ADAPTATION FUND

REGIONAL PROJECT PROPOSAL

BOUCLIER-CLIMAT /Mono Project
Towards a climate risks shield in the Mono River Basin
Strengthening adaptation and resilience to climate change through integrated water resources and flood management
Benin, Togo

Title of Project:	**Towards a climate risks shield in the Mono River Basin (Benin, Togo): Strengthening adaptation and resilience to climate change through integrated water resources and flood management (Project: BOUCLIER-CLIMAT[1] /Mono)**	
Countries:	Benin and Togo	
Thematic Focal Area[2]:	Transboundary water management	
Type of Implementing Entity:	Regional Implementing Entity	
Implementing Entity:	**Sahara and Sahel Observatory (OSS)**	
Executing Entities:	**Regional level:** Basin Authority (MBA) & Global Water Partnership in West Africa (GWP-WA)	
	National level: National Coordination Institutions	
	Benin	Ministry of Water and Mines (General Directorate of Water)
	Togo	Ministry of Water and Rural Hydraulics[3] (Directorate of Water Resources)
Amount of Financing Requested	14,000,000 in U.S Dollars Equivalent	
Letters of Endorsement (LOE) signed for all countries: Yes ☒ No ☐		

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

Stage of Submission:

☒This proposal has been submitted before including at a different stage (pre-concept, concept, fully-developed proposal)

☐ This is the first submission ever of the proposal at any stage

In case of a resubmission, please indicate the last submission date: Click or tap to enter a date.

[1] *Since the two countries are francophone, the acronym "Bouclier Climat" (French meaning of "Climate Shield") will be adopted.*
[2] *Thematic areas are: Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.*
[3] *Ministère de l'Eau et de l'Hydraulique Villageoise*

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ACRONYMS

ADAPT-WAP	Integration of Climate Change Adaptation Measures In the concerted management of the WAP transboundary
AF	Adaptation Fund
AMCOW	African Ministry Council of Water
AP-SPTAT	agricultural policy supported by the strategic plan for the transformation of agriculture in Togo
BADEA	Arab Bank for Economic Development in Africa
BOAD	Banque Ouest Africaine de Developpement
CC	Climate Change
CLIMAFRI	Implementing CLIMate-sensitive Adaptation strategies to reduce Flood RIsk in the transboundary Lower Mono River catchment in Togo and Benin
CN	Concept Note
CWS/DRS	conservation of water and soils/defense and restoration of soil
DCP	Data Collection Plateform
DPSS	Directeur de la Planification Stratégique et du Suivi
ECOWAS	Economic Community of West African States
ED	Executive Directorate/Executive Director
EEs	Executing Entities
ESIA	Environmental and Social Impact Assessment
ESP	Environmental and Social Policy
ESRMP	Environmental and Social Risk Management Plan
EWS	Early Warning System
FAO	Food and Agriculture Organization
FIDA/IFAD	Fonds International de Développement Agricole/International Fund for Agriculture Development
FP	Focal Point
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gaz
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GPSD	Growth Program for Sustainable Development
GWP-WA	Global Water Partnership in West Africa
HDI	Human Development Index
HILO	High Intensity Labor Force
HIMO	Haute Intensité de Main d'œuvre
HIPC	Heavily Indebted Poor Country
IE	Implementing Entity
IGAs	Incoming Generating Activities
INBO	International Network of Basin Organizations
INSAE	Institut National de la Statistique et de l'Analyse Economique
IPCC	Intergovernmental Panel on Climate Change
IREE	Initiative Regional pour l'Eau et l'Environment
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
LCCRDS	Low Carbon and Climate Resilient Development Strategy
MBA	Mono River Basin
MRB	Mono River Basin
NAPA	National Adaptation Plan of Action
NBS	Nature Based Solution
NCC	National Coordination Committee
NCCMP	National Climate Change Management Policy
NCPA	National Civil Protection Agency
NDA	National Designated Authority
NDC	National Determined Contribution
NDP	National Development Plan
NDRRS	National Disaster Risk Reduction Strategy
NEE	National Executing Entities
NEE	National Executing Entity
NGO	Non Government Organization
NPACC	National Plan for Adaptation to Climate Change
N-PMU	National Project Management Unit
NTFPs	Non-Timber Forest Products
OiEau	Office International de l'Eau
OSS	Observatoire du Sahara et du Sahel
PANGIRE	Plan d'Action National de Gestion Intégrée des Ressources en Eau
PAPBio C1	Management of mangrove forests from Senegal to Benin Project
PCSO	Platform of Civil Society Organizations
PMU	Project Management Unit
PNDA	National Agricultural Development Policy
PNDES	National Economic and Social Development Plan
PNE	Partenariat National de l'Eau
PROCAD	Agricultural Diversification Support Framework Program
PRSD	Poverty Reduction Strategy Documents
RAMSAR	RASMAR Convention
REE	Regional Executing Entity
RIE	Regional Implementing Entity
RIWE	Regional Initiative for Water and Environment
R-PMU	Regional Project Management Unit
RPSC	Regional Project Steering Committee
RPSC	Regional Project Steering Committee
SAGE	Schema d'Aménagement et de Gestion de l'Eau
SAP	Strategic Action Plan
SDAGE	Schéma Directeur d'Aménagement et de Gestion des Eaux
SIDA	Sweeden International Development Agency
SPDAS	Strategic Plan for the Development of the Agricultural Sector
SSW-NNE	South South West – North North Est
TBR	Transboundary Biosphere Reserve
TDA	Transboundary Diagnostic Analysis
TNC	Third National Communication
UNEP	UN Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WACA	West Africa Coastal Area Management Program
WACDEP-G	Water, Climate, Development, and Gender Investments
WAF	West Africa
WASCAL	West African Science Service Center on Climate Change and Adapted Land Use

PART I PROJECT INFORMATION

1. Project Background and Context:

1.1 The Mono River Basin (MRB): Outlook and Physical setting

1. The Mono River Basin is one of the twenty-five (25) transboundary river basins in West Africa. It covers an area of about 24,300 km² between latitudes 6°16′ and 9°20′ North and longitudes 0°42′ and 2°25′ East and extends over 3,000 km² (12%) in Benin and 23,300 km² (88%) in Togo (Fig.1). It is oriented North-East and South-West on a slightly accentuated landform. The watershed comprises a coastal sedimentary basin in the south, shaped as a coastal plain and plateaus, and higher landform in the north comprising the Atacora Mountains and their southern extensions, the Togo Mountains. These landforms are dissected into several massifs, whose crests-oriented SSW-NNE, culminating between 600 and 941 m at Atilakoutsé (Togo), constitute a real water tower. This feeds several sub-meridian to meridian flowing rivers. However, most of the watershed is at low altitude (30 to 250 m). Administratively, the basin covers the Departments of Mono, Couffo and small parts of the Departments of Collines and Donga in Benin. In Togo, it covers the Maritime, Plateaux and Central Regions and a small portion of the Kara in Togo.

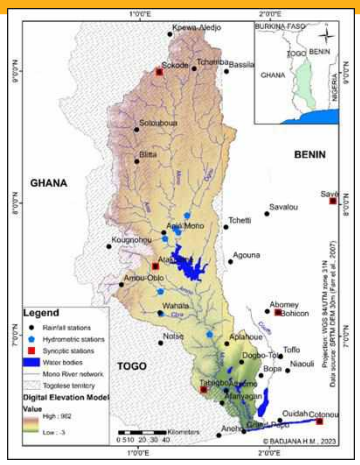

Figure 1:The Mono River Basin (MRB)

1.1.1 *Bioclimatic zones of the Mono River Basin and their hydro-climatic characteristics*

2. Average annual rainfall in the Mono Basin ranges from 900 mm in the southeast to 1200 mm in the northwestern highlands. There are two climatic domains in the basin: the Sudano-Guinean or Subequatorial domain in the southern part of the basin and the Sub-Sudanian or Tropical domain in the northern part with a rainy season and a dry season.
3. The sub-equatorial climate is subdivided into maritime sub-equatorial (from the coast to latitude 6°35' N) and interior sub-equatorial (from 6°35' to 7°30' N). It is characterized by two rainy seasons and two dry seasons. Rainfall is very abundant during the main rainy season from April to July. It represents 50 to 60% of the annual rainfall, including 30% in June. The short dry season, which lasts on average from the third decade of July to mid-September, represents 15 to 20% of the annual total4. The short rainy season, which lasts from mid-September to mid-November, represents 16 to 23% of the average annual rainfall totals. This is followed by the long dry season from December to mid-March with only 8-9% of the annual average rainfall.
4. The Subsudanian or Tropical climate has a rainy season and a dry season. It is characterized by a unimodal regime of the seasonal rainfall cycle with 82 to 84% of annual rainfall received between May and October with a rainfall maximum in July-August, and 16 to 18% between November and April.
5. The average maximum temperature for the entire basin ranges from 28.4˚C to 33.7˚C while the average minimum temperature fluctuates between 24.3˚C and 27.8˚C from 1981 to 2010.

1.1.2 *Hydrology*

6. The Mono River, 530 km long, has its source in the Koura Mountains at Alédjo in the Commune of Bassila in northern Benin. It crosses the Togolese territory where most of its course takes place. Along the southern part of the river towards its mouth, it forms the international border between Togo and Benin. The river flows into the Atlantic Ocean through its mouth called "Bouche du Roy" in the commune of Grand-Popo in the south of Benin through a vast network of lagoons and brackish water lakes (the lagoon of Grand-Popo, the lake togbadji, the lake doukon, the lake toho, etc).
7. The main tributaries of the Mono River are located in its Togolese portion. These are the Ogou (210 km), Anié (161 km), Amou (114 km), Amoutchou (62 km) and Khra (69 km) rivers. In Benin, the lower Mono valley has also a highly developed hydrographic network, with several ponds and lakes. In addition, there is another well-defined drainage branch known as the Sazué (63 km). The river is characterized by a "transitional tropical regime with a Dahomean variation" marked by strong inter-annual irregularity and very different flow values yearly. The low water season is rigorous and the high-water season quite long. The average monthly flow, observed at the Athieme station, from February to April (minimum low water) is 0 m3/s, while that of September, the main month of flooding, is 261 m^3/s. Estimated from data observed between 1991 and 2022, the average annual flow of the Mono at Athiémé is 153 m3/s. Over the same period, the maximum annual discharge ranged from 97.1m^3/s observed in 1995 to 1,005m^3/s recorded in 1999. The average annual maximum discharge over this period is 588 m^3/s.
8. The analysis of the functioning of the river-lagoon complex downstream of the Mono basin shows that this system is regulated by several factors, including the influence of the marine waters of the Atlantic Ocean, but also by the hydrological regimes of the Mono River and the Couffo River - Lake-Ahemé - Coastal Lagoon complex. Indeed, the Atlantic Ocean influences the hydrology of the lagoon system through the dynamic and saline tide. Although it oscillates only around one meter (microtidal regime), the tidal range dictates the direction of flows in the river-lagoon complex downstream of the Mono basin.
9. Furthermore, each year, the first flood of June-July of the Couffo River is very decisive in the rise of the water level in the lagoon system, which remains brackish. On the other hand, in August-October (Mono River flood), the currents of the Mono River become very strong in the lagoon system and the water becomes purely fresh. Thus, at low tide, almost all

4 Amoussou, E. (2010). Variabilité pluviométrique et dynamique hydro-sédimentaire du bassin versant du complexe fluvio-lagunaire Mono-Ahémé-Couffo (Afrique de l'ouest) (Doctoral dissertation, Dijon).

the water of the Mono crosses the coastal lagoon and flows directly into the sea through the Bouche du Roy. At high tide, although most of the water from the Mono also flows into the sea through the Bouche du Roy, some of it flows up the Ahô channel to be stored in Lake Ahémé.

10. In short, the lagoon system sees its waters flow in one direction or the other according to the tides and the hydrological seasons of the Mono and Couffo rivers. In a purely hydrological sense, the territory of the Mono Basin Authority should therefore consider both the Mono River watershed (in Togo and Benin) and the Couffo watershed (in Benin) including Lake Ahémé, the Aho channel which crosses the Grand Popo lagoon at the junction of the lake village of Djondji ("triple point" receiving water from the Ouidah lagoon, the Couffo-Lake Ahémé - Aho channel complex and the Grand Popo lagoon).
11. The construction of the Nangbeto dam (11715 hm³) in 1987 on the river has led to a significant modification of the flow in support of low water levels with more frequent floods that affect the well-being of the populations and the stability of the Mono River ecosystems. The effects of the Nangbeto dam are reflected in a 97% increase in low water flows while flood flows have decreased by 3%. This shows the role played by the Nangbeto dam on the flow rate and the attenuation of floods and consequently a perpetuation of the flow downstream of the basin. The Mono watershed is home to several small water reservoirs.

1.1.3 *Ecological heritage and biodiversity*

12. The Mono transboundary basin is marked by a wetland complex composed of freshwater aquatic ecosystems fed by three major tributaries (Ogou, Anié and Amou) and vast marine and coastal ecosystems. The latter extend from the estuary of the Mono commune to the commune of Grand-Popo in Benin. As a result, the region includes gallery forests, grasslands, mangroves and forest plantations, as well as specific ecosystems that constitute protected areas such as the Fazao-Malfakassa National Park in Togo and especially the Mono Transboundary Biosphere Reserve (TBR). Located in the downstream part of the basin between 6° 8' 52.8'' N and 7° 3' 41.8'' N, latitude and between 1° 24' 18.2'' E and 1° 30' 0.0'' E longitude, the TBR covers a total area of 346,286 ha, of which 203,789 ha are in Togo and 142,497 in Benin. It hosts three wetlands of international importance that are recognized as RAMSAR sites: site 1017 (Lake Toho in Benin) and N°736 (Togodo Wildlife Reserve) and site N°1722 (Coastal Wetlands) in Togo. The TBR is of capital importance for the two States since it emphasises the efforts of the two governments in terms of biodiversity conservation.
13. The Mono River Basin abounds with a very varied fauna, which is dependent on the different ecosystems that make it up from upstream to downstream. The inventory of the fish fauna of the "Mono River/Coastal Lagoon" river complex in Benin has identified 61 species of fish, 59 of which have been fully identified. In addition to this multitude of fish species, there are crustaceans such as crabs, shrimps, etc. A preliminary assessment of the potential of mammals at the level of the Mono reserve in Benin and Togo has identified 28 species of mammalian fauna (GIZ, 2015). The Mono basin is home to a significant avifaunal diversity. The most remarkable bird species are mainly water birds. Reptiles are represented by Ophidians (snakes), Saurians (lizards), Chelonians (turtles) and Crocodilians (crocodiles). Several species of amphibians are present in the basin.
14. As for the flora, the distribution of plant formations in the Mono watershed depends on heritages, the current climatic environment (rainfall and humidity), pedology and variation in soil salinity (coastal region) as well as anthropic pressure. Thus, from the south to the north of the basin, several main vegetation formations can be schematically identified. There are several forest reserves in the Mono Basin, including the Aboudoulaye forest, the Naglanou forest, the Akissa forest and the Togodo forest (Amoussou et al., 2017). The basin contains also relict forests that are largely sacred. This is the case for the Dogbo Ahomè forest (0.75 hectare), which includes species such as *Parkia biglobosa*, *Xanthoxylum xanthoxyloides*, *Antiaris toxicaria*, *Kaya senegalensis* and *Albizia globerrima*.

1.1.4 *Soils*

15. The Mono Basin is based on coastal sedimentary basin rocks in its southern part and crystalline basement rocks in its northern part. The alteration of these rocks produces several soil groups in the basin. These include sesquioxide soils, including tropical ferruginous and ferralitic soils, hydromorphic soils, raw mineral soils, poorly developed soils, halomorphic soils and vertisols (Lamouroux, 1966; Willaine and Volkoff, 1967).
16. Leached tropical ferruginous soils are the dominant soils in the basin, occupying the area from about the 7th parallel to the extreme north. The southern part of the basin, covered by the lower Mono Valley, consists mainly of hydromorphic mineral soils (Figure 2).
17. There are also juxtapositions of leached tropical ferruginous soils with concretions and cuirasses and weakly ferralitic soils and, to a lesser extent, vertisols. In the western part of the basin, bordered by the Atacora mountain range, the soils are not very developed. In the far north of the basin, around Kpewa-Alédjo, where the geological substratum is Atacora quartzite, raw mineral soils are found.

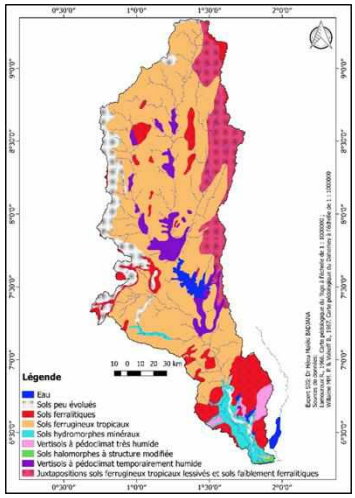

Figure 2. Major soil types in the Mono basin

1.1.5 *Hydrogeology*

18. The Mono River and its hydrographic complex contribute to the recharge of groundwater stored in two major aquifer formations:
    - the granitic, gneissic, mica schist basement;
    - the sedimentary made up of clays, argillites and sandstones.

19. The main hydrogeological structures of the basement are those of the Dahomeyides chain which contain two types of overlapping aquifers and presenting a hydraulic continuity. They are composed by the fractured aquifers where water circulates in the cracks with a flow of drilling between 0,4 and 10 m^3/h. They are topped by the alteration aquifers which have a better permeability of about 1 to 9.10^{-7}m/s. These aquifers are the most exploited by populations through large wells. The average thickness of the alteration aquifers varies from 3 to 15 m.
20. The coastal sedimentary basin of the Mono Basin is part of the large coastal sedimentary basin or Keta Basin, which extends from Côte d'Ivoire to Nigeria. The sedimentary formations include:
    - **The Quaternary Aquifer**: located along the coastline, over a width of 1 to 2 km, the dune sand reservoir is made up of sand and gravel, generally with little clay. In density equilibrium with the marine salt water, the fresh water table is fragile and is only exploited in its superficial part. It is vulnerable and generally polluted at the bacteriological level.
    - **The Terminal Continental Aquifer**: this is the best-known aquifer because of its accessibility and the large number of wells and boreholes that exploit it. It is presented in the form of a series of unconfined aquifers comprising more or less clayey sands, clays and gravel intercalations. The wetted thicknesses are between 10 and 50 m and the depth of the static level varies from 10 to 40m.
    - **The Upper Cretaceous sands**: These are the site of a non-artesian confined aquifer covering an area of about 850 km2 in the northern part of the coastal basin between the Ghana border and the Mono. The best characteristics of this water table are found towards the Togo-Benin border, east of Tabligbo, where the thickness of the sands reaches nearly 25 m, and the exploitation rates are 100 m^3/h.
21. It is estimated that about one third of the total area of the basin (1300 km^2/3600 km^2) contributes to aquifer recharge, i.e. an annual input of between 60 and 120 x 106 m^3.

