shoreline protection
This output involves the extensive planting of over 80 kilometers of native vegetation and trees, in collaboration with local communities, as a measure for shoreline protection in zones earmarked by coastal and conservation management plans. Complementing this environmental action, community-based monitoring and regulatory frameworks will be established to ensure the ongoing protection and health of the newly established shoreline vegetation.

Adaptation activities will include:
- Plant native vegetation and/or trees with communities on priority zones defined in coastal management plans and conservation plans
- Develop community based monitoring and regulations to protect the shoreline vegetation

Output 1.5 Implementation of agroforestry in aquaculture villages
This output involves the introduction of agroforestry practices in aquaculture villages, aiming to enhance the resilience of watersheds against climate impacts through adaptive strategies like conservation agriculture and water conservation. This output emphasizes empowering local fishing communities to manage climate-resilient aquaculture village watersheds, supported by comprehensive training programs in sustainable fishing methods and watershed planning to ensure the sustainability and effectiveness of these interventions.

Adaptation activities will include:

- Implementation of watershed-related activities advancing adaptive strategies, such as agroforestry, conservation agriculture, and water conservation.
- Empower local fishing communities, enabling them to design and oversee climate-resilient aquaculture village watersheds.
- Organize training programs on sustainable fishing methods and climate-resilient watershed planning for local fishers and committees, ensuring knowledge transfer for effective management.

Output 1.6 Implementation of the blue transformation approach in coastal ports, harbours, and fish landing/marketing jetties, and integrated coastal zone management measures across fisheries hotspots
In collaboration with the "Blue Ports Initiative" (FAO, UNESCO and IOC) this output will implement marine conservation and resilience measures against climate impacts. Activities under this initiative encompass marine spatial planning to optimize coastal resource use, stringent enforcement against illegal fishing, development of community-driven blue economy ventures with an emphasis on women empowerment and job creation, and the application of circular economy principles in waste management. These efforts collectively aim to realize a sustainable and resilient coastal infrastructure. This output further supports climate resilience by integrating sustainable port operations with Integrated Coastal Zone Management (ICZM).

The barriers addressed by this output include pollution from port activities, illegal fishing, unsustainable coastal development, and habitat destruction. To overcome these barriers, the project will leverage enablers such as policy reforms in support of sustainable port operations and coastal conservation, as well as active involvement from local communities in both port and coastal management. Stakeholders including port authorities, local fishing communities, environmental NGOs, coastal populations, and government entities are crucial to this initiative. They will be engaged through policy reforms, capacity building, and finance, particularly vital for developing countries facing significant climate-related risks. The enablers of this initiative consist of policy reforms advocating sustainable port activities and coastal conservation, paired with the proactive participation of local communities in management practices. The activities outlined in the blue port approach, such as implementing marine spatial planning and enforcing measures against illegal fishing, emphasis the timely and effective need for adaptation action.

Activities will include:
1. Implement marine spatial planning to optimize the use of coastal areas.
2. Enforce international measures against illegal fishing.
3. Foster community-managed blue economy business plans emphasizing women empowerment and blue jobs.
4. Implement solid and liquid waste management using circular economy principles.

Output 1.7 Water and soil management to support inland aquaculture systems
This output encapsulates the implementation of integrated water and soil management practices to bolster inland aquaculture systems against the water (particularly groundwater) and soil challenges posed by climate change. Key activities include piloting climate-resilient aquaculture practices, developing comprehensive water and environmental management plans, ensuring gender-responsive infrastructure design, and establishing green infrastructure to manage droughts and floods. Community training for fish farmers on these new systems is also a critical component, ensuring the sustainability and resilience of aquaculture practices in the face of changing climate conditions.

Adaptation activities will include:
- Pilot the introduction of climate-resilient aquaculture systems in select regions, focusing on water management, sustainable feed production methods, and energy-efficient technologies.
- Develop a water resources management plan for aquaculture systems.
- Develop environmental management systems for aquaculture systems.

- Ensuring the design and access to new climate-resilient infrastructure consider the specific needs and contributions of both men and women in the sector.
- Formulate soil conservation management plans for aquaculture villages, incorporating hydro-agricultural structures to enhance water conservation, minimize erosion, and refine water management practices.
- Implementation of green infrastructure for drought and flood management by establishing infrastructure such as dikes and water retention ponds to build resilience against climate extremes.
- Development of hydro-agricultural structures, such as water harvesting tanks, for water and soil conservation, protecting ponds from climate-induced challenges.
- Fish farmers community training to the operations

Component 2 – Strengthening capacities, and resilience in aquatic food systems

Outcome: Strengthened resilience and sustainability of livelihoods in Benin's fisheries and aquaculture sector through the promotion of climate-resilient fishing practices, policy coherence, financial empowerment, adaptive strategies, community and institutional capacity building, and the active engagement of local communities and women in target regions

Component 2 of the project will further enhance the resilience of Benin's fisheries and aquaculture sectors to the impacts of climate change and address the socio-economic challenges faced by those dependent on these systems. The component integrates climate-resilient practices and infrastructure improvements with capacity-building and financial empowerment strategies, with a strong emphasis on gender equality and the economic empowerment of women (SDG5)

The component encompasses a range of initiatives, from strengthening the institutional and regulatory capacities of fisheries agencies to providing essential water supply and sanitation services at fish landing sites. Infrastructure investments, such as installing solar-powered refrigeration at landing sites, are key to ensuring the value chain's resilience. Special attention will be given to the specific health and safety challenges faced by women, such as those engaged in fish processing activities, and ensuring safe working conditions and appropriate protective equipment.

Efforts to bolster alternative livelihoods and community-based resilience through comprehensive training in sustainable fishing methods and climate-resilient watershed planning are also pivotal. These efforts include the explicit tracking of female beneficiaries and ensuring that at least 50% of the leadership roles in these initiatives are filled by women, to promote gender equity in the sector.

Special attention is given to empowering women and youth, supporting aquaculture producers in pilot villages, and establishing a pilot weather and water quality observing network. The component also focuses on compiling and sharing vital climate change and fisheries monitoring data with stakeholders and providing disaster relief and climate insurance to mitigate climate-induced risks.

This component aims to further enhance resilience and adaptive capacity in the fisheries and aquaculture sectors through the integration of modern climate science with traditional management. It addresses challenges like the lack of real-time environmental data and inadequate infrastructure for managing climate disasters, while also tackling gender disparities in these areas. To overcome these barriers, the project will establish digital monitoring systems, develop infrastructure for disaster management, and implement gender-inclusive disaster relief and climate insurance schemes. Key stakeholders such as meteorological departments, disaster management agencies, technology providers, and women's organizations will collaborate to create a comprehensive climate information system supporting over thousands of beneficiaries in the course of the project and beyond (a more precise figure will be determined during the PPG). This will facilitate informed decision-making and improve disaster preparedness, with a goal of achieving a 20% increase in readiness

post-training. The plan includes piloting a weather and water quality network, compiling and sharing climate change data, and providing disaster relief and climate insurance, ensuring that at least half of the leadership roles are filled by women to promote gender equity in the sector.

The climate information and disaster preparedness strategy involves incorporating predictive analytics from climate models into decision-making tools for fisheries management, directly enhancing relevant outputs. These tools will enable managers to adjust fishing quotas and protect vulnerable species during adverse climate conditions. Additionally, for disaster preparedness, the climate models will inform the relevant outputs by providing early warning systems for extreme weather events, guiding evacuation plans, and optimizing the allocation of resources for disaster response. This predictive insight will be crucial for developing strategic plans that can adapt to and mitigate the impacts of climate change, thus securing both the ecosystem and the communities dependent on it.

The overarching goal is to create a robust, diversified, and economically sustainable fisheries and aquaculture industry, bridging the gap between traditional practices and innovative, sustainable strategies as existing traditional practices lack the resilience to confront climatic challenges, and the baseline project, while economically supportive, does not sufficiently address the specific climatic threats. Thus, Component 2 is essential to introduce modern, sustainable measures that not only safeguard the economic dependency of many in these resources but also ensure their long-term viability against the backdrop of a changing climate.

Intervention areas

Output 2.1. Strengthen the institutional and regulatory capacity of key governmental fisheries agencies to ensure effective deployment of sustainable fishing practices and improve enforcement

This output aims to enhance the administrative and operational capacity of key agencies, ensuring robust enforcement of fishing regulations, which is essential for the sustainable management of the sector. The main barriers addressed include weak enforcement of existing regulations, institutional knowledge gaps and lack of trained personnel, and gender disparities in decision-making processes. Enablers such as the improved regulatory oversight, institutional capacity building and targeted training, and inclusion of gender perspectives and mainstreaming, will help bring about the desired outcome. The project can contribute to the enforcement of supporting legislation by collaborating closely with government agencies, offering technical assistance, and facilitating regular monitoring and reporting mechanisms. By actively involving local communities and making them aware of the benefits of adherence, a culture of voluntary compliance can also be fostered.

The main stakeholders for this output are a coalition of key ministries and regulatory bodies, including the Ministry for the Living Environment and Sustainable Development, Ministry of Agriculture, Livestock and Fisheries, and Ministry of Decentralization and Local Governance, alongside the Benin Environmental Agency. These entities play pivotal roles in overseeing fisheries, the environment, and economic planning, ensuring regulatory compliance, and facilitating sustainable practices across fisheries and aquaculture sectors. Additionally, gender-focused NGOs that are experts in gender mainstreaming collaborate closely with these institutions to promote gender equality and ensure that all initiatives equally empower and benefit every member of the community.

Activities will include:

- Conduct comprehensive training sessions for governmental fisheries agencies to strengthen institutional capacities to align with climate resilience objectives in fisheries and aquaculture, while also ensuring policy coherence with national and international environmental and financial frameworks.
- Facilitate periodic regulatory reviews in collaboration with legal experts to ensure that adaptive strategies are effectively enforced through robust regulations, emphasizing policy reform for greater coherence across sectors.

- Develop and implement a framework for institutional capacity strengthening, focusing on aligning diverse policies and actions towards a common goal of sustainable fisheries management and climate resilience.
- Organize gender sensitivity workshops, integrating gender equality in institutional protocols to empower all societal segments, particularly women, to contribute to and benefit from climate resilience actions.
- Enforce international measures against illegal fishing (in collaboration with the Blue Ports Initiative).
- Establish a cross-sectoral coordination mechanism to foster policy coherence and institutional collaboration, ensuring that fisheries management strategies are in line with national development goals and international commitments.

Output 2.2. Water supply and sanitation services provided at fish landing sites
This output aims to enhance the infrastructure at fish landing sites by establishing water supply systems and sanitation facilities at a minimum of four key locations. This initiative is geared towards improving hygiene and health conditions, thereby supporting the well-being of those who rely on these sites for their livelihoods and the broader community that utilizes these resources.
Adaptation activities will include:
- Establish water supply systems and sanitation at least at 4 landing sites

Output 2.3. Equipment and Freezing infrastructure at pilot landing sites to sustain fisheries value chain and resilience of the fisheries production channel
This output focuses on bolstering the resilience of the fisheries value chain by equipping pilot landing sites with solar-powered refrigeration and ice production facilities. This infrastructure is intended to sustain fisheries production and enhance the sector's resilience to climate change. Additionally, the output includes training and support for ten targeted fishermen organizations that will manage this infrastructure, ensuring effective operation and maintenance.
Adaptation activities will include:
- Install solar fridges and/or ice production in pilot landing sites to improve climate change resilience of fishermen
- Train and follow 10 target fishermen organization managing the infrastructure

Output 2.4. Alternative and complementary rural livelihoods strengthened in selected watersheds
This output is designed to diversify and strengthen alternative livelihoods within selected watersheds, reducing reliance on fisheries and enhancing economic resilience. This output includes the promotion and support of non-fisheries-based enterprises in fishing households, assessing their viability, and providing start-up assistance for sustainable income-generating activities, coupled with ongoing capacity building and business mentoring. Additionally, it aims to implement pilot plastic avoidance and reuse initiatives in 20 fishing communities, with a focus on developing, showcasing, and evaluating micro-projects that address plastic waste issues.

Local community engagement will be facilitated through participatory approaches to ensure community members are integral to the decision-making process. A series of community meetings and workshops will be convened to identify viable non-fisheries enterprises, with special committees formed comprising community representatives to provide feedback and oversee project implementation. These committees will be responsible for gathering community proposals, guiding the selection of sustainable income-generating activities, and ensuring that plastic avoidance and reuse initiatives are culturally acceptable and practically feasible. To incorporate community feedback and ensure representation, suggestion boxes, regular community forums, and feedback surveys will be established. Additionally, community liaisons will be appointed to maintain open lines of communication between the project team and the community, ensuring that all voices are heard and that the project activities are transparent and accountable to the needs and aspirations of the local population.

Adaptation activities will include:

- Non-fisheries-based enterprises that are promoted in fisheries households
  - Assess viable local non-fisheries based enterprises
  - Select and start-up support for commercially viable income- generating proposals
  - Sustain capacity building and mentoring to support business capacities.
- Pilot plastic avoidance and reuse systems in place in 20 fishing communities
  - National showcase and review of plastic waste avoidance and reuse initiatives
  - Develop plastic avoidance and/or reuse micro-projects project selected sites
  - Monitoring and evaluation of the micro-projects

Output 2.5. At least 20 fishing Committees are trained in tackling the cumulative effects of climate change in fisheries

This output aims to empower at least 20 fishing committees with the knowledge and skills necessary to address the cumulative effects of climate change on fisheries. This will be achieved through a comprehensive Training of Trainers program that encompasses modules on catchment management, planning, and climate risk reduction, followed by hands-on training sessions conducted within the village communities themselves.

Adaptation activities will include:

- Training of Trainers programme, modules and material about catchment management and planning and climate risk reduction.
- Activity : Conduct the Training of Trainers sessions in the village communities
- Activity Conduct the training sessions in the village communities.

Output 2.6. At least 20 fishing committees are trained in sustainable fishing methods and climate-resilient watershed planning for local fishers and committees, ensuring knowledge transfer for effective management.

This output involves training at least 20 fishing committees in sustainable fishing practices and the development of climate-resilient watershed management plans. The process includes creating and delivering a Training of Trainers program, complete with educational modules and materials focused on catchment management, planning, and climate risk mitigation, which will then be disseminated through targeted training sessions within local village communities.

Adaptation activities will include:

- Activity : Develop the Training of Trainers programme, modules and material about catchment management and planning and climate risk reduction.
- Activity : Conduct the Training of Trainers sessions in the village communities
- Activity Conduct the training sessions in the village communities.