1.2 Socio-demographic and economic characteristics of the Mono River Basin

22. Mono basin covers 61 communes in seven (07) regions across the two countries. Based on census data, the Mono Basin population is estimated at 4,723,280 in 2023, of which 51% are women (RGPH4, 2013 in Benin and RGP5, 2022 in Togo). The majority of this population is rural (56%) and young (77% under 35 and 52% between 15 and 59): 39% in Benin and 61% in Togo. According to projections derived from population growth rates in each country (3.5% in Benin in 2013 and 2.3% in Togo in 2022), the population is expected to reach 11,957,297 by 2050. Population trends in the basin are shown in Figure 2.
23. The average population density, which was 75 hts/km^2 in 2002, marks an unequal distribution between the north and south of the basin. Indeed, the population is very dense in the coastal region (230 hts/km^2) and quite high on the plateaus (105 to 120 hts/km^2), whereas it is lower (5 to 15 hts/km^2) in the upper basin (Atacora Mountains in Togo). This is linked to the presence of mountains that do not offer large areas for cultivation.
24. In the basin, ethnic cultural and cultic affiliations based on the cult of the Vôdoun mark the individual and collective way of life, the management of ecosystems and village communities.
25. The natural resources of the Mono River basin have long been a capital for the communities of Togo and Benin from which they have developed several socio-economic activities, notably agriculture, livestock, fishing, exploitation of mining resources and river transport, etc. Despite the contribution of the exploitation of these resources to the economy of both countries, most of these populations still live below the poverty line with Gross Domestic Products (GDP) estimated in 2022 at US$ 1,303 for Benin and US$ 918 for Togo (World Bank, 2023).

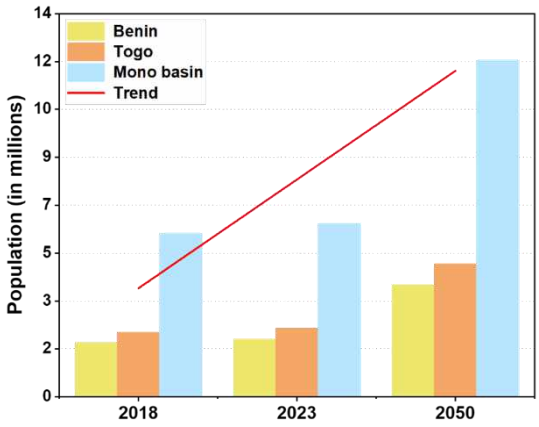

Figure 3: Population trends in the basin from 2018 to 2050

26. Like Togo and Benin, the primary sector (agriculture, livestock and fishing) occupies more than 70% of the active population of the Mono basin. Rainfed and subsistence agriculture remains the main activity in the watershed and occupies nearly 77% of households on the Benin side compared to 60% in Togo. This percentage varies from 68% among the higher income populations to 93% among the poor populations in Benin (INSAE, 2002) and 44% and 69% respectively in Togo. Most family farms (79%) are run by men, 21% by women. For both countries in the Basin, achieving food security and improving the livelihoods of the population requires the development and modernization of the agricultural sector.
27. Agriculture is developed from the south to the north of the basin. The cultivation techniques used remain essentially traditional with, increasingly, an extension of the sown areas without an improvement in productivity. In the coastal region of the basin, crops are essentially market garden crops (rincrin, okra, eggplant, carrots, onions, tomatoes, etc.). These crops are often coupled with maize and are perfectly developed during low water periods in the river beds. In the south of the basin, on the plateaus and in the dry valleys, people grow cereals (millet and sorghum) and tubers (maize, cassava, sweet potatoes, rice, cowpeas, etc.) and cash crops, notably groundnuts, palm and sometimes cotton. In the center and north of the basin, cash crops (groundnuts and cotton) are more developed and occupy the plateaus and sometimes the slopes. However, cereal crops (millet and sorghum) and tubers (yams, cassava) are also widely grown and represent a significant area of sowing.
28. Irrigated agriculture is increasingly developing in the basin with agropoles and Planned Agricultural Development Zones, which are areas of at least 100 ha developed by the state. These are the sites of Avévé in the Lakes (100 ha), Hompou

in Bas-Mono (100 ha for maize), Kouétchou in Bas-Mono (84 ha for maize and provision for market gardening on 10 ha), Koutoukpa, (100ha in Amou with a rainfed system for rice production) and the irrigated perimeter of Agomè-Glozou (about 400 ha for rice).

29. Like agriculture, fishing is also an important economic sector that occupies the populations of the Mono transboundary basin. It is practiced throughout the year on rivers, lakes and lagoons and, during the high-water period, from June to November, in marshes and ponds. Fishing offers a wide range of fish and shellfish. The most caught species are *Parachanna obscura, Clarias lazera, Tilapia heudelotii, Tilapia zilii, Lisa falcipinnis and Acentrogobius schlegelli, Chrysichtys areutus, Synodontis, Lates niloticus, Saratherodon, Callinectes, Macrorachim, Penaeus duorareum*, etc. In the basin in general and, in the lower course, the fished species are sold. The resellers are, for the most part, the fishermen's wives who buy it from their husbands and then deal with other intermediary women traders. In the past, the fishermen's wives who provided the income controlled more than 70% of the household expenses in most cases. They controlled all family income and provided much of the education for their children.

30. The analysis of the fishing sector has shown that the overexploitation of water bodies, reported since 1995 by the FAO, is the main factor in the degradation of freshwater and marine environments. Artisanal fishing alone exceeds the exploitable potential. The decrease in the size of the catches and the accelerated depletion of the populations observed in all the fisheries indicate that the operators have gone beyond the maximum sustainable yield.

31. Livestock production in the Mono Basin is characterized by cattle, which is more important in the northern part and is mainly composed of transhumant animals from neighboring countries, particularly Burkina Faso and Niger. Small-scale livestock production (poultry, sheep, goats, pigs, etc.) and small-scale production is often carried out by women. Modern commercial poultry farming is developing on the outskirts of the major cities in both countries. The search for grazing areas for cattle breeding is causing more and more conflicts in the basin.

32. The Nangbeto dam in Togo represents the most important water mobilization infrastructure around which many economic activities are developed. With a storage capacity of 1715 hm^3, it contributes more than 20% of the electrical energy consumed by Benin and Togo, its annual production reaches more than 1,000 to 1,500 tons of fish and allows 43,000 hectares of land to be irrigated. Despite its very important contribution to the economy of the two countries, the periodic releases of water from the Nangbeto dam have intensified flooding in the communes located downstream. Thus, in 2007, the commune of Grand Popo recorded floods that lasted an exceptional 60 days and caused 2 deaths, 6 injuries and enormous material damage. Approximately 12,839 inhabitants of the commune were left homeless, 3,337 hectares of agricultural crops were destroyed or washed away, and 1,918 animals were decimated. The damage to infrastructure was just as extensive: 2009 huts were demolished, and 13 classrooms damaged[5]

33. The Mono River Basin is therefore facing major challenges in terms of development and improving the socio-economic conditions of the communities, the most important of which are related to the environmental degradation of the watershed, which has been greatly exacerbated by the impacts of climate change, thus making the communities and ecosystems very vulnerable.

1.3 Project zone identification and description & target population

Project intervention zones

34. The activities planned under the BOUCLIER-CLIMAT project will be developed in the most vulnerable communes to hydro-climatic hazards (Fig. 4). At the concept note stage and during the stakeholder consultation process, local stakeholders proposed vulnerable communes on the basis of criteria defined and validated at the regional workshop, i.e: (i) the state of the environment, (ii) the state of water and land resources, (iii) the degree of food insecurity, (iv) the degree of dependence on natural resources, (v) the degree of dependence on agriculture, and (vi) the threats posed to these areas by climate change (floods and droughts).

35. This selection consultation process identified 51 communes, including 10 in Benin, spread over 03 departments (Mono, Couffo and Donga), and 41 in Togo, spread over 04 departments (Maritime, Plateaux Region, Central Region and Kara Region), as potential project intervention zones. Located on both sides of the Mono river, mostly downstream of the Nangbéto dam, these communes are subject to frequent flooding, causing considerable material and human damage.

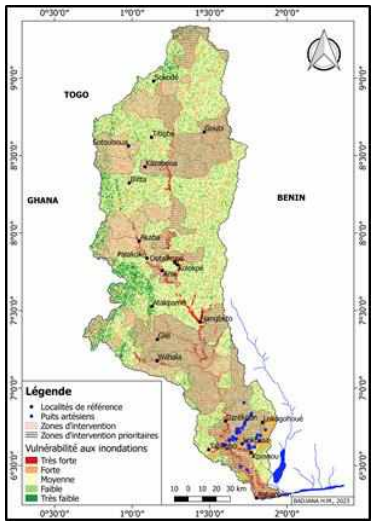

Figure 4. Zones of priority intervention

36. This consultation process was extended during the development phase of the full project proposal, in line with the requirements of the AF, and was also the subject of a more detailed assessment of the potential project intervention communes, pre-selected during the concept note phase of the project on the basis of a study of the basin's vulnerability to climate change and additional criteria related to socio-economic and environmental aspects (population density, local women's groups, water-related conflicts, similar projects in the past or in progress, specific ecosystems, unused artesian wells).

37. This consultation took place from 20 to 28 March in each of the two (02) countries (see PART III, Section I) and included meetings with national and local stakeholders and beneficiaries in a number of vulnerable communities in Benin and Togo.

[5] *GWP, 2009. Nangbeto : Quand la source d'énergie devient source de malheurs. INFO Magazine d'information sur l'eau et l'environnement. Atelier régional des Médias sur la gestion des Eaux Partagées en Afrique de l'Ouest.*

Thirty-four (34) priority intervention communes (Figure 4 and Table 1) were identified and validated through this process. Project implementation will focus on these communes to maximize the local impact of the project.

38. The Project's activities will include basin-wide activities, while others will focus on sites with specific environmental and socio-economic problems. Sites for the activities will be identified in vulnerable communes by the local authorities in close consultation with the communities during the inception and baseline studies, on the basis of additional criteria to be defined considering the vulnerability of the population and ecosystems to climate change, as well as practical and logistical considerations.

Table 1: Project intervention areas

Country	Department / Region	Communes covered by intervention zones	Communes covered by priority intervention zones
Benin	Mono	Lokossa, Athiémé, Grand-Popa	Lokossa, Athiémé, Grand-Popa
	Couffo	Klouekanmé, Aplahoué, Djakotomé, Toviklin, Lalo, Dogbo-Tota	Klouekanmé, Aplahoué, Djakotomé, Toviklin, Lalo, Dogbo-Tota
	Donga	Bassila	Bassila
Total Benin		**10**	**10**
Togo	Maritime	Bas-Mono 1, Bas-Mono 2, Lacs 2, Yoto 1, Yoto 3	Bas-Mono 1, Bas-Mono 2, Lacs 2, Yoto 1, Yoto 3
	Plateaus region	Akébou 2, Amou 1, Amou 2, Amou 3, Anié 1, Anié 2, Danyi 1 & 2, Est-Mono 1, Est-Mono 2, Est-Mono 3, Haho 1, Haho 2, Haho 3, Haho 4, Kpélé 2, Moyen-Mono 1, Moyen-Mono 2, Ogou 1, Ogou 2, Ogou 3, Ogou 4, Wawa 2, Wawa 3	Amou 2, Anié 1, Est-Mono 1, Est-Mono 2, Est-Mono 3, Haho 1, Haho 2, Haho 4, Moyen-Mono 1, Ogou 2, Ogou 3, Ogou 4
	Central Region	Blitta 2, Blitta 3, Sotouboua 1, Sotouboua 2, Sotouboua 3, Tchamba 2, Tchamba 3, Tchaoudjo 1, Tchaoudjo 3, Tchaoudjo 4	Sotoubou 3, Tchamba 2, Tchamba 3, Tchaoudjo 1, Tchaoudjo 4
	Kara region	Assoli2 & Assoli 3	Assoli2 & Assoli 3
Total Togo		**41**	**24**
Total		**51 communes**	**34 communes**

Potential project beneficiaries

39. Thirty-four (34) communes have been identified as the project's 'priority implementation zone' in Benin and Togo, based on their climatic vulnerability and following consultation with local authorities and other stakeholders. The selection of the actual target communes/villages and beneficiaries will be made during the start-up phase of the project in consultation with national stakeholders in both countries.

40. The population of these communes is estimated at around 2,950,120 inhabitants, of whom 52% will be aged between 15 and 59 in 2023 (projection based on national demographic growth rates). They will be directly or indirectly affected by the implementation of the activities. The table below shows the breakdown of the population of these communes by gender.

Country	Department/Region	Target communes	Total population in target communes	Male	Female
Benin	***Mono***	*Lokossa*	*148,058*	*72,330*	*75,728*
		Athiémé	*79,675*	*38,879*	*40,796*
		Grand-Popo	*81,301*	*39,831*	*41,470*
	Couffo	*Klouekanmé*	*181,399*	*83,988*	*97,410*
		Aplahoué	*241,366*	*112,394*	*128,972*
		Djakotomé	*189,060*	*87,999*	*101,061*
		Toviklin	*124,995*	*58,050*	*66,944*
		Lalo	*169,167*	*79,740*	*89,428*
		Dogbo-Tota	*145,372*	*69,527*	*75,845*
	Donga	*Bassila*	*183,506*	*91,091*	*92,415*
Total Benin			**1,543,899**	**733,829**	**810,070**
Togo	***Maritime***	*Bas-Mono 1*	*56,656*	*26,570*	*30,085*
		Bas-Mono 2	*40,386*	*18,816*	*21,570*
		Lacs 2	*43,841*	*20,905*	*22,936*
		Yoto 1	*79,132*	*37,440*	*41,692*
		Yoto 3	*55,330*	*26,127*	*29,203*
	Plateaus region	*Amou 2*	*40,936*	*20,480*	*20,456*
		Anié 1	*103,062*	*51,285*	*51,777*
		Est-Mono 1	*35,449*	*17,835*	*17,614*

Country	Department/Region	Target communes	Total population in target communes	Male	Female
		Est-Mono 2	*104,209*	*53,081*	*51,127*
		Est-Mono 3	*28,585*	*14,329*	*14,256*
		Haho 1	*122,687*	*60,529*	*62,159*
		Haho 2	*84,405*	*38,802*	*45,602*
		Haho 4	*44,976*	*22,196*	*22,780*
		Moyen-Mono 1	*47,873*	*22,194*	*25,679*
		Ogou 2	*57,576*	*28,560*	*29,016*
		Ogou 3	*53,028*	*25,945*	*27,083*
		Ogou 4	*29,716*	*14,150*	*15,566*
	Central Region	*Sotouboua 3*	*28,409*	*14,292*	*14,116*
		Tchamba 2	*66,423*	*33,799*	*32,624*
		Tchamba 3	*54,428*	*27,278*	*27,149*
		Tchaoudjo 1	*181,793*	*90,259*	*91,534*
		Tchaoudjo 4	*20,745*	*10,205*	*10,540*
	Kara region	*Assoli2*	*10,161*	*4,998*	*5,163*
		Assoli 3	*16,413*	*8,072*	*8,341*
Total Togo			***1,406,221***	***688,152***	***718,069***
Total			***2,950,120***	***1,421,980***	***1,528,139***

41. The project will directly impact an estimated 90,000 individuals, equivalent to 15,000 households. This estimate will be verified at the project's onset during the site selection process, with the support of local authorities in the region.

1.4 Climate trends in the Mono River Basin

1.4.1 *Past climate*

42. **Temperature:** The temperature in the Mono River basin has increased over the past 50 years (Figures 5 & 7). Several studies conducted in the basin indicate a significant increase in average temperature of more than 1°C with a decrease in the number of cold days and nights and an increase in the number of hot days and nights. This climate change has contributed to the amplification of the effects of drought in the Mono basin.

43. **Rainfall:** Like all of West Africa, the Mono River basin has experienced spatio-temporal instability in rainfall over the last 50 years (Figure 5b). Hydro-climatic studies carried out in the basin have shown a 14% decrease in average annual rainfall with repercussions on the river's water flow during the 1970s and 1980s. In fact, the flow of the Mono River measured at Athieme dropped from 156 m^3/s (1961-1970) to 86.6 m^3/s (1971-1990) on average, i.e. a 44% reduction. The southern part of the basin has mainly experienced abrupt rainfall decreases. But the rainfall recovery (3%) and a trend towards increased maximum daily rainfall in the 1990s led to a 60% increase in runoff in the basin. The construction of the large Nangbeto dam in 1987 modified the hydrological regime of the Mono River with abundant low flows supported by water releases and lower floods.

44. Nevertheless, the state of affairs carried out by the Mono Basin Authority (MBA) shows an overall decrease in the average Mono precipitation trend (-2.13 mm per decade) from 1961 to 2018 in the basin. Analysis of recent precipitation data over the period 2010 to 2020 (Figure 4b) shows an overall downward trend with several particularly wet years (2010 and 2019) resulting in catastrophic flooding. On the other hand, the number of consecutive dry days shows an increasing average trend in the basin with an increase rate of 3.4 days per decade.

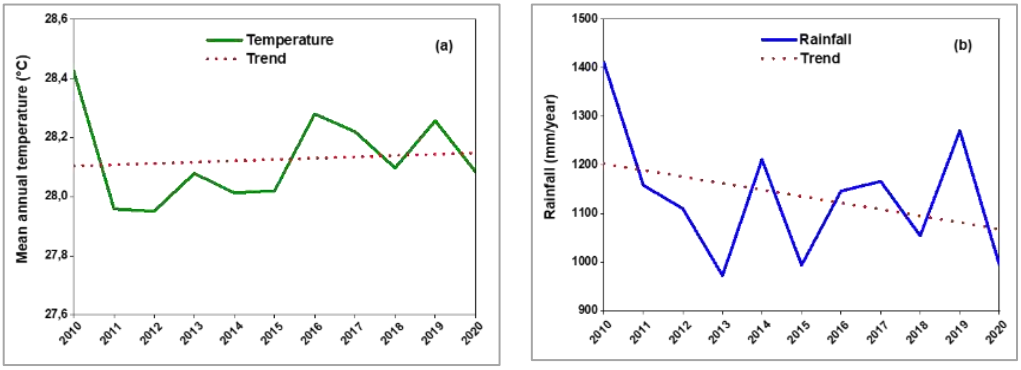

Figure 5. Temperature (a) and Rainfall trends in the Mono basin
(Data source: National Meteorological Agencies of Benin and Togo)

1.4.2 *Forecast*

45. The climate scenarios[6] carried out (RCP4.5 and RCP8.5) on the Mono basin all show a continuation of the upward trend in temperatures over the next 50 years. The greatest increases are projected in the north and part of the south (Figure 6). The projected temperature increase is estimated to be between 1 and 2°C by 2071 compared to the reference situation 1966-2015 and may reach 5°C depending on the rate of greenhouse gas emissions.

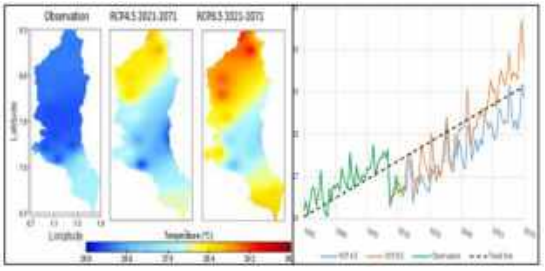

Figure 7: Spatial distribution and temperature trend in the Mono basin (source: CLIMAFRI, 2021)

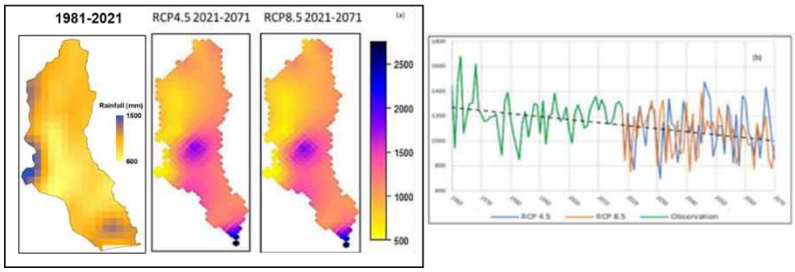

Figure 6:Past and future spatial distribution (a) and trend (b) of mean annual

46. A comparison with the period 1966-2015 indicates for the future, a potential decrease in precipitation of 20% over the entire basin (**Erreur ! Source du renvoi introuvable.**b). It is more missed in the northern part, while an increase is projected in the central part and at the outlet in the south near the coast (**Erreur ! Source du renvoi introuvable.**a).

47. Declining trends are observed when comparing past and future periods. Thus, high variability from year to year is to be expected. Also, since these trends are a 50-year average for the entire basin, changes at a specific location and in a given year may be different from the overall trend presented here. A much more in-depth analysis by climate zone or station within the basin will provide a more detailed result on rainfall by station in the future.

48. The similarities between the two scenarios could increase the likelihood that the projections will be realized. It is therefore necessary to take adaptation measures to compensate for this rainfall deficit in the future and/or to take actions to mitigate the anthropogenic effects that lead to this reduction in rainfall in the basin. By 2030, Togo and Benin could experience a sea level rise of 0.1 m and could reach 0.3 by 2050.

1.5 Impacts of climate change

49. Climate change is increasingly characterized in the Mono Basin by rainfall variability often combined with extreme climatic events that have changed in frequency and/or intensity over the past 50 years, resulting in devastating floods, droughts, storms and sudden temperature changes. Climate projections already predict an occurrence of these events that will have impacts on natural resources, ecosystems and all economic sectors.

1.5.1 *Impacts on water resources*

50. In the Mono River basin, climate change is impacting the quantity and quality of water resources. Droughts combined with other factors, notably the high demand for water, have led to a decrease in the flows of the large lakes[7] and the Mono River, with a drop in flow levels, especially in the north of the basin and downstream of the Nangbeto dam. Thus, the drying up of the Mono River has been noted during less rainy years, especially downstream of the dam, where releases are no longer assured on a recurrent basis to feed the river.

51. In addition, the intensification of rainfall in recent years has caused cyclical and catastrophic floods (between June and October), particularly the floods of 2010 affected large areas, especially in the downstream part of the basin and its lower valley, resulting in the destruction of crops, loss of agricultural and livestock products, pastoral and fish farming, massive displacement of populations and loss of human life and habitat. For example, the exceptional rains of October 2019 caused the following damage, particularly in the localities of the Mono department (in Benin) and the Maritime region (in Togo): the submergence of about 4100 hectares of land in the downstream part of the basin; about 15,000 households and more than 60,000 people in nearly 200 villages were affected; the inaccessibility and degradation of several public buildings and basic infrastructures (health centers, schools, water points, roads, etc.).

52. Flooding, particularly of homes (latrines, waste, etc.), contaminates the water, leading to water-borne diseases such as cholera. The rise in the level of the Atlantic Ocean, into which the Mono River flows, causes saline intrusion into coastal aquifers. Similarly, droughts and intense rainfall limit the recharge of groundwater, leading to a drop in the water level in wells and boreholes, especially in the Togolese part of the basin. However, recurrent flooding favors aquifer recharge in the valley and the downstream part of the basin. These climatic risks also create difficulties for households in terms of drinking water supply, especially during the long dry seasons and in the event of flooding.

53. Climate change will have consequences on the proliferation of floating plants (water lettuce, water hyacinth, etc.) due to the reduction of the flow velocity of the watercourses, the change of their temperature as well as the deterioration of the water quality. These plants provide ideal conditions for the multiplication of vectors of water-related diseases such as malaria and asphyxiate the water bodies of wetlands.

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[6] *Amoussou, E., Awoye, H., Totin Vodounon, H. S., Obahoundje, S., Camberlin, P., Diedhiou, A., ... & Boko, M. (2020). Climate and extreme rainfall events in the Mono River Basin (West Africa): investigating future changes with regional climate models. Water, 12(3), 833.*

[7] *https://www.bees-ong.org/Les-ressources-en-eau-au-Benin-face-aux-changements-climatiques.html*

54. In February 2021, the city of Anié suffered from an unprecedented water shortage. The cause was the drying up of the Anié River, which serves as a source of drinking water for the city and its surroundings. A situation which, according to local authorities, is due to climatic changes that led to the severe heat wave recorded this year. In addition to this, there is an increasing demand for water in the city.
55. Climate variability and change influence groundwater systems both directly through recharge and indirectly through changes in groundwater use. Although groundwater is less directly and more slowly affected by climate change, it is affected in a variety of ways through recharge, discharge and storage (Taylor et al., 2013). According to the ECOWAS regional climate strategy, groundwater recharge in the coastal zone is expected to decrease by 12.5 and 25% respectively by 2030 and 2050. In Togo, the impacts of climate change on groundwater resources can be seen in the early depletion of wells and water tables, saline intrusion in the terminal continental zone and a reduction in the availability of groundwater for various needs.
56. The unconfined Continental Terminal aquifer and the shallow basement aquifers that supply rural populations in the Mono basin are much more vulnerable to annual or longer droughts than the confined and deep aquifers considered to be "drought-resistant" resources. These aquifers are increasingly exposed to saline intrusion phenomena, to contamination of agricultural origin due to agricultural applications and practices, to poorly treated or untreated industrial effluents, and to domestic discharges which lead to the presence of abnormal elements in the groundwater (SDAI, 2022).
57. The results of the survey on the perception of the impact of climate change on water resources reveal that, out of 727 respondents, the impacts faced by communities are the drying up of rivers (70%) or even the disappearance of certain watercourses (26%), the drying up of ponds (54%), the drying up of wells (51%) and water shortages in the dry season (48%). Water pollution during floods was also reported, making access to drinking water difficult.

1.5.2 *Impacts on agriculture and food security*

58. Agriculture is the main source of subsistence for the populations of the Mono basin. It is highly rain-fed with the introduction of more and more irrigated and flood crops (flood recession market gardening). However, this agriculture remains very vulnerable to the effects of climate change. The frequency and intensification of droughts, resulting in longer dry seasons and a delay in the onset and duration of the rainy season, leads to drying of soils, reduced surface runoff and use of agricultural land, thus increasing food insecurity and affecting the livelihoods of communities.
59. Agriculture in the Mono basin will be highly vulnerable to climate change by 2050. According to Togo's Fourth National Communication (QCN) on climate change, the disruption of the agricultural calendar, the devastation of crops by pests, the appearance of new invasive species, the disappearance of certain cultivars, the drop in agricultural yields, flooding and the erosion of arable land will be more pronounced by 2050.
60. Essentially rain-fed, agriculture in the Mono basin will be vulnerable to disruptions to the agricultural calendar, characterised by a significant drop in rainfall at the start of the main growing season in the basin (March, April and May); a late start to the rains and a drop in rainfall (Houssou-Goe, 2008). The impact of this seasonal shift is loss of seedlings, reduced income and purchasing power, rural exodus, undernourishment (prolongation of the hunger gap), seasonal migration of farmers and so on
61. The combination of this tendency towards a late start to the season and the occurrence of extreme weather phenomena has harmful effects on agricultural activities. The populations of the localities located in the Mono basin are exposed to the effects and impacts of flooding, eroding their livelihoods, including the agricultural land and the plantations and crops they support (QCN, 2022). The assessment of damage, losses and recovery and reconstruction needs from the 2019 floods in the communes of Grand Popo, Athiémé, Lokossa and Dogbo located in the Mono basin put the damage and losses for agriculture at 12,700,411,243 CFA francs (PDNA, 2020).
62. Climate change has reduced yields of maize, the main food crop in the watershed, by about 25%. Similarly, periodic drying of the river has led to a decrease in the availability of water for irrigation, especially in some rice producing areas such as Dézé[8]. The survey of 727 people revealed that the biggest impact was in the agricultural sector, where 86% of those surveyed felt that agricultural yields had fallen. Other impacts include the abandonment of certain crops (45%) such as sorghum and rice. Rainfall deficits have also led to salinization and acidification of the land, with repercussions on agricultural productivity, mainly cotton, and the level of agricultural income of local populations, leading to a high prevalence of poverty.
63. The simultaneous increase in temperature and rainfall will lead to the proliferation of microorganisms that parasitize plants, insect pests and weeds in flooded areas. This will increase the maintenance costs of farms, reducing the income of producers and exposing the population to food insecurity, with an impact on export earnings and therefore on the Agricultural Domestic Product (ADP)[9]. In Benin, some projections predict a decline in agricultural production of around 23% by 2020[10] in conjunction with a continued decline in rainfall. Projected impacts relative to the baseline (1981-2010) show a decline in maize EVDT yields of 16.7% and 8.9% by 2030 and 2050 respectively. Cowpea yields could decline by 26.7% in 2030 and 26.1% by 2050. For groundnuts, the projections suggest a decline of about 2.5% by 2030, while by 2050 the outlook is more favorable for yield improvement, with a rate of about 6.4%.

[8] *Jean GUEDESSOU (2009). Enjeux des changements climatiques dans la mise en œuvre du projet d'aménagement hydroagricole de la basse vallée du fleuve Mono. 14è colloque international de l'IEPF et du SIFEE, Niamey 2009*
[9] *Gouvernement du Togo, 2018 : TCN*
[10] *AKPONIKPE, 2019 Etude de Vulnérabilité aux changements climatiques du Secteur Agriculture au Bénin. Report produced under the project "Projet d'Appui Scientifique aux processus de Plans Nationaux d'Adaptation dans les pays francophones les moins avancés d'Afrique subsaharienne", Climate Analytics gGmbH, Berlin.*

64. In Togo, projections on the impacts of climate change predict losses of between 5 and 10% of maize and rice production by 2025 and 2100. This means losses of between 6.16 and 87.6 billion CFA francs for maize and between 1.4 and 58.5 billion CFA francs for rice for the same period.

65. In addition to flooding, drought causes losses for the agricultural sector in the Mono basin. The Togo QCN on climate change reveals that yield losses caused by pockets of drought were very high in 2014 in the Plateaux region, which is partly covered by the Mono basin: 0.8t/ha for maize, 1.2t/ha for millet/sorghum and 1.1t/ha for yam. In 2015, the situation worsened for maize and rice, with estimated losses of 1.3t/ha and 1.0t/ha respectively. Benin's National Climate Change Adaptation Plan reports that, while the indicators of rainfall variability observed over the past two decades or so generally relate to a marked delay in the actual onset of rainfall, the occurrence of long dry spells, and a significant reduction in rainfall events, in a scenario where these risks persist or increase, agricultural production could be seriously affected. Yields will fall by between 8.9% and 28.8% depending on the maize variety, by more than 26% for all cowpea varieties by 2050, and by around 2.5% for groundnuts by 2030. Cotton yields will fall by 0.9% in 2030 and 6.3% in 2050

66. All of these phenomena, exacerbated by demographic growth and the overexploitation of natural resources, will continue in the future and even increase if appropriate measures are not implemented.

1.5.3 *Impacts on livestock*

67. The water resources of the Mono Basin are also used to raise large livestock, especially during periods of drought, but mainly small livestock (poultry, pigs, goats and Cane rat) used as a source of income by many households, particularly the Peulh. Unfortunately, this sector is also affected by the effects of climate change, resulting in a decrease in livestock production and several other indirect losses. Some of the effects of climate change on livestock include heat stress and cold, increased disease, and decreased food, feed, and water.

68. In the Mono basin, flooding is causing a loss of livestock. The survey carried out to assess the damage and losses linked to the 2019 floods in the livestock sub-sector revealed that the communes of Lokossa, Athiémé, Grand-Popo and those of Aguégués, Dangbo, Adjohoun and Ouinhi were the worst affected by the floods (PBNA; 2020). The proliferation of water-borne diseases and the deterioration of watering infrastructures have also been identified as impacts of flooding.

69. In Benin, increasingly long dry spells are causing scarcity of grazing and intensification of transhumance, increased soil degradation, and consequent decline in livestock productivity. These climatic events, as well as the frequent floods, directly lead to animal mortality, the proliferation of water-borne diseases and the degradation of watering infrastructures (wells, boreholes). This has obvious economic repercussions on the lives of the affected populations (poverty, food insecurity, low income, migration of the population, etc.). Future impacts include the prevalence of diseases such as foot-and-mouth disease, pests of small ruminants, lumpy skin disease, and the spread of ticks of the genus Rhipicephalus Boophilus microplus, as well as the drastic loss of livestock.

70. In Togo, increased rainfall and temperature will result in increased mortality and abortion rates in herds, proliferation of vectors and diseases, and reduced forage quality. The availability of forage and the development of domestic transhumance could be affected by seasonal variations. This situation will have a strong impact on the availability of meat products in the country and will lead to the impoverishment of those working in the processing of these products. The decrease in the availability and quality of fodder and the development of internal transhumance will exacerbate conflicts between herders and farmers.

71. The drying-up of pastures is a direct problem for livestock farming, which is not spared the adverse effects of global warming and climate change. Indeed, according to local people, climate change is causing regular and persistent plagues (40%), the appearance of new epizootics (37%), and a reduction in calving (21%) due to the recurrence of successive diseases affecting livestock and poultry, with the general consequence of a reduction in the number of livestock noted by 62% of those 727 surveyed.

1.5.4 *Impacts on fishing*

72. Fishing, the main activity of the Mono floodplain populations, is also subject to the effects of climate change. The change in water temperature has an impact on their growth rate, the seasonality of reproduction as well as on the overall mortality rate of marine animals. Thus, the increase in temperature will lead to a decrease in the volume of fishery products such as fish, shrimp and crabs.

73. The level of rivers plays an important role in the reproduction of aquatic species, so low rainfall prevents the upwelling of fish, for example, in the arms of rivers for egg laying. This threatens the extinction of certain fish species and consequently the yields and production of fish with impacts on the income of the actors in the field, in particular women, and on the nutritional needs of the populations (malnutrition).

74. In Benin, the future impacts of climate change on the fisheries sector indicate a high rate of fish mortality and the loss of ecological habitats for fish species.

75. In Togo, the rise in sea level associated with the increase in temperature may cause some fish species to migrate to deeper waters and a decrease in the volume of pelagic resources. The rise in sea level will lead to a permanent intrusion of salt water into the rivers with the consequence of migration and a decrease in the productivity of certain fish species such as fish, shrimp, crabs, etc. Togo's National Climate Change Adaptation Plan predicts major disruptions to fish productivity cycles, salinisation of freshwater bodies and a high mortality rate among fry. Similarly, the increase in the temperature of the warm marine surface layer could lead to frequent migrations of certain species of fish to deeper waters and a reduction in the volume of pelagic resources.

76. People whose main activity is fishing and whose homes are close to rivers in the Mono basin are doubly affected by flooding. When their homes are flooded, they are forced to move away from the fishing grounds they have built, exposing them to major economic difficulties. Flooding is nevertheless an opportunity for the development of fishing activities.
77. People regret the decline in fishery resources (37% of those surveyed) and the disappearance of fishing-related income-generating activities (9%).

1.5.5 *Impacts on ecosystem services*

78. The Mono basin has a wide variety of ecosystems and landscapes, some of which are classified as biosphere reserves under UNESCO's MAB programme (the Mono transboundary biosphere reserve, which includes the Mono delta, and the Togodo Sud reserve).
79. Logging, saltwater intrusion into the Mono River and freshwater lakes, and pollution, linked to the effects of climate change, have contributed to the overall degradation of ecosystems in the Mono River basin. Droughts and floods, which either dry up or fill in ecosystems, affect the provision of ecosystem services. The submergence of ecosystems by flood waters modifies the habitats and ecology of certain animal and plant species by altering the ecological parameters that are conducive to their development.
80. The often recurrent and persistent droughts have pushed the populations to occupy wetlands three of the Ramsar sites for the practice of agricultural and breeding activities. These practices generate conflicts between transhumant herders and agricultural producers on the one hand, and conflicts between producers and hippos on the other hand, who once they leave the water have no other choice but to feed in the fields. These areas are thus subject to degradation resulting in the silting up of rivers and water bodies, the disappearance of certain protected animal species (hypopotamuses, etc.), and the reduction of more than 60% of forest and savannah tree formations (including classified forests). Apart from this, flooding also has an impact on ecosystems in the basin. According to 38% of respondents, flooding causes erosion and degradation of riverbanks, as well as river pollution. For 35% of respondents, flooding accelerates the silting-up and silting-up of wetlands, accompanied by their invasion by helophytes such as Typha.
81. Under the SSP126 and SSP585 scenarios, there will be an increase in species mortality by 2100 because of increased water stress. Particularly for the gallery forests of the rivers upstream of the dam, such as the Anié, Mono and above all the Ogou and their tributaries, the drop-in flow rates by 2100 will inevitably lead to their degradation.
82. In Benin, the major climatic risks with the highest impact on forest ecosystems (all plant formations combined) and on riparian communities are floods, heavy rains and drought. Among the livelihoods most at risk from flooding, heavy rains and drought, small-scale foresters and managers of traditional agroforestry parks are most at risk. Future impacts include dieback of gallery forests, physiological and ecological dysfunction of some forest ecosystems, decline in populations of characteristic woody species (Dialium guineense, Sclerocarya birrea, Afzelia africana, Diospyros mespiliformis, Daniellia oliveri, etc.), and changes in the stand structure of some plant and animal species.
83. Benin's national adaptation plan mentions the decline of gallery forests, the physiological and ecological dysfunction of certain forest ecosystems, the decline in populations of woody species and the modification of the population structure of certain plant and animal species as the main threats posed by climate change to forest ecosystems. The Fazao-Malfakassa, Abdoulaye and kpessi wildlife reserves, and the classified forests of Amou-Mono, Tchilla Monota, Sotouboua, etc. will potentially be affected. By affecting several forest and fruit species with high economic potential, according to the plan, this decline will have economic, environmental and socio-economic impacts.
84. In Togo, flooding resulting from increased rainfall could reduce the productivity of natural wood formations. The intrusion of salt water into rivers as a result of rising sea levels could affect the productivity of mangroves. The decrease in the national wood potential due to the decrease in the productivity of natural formations (forests, savannahs, mangroves, etc.) will lead to energy deficits, especially at the household level, and an increase in the price of wood products. The increase in the price of wood products will have an impact on the remaining forest formations and on the income of the populations. Togo's fourth national communication on climate change indicates that the vulnerability index of ecosystems to stressful climatic factors is high in two of the 3 regions covered by the Mono basin in Togo. Forest ecosystems will be further threatened by the occurrence of dry sequences, increased water stress and the risk of vegetation fires. This will result in the mortality of young seedlings planted during reforestation, the intensification and increased frequency of vegetation fires, leading to the savannisation of forest ecosystems, the loss of biodiversity, a fall in forest productivity, the loss of forest cover, and so on. Issifou et al (2022) estimate that 4.20% of species are threatened in the Mono basin.
85. The drop in rainfall and flow rates and the rise in temperatures will lead to the decline or even disappearance of aquatic species. The watercourses upstream of the Nangbéto dam and the Amou and Chra tributaries downstream will dry up much more than the river Mono in its downstream section. Ponds and lakes will see their water levels drop and their ecosystems degraded. In the specific case of mangroves with high economic potential, the recurrence of flooding in the near future will lead to seasonal dulcification of the water in these ecosystems instead of daily dulcification by the tides.