Output 2.7. Capacity strengthening for women and youth

This output is focused on enhancing the skills and opportunities for women and youth in the fisheries sector. This includes organizing training courses on ecological harvesting and marketing for women crab and oyster producers, providing them with sustainable harvesting equipment, and embedding gender-responsive strategies across fishing and aquaculture activities. The output also emphasizes the importance of integrating local communities in decision-making processes, ensuring gender equity in community engagement, and leveraging both scientific and traditional knowledge to establish effective climate adaptation measures.

To ensure that the proposed gender dimension is fully integrated in the project design and implementation, the development of the full gender assessment and action plan will be part of the PPG activities. The gender action plan will outline the budget and tracking and reporting mechanism to be implemented by the project. The gender related activities are intrinsically intertwined within the project components and outcomes and therefore each component will be implementing relevant gender-related outputs and activities. The gender action plan will present the consolidated budget, that is split across the components as relevant, to implement the gender

action plan, i.e. the gender-related activities of the project. The gender action plan will also lay out the plan for tracking and reporting on progress, which will be integrated into the M&E mechanism of the project.

Adaptation activities will include:
- Organize twenty (20) training courses for the benefit of women crab and oyster producers on ecological collection, production, handling and marketing techniques;
- Equip women with equipment for sustainable collection, growing and handling of crabs and oysters;
- Integrate gender-responsive strategies in both fishing and aquaculture sectors: conduct comprehensive gender analyses, host capacity-building workshops emphasizing female participation, establish guidelines for equal access and decision-making, and monitor gender-inclusive outcomes.
- Integration of local communities, fishers, and other stakeholders in decision-making by championing local community empowerment, leveraging both scientific expertise and traditional knowledge to frame effective adaptation measures.
- Gender-Equitable Community Engagement by fostering gender-balanced stakeholder representation in community engagements to ensure that both men and women have an equitable voice and influence in decisions.

Output 2.8. Support aquaculture producers in 5 villages to sustain their productivity as an example for integrative aquaculture for the country
This output aims to advance climate-resilient aquaculture practices by supporting producers in five villages, thereby serving as a model for integrative aquaculture throughout the country. It will integrate strengthening innovation and private sector engagement, focusing on the transfer of innovative technologies and supporting Micro, Small, and Medium Enterprises (MSMEs) through targeted mechanisms. The capacity of pilot producer organizations will be enhanced for farmer-to-farmer knowledge exchange on integrated aquaculture and climate adaptation, supplying equipment for sustainable practices, and empowering women in the sustainable production of seafood. Furthermore, it involves developing and implementing financial sustainability strategies for cooperatives and leveraging grant finance mechanisms to catalyze significant investments in climate-resilient practices. The feasibility of expanding value chains for shrimp, crab, and oyster in key aquatic areas will be assessed, with an emphasis on creating supportive environments for private sector actions.
Adaptation activities will include:
- Strengthen 5 pilot producers organization (cooperative) capacity to develop farmer to farmers extension on integrated aquaculture production and climate change adaptation
- Support with equipment for sustainable household aquaculture integrated production and resilience of small farmers and cooperatives
- Equip women with equipment for sustainable collection, growing and handling of crabs and oysters;
- Incorporate innovative financial tools and inclusive microfinance models to enhance the economic viability of aquaculture practices.
- Design cooperative financial sustainability strategy and implement it at the pilot cooperative level
- Conduct a feasibility study on the development of shrimp, crab and oyster value chains at Lake Nokoué and the coastal lagoon

Output 2.9. Pilot weather and water quality observing network established
This output encompasses the establishment of a pilot weather and water quality observation network to bolster climate resilience. The activities involve evaluating current monitoring systems to identify enhancement opportunities, procuring and installing necessary monitoring equipment for weather, hydrological, and water quality parameters, and training local communities in the operation and maintenance of this network to ensure its sustainable functionality.

Adaptation activities will include:

- Assess existing weather, hydrology and water quality monitoring networks and on- going programmes to identify potential sites for network strengthening
- Procure and install weather, hydrological and water quality monitoring equipment
- Community trained to monitoring network

Output 2.10. Climate change and fisheries monitoring datasets are compiled and shared with all stakeholders

This output is dedicated to the consolidation and dissemination of climate change and fisheries monitoring data, ensuring that all stakeholders, particularly fishing communities, have access to critical information. This includes the creation of tailored climate information products with varying frequencies—daily, weekly, and seasonal—and the strategic distribution of these resources to fishermen and others involved in the fisheries value chain, promoting informed decision-making and adaptive practices.

Adaptation activities will include:

- Design climate information products for fishermen communities to be availed daily, weekly and seasonal
- Disseminate information products to fishermen and to fisheries value chain stakeholders

Output 2.11. Provision of Disaster Relief and Climate Insurance

This output aims to provide robust support mechanisms for the fisheries and aquaculture sectors through the implementation of a disaster relief program and the introduction of tailored climate insurance packages to mitigate losses due to climate-induced events. This output also prioritizes the integration of gender-responsive approaches within disaster preparedness plans, aligning with broader efforts to embed gender considerations into climate strategies, ensuring that resilience-building measures are inclusive and equitable.

Adaptation activities will include:

- Implement a disaster relief program to mitigate climate-induced losses.
- Roll out climate insurance packages tailored for the fisheries and aquaculture sectors.
- Incorporate gender-responsive approaches in disaster preparedness plans.

Output 2.12. Increasing financial accessibility for fisheries and aquaculture development

This output is focused on expanding financial accessibility in the fisheries and aquaculture sectors of Benin, with a suite of activities designed to create a conducive environment for investment and sustainable growth. The project will strengthen the innovation ecosystem by fostering private sector involvement and creating conditions for private sector actions that contribute to the project's objectives. Efforts will concentrate on strengthening the policy and regulatory framework, improving human capital through targeted training and capacity-building, and promoting financial literacy among women to foster inclusive sectoral empowerment. Additionally, the output includes initiatives to highlight and support women-led enterprises in fisheries, aiming to make investment opportunities universally accessible and support equitable participation in the sector.

This output addresses barriers such as limited financial accessibility, outdated technology, and insufficient investment in the sector. The enablers put forth are a supportive policy environment, partnerships with financial institutions, promotional endeavours, and engagement strategies to elevate the sector's appeal. The initiatives will include using grant finance to share risks and catalyze private sector investments, thereby incubating and accelerating MSMEs in the fisheries sector. The stakeholders engaged in this output encompass financial institutions, fishers, aquaculture entrepreneurs, policymakers, research institutions, potential investors, environmental agencies, and women-led fisheries ventures.

Activities will include:

- Strengthening the policy and regulatory environment to attract investments and ensure the sector's sustainable growth, factoring in facets like licensing, property rights, environmental sustainability, food safety, and societal aspects.

- Facilitating the transfer of cutting-edge technologies and innovative practices into the fisheries and aquaculture sectors.
- Investing in human capital via comprehensive training and capacity-building initiatives targeting a broad spectrum of stakeholders in the fisheries and aquaculture sector. This includes fostering knowledge exchange via extension services, technical assistance, and synergies with educational and private entities.
- Enhancing financial accessibility for fisheries and aquaculture development by improving access to inclusive financial services and products tailored to the needs of the sector.
- Launching specialized financial literacy and managerial sessions, specifically designed for women in the fisheries sector, to bolster their empowerment and equitable sectoral involvement.
- Conducting dedicated events spotlighting women-led initiatives in fisheries, ensuring investment opportunities are accessible to all, irrespective of gender.

Component 3 - Effective Knowledge management, communications, adaptative management for Benin's fisheries resources

Outcome: Empowered Fisheries and Aquaculture Sector through Enhanced Knowledge Flow, and Adaptive Strategies, and Gender-Inclusive Approaches

Component 3 emphasizes the critical role of knowledge management, communication, and adaptive management in supporting fisheries resources. The outcome of this component will be a streamlined and effective flow of information, ensuring stakeholders are well-informed and equipped to adapt fisheries resources to changes and challenges. It would foster improved decision-making, promote best practices, enhance stakeholder collaboration, with particular attention to gender-responsive strategies, and ensure the sustainable growth and resilience of Benin's fisheries resources. The focus on adaptive management places an emphasis on continuous learning and adjusting strategies based on new information or changing circumstances, including gender-specific challenges and opportunities.

The baseline project, though instrumental, doesn't fully address the need for a centralized and dynamic system of information dissemination and learning specific to the climate resilience of fisheries resources, including gender dimensions. The achievement of this outcome is thus critically needed. By implementing this component, Benin can ensure that stakeholders at all levels are well-informed, that lessons from past and ongoing projects are harnessed, including those related to gender equity, and that adaptive strategies are developed based on real-time feedback and data, ultimately driving the adaptation and resilience of fisheries resources with a gender-sensitive approach.

Output 3.1. Enhance the capacity of key stakeholders by implementing targeted knowledge transfer, research, and communication initiatives that incorporate a gender perspective (including of a centralized digital platform)

In this output, the project sets out to construct a solid informational foundation, directly tackling barriers such as the inadequate dissemination of knowledge and information, limited stakeholder capacity, and a shortage of comprehensive climate impact data specifically in the fisheries sector, with an emphasis on addressing gender disparities. By developing a detailed knowledge management plan, the initiative will reinforce existing frameworks and foster an environment ripe for the transfer and application of critical knowledge, including knowledge that specifically addresses gender-related issues in fisheries. The emphasis will be on communication initiatives designed to convey the implications of climate change and necessary adaptation strategies effectively, while ensuring gender perspectives are central to these discussions. The central digital platform will be a critical tool for overcoming these barriers by ensuring all stakeholders, including women and underrepresented groups, have unfettered access to pertinent information. Stakeholders engaged will include policymakers, fishing communities, and researchers, who will benefit from and contribute to the dynamic exchange of knowledge facilitated by the project.

To effectively manage and disseminate knowledge, the project will:

- Develop a detailed knowledge management plan during the PPG phase, leveraging the African Development Bank's existing framework and integrating lessons learned from past projects, including insights related to gender inclusivity.
- Targeting the dissemination of knowledge on climate change adaptation within fisheries and aquaculture, with a focus on addressing gender-specific impacts and solutions.
- Creating a centralized digital platform for stakeholders to access real-time data, research findings, and best practices, ensuring that gender-related data and insights are prominently featured.
- Organizing regular workshops, webinars, and community forums to facilitate interactive feedback and collaborative learning, with sessions dedicated to addressing gender-specific challenges and opportunities in fisheries.
- Conducting systematic data collection and analysis, and implementing workshops, seminars, and study tours with a focus on open dialogue and cooperation, including the exploration of gender dynamics in fisheries management.
- Incorporating gender-sensitive considerations into all activities to promote gender equality.

To ensure there is effective and strategic communication throughout the project duration the following activities will be implemented:
- During the PPG, as part of the detailed stakeholder analysis, engage all the stakeholders involved in the GEF project and other ongoing related projects, such as the FAO, JICA, and the ACMA Project. Understand their interests, influence, relation to, and the nature of their involvement with the project.
- During the PPG, the project will clearly define what the communication plan aims to achieve in terms of enhancing collaboration, knowledge exchange, and ensuring the synchronization of data and findings among various partners. To ensure that the communication plan is in sync with the knowledge management plan, it will leverage the tools and methods proposed for knowledge exchange.
- During the PPG, the budget and resources required to rollout the communication plan will be effectively outlined.
- During the PPG, metrics and indicators will be established to measure the effectiveness of the communication activities and adapt the plan as needed based on feedback and outcomes.
-

Throughout the project the communication plan will ensure that:

- key messages are developed and conveyed on the project's aims, its synergy with ongoing initiatives, and the benefits of collaborative efforts.
- Appropriate channels and tools for communication are selected that align with the stakeholders' preferences and accessibility. This will include digital platforms, meetings, workshops, and reports.
- Detailed activities are planned that facilitate strategic communication, such as regular stakeholder meetings, joint workshops, and real-time data-sharing sessions.
- Clear roles and responsibilities are assigned for the project team members in executing the communication plan.
- potential risks in communication are identified, such as misinterpretation of data or misalignment of project goals among partners and mitigated.

Additional activities to scale-up communication efforts, that will be confirmed during the PPG, will include:
- Conducting joint situational analyses with other project teams to align objectives and activities.
- Organizing collaborative data analysis sessions to integrate findings across projects.
- Scheduling regular inter-project review meetings to assess progress and align future actions.
- Developing a joint publication and dissemination strategy for shared learnings and outcomes.

Output 3.2. Adaptive management strategies, ensuring effective real-time adjustments to project interventions

This output addresses the rigidity of traditional intervention strategies and the absence of efficient feedback mechanisms which are significant barriers to adaptive management. By adopting an iterative and reflective approach to project management, the project will utilize feedback and evaluations to foster adaptability and resilience in the face of climate change. This output recognizes the necessity of enabling factors such as fortified communication systems, continuous stakeholder engagement, and comprehensive monitoring and evaluation mechanisms. Through these enablers, the project will navigate challenges like the lack of real-time data for effective decision-making and limited research into the effects of climate change on fisheries. The stakeholders to be engaged will extend to regional entities, project implementation teams, and select research institutions, all of whom play a vital role in the adaptive management process. These activities are not just about providing information but also about building a system that can adjust and respond as conditions change, ensuring that fisheries resources are managed sustainably and effectively for the future.

- Utilizing a reflective approach that includes periodic evaluations, feedback sessions, and assessments from third parties to adapt and improve the project continuously.
- expanding the knowledge management plan to include adaptive management strategies specifically for climate change challenges faced by Benin's fisheries resources.
- Strengthening communication systems, continuous stakeholder engagement, and establishing robust monitoring and evaluation mechanisms.
- Engaging a wide array of stakeholders, including policymakers, researchers, and fishing communities, in the PPG stage and implementation.
- Enhancing research and monitoring to assess and respond to the effects of changing oceanic conditions on fisheries, focusing on vulnerability and adaptive capacities.
- Developing communication channels and monitoring frameworks to support the execution of timely and effective interventions.

Gender Equality and Women's Empowerment

Effective knowledge management, communications, and adaptive management for fisheries resources will place a strong focus on gender equality and youth empowerment, with tailored outcomes captured within the Theory of Change (TOC). While the African Development Bank baseline project has already laid the groundwork with a focused gender analysis and the integration of gender-sensitive indicators in its results framework, our GEF project aspires to build on this foundation, scaling up actions dedicated to gender equality, women's, and youth empowerment in the realm of fisheries resources. As we transition to the Project Preparation Grant (PPG) phase, the project's commitment to gender mainstreaming will be well-embedded in its design, through the following:

o A Detailed Gender Analysis, drawing insights from the existing AfDB baseline project and expanding upon it. This analysis will not only map the current gender landscape but also identify gaps and potential opportunities for gender inclusivity within the adaptation and management of fisheries resources.

o Incorporation of Sex-Disaggregated Data, to understand the nuanced experiences, needs, and contributions of both genders to fisheries resources. This data will directly inform the project components, ensuring they are both inclusive and effective.

o Embedding Gender-Responsive Measures for actionable change. Each project component will be designed or re-evaluated to incorporate gender-responsive measures. This means not just facilitating participation but actively empowering women and addressing structural gender disparities, from access to resources to decision-making capacities.

o Continuous Engagement and Feedback to ensure that the project's gender-centric strategies remain relevant and adaptive.
o Capacity Building and Awareness: Apart from structural changes, the project will invest in capacity-building workshops, aiming to foster an environment where gender equality is valued and pursued proactively by all stakeholders.