1.5.6 *Impacts on energy*

86. Energy production, one of the main objectives of the construction of the Nangbeto dam in the Mono basin, requires a certain level of water in the reservoir. However, this level can drop drastically several times during the year due to climate change, resulting in interruptions in electricity supply. Cyclical flooding affects the infrastructure (sites and power plants, networks, etc.) of energy production.
87. Climate change impacts also affect line losses due to heating of the electricity transmission and distribution network, disruption in the operation of certain infrastructures such as power grids, reduced efficiency of solar photovoltaic panels,

and the scarcity of biomass resources. The vulnerability of the biomass and hydroelectricity sub-sectors will de facto lead to a decrease in energy supply in relation to demand and should increase hydrocarbon consumption.

88. The impacts include difficulties in obtaining supplies of wood energy, affecting various sectors of activity, both small-scale and industrial, which have significant energy needs. The main direct impact of this phenomenon is the reduction in production from the Nangbeto dam of 20 KWh/year between 1987 and 2016 due to the 45% reduction in water flow at Nangbeto. This situation will worsen in the future as a result of climate change/variability.

89. The supply of wood energy in the Mono Basin, especially in the Maritime region, would become almost impossible by 2025, 2050, 2075 and 2100. Both artisanal and industrial sectors of activity with significant energy needs to ensure an acceptable level of operation would be affected. The increase in expenditure due to an increase in hydrocarbon consumption should make the transport sector economically vulnerable. The availability of biomass energy, the main source of energy for households, would be seriously compromised in the coming decades. Women would be most at risk as they are directly involved in the collection and use of biomass energy. The trade and catering sectors will also be affected.

1.5.7 *Impacts on navigation*

90. River transport on the Mono River is mainly by dugout canoe in the landlocked areas. However, the decrease in rainfall leading to the cessation of the flow of the river and the drop-in water level in some places, the progressive silting up of the rivers downstream and the drought make navigation difficult. The silting up of rivers downstream and the invasion of open water by floating aquatic plants, which is exacerbated by the drop-in flow rates due to climate change, are also making navigation difficult on the Mono.

1.5.8 *Impacts on tourism*

91. The major climatic risks affecting tourism in the basin are flooding, high water, excessive heat, sea level rise and high winds. The submergence/disappearance of habitats or hotel infrastructures in the coastal zone, the drop-in tourist activity linked to extreme climatic conditions, the disruption of the activities of tour operators, the drop in the number of visitors to tourist infrastructures or sites, the drop in the activity of guiding tourists, constitute the climatic impacts observed throughout the basin. In terms of projection, the impacts of climate change on the tourism sector indicate the decrease in tourism revenues, the loss of terrestrial and marine biodiversity, the loss of aesthetic value of landscapes or tourist sites, the disappearance of sandy beaches related to the combined effects of sea level rise and other phenomena such as coastal erosion and the loss or destruction of tourism infrastructure built near the coast. The socio-economic consequences envisaged include loss of jobs and impacts on living standards and reinvestment in the development of new tourism infrastructure at the Coastal level.

1.6 Increasing competition and growing potential conflicts

92. Conflicts arise between various users of the basin's water resources:

- Conflicts **between farmers and herders**: Conflicts between farmers and herders around water bodies are very frequent in the Mono basin. These are generally transhumant herders. During the off-season, in some villages, groups of young people even organize themselves to watch over their market gardening operations during the night at the edge of the water bodies.
- Conflicts **between fishermen**: Around Lake Ahémé, for example, conflicts are due to: i) the use of fishing techniques and gear that catch small fish and limit the access of some fishermen to the lake's fishery resources; ii) the use of weirs that prevent marine fish from going upstream to the localities further upstream; iii) the use of fine mesh nets throughout the water body, which only accentuates the decline in fish productivity in the lake; iv) the use of unbaited longlines, which are devastating to the fishery resource and constitute a danger for the fishermen themselves.
- Conflicts **between the populations** affected by the floods and the Electrical Community of Benin: they are related to the floods recorded in the lower Mono valley following the opening of the sluice gates (water releases) to evacuate the overflow from the reservoir, in order to reduce the pressure on the dam dike during the floods. The authorities of the communes concerned, particularly Athiémé, complain about this situation but have never been able to find a lasting solution with those of the Electrical Community of Benin.

1.7 Vulnerability assessment and adaptation measures in the MRB: Natural risk prevention and adaptation measures

93. Both Benin and Togo, making this request, relate to the same agro-climate/ecological area that is one of the area's most prone to climate change[11]. They have developed the required tools and implemented various actions to adapt and strengthen the resilience of populations. These include NAPAs and NAPs, which are the reference documents for political and strategic guidance. The different sector agendas (resources in terms of resilience development must be aligned with these documents).

94. The impacts of climate parameters over the last ten years (2010-2020) show that the effects of climate change/variability observed since the severe droughts (1970) are still present. This climate change is marked mainly by an increase in the intensity of daily rainfall, an increasingly frequent return of torrential rains, frequent pockets of drought and a global trend

[11] *Sylvia Szabo et al. (2016). Making SDGs Work for Climate Change Hotspots. Environment: Science and Policy for Sustainable Development 58:6, pages 24-33.*

toward a decrease in rainfall and an increase in temperature, which has made the Mono basin particularly vulnerable. This vulnerability is mainly characterized by the degradation of the basin's ecosystems, even in protected areas, the variability of flows resulting in the recurrent drying up of the Mono River in the upstream part of the basin, and frequent floods, the most recent of which was in 2019. These floods represent a major risk for the local population. Indeed, the 2010 and 2019 floods caused significant material and human damage (section 1.5.1) and also led to the loss of livelihoods, increasing dependence on global food aid.

95. The revised Nationally Determined Contributions (NDCs) (October 2021) of Benin and Togo have also assessed the current vulnerability of these two countries where the Mono river basin is located. According to these NDCs, the major climatic risks that impact livelihoods in the agriculture, water resources, coastal and forestry sectors are drought, floods, late and heavy rains, high winds, excessive heat and sea level rise. Over the past three decades, these have had a number of impacts, including reduced agricultural yields, disruption of agricultural calendars, lower water levels in drinking water dams, extended low water periods, sinking of river banks, etc. With regard to future vulnerability, the climate risks to which natural and human systems could be exposed are part of a scenario of persistence or accentuation of the risks currently observed and depend on the sector considered. The potential impacts, according to the climate projections for the 2025, 2050- and 2100-time scales, range from coastal flooding and salt water intrusion into rivers and water tables to a drop in maize yields in certain agro-ecological zones (notably ZAE5). Priority actions are identified and implemented in the two countries in order to contend with these risks in the different sectors, these are:

- Implementation of irrigation plans and definition of mechanisms for their sustainable management, taking into consideration climate change adaptation.
- Promotion of sustainable and resilient climate-smart agriculture through increased planting, staggered and repeated sowing, anti-erosion management, use of short-cycle varieties, modification of sowing order, development of lowlands, installation of artificial ponds, crop diversification, and introduction of new crops; market gardening; increasing agricultural land; off-season cultivation.
- Development of national plans for the mitigation and adaptation of water resources to climate change.
- Knowledge improvement and monitoring of the linkages between water, environment, and climate change.
- Designation of local policies and local water and climate change-related risk prevention plans.
- Search for sustainable funding for the implementation of priority actions.
- Coordination of the fight against water-related risks at the local level and strengthening of local capacities in this fight.
- Reforestation and Soil restoration.
- Reinforcing house foundations against flooding.

96. It is worth noting that the implementation of these measures is still quite inadequate, and the results need significant investments to achieve the expected objectives. In this respect, the BOUCLIER-CLIMAT project will contribute to the implementation of these adaptation measures for the benefit of the most vulnerable communities and to their reinforcement. These adaptation measures will build on the experiences of the past and their teachings, they will also emphasize the integrated, qualitative and quantitative, management of water resources. This integrated approach will consider other vulnerable sectors, including agriculture, livestock, fisheries and ecosystem services.

2. The project's objectives

97. The overall objective of the project is to strengthen the resilience of vulnerable communities in the Mono River Basin through building adaptive capacity to the risks of recurrent flooding and promoting the sustainable and equitable use and management of water resources and related ecosystems.

98. The specific objectives of the project are to:

- Ensure the long-term monitoring of climate risks through the production of reliable scientific data and information, at local, national and transboundary levels in the Mono River Basin;
- Develop and implement a regional flood early warning system for vulnerable community's disaster risk reduction;
- Implement concrete adaptation actions to build the resilience of the most vulnerable communities;
- Strengthen the institutional and technical capacities of the MBA and its stakeholders.

3. Components and financing of the project

99. The table below presents the three (03) components according to which the BOUCLIER-CLIMAT project will be implemented. Their proposal is based on the set objectives, and they translate into the set of actions to be carried out in order to contribute to meeting the challenges of strengthening the adaptation and resilience of communities vulnerable to the impacts of climate change in the Mono basin. For each of them, expectations have been formulated in terms of results and a budget has been defined for each of the expected outputs.

Table 2. Project components, expected outcomes, outputs and financing

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)	%
C1: Setting up/strengthening tools for climate change resilient management of the Mono River basin	Outcome 1.1: Establishment of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) for effective flood management in the Mono River basin	Output 1.1.1: Mono-RCbFEWS designed and validated	Benin and Togo	200,000	2%
		Output 1.1.2: Mono-RCbFEWS functional and deployed	Benin and Togo	1,400,000	12%
		Output 1.1.3: Disaster emergency management plans set up and operational	Benin and Togo	500,000	4%
			Subtotal component 1	**2,100,000**	**18%**
C2: Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures	Outcome 2.1: Enhanced resilience of water resources to the impacts of CC and overexploitation	Output 2.1.1: The availability of water resources (quantity and quality) improved and their use rationalized	Benin and Togo	2,490,000	21%
	Outcome 2.2: Preservation of Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) through effective implementation of adaptation measures against the impacts of climate change	Output 2.2.1: Basin ecosystems, especially those in RAMSAR areas, rehabilitated and preserved	Benin and Togo	2,010,000	17%
	Outcome 2.3: Implementation of adaptation measures for the benefit of the population	Output 2.3.1: Agricultural resilient practices adopted and enhanced	Benin and Togo	1,000,000	8%
		Output 2.3.2: Improved and sustainable fishing is supported	Benin and Togo	750,000	6%
		Output 2.3.3: Resilience and adaptive capacities of populations to Climate Change improved by installing value chains of agricultural and fishery products	Benin and Togo	2,500,000	21%
			Subtotal component 2	**8,750,000**	**74%**
C3: Strengthening the capacities of different actors, sharing knowledge and raising awareness among all beneficiaries at different levels	Outcome 3.1: Mobilized and sensitized stakeholders through communication and capacity building activities	Output 3.1.1: Practitioners, technicians, extension agents and decision-makers sensitized and trained on technical and environmental aspects of the project	Benin and Togo	360,000	3%
		Output 3.1.2: Communities in target areas sensitized and trained on climate change resilience and EWS issues.	Benin and Togo	330,000	2.7%
		Output 3.1.3. BOUCLIER-CLIMAT/Mono project results and lessons learned disseminated and shared	Benin and Togo	310,000	2.6%
			Subtotal component 3	**1,000,000**	**8%**
			Activities budget (A)	**11,850,000**	**100%**
			Project Execution cost (B)	1,060,000	8.9%
			Total Project Cost (A+B)	12,910,000	-
			Management Fee charged by the Implementing Entity (C)	1,090,000	8.4%
			Total (A+B+C)	**14,000,000**	

4. Project calendar

100. The implementation period for the BOUCLIER-CLIMAT project is 5 years (60 months). Given its current level of formulation, the main steps and the projected schedule for the preparation and implementation of the project are presented in the table below

Milestones	Planned dates
Start of project implementation	October 2024
Mid-term review (if scheduled)	December 2027
Project closure	June 2029
Terminal evaluation	November 2029

PART II PROJECT JUSTIFICATION

A. Description of the Project components

101. The major ambition of this project is to strengthen the resilience to climate change of vulnerable communities in the transboundary Mono River Basin, through the implementation of various adaptation actions on the ground and the strengthening of the technical and institutional capacities of key stakeholders in the basin (MBA, technical institutions, NGOs, populations and users, etc.). The main actions to be deployed in the field will eventually lead to a significant reduction of the impacts of major climate hazards in the basin, in particular cyclical floods, to the improvement of the livelihoods and living conditions of the populations as well as to the implementation of integrated management of water resources and associated ecosystems. For a better efficiency/effectiveness, the BOUCLIER-CLIMAT project will be implemented following a regional approach which is meant to be participatory and inclusive with the involvement of all the stakeholders of the basin, especially since it is a common and shared space requiring synergy of actions between the two countries.

102. The project is organized around three components, the expected outputs and outcomes for each component as well as the planned activities to achieve the project objectives. The section below present details on the components, outcomes and activities.

Component 1: Setting up/strengthening tools for climate change resilient management of the Mono River basin (US$ 2,100,000).

103. The objective of this component is to operationalize **a modern and efficient Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS)** at the basin level. This Mono-RCbFEWS, which will be the first system at the basin level, and will be designed in conjunction with the existing regional, national and local systems in this area. In addition to the design of the prototype of the Mono-RCbFEWS and its deployment, the achievement of the component' objective will also require the strengthening of the networks and systems for monitoring and collecting reliable hydro-climatic data and information in real time to support the effective operation of the Mono-RCbFEWS. In this regard, the project will contribute to the establishment of the required infrastructure that will host the Mono-RCbFEWS and particular emphasis will be placed on the acquisition of modern/innovative tools, materials and/or equipment and on the strengthening of the capacities of the actors in their use and maintenance. Similarly, the interventions required in terms of strengthening the technical and institutional capacities of the actors will be deployed to ensure optimal functioning of the Mono-RCbFEWS as well as its sustainability. Also, to note that through the different initiatives funded by the Adaptation Fund, OSS has gained extensive experience with regional, national, and local procedures and regulations related to the implementation of early warning systems in West Africa. Based on this and in order to ensure complementarity, sustainability and the efficient use of the available data, the OSS will support the implementation of this component.

Outcome 1.1: Establishment of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) for effective flood management in the Mono River basin

104. The implementation of a regional EWS will be done through a regional participatory and inclusive approach aiming at involving the different stakeholders (institutions, communities, NGO's, etc.) to develop an operational system that increases the resilience of the vulnerable populations and ecosystems to the impacts of climate change as well as the resilient management of the Mono River basin, but also linking the local level (population livelihood) to the national and regional levels (policy and strategy).

105. In addition to the direct beneficiaries on the ground, the design and implementation of the Mono-RCbFEWS will involve different categories of actors at the regional and local levels as well as different sectoral technical departments responsible of water, environment, meteorology, civil protection, etc. in the two countries. The different outputs and activities planned for the achievement of Outcome 1.1 are described below.

Output 1.1.1: Mono-RCbFEWS designed and validated

106. By combining the historical records and continuous collected near real-time records, the Mono-RCbFEWS will generate flood risk maps showing the hotspots reflecting the most vulnerable area to flood. This information gives insight about the risk level and extent to mitigate damages to properties and human lives and strategize the development of emergency plans and support therefore data-driven decisions.

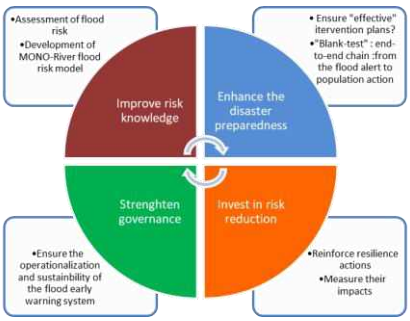


Figure 8. Overview of Mono-RCbFEWS architecture

107. To date, there is no formal regional early warning system for concerted management of the risks. Each country has its own national early warning system, even though these are still rudimentary and require significant improvement. The development of this Mono-RCbFEWS, which will be based on the existing national ones, will consider the aspirations of the two-member states and will be accompanied by a global operation and maintenance plan..

108. Therefore, the project will capitalize the existing by undertaking the diagnosis of existing flood early warning system and analyze their possible interactions between the Mono-RCbFEWS, map the parties to be involved in the development of emergency response plans and define and operationalize the channels to alerts disseminations for communities.

109. The activities planned within this framework are the following:

- **Activity 1.1.1.1: Carry out an inventory of early warning systems (EWS) and national/regional warning plans for hydro-climatic hazards and establish a detailed technical assessment of functioning and operability (data, models, etc.) and institutional (governance, etc.).** This activity involves inventorying early warning systems (EWS) and national/regional warning plans for hydro-climatic hazards, assessing their technical and institutional aspects. This includes evaluating existing EWS, operational models, vulnerability assessments, and alert thresholds. The assessment aims to inform actions for EWS improvement, operational plans, model selection, and data requirements. Additionally, it involves evaluating existing infrastructure to enhance the reliability of meteorological and hydrological data for proactive flood risk management. Mapping stakeholders for disaster response and defining dissemination channels for flood alerts are crucial steps to ensure timely communication and community preparedness. This process involves stakeholder engagement, capacity building, and testing of communication protocols tailored to local communities in the Mono basin.
- **Activity 1.1.1.2: Develop a prototype of Mono-RCbFEWS at the basin scale in connection with the national and local devices and define the investments to be carried out (data production, equipment, etc.) using the supporting tools (modeling, flood forecasting), web platform, etc.** This activity aims to develop a prototype of the EWS to be implemented at a basin-scale, aligning with national and local systems and defining the required investments. The system integrates essential components for timely flood forecasts and risk information dissemination, ensuring anticipation, response, and intervention. The development process will involve a participatory approach, considering gender perspectives, cultural diversity, and regional dimension, and incorporating existing EWS. Structured around four components inspired by UNISDR recommendations, it focuses on i) flood risk knowledge, ii) monitoring and warning, iii) response capability, and iv) dissemination and communication. These components will ensure timely alerts, multi-level data access, and community engagement, enhancing preparedness and resilience.
- **Activity 1.1.1.3: Ensure the institutional anchoring of Mono-RCbFEWS at the regional and national levels, including community aspects to be integrated at different levels of alert management and the feedback mechanism.** Through this activity and to ensure a robust anchorage of the EWS, the project will undertake various actions including measures such as developing policies and legal frameworks, establishing a steering committee, conducting capacity building and training programs, engaging local communities, implementing multi-level alert management, establishing effective information dissemination and feedback mechanisms, and implementing a monitoring and evaluation framework to ensure effectiveness and sustainability. These efforts aim to ensure community involvement, system reliability, and long-term sustainability of the flood early warning system.
- **Activity 1.1.1.4: Validate the studies and the Mono-RCbFEWS prototype by the project stakeholders through workshops (2 national workshops and 1 regional workshop).** This Activity involves validating the studies and the Mono-RCbFEWS prototype through workshops, including two national workshops and one regional workshop. The first national workshop targets key stakeholders to present study findings and gather feedback on flood risks and EWS design. The second national workshop demonstrates the prototype, gathers usability feedback, and discusses integration with existing systems. The regional workshop involves representatives from regional bodies and aims to gather feedback on regional applicability and customization needs. These workshops ensure stakeholder input in refining the prototype and enhancing its effectiveness and acceptance.

Output 1.1.2: Mono-RCbFEWS is functional and deployed

110. To confirm the functionality and deployment of the Mono-RCbFEWS, and to ensure its effectiveness and sustainability, modern tools and equipment will be procured and set up alongside reliable hydro-climatic data in real time. Institutional and regulatory mechanisms will be strengthened, with three levels of intervention established:

- Strengthening existing Local Early Warning Units in vulnerable areas, supported by community relays.
- Involving national EWS actors through National Coordination Units in each country.
- Establishing a Regional Early Warning Coordination Unit within the Mono Basin Authority, facilitating coordination between national units, supporting their activities, and managing the Mono Basin Observatory.

The figure below provides an overview of the planned organization for the operationalization of the Mono-RCbFEWS.

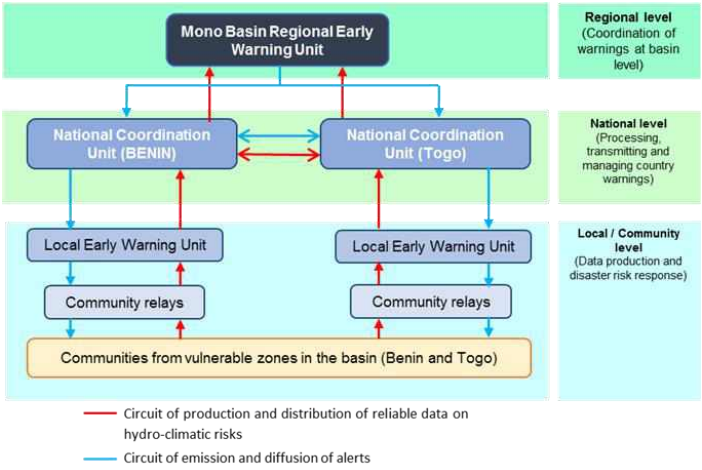


Figure 9: Organizational device for the management of the Mono-RCbFEWS

111. In this regard, the following activities are proposed for the achievement of this output:

- **<u>Activity 1.1.2.1:</u> Acquire and set up remote monitoring/surveillance stations (hydrometric, meteorological, water level gauges, piezometers, real-time remote transmission system, etc**.). Based on the validated recommendations on strengthening the already existing networks resulting from the national/regional consultation carried out in Activity 1.1.1.1, the project foresees to strengthen and upgrade the existing equipment with sensors and telemetry modules as well as the acquisition of new hydro-mets stations where required. The sensors include, but not limited to, canal/rivers water level sensors, pumping station sensors at sewage and drainage pumping stations, rain gauges station at key vulnerable locations not covered by the existing network. It's important to note that the technical specifications of the equipment to be acquired will be validated by the beneficiaries prior to their acquisition. Once the equipment and materials have been acquired, the capacity of the targeted national hydrometeorological services will be strengthened for their use.
- **<u>Activity 1.1.2.2:</u> Construct/renovate and equip EW information centers with deploying equipment: IT equipment (servers, processing units, software, GPS, etc.).** Through this activity the project will involve constructing/renovating and equipping Early Warning (EW) information centers with necessary IT equipment for deploying the Mono-RCbFEWS according to the selected prototype. The EWS center will be the main component that will host the coordination unit and all the equipment required for the smooth running of the Mono-RCbFEWS. The new premises will also be utilized for trainings, alerts management , data collection and information sharing on the flood risks and other climate hazards.
- **<u>Activity 1.1.2.3:</u> Acquire tools and materials to broadcast the warning messages to the population.** This activity involves the procurement of essential tools and materials required for effectively broadcasting warning messages to the population. This encompasses a range of items such as beacons, flags, sirens, signaling devices, speakers, telephones, local radio equipment, motos and vehicles. The aim is to ensure that the necessary infrastructure is in place to promptly and efficiently disseminate crucial alerts and information to the community in times of emergencies or impending threats.
- **<u>Activity 1.1.2.4:</u> Produce and disseminate the warning messages (bulletin, maps, radio message synthesis, SMS, digital media).** The aim of the activity is to effectively communicate critical information regarding risks and ensure that the message reaches the target audience promptly and comprehensively. Flood alerts will be disseminated through various channels including radio, TV, mobile phones, and a web platform, with standardized procedures and a well-defined dissemination chain ensuring timely delivery. Training sessions will facilitate technology transfer and capacity building. The system will be set up in collaboration with national services and the Mono Basin Observatory.
- **<u>Activity 1.1.2.5:</u> Develop/revise water information sharing frameworks at regional and national levels and implement an action plan to operationalize them.** This activity aims to enhance the exchange of water-related information to better respond to and mitigate flood risks. This activity involves establishing a network of experts in Benin and Togo, as well as at the regional level within the Mono Basin. This network will bring together professionals, researchers, and other stakeholders involved in water management, flood control, and disaster management. The network will be equipped with an action plan detailing specific steps, deadlines, responsibilities, and resources required for the establishment, operationalization, and effective maintenance of a centralized platform facilitating data exchange among stakeholders. This platform will be created and managed by the Mono Basin Observatory with the support of OSS and GWP-AO.

Output 1.1.3: Disaster emergency management plans are set up and operational

112. Emergency management plans are essential tools for the operationalization of Mono-RCbFEWS. As such, to support the deployment of Mono-RCbFEWS, a contingency plan consisting of an operational manual/tool will be developed that will essentially provide guidance for preventing, protecting against and managing the impacts of flood disasters in the basin. As with the design of the Mono-RCbFEWS, this plan will consider existing national/regional contingency plans and

involve the participation of all stakeholders. The contingency plan will consider regional, national and community dimensions and will include a detailed disaster and emergency management procedure. It will target the different environmental and socio-economic components affected by disasters (humans, animals, crops, etc.). The required trainings and different awareness sessions will reinforce the ownership of the emergency plan actions by the beneficiaries.

113. The planned activities are described below:

- **Activity 1.1.3.1: Develop and/or update warning emergency and resilience plans for communities facing hydro-climatic risks.** The activity aims to create or update community resilience plans that incorporate measures for adapting to hydro-climatic risks and reducing risks associated with climate change. A participatory and inclusive approach will be used to identify and prioritize necessary actions and the roles of stakeholders to be considered in these plans. They will be developed with local expertise.
- **Activity 1.1.3.2: Monitor the EWS, feedback mechanism and its contingency plans.** This focuses on developing manuals for coordinating flood responses, mitigation plans, and assessing organizational interoperability to ensure effective alert dissemination and community involvement. A monitoring and evaluation unit will oversee system performance using defined key performance indicators, with data collection and feedback mechanisms to ensure swift responses. Contingency plans will be developed accordingly. Regular drills will test the effectiveness of feedback and contingency plans, while community engagement and training will enhance system sustainability.
- **Activity 1.1.3.3: Implement blank operations (Tests) to validate the different components of the Mono-RCbFEWS.** The Mono-RCbFEWS generates timely flood risk warnings for increasing local communities' resilience. In order to assess its effectiveness, it's foreseen to implement two blank operations at the regional and national level to validate its different components where end-to-end early warning system for flood forecasting will be tested. This activity will include also the capacity building for local communities on participatory risk assessment, the development of community-based manuals, flood risk maps and emergency plans. The simulation involves the different parties and is expected to allow improved coordination and collaboration with the different stakeholders and communities' representatives.

114. The regional operation validates system components and assesses effectiveness in a controlled scenario, evaluating data collection, forecasting models, warning dissemination, and response mechanisms. Similarly, the national operation evaluates system integration, scalability, and response mechanisms across regions or the entire countries. Feedback from stakeholders informs improvements, aiming to replicate success in other flood-prone communities to enhance resilience.

Component 2: Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of CC through concrete adaptation measures (US$ 8,750,000).

115. This component aims to undertake concrete adaptation actions to improve ecosystems' and communities' resilience to climate change impacts. It involves identifying vulnerable areas, restoring land, constructing water retention structures, improving water supply, implementing income-generating activities, and providing capacity-building. Local labor will be emphasized for employment, with community involvement and gender considerations integrated. National and regional workshops will gather stakeholder input.

Outcome 2.1: Enhanced resilience of water resources to the impacts of CC and overexploitation

116. The resilience of water resources determines the resilience of all the sectors that rely on them, as they are essential for the development of the life and economic systems of the basin. According to the report of the preliminary study on vulnerability to climate change, water is one of the most vulnerable sectors to climate change, affecting local communities and their socio-economic development in the Mono Basin. Therefore, a specific objective of the project will be to identify and further analyze the vulnerable areas of the basin, and to implement measures and actions to strengthen water availability and resilience to support socio-economic activities and the well-being of ecosystems.

Output 2.1.1: The availability of water resources (quantity and quality) is improved, and their use is rationalized

117. The recent studies on the Mono basin status, the consultation undertaken with of stakeholders and the visit of some sites in the basin reveal that the most sensitive areas in terms of degradation and deficiency of water resources are located at the headwater upstream. Paradoxically, in flood-prone areas, water shortages during the dry season are acute for the development of socio-economic activities due to the lack of water storage infrastructure (ponds, etc.). Urgent actions must be implemented to reverse this trend. Furthermore, in the downstream part of the basin, mainly in the coastal aquifer basin, there are many undeveloped artesian wells that have been continuously discharging their water into the environment for decades. In addition to flooding and sanitation problems leading to pollution and environmental degradation, this situation exposes the reserves to long-term depletion. The BOUCLIER-CLIMAT project will help refine vulnerability assessments and propose solutions to improve water management to benefit the population. Accompanying measures to strengthen water management at the grassroots level will be also implemented.

- **Activity 2.1.1.1: Carry out a baseline study to identify localities in vulnerable zones with areas (riverbanks, headwaters and agricultural land) heavily degraded by water erosion and/or other agricultural practices.** This activity will identify community actions and the need for external support to restore degraded ecosystems and their services in the basin. It will cover the entire Mono basin, in particular the headwaters of the main river and its tributaries (Anié, Amou, Ogou), the river banks (Mono, Anié, Amou, Ogou), degraded agricultural lands, degraded protected areas, degraded wetlands, RAMSAR sites, floodplains, etc. This

study will provide the project with a baseline of vulnerable areas to climate change and, in particular, the adaptation needs of local communities, especially the most vulnerable (women and youth). For many of the expected outcomes of the project, it will also provide the final reference indicators.

- **Activity 2.1.1.2: Develop Community based Adaptation Action Plans specific for the most vulnerable sites / areas identified in the baseline.** These CAAPs will be carried out in close collaboration with local communities, using a multidisciplinary approach to understand the potential impacts of climate change on various aspects of the site, including water resources and associated ecosystems. This will enable adaptation measures to be identified as well as an assessment of the feasibility and effectiveness of these measures in terms of local constraints, costs, benefits and associated risks.
- **Activity 2.1.1.3: Construct gray small runoff collection structures ("boulis", run-off collection basin, etc.) at the headwater of basins to support groundwater recharge and the promotion of agro-sylvo-pastoral activities.** The aim of this activity is to improve water availability through the construction of small runoff collection structures (boulis, basins, etc.), to construct new and to rehabilitate existing wells for more resilient agro-sylvo-pastoral activities at the headwaters of the basin. This intervention will contribute to improving food security and livelihoods, regenerating ecosystems and reducing social conflict. The project will also support the acquisition of materials and equipment, as well as capacity building/training and coaching to improve the management of infrastructure and water resources, and to promote agro-sylvo-pastoral activities at the head of the basin.
- **Activity 2.1.1.4: Implement actions for the protection, enhancement and sustainable management of groundwater and artesian wells in the downstream part of the basin.** Several hydraulic structures are built for their exploitation, including simple wells and artesian wells (gushing wells). In some areas of the basin, these gushing wells present risks to the population related to flooding and water-borne diseases. This activity proposes appropriate measures to protect these wells and limit their negative impact on the environment and local communities. This includes developing small irrigation systems (10 ha for each site), fishponds, drinking water supply facilities and directing excess water to areas with significant depression for aquifer recharge. Four (04) sites will be selected for this activity. To implement this activity, the project will build on the experience of the Benin National Water Partnership (PNE-Benin) and its partners in developing governance and economic development of artesian wells in southern Benin.
- **Activity 2.1.1.5: Strengthen community/local water management bodies (establish Water Users Organizations**). The objective of this activity is to organize the local community and the water management bodies, such as basin and local water committees, in order to promote integrated and sustainable water resources management. These bodies are key in this framework, and require an improved organization, structure and capacity to effectively play their role. Implementation will be preceded by an assessment study to identify the challenges faced by the existing committees. The project will then support the restructuring existing bodies and the creation new ones in line with national policies in Benin and Togo. Each body will be provided with action plans and the capacity of its members to implement climate change adaptation measures will be strengthened. Materials and equipment will be provided to support the implementation of these plans, fostering greater ownership of adaptation activities among basin communities and stakeholders, thereby ensuring the project's success.

Outcome 2.2: Preservation of Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) through effective implementation of adaptation measures against the impacts of climate change

118. The sustainability of production systems, including land, soil, biodiversity, and water resources, is crucial for community development. Climate change-induced ecosystem degradation threatens agro-sylvo-pastoral and fisheries productivity, necessitating rehabilitation efforts and nature-based solutions, particularly in RAMSAR areas.

Output 2.2.1: Basin ecosystems, especially those in RAMSAR areas, are rehabilitated and preserved

119. The study to update the basin inventory highlighted the alarming state of degradation of the basin's ecosystems and the loss of biodiversity. Areas of ecological and heritage importance, such as RAMSAR sites and other wetland ecosystems in the downstream part of the basin, are not spared from this situation. Similarly, the riverbanks are in an advanced state of degradation in many places. Consultative meetings and site visits to the Togodo Protected Area - Ramsar site no. 736, Lake Togbadji, the Gbidji community forest, the banks of the Mono River and its tributaries, etc. have confirmed the need for action. The actions planned under this output will help to reverse the trend of land and ecosystem degradation in the basin and conserve them, which is important for building community resilience. To this end, the following activities will be implemented under this output:

- **Activity 2.2.1.1: Develop/update wetland management plans for the RAMSAR sites incorporating climate change aspects.** These sites, along with the transboundary Biosphere reserve provide vital ecosystem services contributing to community well-being and climate change adaptation. The activity will establish coherent planning tools aligning with national and international legal frameworks and promoting coordination and synergy of interventions at national and cross-border levels. In Togo, building on the IREE Project's results, the Ramsar 736 site will undergo ecosystem evaluation consolidation and priority action planning. In Benin, the Ramsar 1017 site, with an updated development plan, will focus on implementing measures to combat climate change and coastal erosion.
- **Activity 2.2.1.2: Implement "Nature-based Solutions (NbS)" approach to ensure reforestation and assisted natural regeneration of degraded areas.** The project will implement Nature-based Solutions (NbS)

to restore degraded areas through reforestation and assisted natural regeneration. Hotspot areas/sites identified from previous studies (Activities 2.1.1.1 & 2.1.1.2) will be targeted in Benin and Togo to enhance ecosystem and community resilience to climate change risks. Approximately 2,000 linear meters of riverbanks and degraded banks of the Mono River and its tributaries, along with 500 hectares of land at the basin's headwaters, will be restored, leading to improved livelihoods and food security for local communities. This restoration effort will also contribute to the regeneration of water-related ecosystems and help mitigate flooding. Capacity building will be provided to communities based on NbS implementation guidelines developed under the project. Additionally, support will be extended to local communities for the implementation of proposed NbS solutions and income generation activities, aimed at reducing human pressures on natural resources. Packages containing materials and equipment will be acquired to facilitate the implementation of NbS and income generation activities.

- **Activity 2.2.1.3: Establish tree nurseries under a Public Private Partnership (PPP) arrangement**. Fostering collaboration between government entities and private companies, this initiative aims to utilize the resources, expertise, and innovation of both sectors to efficiently produce quality tree seedlings. Through this collaborative approach, the project seeks to support reforestation efforts, create economic opportunities, and promote environmental stewardship. Selected individuals and groups operating tree nurseries will be identified and trained in nursery establishment and management, with advisory support from government departments and provision of seeds, equipment, and tools. Under this activity 10 community-based nurseries will be established in Benin and 24 in Togo. This support aims to enhance their production capacity to supply seedlings for the project's restoration activities.
- **Activity 2.2.1.4: Undertake actions to restore and protect RAMSAR sites: wetlands and mangroves in the downstream part of the basin.** This activity will permit to implement measures to restore and safeguard RAMSAR sites, encompassing wetlands and mangroves located downstream in the basin. These actions will be guided by priority action plans developed in Activity 2.2.1.1, and will be expanded to include other significant sites such as classified forests and additional mangroves. Three million seedlings generated in Activity 2.2.1.3 will be procured and utilized for reforesting and rehabilitating degraded target areas. This initiative aims to prioritize restoration and protection efforts through nature-based solutions like reforestation, buffer zones, and assisted natural regeneration. Furthermore, capacity-building and awareness initiatives among local stakeholders will be conducted to enhance environmental and socio-economic benefits in the short and medium term.

Outcome 2.3: Implementation of adaptation measures for the benefit of the population

120. Most of the population of the basin still live below the poverty line and is therefore very vulnerable. The priority actions to be implemented within the framework of this outcome are to strengthen the populations' livelihoods, especially those who are vulnerable and therefore their adaptive capacities and resilience. The priority actions planned are related to the subsidy of income-generating activities and environmental benefits covering farming, livestock and fisheries production, etc., processing units and the promotion of agricultural and fishery products for the benefit of vulnerable communities, in particular women, young people and people living with disabilities.

Output 2.3.1: Resilient agro-sylvo-pastoral practices adopted and enhanced.

121. This involves implementing measures aimed at enhancing the resilience of agricultural and livestock systems to the environmental, climatic, and socio-economic challenges. This Output will promote sustainable agro-sylvo-pastoral techniques and improve livestock practices to optimize productivity and sustainability. It will also involve research and development of new approaches and technologies tailored to each specific site to ensure consistency and efficiency of the planned measures. The implementation of this Output will require a holistic and collaborative approach involving a variety of stakeholders to ensure sustainable and beneficial outcomes for agricultural and pastoral communities.