Implementation arrangements

The MAEP is the executing agency for the project. The proposed GEF project will share the same Project Management Unit (PMU) as the baseline project and will be composed of a team of experts, housed at the Directorate of Fisheries Production (DPH) and decentralised within the Departmental Directorates of Agriculture, Livestock and Fisheries (DDAEP) and the Territorial Agencies for Agricultural Development (ATDA) will implement the project. The PMU will be responsible for day-to-day operations, including work planning, monitoring, evaluation and project management. The Project Coordinator will be appointed from within the MAEP. Other PMU staff will be recruited on a competitive basis, and will include: (i) an Aquaculture Specialist, (ii) a Fisheries Development and Management Specialist, (iii) an Environmental Monitoring Specialist, iv) Climate Change adaptation Specialist, (v) an Investment and Trade Officer, (vi) a Public Procurement Specialist, (vii) a Social, Gender, Youth and Inclusion Officer, (viii) an Administrative and Financial Officer, (ix) an Accountant, (ix) a Community and Regional Development Officer, (x) a Monitoring and Evaluation Officer; (xii) an Infrastructure Specialist and support staff. The project will rely on the devolved services available in the regions.

Steering committee: A steering committee will be set up, chaired by the MAEP and composed of representatives of the following bodies: (i) the Benin National Chamber of Agriculture, (ii) the Autonomous Debt Management Fund, (iii) the Ministry of Agriculture, Livestock and Fisheries; (iv) the Ministry for the Living Environment and Sustainable Development, (v) the Ministry for Gender, (vi) the Ministry for Employment, (vii) a representative of the Interprofession Poisson d'Élevage du Bénin, (viii) a representative of the professional fishing organisations and (ix) a representative of the Association Nationale des Communes du Bénin (the National Association of Benin Municipalities). The Steering Committee will meet twice a year. The Committee will review the annual work plans and implementation budget as well as periodic project implementation reports to ensure that implementation complies with the strategic orientations. The Bank will provide technical advice and implementation support through regular supervision missions.

Monitoring and Evaluation (M&E)
The projects M&E mechanisms will realise the effective and efficient achievement of project objectives, with an enhanced focus on gender inclusivity and sensitivity, while continuously informing and improving future interventions. More specifically, the project will embed a robust monitoring and a comprehensive, gender-sensitive evaluation of the project through regular progress reports, thus ensuring transparency and effectiveness, and gender-equitable practices in project activities. Monitoring and evaluation ensure that project activities remain aligned with the desired outcomes, with an added focus on ensuring gender equality and addressing specific needs and contributions of women and youth. Through continuous assessment, project partners, stakeholders and donors can be confident in the project's direction, efficacy, transparency and commitment to gender equity. By incorporating gender-specific activities into the project monitoring and evaluation output, we ensure that the project doesn't just achieve its primary objectives but also promotes gender equality, thereby aligning with sustainable development goals and creating a more inclusive impact. The risks addressed by this output include lack of transparency or oversights in project activities, and potential gender biases or inequities. The key stakeholders engaged under this output include the project management teams, project partners, donor agencies, local communities, policymakers, and groups representing gender interests.

A joint monitoring and evaluation system will be established to measure the effectiveness of both the baseline project and the GEF project. This system will incorporate a specialist in monitoring and evaluation within the Project Management Unit (PMU) to implement a robust monitoring mechanism at both central and peripheral levels, ensuring the project's results are continuously tracked with a gender-sensitive lens. A portion of the project's operating budget will be allocated specifically for monitoring-evaluation activities with dedicated resources for gender-specific monitoring. Regular monitoring will include the preparation and submission of quarterly and annual activity reports to the Bank, adhering to the agreements concluded, including detailed gender-disaggregated data. The Bank will conduct monitoring and supervision missions at least twice a year, as well as a mid-term review mission. The Benin country office will maintain a permanent dialogue with the country's authorities and monitor the project. At the project's completion, the Government will prepare a Completion Report, which will serve as the basis for the Bank's Completion Report to evaluate the results and draw lessons learned. The Completion Report will be a valuable resource to inform the Terminal Evaluation report of the GEF project. More specific monitoring will be carried out between the national country office and Bank headquarters.

The project core indicators will be aligned with the monitoring plan to track progress towards project outcomes, such as the number of people benefiting from improvements in agriculture/aquaculture/fishing and the rural population trained in improved technologies, with specific attention to gender-based differences and impacts. These indicators will be reported annually and will be used to inform the project's quarterly progress reports, audit reports, sector ministry monitoring, ESMP monitoring, and other reports to provide diagnostic information for subsequent improvement.

The project will ensure that monitoring and evaluation mechanisms are in line with gender mainstreaming best practices, with gender-sensitive indicators included in mid-term reviews and terminal evaluations. A detailed gender analysis will be part of the monitoring and evaluation framework to ensure that both men's and women's experiences and needs are reflected in project reports. The monitoring and evaluation for the implementation of the gender action plan will be budgeted under the M&E budget.

Activities will include:

- Regular progress reports, ensuring stakeholders are kept updated, directly contributing to project transparency and adaptability, and highlighting gender-specific achievements and challenges.
- Project implementation reports, mid-term reviews, and terminal evaluation reports, providing a holistic view of project achievements and areas of improvement, with a clear focus on gender equity.
- Monitoring and evaluating the implementation of the gender action plan. Specific activities will involve:

 Collect and analyse data based on gender to ensure that both men's and women's experiences and needs are reflected in project reports. This will ensure that interventions and results are gender responsive.
 Design project reports in a manner that highlights gender-specific outcomes, ensuring that interventions are not only effective but also equitable.
 Establish women-only feedback sessions or surveys to ensure that women feel safe and empowered to provide feedback on project interventions, ensuring their voices are heard and acted upon.
 Train the monitoring and evaluation teams on gender sensitivity, ensuring they are equipped to collect, analyse, and interpret gender-specific data effectively.
 Include gender-specific indicators in mid-term reviews and terminal evaluations, ensuring that project impact on women and men, girls and boys is comprehensively assessed.
 Promote the involvement of men as allies in supporting gender-equitable monitoring and evaluation processes, ensuring a holistic approach to gender integration.
 Periodically conduct gender audits to ensure that the project's monitoring and evaluation mechanisms are in line with gender mainstreaming best practices.

GEBs and Adaptation Benefits

The project's successful implementation will create a ripple effect of benefits, both in Benin and the wider region. The holistic approach—encompassing ecosystem restoration, community empowerment, gender equality, and knowledge exchange—ensures that the project addresses climate change adaptation comprehensively, leading to sustainable and resilient fisheries resources. These are presented in the below tables according to local and regional benefits.

By managing 65,000 hectares of coastal and marine areas for climate resilience and reinforcing 8 key policies, plans, frameworks, and institutions for climate adaptation, the project promises substantial local, national and regional impact. It's set to directly benefit 1.2 million beneficiaries and actively involve at least 10 private sector enterprises in climate adaptation efforts. Furthermore, the initiative is committed to enhancing the knowledge and capabilities of 10,000 people, ensuring that women represent half of this empowered group. Through its comprehensive scope, the project not only strengthens resilience but also establishes itself as a paradigm for regional knowledge sharing, collaborative engagement, and blue economy advancement, potentially inspiring replication, and inclusive gender mainstreaming strategies across neighbouring countries.

TABLE 4 LOCAL BENEFITS IN BENIN

Local benefits	Description
Enhanced Resilience of Fisheries Resources	By focusing on adaptive strategies and restoring degraded ecosystems, the project will ensure that fisheries resources can withstand the adverse impacts of climate change, such as changing weather patterns and rising sea levels.
Sustainable Livelihoods	The fisheries resources are vital for many communities in Benin. By bolstering the resilience of fisheries resources to climate change, the project ensures the sustainability of livelihoods that depend on them
Preservation of Biodiversity	With the conservation of lagoons, wetlands, and marine ecosystems, as well as the protection and restoration of spawning grounds, the project will help in maintaining the biodiversity in these habitats.
Local Community Empowerment	The project's emphasis on local community empowerment ensures that communities are not just beneficiaries but are active participants in climate resilience efforts. This involvement leads to more sustainable and locally relevant adaptation strategies
Gender Equality	The project specifically targets gender considerations, ensuring that women have equal access to resources, opportunities, and decision-making power in fisheries management.
Enhanced Knowledge and Capacity Building	Through the project's knowledge management and adaptive strategies component, stakeholders at all levels will be well-equipped to deal with the challenges posed by climate change.
Policy Reform	The project will influence policy reforms that prioritize climate resilience in fisheries resource management.

TABLE 5 REGIONAL BENEFITS OF THE PROEJCT

Regional Benefits	Description
Knowledge Exchange	The project promotes knowledge exchange workshops, seminars, and study tours, facilitating cross-learning between Benin and other countries, ensuring that successful strategies are shared and replicated

Strengthened Regional Collaboration	By aligning with regional bodies and working closely with neighbouring countries, the project fosters collaboration, and unified efforts towards climate resilience in fisheries resource management.
Blue Economy Promotion	Through the mainstreaming of 'blue port principles' and other related activities, the project will advance the blue economy model, setting a precedent for other nations in the region.
Demonstration Effect	The successful implementation of this project in Benin can serve as a model for other countries in the region, showcasing best practices and effective strategies for building climate resilience in fisheries resource management.
Gender Mainstreaming	As the project emphasizes gender equality and women's empowerment, it can influence other regional players to incorporate gender considerations into their strategies, leading to a more inclusive approach to climate change adaptation.

Knowledge generation
The project follows previous fisheries programmes financed by the Bank (such as, the Mono Integrated Rural Development Project (PDRIM, 1992-1999, in partnership with the European Development Fund (EDF); the Support Programme for the Participatory Development of Artisanal Fisheries (PADPPA, 2005-2011); the Support Project for the Development of Mono and Couffo (2003-2010)).

During the PPG, a detailed knowledge management plan will be developed for the project that will expand on the existing knowledge management approach of the African Development Bank financed baseline project. This knowledge management plan will detail how it will contribute to the project's overall impact, including plans to learn from relevant previous and ongoing projects; proposed tools and methods for knowledge exchange and learning; knowledge outputs; strategic communication plan; and budget and timeline.

The objective of the knowledge management plan for this project will be to proficiently manage knowledge so that Benin's fisheries resources can gain from enhanced decision-making, augmented sustainability, and the progression of responsible practices and profitability. It endorses the swapping of ideas, experiences, and optimal practices, empowering stakeholders to learn reciprocally and collaborate for the sustainable management of fisheries resources.

To achieve this, the plan will emphasis data and information collection, knowledge sharing platforms, capacity building, stakeholder engagement, knowledge transfer, User-to-User Exchanges, technology assimilation, policy support, research, lessons learned, and monitoring, all integrated under component 3, fostering a collaborative environment where stakeholders can exchange ideas, experiences, and best practices for the sustainable management of fisheries resources.

National benefits
Benin has many policies and regulations that are focused on environmental sustainability, climate change adaptation, as well as those that focus on fisheries and aquaculture to promote sustainable practices, resource conservation, and the development of the sector. The main ones are described in this section.

The current state of implementation of measures to combat the harmful effects of climate change shows that Benin has a clear political commitment to position itself as a low-carbon, sustainable and climate resilient country. Benin has ratified several Multilateral Environmental Agreements including the Convention on Biological Diversity, the United Nations Framework Convention to Combat Desertification and the United Nations Framework Convention on Climate Change.

The Action Plan of the Government of Benin (PAG) for 2016-2021, adopted in October 2016, is the key operational planning instrument at the national level. It takes into consideration the 2030 Sustainable

Development Goals and the Paris Agreement, and places sustainable development at the heart of its action to improve living conditions.

This project is very much aligned with Benin's priorities and the Government Action Programme (PAG, 2021 – 2026) through Pillar 2: Continue the structural transformation of the economy (areas of concentration 1'agriculture, livestock, and fisheries; and the processing industry, crafts, and trade) and Pillar 3: Continue to improve the social well-being of populations. The project is aligned with the national strategy of the agricultural sector: the Strategic Plan for the Development of the Agricultural Sector (PSDSA 2017-2025), including the National Agricultural Investment and Food and Nutritional Security Plan (PNIASAN) 2017 – 2021) whose 3rd generation is being developed. The project meets the objectives of increasing fisheries productivity, fighting poverty, sanitation, and rehabilitation of water bodies. The project will contribute to strengthening fisheries production through improved environmental and climate resilient practices. The project is also in line with the National Employment Policy 2020-2025. Indeed, the project, through the construction and rehabilitation of infrastructure, training and improved access to finance, increased involvement of the private sector and support for the transition from training to employment, will help increase access to employment for women and young people. Finally, the project is consistent with Benin's Nationally Determined Contribution (NDC) which advocates the use of climate-resilient practices and weather monitoring to strengthen the resilience of the fisheries and aquaculture sectors.

In terms of improving or developing national polices, the real difficulty in Benin lies in the implementation of these strategies and ensuring compliance with them by the population and other stakeholders. Therefore, the focus of this project will not be to develop new national policies, but rather to improve the implementation of the existing policies. During the PPG, a more detailed assessment of policy coherence will be undertaken to determine whether the existing interventions related to the scope of proposed policy activities need to be expanded.

TABLE 6 POLICIES AND REGULATIONS FOCUS ON FISHERIES AND AQUACULTURE

Policies and regulations	Description
2018–2025 Plan National de Développement	Building resilience to climate change is a focus of Benin's National Development Plan. Through this plan, Benin is called upon to adopt more targeted sectoral policies and take accompanying measures to ensure the effectiveness of spatial and management instruments and the development of good practice in environmental governance and participatory land management.
Fisheries and Aquaculture Law (Law No. 2017-39)	This law serves as the primary legal framework for fisheries and aquaculture activities in Benin. It outlines provisions for fishery management, aquaculture development, fishing rights, licensing, monitoring, and enforcement. It aims to ensure sustainable exploitation of fisheries resources and the promotion of responsible aquaculture practices.
Fisheries and Aquaculture Law (Law No. 2014-19 of 7 August 2014 on fisheries and aquaculture in the Republic of Benin). Decree No. 2018-335 of 25 July 2018 laying down the conditions and procedures for practising fishing and Decree No. 2018-334 of 25 July 2018 laying down the conditions and procedures for practising aquaculture in the Republic of Benin.	This policy provides a long-term vision and strategic framework for the development of the fisheries and aquaculture sector in Benin. It emphasizes sustainable resource management, the improvement of fishery infrastructure and facilities, capacity building, and the promotion of aquaculture as a viable sector for economic growth and poverty reduction.