- **Activity 2.3.1.1: Set up / rehabilitate livestock corridors and grazing areas in order to limit the generalized land degradation.** The activity involves establishing transhumance corridors to reduce conflicts between farmers and herders. Comprehensive studies will be conducted to identify conflict zones and corridor needs, followed by consultations with local stakeholders to define best practices for demarcation. Detailed plans will be developed, considering environmental factors and community needs and will be also related to the Community Adaptation Action Plans to be developed under activity 2.1.1.2. This activity will allow the development of a basin global pastoral management plan which will take into account the flood prone areas as well as the CC impacted ones. This plan will be also considering the contingency plan established for the EWS. Awareness and training programs will be implemented to promote mutual understanding, with economic incentives considered to encourage cooperation. Continuous monitoring will ensure the effectiveness of established corridors and their adaptation to the changing needs of local communities.
- **Activity 2.3.1.2: Promote and support the planting of fodder crops to enhance livestock nutrition.** The activity aims to encourage the planting of fodder crops to improve livestock nutrition, with a focus on fast-growing tree and shrub suitable/adapted species, especially for small animals. It includes the selection of quality seeds, farmer training, technical support for planting and harvesting, as well as the establishment of fodder storage and distribution systems. For poultry, particular attention will be paid to the fodder supply chain, and the possibility of using insect farming as a new source of fodder will be explored. This initiative will be promoted by producer organizations, project staff, and extension agents, aiming to improve the quality and quantity of food available for livestock, thereby enhancing animal health, productivity, and farmers' livelihoods.

- **Activity 2.3.1.3: Integration and Promotion of Short-Cycle Livestock Production with Cereal and Legume Cultivation.** This activity aims to integrate the raising of short-cycle small animals, such as poultry and rabbits, with cereal and legume production to diversify farmers' income sources while enhancing their economic resilience. The activity will involve training farmers in best livestock management practices, providing necessary resources, and raising awareness about the importance of this diversification to ensure food security and agricultural sustainability.
- **Activity 2.3.1.4: Facilitate farmers' access to veterinary services**. This initiative aims to enhance access to veterinary services for livestock breeders in the Mono Basin, taking into consideration the distinctions between sedentary livestock farming, primarily practiced by women, and nomadic livestock rearing characterized by transhumant herders from Sahelian countries. Despite development efforts in the sector, access to veterinary services remains limited for the most vulnerable and transhumant populations due to insufficient awareness, training, and appropriate infrastructure. Led by the PMU and the Ministries of Agriculture, in collaboration with producer and livestock organizations, this project will target the most vulnerable groups, strengthen the capacities of veterinary service providers, and involve producer organizations in its implementation.

Output 2.3.2: Improved and sustainable fishing is supported

122. This Output focuses on improving and sustaining fishing in the region. Fishing is vital for the inhabitants of the floodplains of the Mono Basin, especially those in the South, but it faces overexploitation of resources and negative impacts from climate change. The Output aims to promote sustainable fishing practices, participatory resource management, combating illegal fishing, promoting aquaculture, and supporting fishermen and local communities. By adopting an integrated approach, this output aims to preserve marine ecosystems while ensuring the socio-economic well-being of fishing-dependent communities.

- **Activity 2.3.2.1: Conduct Climate-Resilient Fishing Techniques Trainings (CRFTTs) to educate fishermen on adapted practices for enhancing water ecosystem sustainability.** The activity will involve organizing regular training sessions for identified fishermen and women throughout the project duration. These sessions will focus on imparting knowledge and skills related to sustainable fishing methods and techniques. The trainings will be facilitated by the Project Management Unit (PMU) in collaboration with Fisheries administrations from Benin and Togo. Topics covered during the trainings will include various aspects of sustainable fishing such as boat maintenance, net construction, net selectivity, and sustainable use and maintenance of post-harvest equipment. Additionally, the sessions will emphasize the importance of adhering to climate-resilient practices in fishing activities. By providing these trainings and raising awareness among fishermen, the activity aims to bring about several benefits. These include enhancing livelihoods by promoting sustainable fishing practices, improving the quality of fish and other products obtained, and ultimately contributing to the conservation and sustainability of water ecosystems in the region.
- **Activity 2.3.2.2: Introduce and support climate-resilient aquaculture practices as an alternative or complementary livelihood for fishing communities.** This activity seeks to enhance the resilience of these communities to climate change by providing them with alternative livelihoods and food sources. This involves promoting climate-resilient fish species, constructing fish ponds and other aquaculture infrastructure, training farmers in aquaculture practices, and providing technical support for fish farm management. This activity will build upon the experience of private operators, including Lofty Farm, which practices aquaculture on the Nangbéto Dam reservoir. A partnership will be established with Lofty Farm to oversee operations, involving approximately 50 young people in this activity. It will be promoted by private operators, fishing community networks, as well as project staff and ministries in Benin and Togo responsible for fisheries. The objective is to improve the livelihoods and food security of fishing communities while promoting sustainable and climate-resilient aquaculture practices.
- **Activity 2.3.2.3: Equip fishermen and processors with inputs and tools**. The fishing sector analysis has highlighted that overexploitation of water bodies, reported by the FAO since 1995, is the primary driver of degradation in freshwater and marine environments in the Mono Basin. Artisanal fishing alone exceeds the sustainable potential. The declining size of catches and the accelerated depletion of species such as *Parachanna obscura, Clarias lazera, Tilapia zilii, Lisa falcipinnis, Acentrogobius schlegelli, Chrysichthys auratus, Synodontis, Lates niloticus, Sarotherodon, Callinectes, Macrorachium, Penaeus duorareum*, etc., across all fisheries indicate that fishermen have surpassed the maximum sustainable yield. These constraints are exacerbated by the adverse effects of Climate Change. The activity aims to provide fishermen and processors with appropriate equipment and tools to practice sustainable fishing and fish processing. This includes supplying inputs such as nets, fish preparation equipment, sun drying, and smoking equipment. Emphasis will be placed on enhancing the quality of traditional preservation methods through the dissemination of improved drying racks and smoking ovens. Additionally, the project will encourage innovations such as ice utilization throughout the fish value chain, solar dryers, and collective and individual storage facilities.

Output 2.3.3: Resilience and adaptive capacities of populations to Climate Change improved by installing value chains of agricultural and fishery products.

123. In the Mono Basin regions, rural communities are grappling with the profound impacts of climate change, which are disrupting their traditional ways of life centered around agriculture, livestock farming, and fishing. These communities heavily rely on these activities for their livelihoods, with more than 70% of the active population. However, the intensifying

effects of climate change, including erratic weather patterns and rising temperatures, are posing significant challenges to their sustainability.

124. Moreover, the overexploitation of natural resources, such as freshwater sources and marine ecosystems, further exacerbates the precarious situation faced by these communities. The excessive extraction of resources not only threatens the ecological balance but also jeopardizes the food security of the local population dependent on these natural assets. In response to these pressing challenges, Output 2.3.3 seeks to bolster the resilience of these populations by establishing robust value chains for agricultural and fishery products. By creating integrated systems for production, processing, and marketing, the project aims to empower communities to generate income from their agricultural and fishing activities while adapting to the changing climate conditions. This initiative also emphasizes the importance of sustainable practices to safeguard natural resources and ensure long-term economic viability.

125. Furthermore, the project will focus on enhancing commercialization efforts, facilitating access to markets, and strengthening linkages between producers and buyers. By fostering a supportive environment for economic diversification and market expansion, Output 2.3.3 aims to build the adaptive capacity of communities in the Mono Basin regions, ultimately promoting resilience and sustainable development in the face of climate change.

126. The following actions will be undertaken to achieve the goal:

- **Activity 2.3.3.1: Identify the needs for infrastructure and processing units for agricultural and fishery products (palm nuts, soya, cassava, rice, etc.) for vulnerable and disadvantaged communities in the basin**. This activity aims to address urgent needs for infrastructure and processing units for agricultural and fishery products, focusing on vulnerable and disadvantaged communities, with 70% women. These communities face significant challenges related to the risk of flooding and the degradation of river ecosystems. Currently, women' and youth' associations rely on traditional methods of agricultural product exploitation, yielding minimal results. This activity will conduct a comprehensive assessment of infrastructure and equipment needs while strengthening the capacity for product transformation, thereby enhancing local incomes. It will encompass the entire value chain and propose sustainable management mechanisms for identified infrastructure and processing units. This assessment will involve beneficiaries and key local stakeholders contributing to validating infrastructure needs in each national segment of the basin. Through collaborative efforts and informed decision-making, this activity aims to promote resilience and sustainable development in the face of climate change impacts within basin communities.
- **Activity 2.3.3.2: Train stakeholders and farmers on the technical management and transformation of agricultural and fishery products and their development.** This involves identifying training needs, developing tailored training programs, delivering practical and participatory training sessions, evaluating the impact of the training, strengthening the capacities of producer organizations and cooperatives, and establishing partnerships with research institutions and private companies. Training sessions will cover a range of topics, including best production practices, processing techniques, quality standards, and regulatory requirements. Participants will have the opportunity to gain practical and theoretical skills to enhance the quality of their products and access more lucrative markets. This activity is crucial for improving the skills of producers and processors, increasing their productivity and resilience, and promoting sustainable development in the agricultural and fishery value chains.
- **Activity 2.3.3.3: Set up /support collection, storage, transformation, conservation and packaging units for agricultural and fishery products (palm nuts, soybeans, cassava, rice, etc.). This** Activity aims to establish and support collection, storage, processing, preservation, and packaging units for agricultural and fishery products (such as palm nuts, soybeans, cassava, rice, fish, mollusks, and others). This activity seeks to enhance post-harvest handling and fishing practices and their value addition to optimize the quality, shelf life, and marketing of these products. Building on the findings of Activity 2.3.3.1 regarding the assessment of infrastructure needs for processing, it will involve procuring necessary equipment and machinery, implementing appropriate storage and processing techniques, training staff in proper handling and processing methods, and ensuring compliance with quality and safety standards. By establishing these units, the activity aims to increase the income and livelihoods of farmers and fishermen while contributing to food security and economic development in the region.
- **Activity 2.3.3.4: Establish a marketing and sales process.** This activity involves conducting market research to understand consumer preferences and demand trends at the local, national, and regional levels, as well as identifying potential buyers and distribution channels. Strategies will be developed to effectively promote products, including branding, advertising, and participation in local, national, and regional trade events. Partnerships will be established with retailers, wholesalers, and other relevant stakeholders to ensure product accessibility and maximize sales opportunities. Ongoing monitoring and regular evaluations will be conducted to assess the effectiveness of the marketing and sales process, allowing for necessary adjustments to support the economic sustainability of local communities.

Component 3: Strengthening the capacities of different actors, share knowledge and raise awareness among all beneficiaries at different levels (US$ 1,000, 000)

127. This component aims at consolidating the MBA institutional and technical capacities as well as the project implementation framework. Moreover, it will provide means to ensure dissemination of lessons learned through capacity building, communication and training. It will also support the development of innovative knowledge management mechanisms for

information sharing, training and exchange of experiences, data collection and analysis, dissemination and capitalization of best practices. The GWP-WA will be the main partner in charge of this component and will ensure the general technical supervision and support of the capacity building knowledge sharing and awareness raising activities. This will be supported by the development of a web platform and innovative communication tools including social media to take into account the different targets. Some expected outputs of this component are: technical reports; manuals on lessons learned, videos, radio and television programmes, experience sharing visits, awareness campaigns, etc. The project will identify practices and technologies that some communities or members are already adopting, to allow consideration of local knowledge and traditional techniques that are more likely to be adopted by others within the basin communities. The component also includes the development of a communication plan for target groups, in particular vulnerable communities (women, youth, the elderly and the disabled), water users and producers' organizations.

Outcome 3.1: Mobilized and sensitized stakeholders through communication and capacity building activities

128. The development of flexible policies and technical and institutional responses requires capacity building of various stakeholders. This is important to facilitate a common understanding among the basin stakeholders of the concepts of vulnerability, opportunity, risks, impacts and uncertainties of climate change. The skills to develop an appropriate adaptation plan and its implementation are essential, in particular for managing uncertainties in the development of scenarios and the implementation of measures, for using appropriate tools and for integrating adaptation into the basin management plan[12]. In addition to the MBA Executive Directorate, other key stakeholders targeted for capacity building include local communities, NGOs, youth and women's organizations, and extension staff from various national and local sectors such as water, agriculture, environment and forestry, will benefit from several trainings and capacity building sessions on the project topics.

129. As an important action of this outcome, it will be necessary to ensure that communities in the targeted areas are sensitized to climate change adaptation measures and disaster risk reduction. Lessons learned and good practices from the project will also need to be appropriately disseminated.

Output 3.1.1: Practitioners, technicians and decision-makers are sensitized and trained on technical and environmental aspects of the project

130. As the Mono Basin Authority (MBA) is a young organization, special emphasis will have to be placed on capacity building issues to enable it to become operational. The capacity building actions planned within the framework of the project will include both training and material aspects (acquisition of appropriate equipment, suitable premises, etc.) for the MBA and other stakeholders concerned at national and local levels. The activities planned within this framework are the following.

- **Activity 3.1.1.1: Conduct a needs assessment for the institutions involved in the project, evaluate their capacities to manage climate risks in the basin and define their priorities for capacity building.** During the first two quarters of implementation, the project will conduct a detailed capacity needs' assessment of all stakeholders of the project, including farmers, fishermen, local communities, and traditional and local authorities, institutions, etc. led by the Regional Project Management Unit (R-PMU) and the National Executing Entities (NEEs). Throughout this evaluation phase, the Regional Executing Entity (REE) will administer a Knowledge, Attitudes, and Practices (KAP) survey to assess the project partners' KAPs, employing both qualitative and quantitative methodologies and utilizing data collection tools like targeted focus group discussions, among others.
- **Activity 3.1.1.2: Develop training materials for the capacity development program of the institutions, based on the needs assessment.** Informed by the baseline assessments, by the project document, and building on existing evidence, a detailed training plan for the project will be developed, including the development of all modules to be used by field staff. The training plan will include plans and modules for all trainings and capacity building related activities of the project, including crop farming, small livestock rearing, fishery, water management, IGAs, and post-harvest practices.
- **Activity 3.1.1.3: Implement targeted Training of Trainers (ToTs) and capacity-building initiatives for national institutions in the project area, addressing a variety of specified topics (EWS alerts interpretation, water management, RAMSAR sites protection, agricultural and fishing activities, value chain**). This activity aims to equip all stakeholders with the necessary knowledge and skills to effectively address climate-related challenges and promote sustainable development practices in the basin. These training sessions will cover the themes identified in activities 3.1.1.1 and 3.1.1.2. Regional Training of Trainers will be organized by the R-PMU, with technical support from identified thematic experts. National-level Training of Trainers will be organized by the NEEs and experts trained at the regional level. These national trainers will subsequently be responsible for capacity building and providing technical support to beneficiaries (NGOs, youth and women's associations, farmers, fishermen, etc.) in project areas of operation.

Output 3.1.2: Communities in target areas are sensitized and trained on climate change resilience issues

131. The main objective of this output is to raise awareness and build the capacities of the communities in the basin on various targeted themes. As such, the actions to be deployed may include, among others, awareness campaigns on the impacts of climate change such as floods, land degradation, water quality, concrete adaptation solutions and development of innovative mechanisms to valorize indigenous and local knowledge. The main activities planned for this output are described below.

[12] *UNECE (2015). L'eau et l'adaptation au changement climatique dans les bassins transfrontaliers : Leçons à retenir et bonnes pratiques.*

- **Activity 3.1.2.1: Develop a special awareness plan for grassroots communities on the issue of Climate Change and means of adaptation, with particular emphasis on considering endogenous know-how.** This involves developing and implementing a plan to raise awareness on climate change issues and related risks such as flood, with scientifically tested measures for adaptation, as well as promoting their own field-tested knowledge that does not run counter to accepted standards. The project plans to assess the knowledge of local communities, combined with a development special awareness plan for grassroots communities on the issue of Climate Change and means of adaptation, with particular emphasis on considering indigenous know-how and the multiple local languages. National and regional workshops will be held to gather the basin stakeholders' contributions and validate the various progress and final reports.
- **Activity 3.1.2.2: Conduct sessions to familiarize communities with the functioning and importance of Early Warning Systems and provide hands-on training on interpreting warning signals and responding effectively to minimize risks.** This activity aims to enhance the resilience of local communities and their ability to effectively respond to climate-related disasters or potential emergencies. It involves organizing educational and interactive sessions to increase the understanding of local communities regarding the Early Warning System (EWS) from its installation. These sessions will provide practical training on interpreting the warning signals emitted by the EWS to develop their capacity to identify potential risks and adopt appropriate measures to mitigate their impact.

Output 3.1.3. BOUCLIER CLIMAT project results and lessons learned are disseminated and shared

132. Dissemination of the results, lessons and good practices learned from the project is essential for the sustainability of the project and especially their replicability and scaling up. To achieve this, various means and actions will be implemented in this regard: toolkits of good practices, technical reports; manuals on lessons learned, videos, radio and television programs, experience sharing visits, awareness campaigns, methodological guidance notes, sharing of information and experiences through trips and visits, training for dissemination and capitalization of best practices. It will also rely on the development of a web platform and innovative communication tools. A communication plan will help refine the approaches and means required to achieve this objective. In this regard, the following activities are planned.

- **Activity 3.1.3.1: Develop the project's communication plan and strategy, in conjunction with those of the MBA.** The project plans to develop a strategic and operational communication plan, considering the strategic communication objectives of the MBA. Close collaboration will be established with the RIWE MONO project, which also aims to provide the MBA with a communication strategy to engage basin stakeholders and support the implementation of the Basin Strategic Action Plan for the period 2024-2038. The strategy will define target groups, themes, key messages, and communication channels. The communication plan will ensure stakeholders are well informed so they can actively participate in promoting and implementing the project. To achieve these objectives, the following actions are planned: (i) preparing and widely disseminating reports on the project's inception workshop, as well as periodic and annual reports on its implementation through appropriate channels; (ii) preparing and positioning signposts at field action sites; (iii) setting up a dedicated project webpage; and (iv) presenting project results by the ED/MBA and other executing partners at relevant national, regional, and international events to enhance project communication effectiveness. Additionally, a comprehensive study will be conducted to identify various targets, community segments, and specific messages and actions needed to establish connections between the basin's different priorities.
- **Activity 3.1.3.2: Ensure effective dissemination of project achievements and lessons learned through exchange visits.** This activity aims to ensure good visibility of the various achievements of the project through well-targeted communication that identifies the best channels and the key messages sent to reach the appropriate targets. It will also facilitate knowledge sharing between communities and local authorities, the development of a platform at the basin level on knowledge management and the dissemination of good practices. The project will invest in mechanisms to share knowledge about adaptation practices among communities and local authorities, promoting replicability and efficiency. It will capture lessons learned for wider dissemination through publications and tools produced throughout the project's duration. Knowledge sharing meetings will target civil society, community leaders, and stakeholders to promote the platform and integrate other practices. A monitoring, evaluation, and learning system will support the knowledge sharing platform by collecting and analyzing evidence-based lessons. The project will also participate in major regional, continental, and global events to share experiences from the Mono basin. Communication activities will be managed by the ED/MBA with support from GWP-WA and OSS.
- **Activity 3.1.3.3: Organize pa rticipatory workshops in the target areas to engage with community members in facilitating discussions on specified topics (water management, RAMSAR sites protection, agricultural and fishing activities, value chain).** Three regional workshops will be organized by the R-PMU, bringing together project stakeholders, institutions, and basin organizations from the West African sub-region for discussions, exchange of experien ces, and lessons learned related to the project's themes. These workshops will be held starting from the second year of the project and will help strengthen project achievements and facilitate the dissemination of results, thereby enhancing the project's impact and sustainability.

B. Promotion of new and innovative solutions to climate change adaptation

133. The BOUCLIER-CLIMAT project will develop adaptative capacities of climate-vulnerable communities in the Mono River basin by focusing on improving their knowledge, access and adoption of innovative mechanisms that enhance the resilience of their livelihoods and surrounding ecosystems.

- **Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS):** This EWS will be designed in conjunction with regional, national, and local systems, considering existing infrastructure to enhance flood management practices and mitigate the adverse consequences of recurring floods. This integrated approach leverages data from various sources and utilizes advanced technologies to provide timely and accurate warnings, enabling proactive measures to protect lives and minimize damage caused by cyclical flooding events. By implementing this Mono-RCbFEWS, the project pioneers a transformative solution that promotes efficient flood management and strengthens the resilience of communities in the Mono River Basin.
- **Regional approach:** The project will take a regional perspective by facilitating hydro-climatic risk modelling at the river basin scale. This approach allows for a better understanding of the complex interactions between climate, water resources, and ecosystems. By adopting a regional perspective, the project will identify synergistic and effective solutions to address the shared challenges faced by communities in the Mono basin. It also will promote data and information exchange, experience sharing, and transparent decision-making among national stakeholders and the Mono Basin Authority (MBA). A regional approach will be promoted to ensure the viability and sustainability of climate information services, products, and technologies. The project will involve collaborating with a range of partners from the public and private sectors as well as community members and civil society to test and scale up innovative ways of providing rapid assistance to the poorest and most vulnerable farmers after a shock, helping them become more climate resilient and food secure.
- **Community-based approach:** The project will empower communities in vulnerable localities to actively participate in climate change adaptation efforts. This approach will involve engaging local communities to monitor flood risks, prepare for adaptation, and build resilience. By involving the community, the project ensures that local knowledge and perspectives are considered, leading to more effective and sustainable solutions. The project will place a strong emphasis on community empowerment and engagement in climate change adaptation efforts. Through a community-based approach, local communities in vulnerable areas will actively participate in monitoring flood risks, preparing for adaptation, and building resilience. The project will establish mechanisms to involve community members in decision-making processes, ensuring their knowledge and perspectives are considered. By fostering community ownership and participation, the project will generate more effective and sustainable solutions that address the specific needs and challenges faced by each community.
- **Data Collection Platform (DCP):** The project will establish a DCP composed of agro-climatic stations equipped with sensors, recorders, and remote transmitters. These stations will automatically and continuously collect hydro-climatic information from the Mono basin. By utilizing advanced technologies such as satellite imagery, the project will improve data accessibility and provide a comprehensive understanding of large areas, including those that are physically inaccessible. The innovative use of technology in data collection and analysis enables a better understanding of the basin's hydro-climatic conditions and facilitates evidence-based decision-making. Furthermore, the project will develop communication and sharing tools to ensure the free flow of information to relevant stakeholders, enabling them to access and utilize the collected data for developing innovative solutions and making informed decisions.
- **Nature-based solutions:** The project will incorporate "Nature-based Solutions" as part of Component 2. These solutions involve the protection, sustainable management, and restoration of ecosystems while ensuring human well-being and benefiting biodiversity. Given the presence of RAMSAR sites and sensitive ecosystems in the project area, nature-based solutions are highly relevant. They offer multiple benefits, including preserving the natural environment and increasing resilience to climate change impacts. The project will prioritize integrating nature-based solutions into its strategies and actions, ensuring the sustainable management of natural resources and promoting ecosystem services.
- **Income-generating activities:** The project recognizes the importance of improving community livelihoods, particularly for vulnerable groups such as women and youth. The project will implement two financial mechanisms to facilitate beneficiaries' access to grant funding for developing their own initiatives. These mechanisms will be designed to address the specific needs of vulnerable communities and promote actions that ensure livelihoods, generate income, empower communities, and strengthen resilience. These activities aim to provide alternative sources of income for vulnerable groups, such as women and youth, who are often disproportionately affected by climate change. By introducing innovative and sustainable livelihood options, such as climate-smart agriculture, agroforestry, and value chain development, the project seeks to enhance community resilience and reduce their dependency on climate-sensitive sectors.
- **Public-Private Partnerships (PPP)**: The project aims to establish public-private partnerships to leverage the resources, expertise, and innovation of the private sector in order to increase fish production and improve aquaculture practices in the Nangbéto Dam reservoir. During the consultative process, Lofty Farm expressed its interest in sharing its expertise with small-scale fish farmers in the region, thereby contributing to local development and strengthening the capacities of the surrounding communities.

134. Through the integration of these approaches and mechanisms, the BOUCLIER-CLIMAT project promotes innovation, the adoption of new technologies, and the development of effective solutions for climate change adaptation in the Mono River basin. By addressing the specific challenges of the region through a collaborative and participatory approach, the project aims to enhance the resilience of livelihoods, ecosystems, and communities, setting a precedent for innovative climate adaptation strategies.

C. Economic, social and environmental benefits

135. The project aims to implement activities to enhance the resilience of vulnerable populations in the Mono River Basin through civil protection against climate-related disasters (especially floods), development of water resources/wetlands (RAMSAR zones) and other associated ecosystems, improvement of people's livelihoods, and strengthening the technical and institutional capacities of stakeholders. Through its expected outcomes, the project will generate significant economic, social and environmental benefits.

Table 3: Significant economic, social and environmental benefits

Outcomes	Economic	Social	Environmental
1.1: Establishment of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) for effective flood management in the Mono River basin	Sustainable protection of economic assets (agricultural production, community infrastructure, businesses, etc.) Sustainable agro-pastoral practices with the creation of fodder fields and livestock corridors	Direct impacts on almost 90,000 persons (15,000 hosholders) living in the basin downstream and close to the river banks (which of 52% women) and indirectly 2,950,120 persons in targeted communes, Reduction of frequent flood-related deaths	Acquisition of hydro-climatic data in real time and at lower cost than in-situ processes Restore wetlands, mainly those in the RAMSAR zones in the basin Carbon sequestration and low GHG emissions
2.1: Enhanced resilience of water resources to the impacts of CC and overexploitation	Increase water availability for all economic uses mainly agricultural yields and consequently the economic livelihoods and well-being of the basin's communities	Reduction of women's efforts to access water supply (Targeting directly almost 45,900 women in rural area)	Regeneration of degraded soils and ecosystems, protection of land against flooding, groundwater recharge
2.2: Preservation of Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) through effective implementation of adaptation measures against the impacts of climate change	Increase agricultural yields and consequently the economic livelihoods and well-being of the basin's communities	90,000 direct beneficiaries and indirectly the 2,950,120 people in the basin	Sustainable exploitation of the basin's natural resources Soil protection and preservation against erosion and desertification Protect and reduce degradation of lands used for agriculture
2.3: Implementation of adaptation measures for the benefit of the population	Increase climate resilient livestock breeds and numbers which will allow to avoid substantial losses of livestock due to climate change impact	Sustainable increases in productivity and improvements in food security; Women's empowerment; improving social and health well-being.	Reforestation/afforestation Biodiversity improvement
3.1: Mobilized and sensitized stakeholders through communication and capacity building activities	Implementation of measures to protect assets and services increase knowledge on water resources and related ecosystems for informed decision making	90,000 direct beneficiaries	Sustainability of environmental protection actions and scaling up by informed and sensitized populations

136. The main benefits from the project are described as follow:

Environmental benefits

137. The « Bouclier Mono project » will support the strengthening of monitoring networks and the collection of useful and reliable hydro-climatic data to assist in the implementation of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS). In addition, data and information produced will allow a better understanding of the interactions between the environment and human factors, as well as the impacts of climate on these components, in order to define the most appropriate approaches and means for a sustainable exploitation of the basin's natural resources. They will also contribute to the development of tools for planning and sustainable management of water resources and associated ecosystems in the basin.

138. The deployment of the Mono-RCbFEWS is essential and will contribute significantly to the ecosystem, economic and social benefits. Other impacts of these actions include protection and reduction of land degradation for agriculture and restoration of wetlands in the basin. Special emphasis will also be paid to the protection and restoration of RAMSAR zones in the basin.

139. Actions to preserve ecosystems by protecting and restoring springs and riverbanks, protecting and preserving soils against erosion and desertification, reforestation/afforestation, developing livestock corridors, promoting beekeeping, etc. have undeniable and invaluable environmental impacts. Moreover, most of the planned activities will be implemented through the Nature Based Solution (NBS). The immediate and long-term positive effects and impacts of the implementation of these actions are the regeneration of ecosystems and biodiversity in the basin, as well as the conservation of a large vegetation cover and related flora and fauna conservation species. This will increase the provision of ecosystem services in the basin and by extension, the economic and social development of the communities.

140. The project will promote two main implementation strategies, on one hand supporting ecosystem conservation, and on the other hand fostering the development of more sustainable agricultural activities making a responsible use of ecosystems.

141. Hence the community will appreciate ecosystems not only as landscape but also as a basis for their production, a mean to reduce their vulnerability. This will contribute to sustain the protection of ecosystems and to strengthen community links needed for their economic and social development.

142. The lessons and best practices learned from the project are likely to be useful for planning in other national basins in the two countries as well as in transboundary basins. The planned awareness and communication activities will be useful for the replicability and scaling up actions regarding the preservation of the basin's natural resources, ecosystems and biodiversity. This will ensure the project's environmental sustainability

Economic benefits

143. The deployment of the Mono-RCbFEWS will undoubtedly provide the means for rapid and effective decision-making and implementation of measures to protect assets and services exposed to flood disasters in the basin, particularly in its downstream part. The economic benefits include the drastic reduction of economic losses and social impacts due to these disasters.

144. The actions targeting the development of water resources (Outcome 2) will increase the availability of water for economic activities (small-scale agriculture and irrigation, livestock farming, etc.) but also the preservation of ecosystems. These activities will not only contribute to increasing ecosystem services but will also substantially strengthen the livelihoods and economy of the populations, especially the vulnerable communities. Another important effect of this action is the reduction of women's efforts to collect water, especially in rural areas.

145. The project's support in implementing income-generating activities (with priority given to women and vulnerable groups) and promoting other actions such as agroforestry and pastoralism will foster improved livelihoods, as well as financial autonomy and social well-being of communities, especially the most vulnerable communities.

146. Farmers and fishermen that apply sustainable agricultural and fishery practices will benefit from an increased yield and income, and at the same time will reduce the risk of losses due to old practices not adapted to adverse climate impacts. These farmers and fishermen are expected to encourage more producers to use improved practices. Only activities likely to improve the economic situation of households will be encouraged, ensuring a sustainable increase in household incomes. By gradually increasing the livelihoods of subsistence farming and fishery units to make them subjects of lending eligibility, will help to further strengthen their economic development and diversify as well as strengthen economic income activities.

147. Furthermore, enhanced hydro-meteorological information will support and contribute to prevent adverse effects in agriculture and livestock, and give relevant climate information to be considered into the development plans.

Social benefits

148. The effective and sustainable implementation of flood management will contribute to civil protection in the basin. Cyclical floods have significant negative impacts on the socio-economic and environmental systems of the basin. Each year, hundreds of villages are affected, thousands of hectares of crops are destroyed, tens of thousands of people are displaced, and the economies of poor and vulnerable populations collapse.

149. Establishing an effective community-based flood early warning system in the Mono basin will significantly reduce these disasters, thereby enhancing livelihoods and, more importantly, protecting people and increasing their resilience. This implementation will directly impact all 90,000,000 people (nearly 52% of whom are women). Support for vulnerable groups, especially women, through income-generating activities aims to increase beneficiaries' economic income and financial autonomy. Additionally, empowering gender aspects, including women-led initiatives, will be central to the project's actions at all stages, from planning to implementation. They will be actively involved in decision-making processes. The project is designed to benefit local populations, particularly women and other vulnerable groups highly dependent on these resources for their livelihoods and well-being. Thus, gender issues will be integrated into capacity-building programs and community-level interventions. To mitigate adverse effects resulting from project implementation, relevant risks related to planned activities will be addressed in accordance with the Adaptation Fund's Environmental and Social Policy (ESP) and SOA, as well as national environmental legislation in both beneficiary countries.

150. Furthermore, an Environmental and Social Impact Assessment (ESIA), an Environmental and Social Risk Management Plan (ESRMP), and a gender assessment has been conducted for the proposed project with inputs from respective national authorities and implementing entities, in collaboration with the Sahara and Sahel Observatory as the project implementing entity (annex 3). OSS will also apply the Free, Prior, and Informed Consent (FPIC) process to ensure PSE compliance at all project stages. By integrating gender into policies, strategies, and development projects and strengthening the capacity of institutional actors to consider the specific needs of women and men, these actions contribute to reducing systematic inequalities against women in accessing and controlling resources.

151. By sensitizing and training women on the use of climate information, ensuring their participation in awareness and training activities, and integrating them into risk and disaster management bodies, these actions promote more active and equitable participation of women in decision-making and risk management. By enhancing women's capacity to use climate information, participate in awareness and training activities, and integrate early warning system databases, these actions enable women to play a more active role in risk and disaster management, thereby enhancing their autonomy and resilience. By evaluating the effectiveness of early warning systems in reaching all social groups, including gender

considerations, these actions ensure that flood risk alerts are effectively disseminated to all community members, thereby saving lives and reducing material losses. By ensuring equal participation of all social categories, including gender considerations, in awareness and training activities on resilience to climate change, these actions foster a better understanding and broader ownership of issues related to risk and disaster management.

D. Cost-effectiveness of the proposed project

General Overview

152. The proposed project adopts regional, efficient and cost-effective approaches to strengthen the resilience of vulnerable communities in the Mono River Basin by building their adaptive capacity to recurrent flood risks and promoting sustainable and equitable use and management of water resources and related ecosystems. To achieve these objectives, the project plans to establish a regional early warning system for disaster risk reduction, support income-generating and environmentally beneficial activities in agriculture, livestock, fisheries, and agricultural product processing units.

153. In turn, the project will directly benefit about 15,000 households, representing approximately 60,000 direct beneficiaries. Additionally, it will indirectly benefit around 2,950,120 inhabitants, in the project area and entire population of the Mono River Basin. To assess the cost-effectiveness of the adaptation investments proposed by the BOUCLIER-CLIMAT/Mono Project in relation to the expected avoided costs of dealing with the impact of floods and droughts, a cost-benefit analysis was carried out. The analysis compared the estimated costs of the status quo under certain assumptions with the costs of the proposed adaptation measures. The results showed that the average cost of USD 233 per beneficiary for the BOUCLIER-CLIMAT /Mono Project is nearly three times cheaper than the cost of emergency aid required in the absence of the project. Therefore, the project will continuously benefit the communities and serve as a model example for other regions facing similar challenges. This cost-effectiveness analysis will evaluate two alternatives:

- **Alternative 1**: The alternative to the BOUCLIER-CLIMAT/Mono project, no project intervention, with the related economic, environmental and social problems.
- **Alternative 2:** The economic, environmental and social benefits that the proposed BOUCLIER-CLIMAT/Mono project are expected to create in relation to increased environmental protection, resilience, livelihoods diversification, mitigation benefits and climate change adaptation.

Table 4. Comparison project – no project potential expenditure for beneficiaries reached in 5 years

	Unity Cost for 5 year of the project (USD)	**Number of bénéficiaries**	**Total USD**
With The BOUCLIER-CLIMAT/Mono project	155.55	90,000 Direct beneficiaries (15,000 Household)	14,000,000.00
Without The BOUCLIER-CLIMAT/Mono project	566.66	90,000 Direct beneficiaries (15,000 Household)	51,000,000.00
Emergency aid	170 USD/year (Humanitarian Aid/Beneficiary/Year)	Difference with the project	37,000,000.00

154. The comparison between the benefits created by the project (Alternative 2) and the no-intervention of the project (Alternative 1) as well as study for the alternatives are explained in Annex 5

Financial Analysis

155. The financial analysis assessing the cost-effectiveness of the project is detailed in Table 2. This analysis evaluates the financial viability of the project by examining the cost components and the estimated financial returns derived from the project activities. The evaluation utilizes several key financial appraisal methods: cash flow, benefit-cost ratio, net present value (NPV), and internal rate of return (IRR).

156. The benefit calculations focus solely on the increases in beneficiaries' income, as the social and environmental benefits have been addressed in a different section of this analysis and are not included here due to their non-monetary nature. Additionally, the analysis adopts a conservative approach by assuming that only 33% of the beneficiaries will achieve economic and financial sustainability by the project's conclusion. Each analysis was carried out in a precautionary manner, calculating that at the end of the project only 33% of the beneficiaries will have achieved economic and financial sustainability.

Table 5. Financial analysis for project cost-effectiveness

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
A. Cost Components						
Component 1	420,000.00	420,000.00	420,000.00	420,000.00	420,000.00	2,100,000.00
Component 2	1,750,000.00	1,750,000.00	1,750,000.00	1,750,000.00	1,750,000.00	8,750,000.00
Component 3	200,000.00	200,000.00	200,000.00	200,000.00	200,000.00	1,000,000.00
Execution costs (management units)	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	1,050,000.00
Implementation costs (management units)	220,000.00	220,000.00	220,000.00	220,000.00	220,000.00	1,100,000.00
Total costs (A)	2,800,000.00	2,800,000.00	2,800,000.00	2,800,000.00	2,800,000.00	14,000,000.00
B. Financial benefits						

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Study/Consultancy Benefits						
Benefits for Income generation Activity	2,117,264.94	4,234,529.87	6,351,794.81	8,469,059.74	10,586,324.68	31,758,974.03
Total financial benefits (B)	2,117,264.94	4,234,529.87	6,351,794.81	8,469,059.74	10,586,324.68	31,758,974.03
Cash flow (BA)	**-682,735.06**	**1,434,529.87**	**3,551,794.81**	**5,669,059.74**	**7,786,324.68**	**17,758,974.03**
Benefit Cost Ration (B/A)	**0.76**	**1.51**	**2.27**	**3.02**	**3.78**	**2.27**
Net Present Value (NPV)						**15,483,692.75**
Internal Rate of Return (IRR)						**40%**

157. The financial analysis reveals a positive cost-benefit ratio of 2.27, indicating that the benefits of the project substantially outweigh the costs. The Net Present Value (NPV) is positive at $15.483 million, and the Internal Rate of Return (IRR) stands at an impressive 40%. This analysis underscores the project's strong financial performance and potential for continued benefits beyond its initial phase. Given these metrics, the project is deemed highly cost-effective and represents a sound investment, with ongoing benefits expected to accrue annually.