National Plan for the Development of Aquaculture (2018-2023)	This plan focuses on the development of sustainable aquaculture in Benin. It sets out specific objectives and strategies to increase aquaculture production, improve fish farming techniques, enhance market access, and strengthen the regulatory framework for the sector.
Fisheries Management Plans	Benin has implemented specific fisheries management plans for different fishery resources, such as the management plan for the Lake Nokoué Fisheries Resources and the management plan for the artisanal pelagic fishery in the Atlantic Ocean. These plans aim to ensure the sustainable use and conservation of specific fishery resources through measures like fishing quotas, gear restrictions, and closed seasons.
National Strategy for Maritime Fishing (2019-2030)	This strategy focuses on the development of the maritime fishing sector in Benin. It aims to enhance the competitiveness, efficiency, and sustainability of the sector by improving fishing techniques, strengthening value chains, promoting market access, and enhancing infrastructure and services in fishing communities.
Environmental and Biodiversity Conservation Policies	Benin has various environmental and biodiversity conservation policies and laws that indirectly influence fisheries and aquaculture practices. These include the Environmental Code, the Forest Code, and policies related to protected areas, wetland conservation, and coastal zone management. These policies aim to protect aquatic ecosystems, habitats, and biodiversity, which are essential for sustainable fisheries and aquaculture.
Trade and Export Policies	Benin has policies and regulations related to fish trade, export, and market access. These policies aim to ensure the quality and safety of fish products, compliance with international trade standards, and the promotion of fair-trade practices. They also focus on strengthening market linkages and supporting the export-oriented fisheries sector.

Transformation and innovation

The project is intended to be transformative and innovative.

The baseline project makes use of several innovation that can be futher applied in the GEF project, as relevant. These innovations, among other, address environmental challenges, enhance productivity, improve resource management, and promote market efficiency, and include:

- Remote Sensing and Satellite Technologies such drones to monitor illegal fishing -
- Mobile Applications and E-commerce Platforms to facilitate direct market access for fishers and aquaculture farmers.
- Aquaculture technology innovations include recirculating aquaculture systems (RAS) that minimize water usage and environmental impacts, automated feeding systems

During the detailed needs and situation assessment and additional stakeholder consultations, the most suitable innovations to be implemented in this project, will be identified. Also, during the PPG, a post-project financing sustainability plan will be prepared to ensure the continuation of scale-up efforts for aquaculture and other fisheries-related operations, post project completion.

The project already contains a number of innovative solutions for transformative impact. These are detailed below.

1. This approach allows for concentrated efforts where they are most needed, directly addressing the drivers of climate vulnerability and environmental degradation, promoting climate-resilient practices, and enhancing sustainable fishing. By focusing on specific hotspots, the project can create significant localized impacts that contribute to larger systemic changes.
2. Project will adopt integrated approach (two-ways approach) aiming at addressing concomitantly inland fishing restauration and sustainable management and promoting sustainable/climate resilient aquaculture system. The project will simultaneously tackle inland fishing restoration and the promotion of sustainable and climate-resilient aquaculture systems, contrasting with past interventions that have only addressed one of these interconnected issues. This integrated approach recognizes and acts upon the interconnected nature of ecosystems and human activities, leading to a more holistic improvement of the fisheries sector and its resilience to climate change.
3. Project will support and accelerate the ongoing shift from climate vulnerable lake-based cage aquaculture system in major lakes to climate resilient floodplain and lagoon-based aquaculture. Supporting the transition from traditional, climate-vulnerable aquaculture systems to those that are more resilient to climate variability, such as floodplain and lagoon-based systems. This transition is transformative as it actively adapts to the anticipated impacts of climate change, ensuring the sustainability of aquaculture in the face of environmental uncertainties.
4. The project will focus directly on aquatic fauna biodiversity conservation through i) establishing no-fishing biological aquatic fauna zones, ii) promoting sustainable blackwater oyster and crab farming and value chains; iii) elaboration and implementation of annual inland fishing plan/calendar. This differs the project from the ongoing intervention with FAO that focuses on the restauration of aquatic habitats/ecosystems, with focus mangroves ecosystem. By focusing on aquatic fauna biodiversity conservation/restoration this project will supplement FAO intervention for building long-term humid ecosystem resilience and preserving fisheries and aquatic biodiversity. Establishing no-fishing zones, promoting sustainable farming of blackwater oysters and crabs, and implementing annual fishing plans differ from general habitat restoration, focusing instead on species-level conservation.

The project has integrated all GEF-8 levers of transformation for the LDCF. Benin has a wide array of legislation and policies dedicated to fisheries resources. Through component 1 the project will ensure policy coherence and the mainstreaming of climate adaptation in Benin's fisheries resources.

The project has integrated the lever of transformation 2 on strengthening the governance structures for fisheries and aquaculture adaptations. As part of component 2 the project will strengthen the existing governance structure, institutions, and infrastructure development plans to ensure the appropriate governance system is in place to drive the transformation of Benin's fisheries resources towards resilience. The relevant decision makers will be engaged across all governance levels and relevant sectors. Institutional capacities will be strengthened.

The level of transformation 3: knowledge exchange and collaboration are implemented through component 3. It is a key vehicle for innovation, technology transfer, sharing of best practices and scaling up adaptation solutions for the fisheries resource management in Benin.

Coordination and Cooperation with Ongoing Initiatives and Project.

Does the GEF Agency expect to play an execution role on this project?

If so, please describe that role here. Also, please add a short explanation to describe cooperation with ongoing initiatives and projects, including potential for co-location and/or sharing of expertise/staffing

In line with the overarching objectives and to optimize resource allocation and expertise, the GEF project has identified key areas of collaboration and synergy with the baseline project and other related projects. Below is listing of similar ongoing and past projects at the African Development Bank, the GEF and other development partners.

The Bank's active portfolio in Benin includes 16 operations as of July 14, 2022, for a total net volume of commitments of 558.10 million USD, including 12 national public projects (488.40 million USD) and 4 regional public projects (69.69 million USD). The portfolio is dominated by the transport sector (48%), followed by agriculture (24%) and the energy (14%).

To implement an effective coordination mechanism for the GEF project to work with other ongoing projects and maximize synergies, the following actions will be taken:

- Establish a Coordination Committee: Create a multi-project coordination committee that includes representatives from the GEF project and other ongoing projects. This committee will be responsible for identifying areas of overlap, sharing information, and finding opportunities for collaboration.
- Joint Meetings and Workshops: Hold regular joint meetings and workshops with stakeholders from related projects to share experiences, data, and best practices. Use these meetings to identify challenges and develop collaborative strategies for addressing them.
- Shared Knowledge and Information Platforms: Develop a shared digital platform where projects can post updates, share monitoring and evaluation data, and access information on innovative approaches being implemented by others.
- Cross-Project Learning: Organize learning exchanges between project teams. This can be facilitated through field visits, or joint training sessions focusing on specific innovations like remote sensing, mobile applications, etc.
- Integrated Planning Sessions: Hold annual integrated planning sessions with all relevant projects to align strategies and objectives, ensuring that efforts are complementary and not duplicative.
- Resource Pooling for Common Goals: Where possible, pool resources for common objectives such as capacity building, infrastructure development, and technology transfer.
- Alignment with National Priorities: Ensure that all projects are aligned with national priorities and policies on fisheries and aquaculture to enhance policy coherence and institutional support.
- Stakeholder Engagement Forum: Establish a forum where project beneficiaries and stakeholders can discuss their needs, feedback on interventions, and propose community-driven solutions, fostering local ownership and sustainability.
- Harmonizing Technological Innovations: Create a technology working group to harmonize the implementation of technological innovations

The proposed coordination efforts will be further expanded and confirmed during the PPG. These efforts will ensure the avoidance of duplicated efforts but also enhance the overall impact through shared learning and collaboration.

The table below presents the list of projects financed by the African Development Bank and other development partners in the rural development sector.

Table 5 Similar projects financed by development partners

N°	NAME OF THE PROJECT	Implementation	Amount Million F CFA	Funding	Zone of the project
1	Project to support the development of the milk and meat sectors and the promotion of livestock businesses (PRODEFILAV-PEL)	2020-2024	19 307,7	BN; FAD; Cooperation Suiise	Operates in all areas of the national territory conducive to the development and promotion of the milk and meat sectors.
2	Project to Support Food Production and Resilience in the departments of Alibori, Borgou and Collines (PAPVIRE-ABC).	2015-2022	15 910	BN, GAF/SP/IDA FUNDS	Departments of Alibori, Borgou and Collines
3	Agricultural Infrastructure Support Project in the Ouémé Valley (PAIA-VO)	2014-2022	2014-2022	37742 FAD,BN,FEM	15 municipalities spread across three departments: Ouémé-Zou-Atlantique
4	Project to support the development of the sector cashew and agricultural entrepreneurship (PADEFA-OTHERS)	2019-2024	11 624	F.A.D., B.N	Departments of Donga and Collines, and partially the departments of Borgou (South) and Zou (Commune of Djidja)
5	Agricultural Development and Market Access Support Project (PADAAM)	2019-2025	28 713,	BN, FIDA, OFID	Hills, Zou, Couffo, Plateau, Ouémé, Atlantique, Mono
6	Development Support Project Market gardening (PADMAR)	2016-2023	28 700	BN, FIDA ASAP, WORRY	Atlantic, Couffo, Littoral, Mono, Ouémé, Plateau and Zou
7	Agricultural Development Support Project and for Market Access (PADAAM)	2019-2025	28 713	BN, FIDA, OFID	Hills, Zou, Couffo, Plateau, Ouémé, Atlantique, Mono
8	Sector Development Support Project Proteins (PADéFiP)	2018-2024	4 165	BN AFD	Bantè, Dassa-Zoumè, Glazoué, Ouèssè, Savalou and Savè. Abomey, Agbangnizoun, Bohicon, Cove, Djidja, Ouinhi, Zangnanado, Za-Kpota, Zogbodomey
9	Green innovation centers project for agri-food sector (ProCIVA)	2014-2023	10 487	BN, COOERATION SUISSE	National scope

The table below presents the list of related ongoing and completed projects financed by the GEF in Benin under the LDCF

No.	GEF ID	Project Name	Type	implementation start	Duration (years)	Country	Agency	Status
1	11001	Indicators and		2022	2	Regional	IFAD	CEO Approved

		Framework for Climate Change Adaptation and Biodiversity conservation finance for Smallholders and Rural communities: leveraging private and public finance	MSP					
2	5904	Strengthening the Resilience of Rural Livelihoods and Sub-national Government System to Climate Risks and Variability in Benin	FSP	2017	5	Benin	UNDP	Project Implemented
3	5431	Strengthening the Resilience of the Energy Sector in Benin to the Impacts of Climate Change	FSP	2016	5	Benin	UNDP	Under Implementation
4	5232	Flood Control and Climate Resilience of Agriculture Infrastructures in Oueme Valley	FSP	2014		Benin	AfDB	Under Implementation

5	5002	Strengthening Climate Information and Early Warning Systems in Western and Central Africa for Climate Resilient Development and Adaptation to Climate Change	FSP	2013	2019	Benin	UNDP	Completed
6	3704	Integrated Adaptation Programme to Combat the Effects of Climate Change on Agricultural Production and Food Security	FSP	2010	2018	Benin	UNDP	Completed

Collaboration - The GEF project team will hold regular coordination meetings with the baseline project and other ongoing projects. These meetings will ensure that projects do not duplicate efforts, align strategies, share best practices, and regularly update on progress. A dedicated liaison will be appointed to manage this inter-project coordination. The GEF project will closely collaborate with the various ministerial departments listed in the baseline project, especially those playing a secondary role in fisheries and aquaculture management.

Data Sharing and Analysis - The baseline project has done substantial groundwork on fisheries data collection and analysis. The Gef project will utilize this data, avoiding redundancy and duplicative detailed analysis. All data generated will be stored in a shared repository, accessible to both projects, ensuring real-time data availability and synchronization. As feasible, data from other ongoing and past project will be included and made accessible to all projects.

Engagement with Research Structures - Building on the research foundation of the baseline project, the GEF project will foster stronger ties with the National Institute of Agricultural Research of Benin, the Benin Center for Scientific Research and Innovation, and other affiliated universities. The aim will be to ensure that research findings are promptly integrated into both projects, fostering innovation and adaptability.

Training and Capacity Building - The GEF project will leverage the training structures highlighted in the baseline project. Collaborative workshops, seminars, and training programs will be conducted to enhance skills, share knowledge, and build capacity.

Joint Monitoring and Evaluation - To measure the effectiveness of both the baseline project and GEF project, a joint monitoring and evaluation system will be established. This will track the progress of individual deliverables and also measure the collective impact on the fisheries and aquaculture sector.

Collaboration with Decentralized Communities - As decentralization has evolved since 2003, the GEF project will closely work with local communities to ensure grassroots involvement. Decentralized communities will be further integrated into the decision-making process, fostering local ownership and commitment.

The GEF Project understands the value of coordinated efforts, and through these measures, aims to align closely with the baseline project and other ongoing initiatives to achieve shared goals for the betterment of the fisheries sector.

Core Indicators

Explain the methodological approach and underlying logic to justify target levels for Core and Sub-Indicators (max. 250 words, approximately 1/2 page)

META INFORMATION – LDCF

LDCF **true**	SCCF-B (Window B) on technology transfer **false**	SCCF-A (Window-A) on climate Change adaptation **false**
Is this project LDCF SCCF challenge program? **false**		
This Project involves at least one small island developing State(SIDS). **false**		
This Project involves at least one fragile and conflict affected state. **false**		
This Project will provide direct adaptation benefits to the private sector. **true**		
This Project is explicitly related to the formulation and/or implementation of national adaptation plans (NAPs). **false**		
This project will collaborate with activities begin supported by other adaptation funds. If yes, please select below		
Green Climate Fund **false**	Adaptation Fund **false**	Pilot Program for Climate Resilience (PPCR) **false**
This Project has an urban focus. **false**		
This project will directly engage local communities in project design and implementation **true**		

This project will support South-South knowledge exchange	
false	
This Project covers the following sector(s)[the total should be 100%]: *	
Agriculture	30.00%
Nature-based management	40.00%
Climate information services	5.00%
Coastal zone management	0.00%
Water resources management	10.00%
Disaster risk management	15.00%
Other infrastructure	0.00%
Tourism	0.00%
Health	0.00%
Other (Please specify comments)	0.00%
Total	100.00%

This Project targets the following Climate change Exacerbated/introduced challenges:*

Sea level rise	Change in mean temperature	Increased climatic variability	Natural hazards
true	**true**	**true**	**true**
Land degradation	Coastal and/or Coral reef degradation	Groundwater quality/quantity	
false	**true**	**false**	

CORE INDICATORS – LDCF

	Total	Male	Female	% for Women
CORE INDICATOR 1 Total number of direct beneficiaries	1,200,000	600,000.00	600,000.00	50.00%
CORE INDICATOR 2 (a) Area of land managed for climate resilience (ha) (b) Coastal and marine area managed for climate resilience (ha)	0.00 65,000.00			
CORE INDICATOR 3 Number of policies/plans/ frameworks/institutions for to strengthen climate adaptation	8.00			
CORE INDICATOR 4 Number of people trained or with awareness raised	10,000	5,000.00	5,000.00	50.00%
CORE INDICATOR 5 Number of private sector enterprises engaged in climate change adaptation and resilience action	10.00			

Risks to Project Preparation and Implementation

Summarize risks that might affect the project preparation and implementation phases and what are the mitigation strategies the project preparation process will undertake to address these (e.g. what alternatives may be considered during project preparation-such as in terms of consultations, role and choice of counterparts, delivery mechanisms, locations in country, flexible design

elements, etc.). Identify any of the risks listed below that would call in question the viability of the project during its implementation. Please describe any possible mitigation measures needed. (The risks associated with project design and Theory of Change should be described in the "Project description" section above). The risk rating should reflect the overall risk to project outcomes considering the country setting and ambition of the project. The rating scale is: High, Substantial, Moderate, Low.

Risk Categories	Rating	Comments
Climate	High	The impacts of climate change have negative effects on agricultural productivity; Impact on overall effects and output; The development of aquaculture villages can have harmful consequences on the environment, population movements and public health. The project will deploy climate-resilient technologies and practices. In addition, capacity building activities on climate adaptation and mitigation measures will be carried out. The project infrastructures will be climate-smart and climate specifications will be integrated into the ToRs and APD/APS files. A climate change expert will be an integral part of the project PMU. The detailed climate risk assessment to be completed during the PPG stage will further define the risks and budget for appropriate mitigation measures, as part of the ESMP.
Environment and Social	Substantial	The impacts of climate change have negative effects on agricultural productivity; Impact on overall effects and output; The development of aquaculture villages can have harmful consequences on the environment, population movements and public health An environment and social expert will be an integral part of the project PMU. Environmental and social impact studies will be carried out during the PPG stage. Environmental and social implications as well as remediation action plans will be established and budgeted.

Political and Governance	Moderate	The socio-political climate seems to be stabilizing after the legislative elections in January 2023. Furthermore, terrorist attacks are becoming more and more frequent in the northern regions, deteriorating security conditions. The measures taken by the Government in terms of equipment, training and strengthening of defence and security forces, as well as strengthening cooperation with neighbouring states (due to the regional dimension of insecurity), should contain pockets of insecurity in the northern regions of the country
Macro-economic	Moderate	The evolution of the economic situation in Nigeria. The resurgence of the COVID-19 pandemic and the Russian-Ukrainian crisis would cause a slowdown in economic growth The Government has taken measures to support purchasing power and support the agricultural sector to deal with the impacts of the Ukrainian crisis on growth. Concerning COVID-19, the implementation of the health response plan, socio-economic measures and vaccination should make it possible to contain the disease and limit its impacts on the economy.
Strategies and Policies	Low	Benin is vulnerable to climate change, particularly droughts, land degradation and floods, which would lead to a drop in yields and fish production, food insecurity, and an increase in poverty in rural areas. . Difficulties in accessing land. These difficulties may arise from bureaucratic red tape or administrative procedures which lengthen deadlines. Benin has several instruments (National Climate Change Management Policy,

		Environmental Action Plan, Fisheries/Aquaculture Development Strategy) which should contribute to mitigating climate vulnerability The baseline project may include in the partnership agreements to be established with local authorities clauses for speed, simplification of procedures and inclusive actions involving local communities, administrative, tax and land authorities.
Technical design of project or program	Low	The project has been prepared as part of a multistakeholder process. This process will continue during the PPG stage
Institutional capacity for implementation and sustainability	Low	Insufficient capacity of the PMU to master the Bank's rules and procedures which could lead to delays in project execution. Capacity building in management is planned by the project for the benefit of the PMU. Continuous support from the bank's sector specialists will be provided throughout the lifespan of the project.
Fiduciary: Financial Management and Procurement	Low	Delay in implementing financial management tools Actors unfamiliar with the Bank's FM and without experience of development projects ● Update the existing Project administrative, financial and accounting procedures manual and train staff in its use; ● Adapt and improve the existing project accounting system (SUCCESS) and provide assistance in the production of financial statements for the first financial year. Recruit qualified RAF and accountant with solid experience in the financial management of projects financed by the Bank.
Stakeholder Engagement	Low	Critical stakeholders that are not included in the project design, consultation and implementation

		process. To continue the multistakeholder engagement process during the PPG and develop a comprehensive stakeholder engagement plan with stakeholders
Other		
Financial Risks for NGI projects		
Overall Risk Rating		

C. ALIGNMENT WITH GEF-8 PROGRAMMING STRATEGIES AND COUNTRY/REGIONAL PRIORITIES

Describe how the proposed interventions are aligned with GEF- 8 programming strategies and country and regional priorities, including how these country strategies and plans relate to the multilateral environmental agreements.

Confirm if any country policies that might contradict with intended outcomes of the project have been identified, and how the project will address this.

For projects aiming to generate biodiversity benefits (regardless of what the source of the resources is - i.e., BD, CC or LD), please identify which of the 23 targets of the Kunming-Montreal Global Biodiversity Framework the project contributes to and explain how. (max. 500 words, approximately 1 page)

The GEF-8 climate change adaptation strategy for 2022-2026 is designed to support transformational adaptation and contribute to the Paris Agreement's Global Goal on Adaptation.

The proposed project cuts across multiple GEF-8 adaptation themes as follows.

Agriculture, Food Security, and Health.
The project will enhance climate-resilient fisheries resource operations; post-harvest measures such as fish storage; improved fish processing technologies; pest and disease surveillance systems for fish in natural waters; strengthened extension services; and augmented capacity of fisher and water user cooperatives. Projects aim to diminish community risk from vector- and water-borne diseases in situations of flooding.

Integrated Water Resource Management to address water security, droughts, and flooding.
The project will apply integrated water resource management approaches to target the interconnectedness of water resources with the aim to manage them sustainably. The project will identify areas for improving the existing IWRM approaches and will incorporate climate change considerations into water management strategies. This implicates a further evaluation of potential impacts of climate changes on water accessibility and fisheries resources. IWRM schemes will be customized to the local backdrop of Benin's fisheries resources, and when amalgamated with efficacious stakeholder engagement procedures, will augment adaptive capabilities during environmental calamities like water insecurity, drought, and inundation.

These examples demonstrate how integrated water resource management can be employed concerning fisheries resources in Benin to address water security, droughts, and flooding. It is essential to tailor these approaches to the specific local context and engage stakeholders to ensure their effective implementation.

Nature-based Solutions
The project will be implementing a range of nature-based solutions to promote sustainable and environmentally sound practices for the benefits of the ecosystem and local communities. These include mangrove restoration, fish habitat conservation, fish aggregating devices, community-based fisheries management, ecosystem-based fisheries management, and scaling-up aquaculture operations. These solutions will contribute to the conservation of fish populations, protection of habitats, and the sustainable use of fisheries resources, benefiting both the environment and local communities.

Early Warning and Climate Information Systems
The project will build on the existing early warning and climate information systems to enhance the resilience and adaptive capacities of Benin's fishing communities and industries. The proposed project will strengthen climate data collection and monitoring, climate analysis and predictions, information dissemination and communication, integration of climate information in decision-making. By strengthening Early Warning and Climate Information Systems for Benin's fisheries resources, the country can enhance its resilience to climate change impacts, reduce risks associated with extreme weather events, and support sustainable and adaptive practices among fishing communities and aquaculture farmers. This will underpin the extended viability of fisheries resources, protect livelihoods, and guarantee the sustainable deployment of marine and freshwater assets.

The proposed project addresses all the priority areas in the GEF-8 LDCF programming strategy, as follows.

Priority Area 1: Scaling Up Finance
The project will apply various strategies and initiatives to scale-up financing for fisheries resource operations. For these activities the project will work closely with local, national, regional, and international institutions and the private sector. Possible strategies and initiatives will involve working with micro finance institutions or programmes specifically designed to provide financial services, such as loans and savings accounts, to fishers and aquaculture farmers.

Increasing investments are needed for the development of infrastructure related to the fisheries resources, such as improving harbours, landing sites, storage facilities, and processing plants. Such investments can attract private sector participation and stimulate economic vitality concerning fisheries resources.
The specific strategies implemented will be tailored to the local context, taking into consideration the needs and priorities of the relevant stakeholders.

Priority Area 2: Strengthening Innovation and Private Sector Engagement
The project will be undertaking necessary activities to encourage the private sector to invest in aquaculture, through providing technical assistance, training, and financial incentives to fish farmers. Ways will be sought for how to enhance aquaculture productivity and sustainability though innovative approaches.
Existing SME's will be supported with entrepreneurship and capacity building to support innovation and private sector engagement.

While the project approach is conducive to contribute to Priority Area 3: Fostering Partnership for Inclusion and Whole-of-Society Approach, among other, as part of the project's cooperation with the "blue ports initiative", which is a global partnership to encourage and assist fishing ports to implement a blue transformation approach in their strategic and operational processes, this aspect was not sufficiently investigated during the PIF preparation stage, hence the determination for how the project will contribute to this LDCF priority area, among other by engaging with non-project beneficiaries, will be undertaken during the PPG.

As has been presented in the project narrative, the project is extremely cross-cutting in nature as it touches across multiple adaptation needs laid out in Benin's NAPA (See Section C). The green cells in table 4 are directly targeted by this project and the yellow cells will indirectly benefit from the proposed project interventions.

While the adaptation needs identified for Benin's fisheries sector are many, this proposed project will target those activities that can leverage the current co-financing to the highest degree and yield the highest GEBs.

TABLE 7 PRIORITY ADAPTATION NEEDS (NAPA, 2008)

Agriculture	Forestry	Energy	Water Resources	Health	Coastal Zone
Improving food crop production systems	Support for participatory management of gallery forests and non-galery forests	Promotion of energy-efficient stoves	Improving drinking water supplies in rural areas	Promotion of impregnated mosquito nets	Protection of the coastline to the east of Siafato and in the Grand-Popo sector
Strengthening the national climate observation network and setting up an agro-climatological early warning system	Support for communal plantations	Dissemination of substitutes and other energy sources (biogas, butane gas, solar energy, oil, biofuels, micro-hydroelectricity)	Protecting and rehabilitating the banks of water bodies	Development of mutual health insurance schemes	Short-cycle cultivation
Integrated and participatory management of catchment areas	Building the capacity of forest communities to prevent and combat wildfires	Reforestation with fast-growing species	Development of water reservoirs	Strengthening the capacity for integrated surveillance of communicable diseases and intervention at all levels	Participatory management of aquatic ecosystems
Development of lagoon fishing and fish farming		Promoting agroforestry	Development and rehabilitation of reservoirs	Vector control	
		Promoting income-generating activities		Promotion of basic hygiene and sanitation	

D. POLICY REQUIREMENTS

Gender Equality and Women's Empowerment:

We confirm that gender dimensions relevant to the project have been addressed as per GEF Policy and are clearly articulated in the Project Description (Section B).

Yes

Stakeholder Engagement

We confirm that key stakeholders were consulted during PIF development as required per GEF policy, their relevant roles to project outcomes and plan to develop a Stakeholder Engagement Plan before CEO endorsement has been clearly articulated in the Project Description (Section B).

Yes

Were the following stakeholders consulted during project identification phase:

Indigenous Peoples and Local Communities: Yes

Civil Society Organizations: Yes

Private Sector: Yes

Provide a brief summary and list of names and dates of consultations

From March 2021 to November 2021 several virtual meetings (due to COVID-19 travel restrictions) were held which involved consultations with various stakeholders, deliberations on a range of project-specific topics, and sessions focused on areas like gender, climate change, public-private partnerships, and economic analysis.

A list of individuals and organisations consulted during the mission, comprising professionals from various sectors relevant to the project's implementation is provided in the table below. A project evaluation mission was conducted in Cotonou, and signatures were appended by representatives of the African Development Bank and the Republic of Benin on April 16, 2021

From December 12th to 16th, 2022, the African Development Bank (ADB) and the Republic of Benin conducted the PROMAC re-evaluation mission, which included consultations in the context of the proposed GEF project. This . This involved multiple sessions and consultations led by Ahmed KHAN, Chief Fishing Expert from the ADB, and other prominent figures from the Republic of Benin, such as Victorin YAOVI EDE and Dossa AGUEMON. The mission started with the arrival in Cotonou on December 11th, followed by a series of working sessions and courtesy visits, including engagements with the Directorate General of Development Financing, the Ministry of Agriculture, Livestock and Fisheries (MAEP), and the Directorate of Fisheries Production.

During the course of the mission, several site visits were undertaken to understand the ground reality and the progress of fisheries and aquaculture projects. These included visits to aquaculture villages in Allada and Dogbo, the Grand Popo PDA site, the breeding station of Tohonou, and the Djassin fish market in Porto Novo, among others.

The mission also included technical sessions on various topics like financial management, the implementation of the Environmental and Social Management Plan (ESMP), climate change considerations, gender inclusivity, and public-private-cooperative partnerships. Collaboration with international partners was evident from the consultations with Dutch cooperation and JICA representatives.

By the end of the mission, on December 16th, the outcomes of the consultations were reported to the ADB Country Representative. The final day culminated in the presentation of the mission's conclusions, discussion on the aide-mémoire, and its subsequent signing, indicating an agreement and understanding between the parties involved.

In both sets of missions, the following organisations were consulting, specifically in regard to the GEF proposed project:

- Association of women fish markets traders
- National Union of marine and artisanal fishmen of Benin (UNAPEMAP – Union National des Pecheurs Marins et Artisans du Benin)
- National Union inland waters fishmen of Benin (FeNaPECHE – Federation National des Pecheurs du Benin)
- Farm Fish Interprofessional of Benin (IPEB – Interprofession Poisson d'Elevage du Benin)
- Local wetland/lagoon communities
- Decentralized and local cooperativesand governments

Table 7 People met during Consultation held from March 2021 to November 2021

Organisation, People met	PROFILE	ADDRESSES
Ministry of Agriculture, Livestock and Fisheries, WENON Dossa	Aquaculture Specialist/DPH	dwenon@yahoo.fr 00229 97284971
Ministry of Agriculture, Livestock and Fisheries, Mr. AHOLOUKPE D. Cyrille	Specialist in Fisheries Management and Aquaculture/DPH	ahocyre@gmail.com 00229 97609484
Ministry of Agriculture, Livestock and Fisheries, DESSOUASSI Comlan Eugène	Aquaculture/ATDA Program Manager	dessouassieugene@gmail.com 00229 97580352
Ministry of Agriculture, Livestock and Fisheries, GANGBAZO Herman	Fisheries Development and Management/DPH	kasseau75@gmail.com

Ministry of Agriculture, Livestock and Fisheries, BRITO Urban	Head of Department for Control and Monitoring of Fisheries Products and Sectors/DPH	cresusfr2004@yahoo.fr
Expert, HOUENOU Hippolyte	PROVAC Coordinator	azougou@gmail.com
Ministry of Agriculture, Livestock and Fisheries, HOUNYO Florent	Person Responsible for Public Procurement	Hflorent65@yahoo.fr 00229 97774583
Institut National des Recherches Agricoles du Bénin Université de Liège, SOSSOU Hervé	Agroeconomist	97184760 Sossou7@yahoo.fr
Ministry of Economy and Finance, Adjamons Camus	Responsible for Studies on Resource Mobilization-MEF	cadjamonsi@finances.bj 00229 69627274
Ministry of Agriculture, Livestock and Fisheries, DJOSSOU Eugene	Framework for the DPP-MAEP	finagene@yahoo.fr 002299607786
Directorate of Planning and Forecasting (Direction de la Planification et de la Prospective), M. LEGBAGAH Senna	Head of Gender and Environment Unit/DPP	senafrik@live.fr 00229 97 49 34 35
Ministry of Agriculture, Livestock and Fisheries, M. HOUNSOU Godonou Robert	Accounting-Control and Audit	houngoro@gmail.com 00229 61564786
Ministry of Planning and Development, M. Karl ASSAVEDO	Point Focal BAD/MPD	assavedok@yahoo.fr 96742291
Expert, BIO QUESTION Christian	Specialist in Entrepreneurship and Youth Employment	souroumalik@gmail.com 00229 95795123
Ministry of Agriculture, Livestock and Fisheries, M. TOGLA Innocent	SGA-MAEP	innotog@yahoo.fr
Ministry of Agriculture, Livestock and Fisheries, M. AGUEMON Dossa	- Director of Cabinet of the MAEP	aguemondossa@yahoo.fr
Ministry of Agriculture, Livestock and Fisheries, M. SODJINOU AÎNA M. Marius	DPP-MAEP	asmarius@yahoo.fr
Ministry of Agriculture, Livestock and Fisheries, M. DJ PRICE Antoine Gaston	- Director of Fisheries Production-MAEP	adjihinto@yahoo.fr 00229 94127838
Japan International Cooperation Agency, BENJAMIN DIE	JICA framework	Morere.benjamin@jica.go.jp
United Nations Industrial Development Organization, BAU, Bernard,	Industrial Development Officer, UNIDO	b.bau@unido.org
United Nations Industrial Development Organization, CHAABANE, Taoufik,	Principal Technical Advisor, UNIDO	t.chaabane@unido.org

United Nations Industrial Development Organization, KAESER, Steffen,	Head of the Infrastructure Standards and Quality Division, UNIDO	s. kaeser@unido.org
United Nations Industrial Development Organization, Onysko, Sugarcane,	Development Finance Officer, UNIDO	g.onysko@unido.org
United Nations Industrial Development Organization, TAVARES, Raymond,	Industrial Development Officer, UNIDO	r.tavares@unido.org

Table 8 people met during consultations in Devember 2022

Organisation, People met	PROFILE	ADDRESSES
Ministry of Agriculture, Livestock and Fisheries, DOSSOUHOUI Cossi Gaston	Minister of Agriculture, Livestock and Fisheries	
African Peer Review Mechanism, AGUEMON Dossa	Director of Cabinet of the APRM	aguemondossa@yahoo.fr
Ministry of Agriculture, Livestock and Fisheries, TOKO Abdoulaye	Deputy Director of MAEP Cabinet	
African Peer Review Mechanism, ASSOGBA KOMLAN Françoise	Secretary General of the APRM	
Ministry of Agriculture, Livestock and Fisheries, TOGLA Innocent	SGA-MAEP	innotog@yahoo.fr
Ministry of Agriculture, Livestock and Fisheries, EDAH Justin	DPAF MAEP	
Ministry of Planning and Development, Karl ASSAVEDO	Point Focal BAD/MPD	assavedok@yahoo.fr 96742291
Ministry of Agriculture, Livestock and Fisheries, DJIHOU ZANITAS	Point Focal BAD MAEP	97873257
Ministry of Agriculture, Livestock and Fisheries, DJ PRICE Antoine Gaston	Director of Fisheries Production-MAEP	adjihinto@yahoo.fr 00229 94127838
Ministry of Agriculture, Livestock and Fisheries, WENON Dossa	Aquaculture Specialist/DPH	dwenon@yahoo.fr 00229 97284971
Ministry of Agriculture, Livestock and Fisheries, AHOLOUKPE D. Cyrille	Specialist in Fisheries Management and Aquaculture/DPH	ahocyre@gmail.com 00229 97609484
Ministry of Agriculture, Livestock and Fisheries, DESSOUASSI Comlan Eugène	Aquaculture/ATDA Program Manager	dessouassieugene@gmail.com 00229 97580352
Expert, HOUENOU Hippolyte	PROVAC Coordinator	azougou@gmail.com

Organization, GUIDIBI Christian	IPEB Farmed Fish Interprofessional President	97988688
Organization, COUDERESS Martial	SG Interprofessional Farmed Fish IPEB	96168310
Japan International Cooperation Agency, BENJAMIN DIE	JICA framework	Morere.benjamin@jica.go.jp
Ministry for the Living Environment and Sustainable Development, BONI YALLA Memanton	Point focal MCVDD	mboniyalla@gouv.bj
Japan International Cooperation Agency, AOKI Toshimicho	JICA, Resident Representative, , Cotonou	Aoki.toshimicho@jica.go.jp
Japan International Cooperation Agency, SATO Jiuchi	JICA, Project Formulation Advisor, Cotonou	Sato.juichi@jica.go.jp
Japan International Cooperation Agency, Benjamin died	Deputy at JICA,Resident Representative, , Cotonou	Morerebenjamin.VBN@jica.go.jp
Local Authority, ALIGBO Alidou	Village Chief Ayiguinnou in Grand-Popo	66868879
Local Authority, AHOUANDJOGBE Sébastien	Resource Person Village Ayiguinnou in Grand-Popo	96835439
Local Authority, CAKPO Joseph	Mayor of the Municipality of Alladah	Josephcakpo73@gmail.com
Local Authority, M Léon	Head of Ayou district, commune of Alladah	97878662
Local Authority, SOMAKPE Richepin	Head of the TOTA district of the commune of Dogbo	97600130
Local Authority, ADAM Aliwanou	Executive Secretary of the commune of Dogbo	95766953
Gender-based organisation, DEGBO Antoinette	President of the women fish merchants of Djassin Tokpa	97229920
Local Authority, Jossinou William	Chef Arrondissement Djassin commune of Porto-Novo	97871285
Local Authority, AGUEMON Norbert	Chief Quartier Djassin Daho	97481473
Fish Farmer, METOEVI Ferdinand	Cluster Model Fish Farmer in Takon	97372386

Local Authority, HOUESSINON Augustin	Chief District 9 of Cotonou	65757858
Gender-based organisation, KPEHOUNTON Jacqueline	President of women fish sellers at the Fifadji market	95579872
Consulting firm, KOGBETO Elias	CEO Ferme Agropastoral de la Vallée (Provenderie)	9798440
Consulting firm, TONON Hermes	General manager CEO SPCH TONON ET FILS	67391717 htonon@spchtononfils.com
Consulting firm, VOORHIUS Coenraad	Invest International, Amsterdam	Cooenraad.voorhuis@investinternational.nl
The Port Authority of Cotonou, From EENOO Bart	Cotonou Autonomous Port	Bart.vaneenoo@pac.bj

During the PPG, upon further stakeholder engagements the actual roles that various stakeholders that are willing to take in the project will be confirmed, at which point the actual linkages between stakeholder groups, organisations, their roles in the project and their respective contributions to the achievements of core and sub indicators will be defined.

Stakeholder groups	**Roles in the system**	**How they support the achievement of adaptation benefits and linkages with core and sub indicators**
Direct beneficiaries		
Fishermen and Fishing Communities	Fishermen and fishing communities directly engage in fishing activities, including artisanal and industrial fishing. They rely on the fisheries sector for their livelihoods and play a crucial role in the sector's operations. Artisanal fishermen rely on traditional fishing techniques and small-scale operations to catch fish for local consumption and small-scale trade.	- Offer firsthand accounts and insights about changes in fish stocks and climate impacts. - Direct beneficiaries of early warning systems and capacity-building programs. Core indicators and sub-indicators: • 1. Number of direct beneficiaries (sex disaggregated) - 1.1, 1.2: Direct beneficiaries from more resilient assets and diversified livelihoods. - 1.3: Beneficiaries from improved climate information services.
Fish Traders and Processors	Fish traders and processors, including local ones, operate in fish markets, processing facilities, and distribution networks within Benin. They buy fish directly from fishermen or fish farmers, process, and package them, and distribute them to local markets, restaurants, and retailers, as well as international markets.	- Can provide data on the quantity and types of fish being processed and traded, showing shifts in fish populations and their potential links to climate change. - Offer insights into market demands and consumer behaviour. Core indicators and sub-indicators:

	Local fishmongers and retailers are involved in selling fish products to local consumers. They may operate small fish stalls or market stands, and they play a crucial role in making fish available to the local population.	• 1. Number of direct beneficiaries (sex disaggregated) - 1.2: Strengthened livelihoods and sources of income.
Land and Infrastructure Management; Policy, Frameworks, and Institutions; Training and awareness; knowledge transfer		
Fishery Extension Officers	Local fishery extension officers, employed by government agencies or NGOs, provide technical advice, training, and support to local fishermen and fish farmers. They play a crucial role in disseminating best practices, promoting sustainable techniques, and enhancing the productivity of the local fisheries and aquaculture sector.	- Assist in identifying suitable areas for building climate-resilient infrastructure in fisheries and aquaculture sectors. - Promote best practices and sustainable techniques. - Organize and lead training sessions for local communities on adaptive strategies. Core indicators and sub-indicators: • 2. Area of land and infrastructure managed for climate resilience - 2.9: Provide technical advice on resilient irrigation or water structures. - 2.10: Contribute to resilient fishery or aquaculture pond management
Government Agencies	Various government agencies have a stake in the fisheries sector, including the Ministry of Agriculture, Livestock, and Fisheries (MAEP). These agencies are responsible for policy formulation, regulation, licensing, and enforcement of fishing laws and regulations. Local fisheries authorities, such as local government departments or fisheries management committees, oversee the regulation and management of fisheries resources at the local level. They may enforce fishing regulations, issue licenses, and collaborate with national agencies to ensure sustainable fishing practices.	- Collaborate in planning and implementing policies for climate-resilient infrastructure and land management. - Facilitate policy reform and integration of climate change adaptation strategies into fisheries and aquaculture sectors. Core indicators and sub-indicators: • 2. Area of land and infrastructure managed for climate resilience - 2.1 - 2.15: Oversee and regulate the areas managed for climate resilience.

	Institution in charge of standards and health safety	• 3. Number of policies/plans/frameworks/institutions for climate adaptation - 3.1 - 3.6: Develop, strengthen, and enforce climate resilience policies and plans, and establish related institutions.
Non-Governmental Organizations (NGOs)	NGOs play a crucial role in supporting sustainable fishing practices, conservation efforts, and community development in the fisheries sector. They often work closely with local communities and collaborate with government agencies.	- Play a pivotal role in promoting policy advocacy and can also be instrumental in policy implementation at the grassroots level. - Organize awareness campaigns and knowledge dissemination forums. Core indicators and sub-indicators: • 3. Number of policies/plans/frameworks/institutions for climate adaptation 3.1, 3.3, 3.7: Collaborate on policy development, engage in institution strengthening, and partnerships.
Research Institutions	Research institutions, such as universities and fisheries research centres, contribute to the sector by conducting scientific studies, collecting data, and providing technical expertise. They play a role in fisheries management, sustainability, and innovation. They contribute to the understanding of local fisheries dynamics and support the development of sustainable practices.	- Provide evidence-based data and studies that can inform policy development and frameworks. - Provide data and knowledge for training materials. Core indicators and sub-indicators:
Regional organizations	e.g., Fisheries Committee for the West Central Gulf of Guinea (FCWC)	- Collaborate for cross-border policies and shared water bodies management. Core indicators and sub-indicators: Particularly, 5.1 and 5.2 could be relevant as these organizations could be instrumental in driving investments and supporting entrepreneurs in the region for climate adaptation.
Community Empowerment and Knowledge Transfer; Awareness raising		
Cooperatives	Fishermen and fish farmers may form cooperatives to collectively address their needs and interests. These cooperatives can help with accessing resources, improving fishing techniques, and collectively marketing their products.	1.2, 4.1: Strengthened livelihoods, source of knowledge transfer, and beneficiaries of training programs. 5.2, as cooperatives could support their entrepreneur members for climate adaptation.

Community-Based Organizations (CBOs)	CBOs, often formed by fishermen or fishing communities, work to protect the interests of local fishermen, promote sustainable fishing practices, and provide support and resources for their members	2.10. CBOs can engage local communities in managing fisheries resources or aquaculture setups.
Private Sector Engagement		
Fish Farmers and Aquaculture Producers	Individuals or organizations involved in fish farming and aquaculture contribute to the overall fisheries sector in Benin. They cultivate fish in ponds, tanks, or other controlled environments for commercial purposes. Local fish farmers engage in aquaculture activities, cultivating fish in ponds, tanks, or other controlled environments. They contribute to the local supply of fish, particularly tilapia and catfish, and play a crucial role in meeting the demand for fish products.	- Adopt and showcase sustainable and resilient aquaculture techniques. Core indicators and sub-indicators: • 2. Area of land and infrastructure managed for climate resilience - 2.10: Managing resilient fishery or aquaculture ponds or cages. • 5. Private sector engagement in climate change adaptation and resilience action - 5.2: Entrepreneurs supported for climate adaptation and resilience.
Fishing Gear Manufacturers and Suppliers:	Companies involved in manufacture, import and supply of fishing gear and equipment, such as nets, boats, and fishing tools, are stakeholders in the fisheries sector. They support the needs of fishermen and fish farmers. Local businesses involved in the supply of fishing gear, such as nets, boats, and equipment, cater to the needs of local fishermen. They provide the necessary tools and materials required for fishing operations.	- Can be engaged to produce and/or supply more sustainable and eco-friendly fishing equipment. Core indicators and sub-indicators: • 5. Private sector engagement in climate change adaptation and resilience action - 5.1: Invest in creating sustainable fishing gear to contribute to resilience actions.
Consumers and Retailers	Consumers and retailers form an important part of the fisheries sector as they drive demand for fish products. They influence market trends and consumer preferences, which can impact the sector's dynamics.	- Drive demand for sustainably caught and produced fish products. Core indicators and sub-indicators: • 5. Private sector engagement in climate change adaptation and resilience action - 5.1: Driving demand for products that align with climate adaptation and resilience can influence private sector engagement.
Financial Mobilization		

financing institutions	Financial institutions play a vital role in supporting the development and growth of the fisheries sector in Benin. Here are some financial institutions that are involved: Commercial Banks: Commercial banks operating in Benin provide various financial services to stakeholders in the fisheries sector. They offer loans, credit facilities, and banking services to fishermen, fish farmers, fish traders, and processors. These services can help fund fishing operations, aquaculture projects, working capital needs, and investment in equipment and infrastructure. Microfinance Institutions: Microfinance institutions cater to the financial needs of small-scale actors in the fisheries sector who may have limited access to formal banking services. They provide microloans, microinsurance, and other financial products tailored to the specific requirements of fishermen, fish farmers, and small-scale fish traders. Agricultural Development Banks: Agricultural development banks or specialized rural banks in Benin may offer targeted financing programs for the agriculture and fisheries sectors. They provide loans and credit facilities for agricultural and fisheries-related activities, including investment in fishing equipment, fish farming projects, and working capital. Development Finance Institutions: Development finance institutions, both local and international, can play a role in financing fisheries sector projects in Benin. They provide long-term loans, equity investments, and technical assistance for sustainable fisheries development, infrastructure improvement, and capacity building initiatives. Investment Funds: Investment funds that focus on agriculture, aquaculture, or sustainable development may invest in the fisheries sector	- Offer loans, grants, and other financial products to bolster the climate resilience of fisheries and aquaculture sectors. Core indicators and sub-indicators: • 5. Private sector engagement in climate change adaptation and resilience action - 5.1, 5.3, 5.4: Financial engagement for climate resilience; offering credit lines or investment funds for such initiatives. - 5.1, 5.3, 5.4: Engaging in financial support and investment for climate resilience initiatives.

	in Benin. These funds provide capital for expanding operations, supporting technological advancements, and promoting environmentally friendly practices. Development Agencies and Donors: International development agencies and donors may provide financial support, grants, or concessional loans to the fisheries sector in Benin. They fund projects related to fisheries management, sustainable fishing practices, value chain development, and market access. Cooperative Credit Unions: Cooperative credit unions or savings and credit cooperatives may offer financial services to fishing communities and cooperative societies in the fisheries sector. They provide savings accounts, credit facilities, and other financial products to support the financial needs of their members. These financial institutions play a crucial role in providing capital, credit, and financial services to different stakeholders in the Benin fisheries sector. Their support enables investment, growth, and sustainable development in the sector while addressing the financial requirements of the various actors involved.	
International Organizations and Donors	International organizations and donor agencies may provide financial support, technical assistance, and capacity building programs to enhance the fisheries sector in Benin. They may also contribute to policy development and governance.	- Provide financial support, technical assistance, and capacity-building programs.
Conservation and Environmental Protection		
Environmental and Conservation Groups	Organizations focused on environmental conservation and sustainable resource management also have a stake in the Benin fisheries sector. They work to protect marine ecosystems, endangered species, and promote responsible fishing practices.	- Collaborate on initiatives and activities aimed at protecting marine ecosystems and ensuring sustainable fishing practices. Core indicators and sub-indicators: - 2 (a & b): Protect marine ecosystems, contribute to managing land, and marine areas for climate resilience.
Contributors to the degradation of fisheries resources		

Industrial Fishing Operators	Large-scale fishing activities *Impact on Fisheries Resources:* Overfishing and habitat destruction	- Adopt sustainable fishing methods, invest in fish stock rejuvenation projects. - Indicator - 2.10: Overexploitation of fish stocks
Polluting Industries	Release of effluents and pollutants *Impact on Fisheries Resources:* Degradation of aquatic habitats and fish health	- Implement waste treatment protocols, support marine cleanup initiatives. - Indicator - 2(a): Impact on marine ecosystems
Coastal Developers	Infrastructure and tourism-related developments *Impact on Fisheries Resources:* Habitat destruction, especially breeding grounds	- Ensure eco-friendly infrastructure, invest in habitat restoration projects. - Indicator - 2(b): Destruction of marine breeding habitats
Illegal Fishers	Engage in Illegal, Unreported, and Unregulated (IUU) fishing. *Impact on Fisheries Resources:* Unregulated depletion of fish stocks	- Engage in formal, regulated fishing systems, attend training on sustainable practices. - Indicator - 2.10: Illegal fishing activities
Local Communities Using Destructive Practices	Non-sustainable fishing methods *Impact on Fisheries Resources:* Quick depletion and habitat damage	- Participate in community awareness programs, transition to sustainable methods. - Indicator 2.10: Use of harmful fishing techniques
Transport Sector	Movement of goods, especially maritime *Impact on Fisheries Resources:* Risk of oil spills and aquatic pollution	- Adopt stringent safety protocols, invest in eco-friendly transportation methods. - Indicator -

(Please upload to the portal documents tab any stakeholder engagement plan or assessments that have been done during the PIF development phase.)

Private Sector

Will there be private sector engagement in the project?

Yes

And if so, has its role been described and justified in the section B project description?

Yes

Environmental and Social Safeguard (ESS) Risks

We confirm that we have provided indicative information regarding Environmental and Social risks associated with the proposed project or program and any measures to address such risks and impacts (this information should be presented in Annex D).

Yes

Overall Project/Program Risk Classification

PIF	CEO Endorsement/Approval	MTR	TE
Medium/Moderate			

E. OTHER REQUIREMENTS

Knowledge management

We confirm that an approach to Knowledge Management and Learning has been clearly described in the Project Description (Section B)

Yes

ANNEX A: FINANCING TABLES

GEF Financing Table

Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	GEF Project Grant($)	Agency Fee($)	Total GEF Financing ($)
AfDB	LDCF	Benin	Climate Change	LDCF Country allocation	Grant	8,932,420.00	848,580.00	9,781,000.00
Total GEF Resources ($)						**8,932,420.00**	**848,580.00**	**9,781,000.00**

Project Preparation Grant (PPG)

Is Project Preparation Grant requested?

true

PPG Amount ($)

200000

PPG Agency Fee ($)

19000

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	PPG($)	Agency Fee($)	Total PPG Funding($)

AfDB	LDCF	Benin	Climate Change	LDCF Country allocation	Grant	200,000.00	19,000.00	219,000.00
Total PPG Amount ($)						**200,000.00**	**19,000.00**	**219,000.00**

Please provide justification

Sources of Funds for Country Star Allocation

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Sources of Funds	Total($)
Total GEF Resources					**0.00**

Indicative Focal Area Elements

Programming Directions	Trust Fund	GEF Project Financing($)	Co-financing($)
CCA-1-1	LDCF	8,932,420.00	41116800
Total Project Cost		**8,932,420.00**	**41,116,800.00**

Indicative Co-financing

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
GEF Agency	African Development Bank	Grant	Investment mobilized	23818400
GEF Agency	African Development Bank	Loans	Investment mobilized	15478400
Recipient Country Government	Government of Benin	In-kind	Recurrent expenditures	1820000
Total Co-financing				**41,116,800.00**

Describe how any "Investment Mobilized" was identified

The investment mobilized was identified from a baseline project undertaken by the AfDB titled "Promotion of Aquaculture and Competitiveness of Fisheries Value Chains Project (PROMAC)".

ANNEX B: ENDORSEMENTS

GEF Agency(ies) Certification

GEF Agency Type	Name	Date	Project Contact Person	Phone	Email
GEF Agency Coordinator	Ayanleh Daher Aden	10/18/2023	Ahmed Khan		a.daheraden@afdb.org

Record of Endorsement of GEF Operational Focal Point (s) on Behalf of the Government(s):

Name	Position	Ministry	Date (MM/DD/YYYY)
Mr. Mémanton Boni Yalla	Director of Planning, Administration and Finance	Ministry of Environment and Sustainable Development	4/25/2023

ANNEX C: PROJECT LOCATION

Please provide geo-referenced information and map where the project interventions will take place

The project is national in scope (however with a stronger focus on Benin's fisheries zone, which is in the south and along the coast (see Figure 10 below). The projects will focus on three main areas of the country: (i) the seafront (Mono, Atlantic, Littoral and Ouémé departments); (ii) inland water bodies and rivers, low-lying areas, artesian boreholes and flood plains scattered across the catchment areas of the South and Centre (Mono, Atlantic, Ouémé and Zou); and (iii) reservoirs and rivers in the Centre and North (Collines, Zou, Alibori, Atacora, Donga and Borgou).

The centre of Benin's fisheries sector is primarily concentrated along the country's coastal regions. The coastal areas, particularly in the southern part of the country, are where most fishing activities and fishing communities are located. This includes towns and cities such as Cotonou, Porto-Novo, Ouidah, Grand-Popo, and Ganvie.

Cotonou, as the largest city and economic centre of Benin, serves as a significant hub for fish processing, distribution, and export. It is home to several fish markets, processing facilities, and storage infrastructure. The city's coastal location provides convenient access to fishing grounds and facilitates the flow of fish products within the country and to international markets.

Other coastal towns and communities in Benin also play vital roles in the fisheries sector. These areas are often characterized by fishing villages and small-scale fishing operations. Fishing activities in these regions include both artisanal and industrial fishing, with a focus on species such as sardinella, tilapia, shrimp, and various demersal fish.

It is important to note that while the coastal regions are the centre of Benin's fisheries sector, fishing activities also extend to inland water bodies such as rivers, lakes, and reservoirs. These inland fisheries contribute to the overall fish production in the country, albeit on a smaller scale compared to the coastal fisheries. Overall, the coastal regions of Benin, particularly Cotonou and surrounding areas, serve as the main centre of the country's fisheries sector, where fishing activities, processing, trade, and related infrastructure are concentrated.

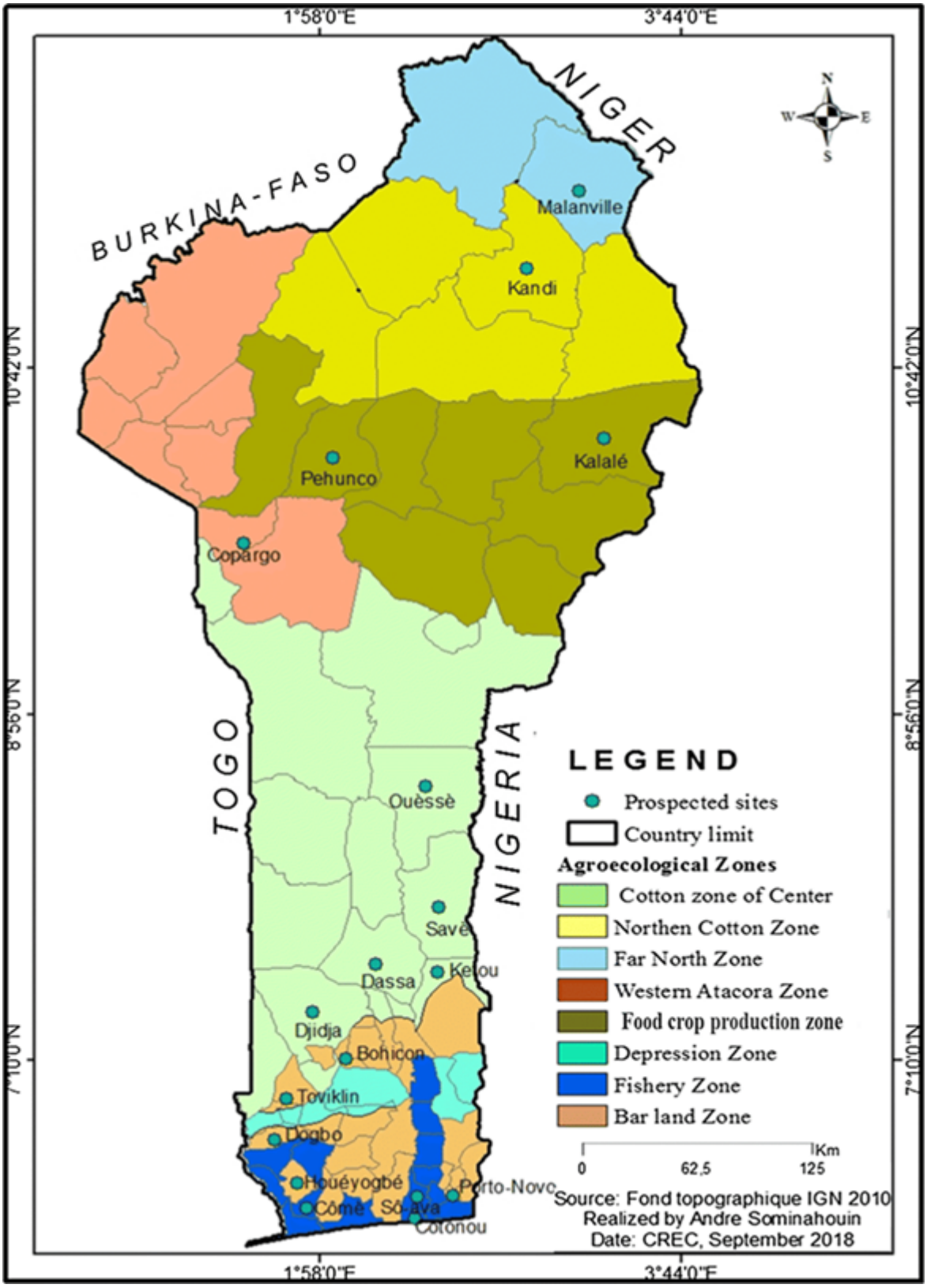
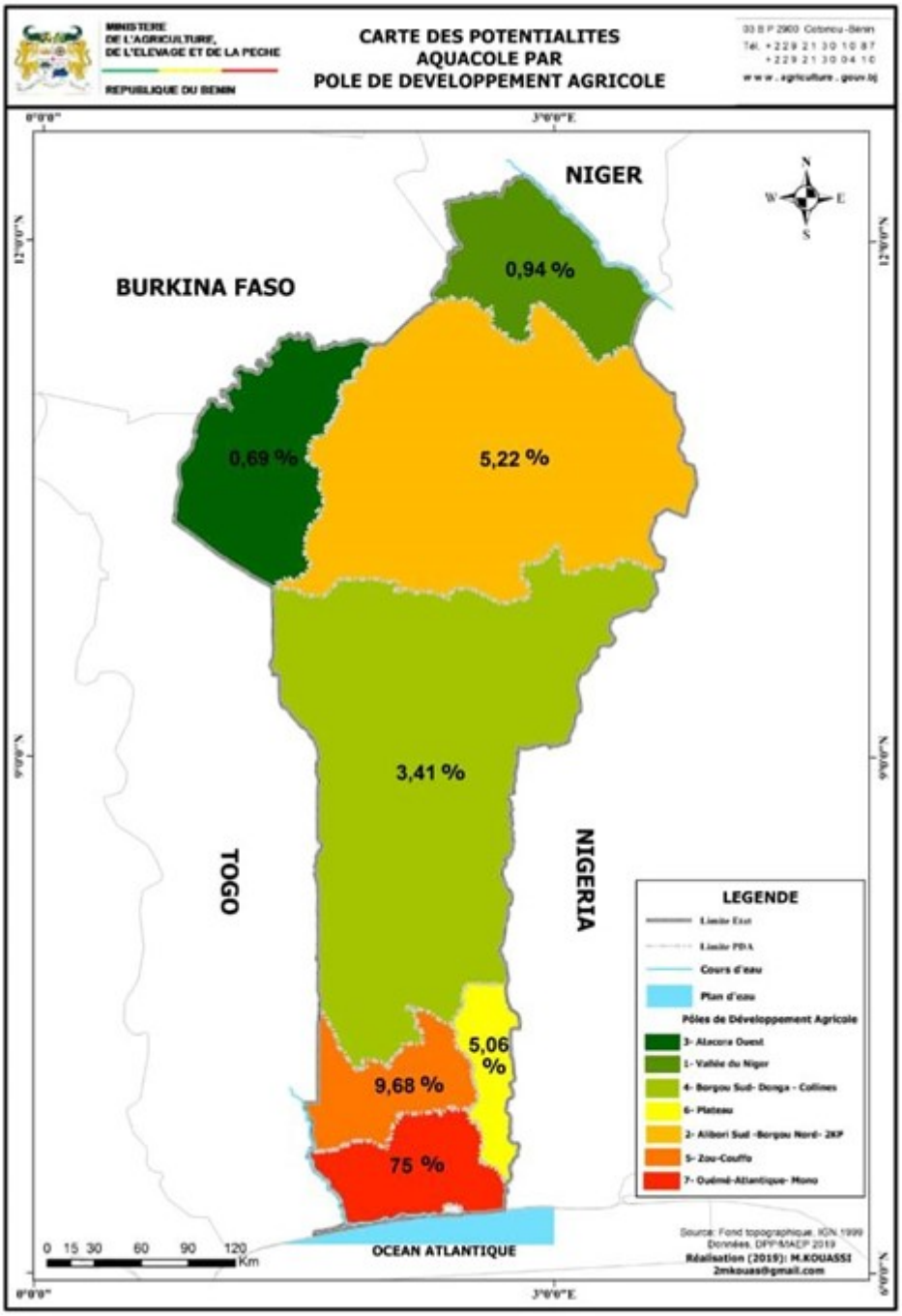


FIGURE 9 MAP OF THE DIFFERENT AGRO-ECOLOGICAL ZONES OF BENIN WITH THE COMMUNES OF STUDIES



The geocoordinates for the project are summarized in the below table.

Project regions	Geocoordinates
Benin	9.3077° N, 2.3158° E
Cotonou	6.37225° N, 2.38725° E
Porto-Novo	6.47069° N, 2.62539° E
Ouidah	6.32683° N, 2.08383° E
Grand-Popo	6.25979° N, 1.72670° E
Ganvie	6.47255° N, 2.40783° E

additional geo coordinates:

Ouémé	6°30′N 2°36′E
Mono	6.457624° N, 1.867408° E

During the PPG all project sites will be confirmed.

ANNEX D: ENVIRONMENTAL AND SOCIAL SAFEGUARDS SCREEN AND RATING

(PIF level) Attach agency safeguard screen form including rating of risk types and overall risk rating.

Title
Enviornmental and social safeguards_Screening_clean

ANNEX E: RIO MARKERS

Climate Change Mitigation	Climate Change Adaptation	Biodiversity	Land Degradation
Significant Objective 1	Principal Objective 2	Significant Objective 1	No Contribution 0

ANNEX F: TAXONOMY WORKSHEET

Level 1	Level 2	Level 3	Level 4
☒ Influencing models			
	☐ Transform policy and regulatory environments		
	☐ Strengthen institutional capacity and decision-making		
	☐ Convene multi-stakeholder alliances		
	☒ Demonstrate innovative approaches		
	☒ Deploy innovative financial instruments		
☒ Stakeholders			
	☐ Indigenous Peoples		
	☒ Private Sector		
		☐ Capital providers	
		☐ Financial intermediaries and market facilitators	
		☐ Large corporations	
		☒ SMEs	
		☐ Individuals/Entrepreneurs	
		☐ Non-Grant Pilot	
		☐ Project Reflow	
	☒ Beneficiaries		
	☒ Local Communities		
	☐ Civil Society		
		☒ Community Based Organization	
		☐ Non-Governmental Organization	
		☐ Academia	
		☐ Trade Unions and Workers Unions	
	☒ Type of Engagement		
		☒ Information Dissemination	
		☐ Partnership	
		☐ Consultation	
		☒ Participation	
	☒ Communications		
		☒ Awareness Raising	
		☒ Education	
		☐ Public Campaigns	
		☐ Behavior Change	
☒ Capacity, Knowledge and Research			
	☐ Enabling Activities		
	☒ Capacity Development		
	☒ Knowledge Generation and Exchange		
	☐ Targeted Research		
	☒ Learning		
		☒ Theory of Change	
		☒ Adaptive Management	
		☐ Indicators to Measure Change	
	☒ Innovation		
	☒ Knowledge and Learning		
		☒ Knowledge Management	
		☒ Innovation	
		☒ Capacity Development	

		☒ Learning	
	☒ Stakeholder Engagement Plan		
☒ Gender Equality			
	☐ Gender Mainstreaming		
		☒ Beneficiaries	
		☐ Women groups	
		☒ Sex-disaggregated indicators	
		☒ Gender-sensitive indicators	
	☒ Gender results areas		
		☒ Access and control over natural resources	
		☒ Participation and leadership	
		☒ Access to benefits and services	
		☒ Capacity development	
		☒ Awareness raising	
		☒ Knowledge generation	
☒ Focal Areas/Theme			
	☐ Integrated Programs		
		☐ Commodity Supply Chains (1 Good Growth Partnership)	
			☐ Sustainable Commodities Production
			☐ Deforestation-free Sourcing
			☐ Financial Screening Tools
			☐ High Conservation Value Forests
			☐ High Carbon Stocks Forests
			☐ Soybean Supply Chain
			☐ Oil Palm Supply Chain
			☐ Beef Supply Chain
			☐ Smallholder Farmers
			☐ Adaptive Management
		☒ Food Security in Sub-Sahara Africa	
			☒ Resilience (climate and shocks)
			☐ Sustainable Production Systems
			☐ Agroecosystems
			☐ Land and Soil Health
			☐ Diversified Farming
			☐ Integrated Land and Water Management
			☐ Smallholder Farming
			☐ Small and Medium Enterprises
			☐ Crop Genetic Diversity
			☐ Food Value Chains
			☐ Gender Dimensions
			☐ Multi-stakeholder Platforms
		☐ Food Systems, Land Use and Restoration	
			☐ Sustainable Food Systems
			☐ Landscape Restoration
			☐ Sustainable Commodity Production
			☐ Comprehensive Land Use Planning
			☐ Integrated Landscapes
			☐ Food Value Chains
			☐ Deforestation-free Sourcing
			☐ Smallholder Farmers
		☐ Sustainable Cities	
			☐ Integrated urban planning

			☐ Urban sustainability framework
			☐ Transport and Mobility
			☐ Buildings
			☐ Municipal waste management
			☐ Green space
			☐ Urban Biodiversity
			☐ Urban Food Systems
			☐ Energy efficiency
			☐ Municipal Financing
			☐ Global Platform for Sustainable Cities
			☐ Urban Resilience
	☐ **Biodiversity**		
		☐ Protected Areas and Landscapes	
			☐ Terrestrial Protected Areas
			☐ Coastal and Marine Protected Areas
			☐ Productive Landscapes
			☐ Productive Seascapes
			☐ Community Based Natural Resource Management
		☐ Mainstreaming	
			☐ Extractive Industries (oil, gas, mining)
			☐ Forestry (Including HCVF and REDD+)
			☐ Tourism
			☐ Agriculture & agrobiodiversity
			☐ Fisheries
			☐ Infrastructure
			☐ Certification (National Standards)
			☐ Certification (International Standards)
		☐ Species	
			☐ Illegal Wildlife Trade
			☐ Threatened Species
			☐ Wildlife for Sustainable Development
			☐ Crop Wild Relatives
			☐ Plant Genetic Resources
			☐ Animal Genetic Resources
			☐ Livestock Wild Relatives
			☐ Invasive Alien Species (IAS)
		☐ Biomes	
			☐ Mangroves
			☐ Coral Reefs
			☐ Sea Grasses
			☐ Wetlands
			☐ Rivers
			☐ Lakes
			☐ Tropical Rain Forests
			☐ Tropical Dry Forests
			☐ Temperate Forests
			☐ Grasslands
			☐ Paramo
			☐ Desert
		☐ Financial and Accounting	
			☐ Payment for Ecosystem Services
			☐ Natural Capital Assessment and Accounting
			☐ Conservation Trust Funds
			☐ Conservation Finance

		☐ Supplementary Protocol to the CBD	
			☐ Biosafety
			☐ Access to Genetic Resources Benefit Sharing
	☐ **Forests**		
		☐ Forest and Landscape Restoration	
			☐ REDD/REDD+
		☐ Forest	
			☐ Amazon
			☐ Congo
			☐ Drylands
	☐ **Land Degradation**		
		☐ Sustainable Land Management	
			☐ Restoration and Rehabilitation of Degraded Lands
			☐ Ecosystem Approach
			☐ Integrated and Cross-sectoral approach
			☐ Community-Based NRM
			☐ Sustainable Livelihoods
			☐ Income Generating Activities
			☐ Sustainable Agriculture
			☐ Sustainable Pasture Management
			☐ Sustainable Forest/Woodland Management
			☐ Improved Soil and Water Management Techniques
			☐ Sustainable Fire Management
			☐ Drought Mitigation/Early Warning
		☐ Land Degradation Neutrality	
			☐ Land Productivity
			☐ Land Cover and Land cover change
			☐ Carbon stocks above or below ground
		☐ Food Security	
	☐ **International Waters**		
		☐ Ship	
		☐ Coastal	
		☐ Freshwater	
			☐ Aquifer
			☐ River Basin
			☐ Lake Basin
		☐ Learning	
		☐ Fisheries	
		☐ Persistent toxic substances	
		☐ SIDS : Small Island Dev States	
		☐ Targeted Research	
		☐ Pollution	
			☐ Persistent toxic substances
			☐ Plastics
			☐ Nutrient pollution from all sectors except wastewater
			☐ Nutrient pollution from Wastewater
		☐ Transboundary Diagnostic Analysis and Strategic Action Plan preparation	

		☐ Strategic Action Plan Implementation	
		☐ Areas Beyond National Jurisdiction	
		☐ Large Marine Ecosystems	
		☐ Private Sector	
		☐ Aquaculture	
		☐ Marine Protected Area	
		☐ Biomes	
			☐ Mangrove
			☐ Coral Reefs
			☐ Seagrasses
			☐ Polar Ecosystems
			☐ Constructed Wetlands
	☐ **Chemicals and Waste**		
		☐ Mercury	
		☐ Artisanal and Scale Gold Mining	
		☐ Coal Fired Power Plants	
		☐ Coal Fired Industrial Boilers	
		☐ Cement	
		☐ Non-Ferrous Metals Production	
		☐ Ozone	
		☐ Persistent Organic Pollutants	
		☐ Unintentional Persistent Organic Pollutants	
		☐ Sound Management of chemicals and Waste	
		☐ Waste Management	
			☐ Hazardous Waste Management
			☐ Industrial Waste
			☐ e-Waste
		☐ Emissions	
		☐ Disposal	
		☐ New Persistent Organic Pollutants	
		☐ Polychlorinated Biphenyls	
		☐ Plastics	
		☐ Eco-Efficiency	
		☐ Pesticides	
		☐ DDT - Vector Management	
		☐ DDT - Other	
		☐ Industrial Emissions	
		☐ Open Burning	
		☐ Best Available Technology / Best Environmental Practices	
		☐ Green Chemistry	
	☒ **Climate Change**		
		☒ **Climate Change Adaptation**	
			☐ Climate Finance
			☒ Least Developed Countries
			☐ Small Island Developing States
			☒ Disaster Risk Management
			☒ Sea-level rise
			☒ Climate Resilience
			☒ Climate information
			☒ Ecosystem-based Adaptation
			☒ Adaptation Tech Transfer
			☐ National Adaptation Programme of Action
			☐ National Adaptation Plan
			☐ Mainstreaming Adaptation
			☒ Private Sector
			☐ Innovation

			☐ Complementarity
			☒ Community-based Adaptation
			☒ Livelihoods
		☒ **Climate Change Mitigation**	
			☐ Agriculture, Forestry, and other Land Use
			☐ Energy Efficiency
			☐ Sustainable Urban Systems and Transport
			☐ Technology Transfer
			☒ Renewable Energy
			☐ Financing
			☐ Enabling Activities
		☐ **Technology Transfer**	
			☐ Poznan Strategic Programme on Technology Transfer
			☐ Climate Technology Centre & Network (CTCN)
			☐ Endogenous technology
			☐ Technology Needs Assessment
			☐ Adaptation Tech Transfer
		☐ **United Nations Framework on Climate Change**	
			☐ Nationally Determined Contribution
		☒ **Climate Finance (Rio Markers)**	☒ Paris Agreement ☒ Sustainable Development Goals ☐ Climate Change Mitigation 1 ☐ Climate Change Mitigation 2 ☐ Climate Change Adaptation 1 ☒ Climate Change Adaptation 2