Advantages of the regional approach

158. Addressing climate change and flood risks requires a collaborative approach beyond national borders due to their transboundary nature. Implementing the BOUCLIER-CLIMAT/Mono project regionally offers significant cost-effective benefits with positive cost-benefit ratios whether interventions are enacted or not.

159. This regional strategy is particularly advantageous for managing drought, a transboundary challenge affecting the Mono basin's two (02) countries. The regional approach brings forth several key advantages: (i) Cooperation/Coordination: Given that drought is a regional phenomenon, shared data and information significantly enhance the effectiveness of regional Early Warning Systems (EWS). This, in turn, strengthens regional capacity, cohesion, and fosters cooperative platforms; (ii) Knowledge, Technology, and Expertise: A regional platform facilitates the amalgamation of diverse ideas, incorporating both indigenous and modern knowledge, alongside technologies and expertise in drought risk management. This environment promotes exchange and experiential learning, which enriches the overall knowledge base; (iii) Minimization of Duplication: Coordinated planning and implementation of interventions at the regional level help prevent overlapping efforts, ensuring more efficient use of resources and greater efficacy in addressing the challenges; (iv) Contribution to Regional Frameworks: The project supports the Regional Initiative for Water and Environment (RIWE) which furthers regional resilience and sustainability initiatives.

160. These elements collectively highlight the necessity and effectiveness of a regional approach in tackling environmental challenges that cross-national borders.

161. Regionally led implementation is not only cost-effective but also expedites processes, contributes to building a pool of regional and national experts, and facilitates the adoption of innovations by member countries. It enhances sustainability and offers a platform for countries to share experiences, knowledge, and resources.

162. The regional approach under this project is deemed the most cost-effective method to generate a sustainable and significant impact for communities vulnerable to climate change, enhancing their resilience and food security. This effectiveness is attributed to an operational framework that pools regional expertise to enhance the understanding of hydro-climatic hazards and to develop integrated and effective adaptation strategies.

163. Moreover, adopting "Nature-based Solutions" (NBS) presents an economically viable and sustainable alternative. NBS are typically less costly in the long term compared to technological investments or constructing and maintaining infrastructure. They offer flexibility and adaptability, evolving with global changes without requiring intensive infrastructure. Within the Mono basin, NBS will facilitate ecosystem preservation actions (replanting, reforestation, soil protection on 350 hectares at river headwaters), improve ecosystem management (through hydro-agricultural development and agroforestry practices), and restore ecosystems (rehabilitating and stabilizing riverbanks, practicing assisted regeneration) as outlined in Component 2 of the BOUCLIER-CLIMAT/Mono project.

E. Consistency with development strategies

164. For each of the two beneficiary countries of the project, water management is one of the major challenges for sustainable development in the context of climate change. Thus, through the implementation of its activities, the project will contribute to the achievement of national orientations/priorities in terms of poverty reduction, environmental protection and adaptation to climate change. The objectives of this project are therefore fully in line with the international texts on transboundary water management, climate change and biodiversity conservation.

165. **At the international level:** Several international treaties aim to reduce natural and technological risks. These include the Sendai Framework for Action on Disaster Risk Reduction, the United Nations Framework Convention on Climate Change and the United Nations Convention to Combat Desertification among others. The objectives of this project are aligned with these treaties and the related objectives are summarized in the table below.

166. **At the regional level:** The project will contribute to the implementation of the various regional guiding documents such as, Regional Flood Risk Management Strategy, ECOWAS policy and mechanisms on Disaster Risk Reduction, Strategic Program for Vulnerability Reduction and Adaptation to Climate Change in West Africa and the Action Plan of the Mono

Basin Authority's overall planning and management framework focusing on the updated Mono Basin Authority strategic plan (2016). Indeed, the project actions are based on the documents that highlight all the Mono Basin challenges, including recurrent flooding, biodiversity loss, ecosystem degradation, climate change, human pressure on natural resources and lack of knowledge of surface and groundwater resources.

167. **At the national level:** Benin and Togo both have (i) a national water policy with a National Action Plan for Integrated Water Resources and Ecosystem Management, (ii) a climate change adaptation policy and a National Adaptation Plan (NAP), (iii) a Nationally Determined Contribution (NDC) and (iv) a strategic framework for flood management.

168. The table below presents the main strategic documents to which the project actions are linked

Table 6: Development strategy and project consistency for the BOUCLIER CLIMAT countries

Level	Plan/Strategy/ Policy	Objectives
INTERNATIONAL	Sendai Framework for Action on Disaster Risk Reduction (2015-2030)	This Framework for Action was adopted to reduce all forms of disaster risks. One of the seven goals of the Framework for Action is to "significantly reduce, by 2030, the number of people affected by disasters worldwide, so that the global average rate per 100,000 people during the 2020 - 2030 decade is lower than the rate recorded during the 2005 – 2015 decade".
	United Nations Framework Convention on Climate Change, 1992	One of the principles of this convention is to take risk management measures beforehand with regard to potential immediate and future damage to the environment and health. All actions to be developed within the framework of this project aim to observe the principles of this framework and more specifically the aforementioned principle.
	United Nations Convention to Combat Desertification	This convention aims to combat desertification and mitigate the effects of drought in the countries that are severely affected by drought and/or desertification. The reforestation of the banks scheduled under this project will contribute to achieve this objective.
REGIONAL	Regional Flood Risk Management Strategy and Action Plan (2020 -2025)	The strategic objectives of this document are to: • Improve the collaboration and develop synergy of action between the relevant institutions working in the flood risk management; • Align the approaches to flood risk management within the ECOWAS Member States; • Establish and/or strengthen the flood warning system and the dissemination of climate risk information within the Member States and in the region; • Consider flood risks in development planning in the Member States.
	Mono Basin Authority Strategic Plan (SP) (2023-2027) further implementation authorized by CTA from Benin and Togo	The Strategic Plan aims to: • Value the basin's water resources for sustainable socio-economic development of the States Parties; • Develop and implement the main tools for the Basin water resources management in accordance with national policies and strategies for the integrated management of water resources and the MBA convention.
	ECOWAS Disaster Risk Reduction Gender Strategy and Action Plan (2020-2030)	The ECOWAS Disaster Risk Reduction Gender Strategy and Action Plan (ECOWAS DRR GSAP) aims to help member States to build resilience to natural hazards that is inclusive of all segments of society. While the Action Plan builds on the Disaster Risk Management activities agreed upon by member states and making sure the language is gender responsive.
	ECOWAS Regional Climate Strategy (2022-2030)	The main objective of the ECOWAS Regional Climate Strategy is to support Member States in meeting the challenge of combating climate change, in particular for the fulfilment of their commitments to meet their commitments under the Paris Agreement.
	Strategic Program for Vulnerability Reduction and Adaptation to Climate Change in West Africa (2030)	ECOWAS is seeking a region with no borders, an area in which every inhabitant has access and uses all resources available, through the creation of opportunities and within the framework of sustainable production and environment. The overall objective of this program is to develop and strengthen resilience and adaptation capacities in the sub-region to contend with climate change and extreme climate phenomena.
	ECOWAS Integrated Water Resources Management Policy (2025)	This policy aims to promote an integrated approach to water resources management for economic development and to achieve poverty reduction objectives in the region.
BENIN	National Disaster Risk Reduction Strategy (2019-2030)	The NDRRS aims to make Benin a resilient country, able to prevent, reduce, manage risks and disasters by 2030, and ensure sustainable recovery to provide a healthy living environment. It also aims to increase sustainably the resilience of communities in Benin, its national institutions and its local authorities to disasters.
	Communication on Benin's adaptation under the United Nations Framework Convention on Climate Change (UNFCCC) 2022	Communication on adaptation has the following objectives: • Increase the visibility and profile of adaptation and its balance with mitigation. • Strengthen adaptation action and support for developing countries. • Contribute to the Global Assessment. • Improve learning and understanding of adaptation needs and actions.
	Nationally Determined Contribution (2021 - 2030)	One of the purposes of the NDC in terms of adaptation is to build the capacity to adapt to climate change in all socio-economic sectors (creation of jobs, income, etc.).
	Strategic Plan for the Development of the Agricultural Sector 2025	The SPDAS aims to improve the performance of Beninese Agriculture, allow it to sustainably ensure food sovereignty, food and nutritional security, and contribute to the economic and social development of Beninese men and women. This objective complies with component 2 of the BOUCLIER-CLIMAT project, which aims to promote innovative and climate-resilient agricultural practices.
	Third National Communication, 2019	For the coastal, water resources and agriculture sectors, the TNC has planned adaptation measures such as: • The implementation of an emergency measures plan, • Flood management. • Integrated management of water resources in agricultural systems, • The development of plant and animal production systems that are climate change resilient.
	National Climate Change Management Policy (NCCMP) 2021-2030	In its program of climate change adaptation, the NCCMP plans on: (i) Establishing an effective multi-risk early warning and management system for disasters and natural hazards, including floods and sea level rise,

		ii) Popularizing water resources integrated management in all hydrographic basins with the construction of rainwater reservoirs in rural areas.
	Low Carbon and Climate Resilient Development Strategy (LCCRDS) 2016- 2025	Implementing the actions of the project component 1 meets sub-project 7 of pillar 3 of the LCCRDS which is to reinforce the climate information and natural disaster risk management EWS.
	PANGIRE, 2010-2025	The objectives of PANGIRE are as follows: • Ensure the ecosystems sustainability; • Provide protection against the negative effects of water, both physical (floods) and health (water-related diseases); • Implement a policy to adapt to climate variability and change impacts on water resources.
	National Adaptation Plan (NAP) (2021-2030)	The NAP aims to increase Benin's resilience and adaptation capacity to climate change while reducing vulnerability to climate change impacts by strengthening the adaptation and resilience capacity of local communities and their livelihoods for an economic and social transformation at the national level by 2030.
	Benin Gender and Climate Change Action Plan (2023-2025)	The objective is to promote the effective integration of gender in the implementation of climate change mitigation and adaptation measures in an equitable manner for men, women and vulnerable people. Specifically, this plan aims to: • inform and raise awareness on the interrelationships between climate change and gender; • build the capacities of institutional and community actors for gender-responsive climate actions; • empower women, youth, people with disabilities and rural communities to strengthen their resilience to climate change.
TOGO	Nationally Determined Contribution (NDC), 2021-2030	The NDC aims to promote integrated and sustainable management of water resources, meet present and future needs in terms of adaptation and pave the way of low-carbon development for the country.
	National water policy adopted in 2010	The general objective of the national water policy is to contribute to the fight against poverty and to sustainable development by providing appropriate solutions to water-related problems, so that it does not hinder socioeconomic development.
	PANGIRE 2010-2025	PANGIRE plans to establish a positive framework for good governance by creating prosperous environment for a fair water governance and by reforming the institutional and organizational framework for water resources management.
	National Development Plan (NDP) 2018-2022	The NDP overall objective is to structurally transform the economy, for strong, sustainable, resilient, inclusive growth, creating decent jobs for all and leading to the improvement of social well-being.
	The agricultural policy supported by the strategic plan for the transformation of agriculture in Togo by 2030 (AP-SPTAT 2030)	The overall objective of agriculture in its interactions with other sectors is that it fully contributes in the emergence of Togo and accelerates the economic growth, poverty reduction and improved the living conditions while ensuring social inclusion and protection and respect for the environment.
	Third National Communication, 2015	As for the coastal, water resources and agriculture sectors, the TNC has provided for adaptation measures, such as: • The implementation of an emergency measures plan, • Flood management. • Integrated management of water resources in agricultural systems, The development of plant and animal production systems that are climate change resilient.
	Strategic Investment Framework for Environment and Natural Resources Management in Togo (CSIGERN 2018-2022)	The Strategic Investment Framework for Environmental and Natural Resource Management (CSIGERN) aims to further encourage public, private and civil society actors and intergovernmental organizations to coordinate their efforts to better exploit the country's environmental, economic and social potential.
	National Implementation Strategy for the United Nations Framework Convention on Climate Change	This strategy aims to mobilize the various categories of actors around development strategies that consider climate change issues. It identified measures to be taken to reduce as much as possible the uncertainties linked to both activity data and greenhouse gas emission factors. For the agricultural sector, it recommended, among other strategies, improving the efficiency of production and promoting the use of less polluting techniques and limiting the risks related to the dangers of global warming and climate change due to greenhouse gases.
	National Action Plan for the implementation of the National Framework for Climate Services (NFCS) in Togo adopted in 2009	The plan aims at strengthening the capacities of the main structure providing climate services in Togo, the Direction Générale de la Météorologie Nationale (DGMN). The key sectors agreed in this process are five (5): (i) disaster risk management, (ii) energy, (iii) health, (iv) water resources and hydrology, (v) agriculture and food security.
	National Strategy for Reducing Emissions from Deforestation and Forest Degradation (REDD+) 2020-2029	REDD+ aims to reverse the trend of forest degradation and deforestation by opting for sustainable management of existing forests and increasing forest cover to 30% by 2050, leading to carbon sinks and effective carbon sequestration.
	National Reforestation Strategy of 1,000,000,000 seedlings for the 2021-2030 decade campaign	The objective of this strategy is to contribute to defining the roles and responsibilities of actors in the implementation of the ten-year ambition: to increase the national forest area in order to mitigate the effects of climate change and reduce poverty. Expanding the forested areas will allow the satisfaction of the population's needs in wood and non-wood products, the creation of green jobs, and the particular attention to fulfilling the basic needs of vulnerable groups (women and youth). Additionally, it aims to reconstitute soil fertility through the increased integration of agroforestry species in agricultural production systems.
	Development and Management Plan 2016-2025 of the Togo protected area complex	The development and management plan aims to make the Togo protected area complex as a sustainable biodiversity management area and a pole of socio-economic development. Its objectives are to: (i) reduce the factors leading to habitat degradation and loss of wildlife, (ii) improve the institutional and technical framework for complex management, (iii) put in place the basic infrastructure for complex development and management, (iv) contribute to the improvement of the livelihoods of the riparian populations, and (v) promote research, education and training activities.
	Simplified Development and Management Plan of the Community Area of Biodiversity Conservation Area of the Dévé Swamp Forest (2018-2022)	The general objective of this management plan of the Community Biodiversity Conservation Area of the Dévé Swamp Forest is to conserve and restore the forest's ecosystems as well as the associated wildlife and plant resources, in order to enhance their value and local development. The specific priorities to be considered in implementing the management plan are as follows: - ensure the protection and restoration of natural ecosystems;

		- promote existing activities, economically profitable and compatible with conservation for the local population; - contribute to the self-management of the local management structures put in place; - mobilize financial resources; - establish a communication and monitoring-evaluation mechanism.
	Development and management plan for the Lake Togbadji Community Biodiversity Conservation Area (2018-2022)	The overall objective of the Lake Togbadji Biodiversity Conservation Area is to safeguard Lakes Togbadji and Egbo and to restore ecosystems, in order to create ideal conditions for the return of wildlife and benefiting local populations. Specifically, the priorities to be considered in the implementation of the management plan are: - ensure the preservation of Togbadji a BOUCLIER-CLIMAT/Mono nd Egbo lakes and related natural ecosystems; - promote alternative economic activities that are profitable and compatible with conservation for local populations; - contribute to the self-management of the local management structures that have been put in place; - mobilize financial resources for the implementation of conservation activities; - put in place a communication and monitoring-evaluation mechanism.
	Update of the Management Plan for the RAMSAR 1017 site (basse couffo valley, cotiere lagoon, aho channel, lake aheme) 2022-2032	The overall objective of this management plan is to strengthen the conservation, wise use and restoration of the wetlands of Ramsar site 1017.

F. Alignment with national technical standards

169. The project is consistent with the environmental, social and gender policy of the Adaptation Fund, and with national environmental and social regulations in both countries.

170. Minor negative impacts of the project could arise from some of the activities under component 2, related to the implementation of priority actions in the areas of the basin most vulnerable to climate change. Indeed, within the framework of the project, activities of restoration and mechanical protection of degraded banks will be implemented. The realization of the small collection infrastructures of runoff water, the implementation of actions of conservation of water and soils/defense and restoration of soils (CWS/DRS) will contribute to attenuate the intensity of the floods and thus the pollution of water, to recharge the groundwater and to restore the ecosystems.

171. The implementation of the Income Generating Activities will consider the alignment and compliance with the environmental and social safeguards, to avoid any harm on the different environment components. However, the project will comply with all relevant agricultural, water and soil resources, environmental and social standards.

172. The activities planned under the project have been proposed in consultation with the implementing entities, ensuring that they comply with the relevant technical standards in each country. An environmental impact assessment will be carried out prior to the implementation of these activities.

173. Also, the site selection criteria applied by the countries have considered, among other things: the fragility of the ecosystem and the vulnerability of the environment and the populations. The protection of the environment (particularly land and water) is a major issue for the project, and the training modules will help to raise awareness on this subject. The table below presents the national laws and regulations of the countries concerned regarding agriculture, land, water and soil resources, as well as the environmental and social standards that will be respected during the implementation of the project.

Table 7: Alignment with technical standards

Country	Relevant national technical standards
Benin	▪ Law n° 2018-18 OF 06 AUGUST 2018 on climate change in the Republic of Benin ▪ Law n° 2010-044 of 21 October 2010 on water management in Benin, ▪ Decree n° 2012-227 of 13 August 2012 establishing the water development and management plan. ▪ Law n°93-009 of 02 July 1993 on the forest regime in the Republic of Benin ▪ Law n°2002-016 of 18 October 2004 on the fauna regime in Benin ▪ Law n° 91-004 of 11 February 1991 on phytosanitary regulations in the Republic of Benin ▪ Law n° 98-030 of 12 February 1999 on the framework law on the environment ▪ Decree n°2017-332 of 06 July 2017 on the organization of environmental assessment procedures in the Republic of Benin ▪ Law n°2017-15 modifying and completing Law n° 2013-01 of 14 August 2013 on the land and property code in the Republic of Benin and its application decrees ▪ Law n°2022 -04 of 6 February 2022 on public hygiene in the Republic of Benin.
Togo	▪ Law 2010 - 004 of 14 June 2010 on the Water Code in Togo ▪ Law No. 2008-005 of 30 May 2008 on the framework law on the environment ▪ Law on the Mining Code: Law n° 2003-012 modifying and completing Law n° 96-004 of 26 February 1996 on the Mining Code ▪ Law n° 64-I4 of 11 July 1964 on the regulation of fishing ▪ Ordinance n° 12 of 6 February 1974 to lay down land and property legislation ▪ Order No. 012/MERF of 17 April 2007 to set up the national consultation platform for the prevention of risks and natural disasters. ▪ Decree No. 97-227/PR of 22 October 1997, approving the Disaster Relief Organization Plan or ORSEC-TOGO plan

G. Project duplication

174. Several projects on sustainable natural resource management and strengthening adaptation with objectives including improving water management and livelihoods, reducing the impacts of flooding and erosion, and strengthening the resilience of local communities to extreme climate events are being implemented in the Mono River Basin. Some are still under implementation and others are in preparation. Development initiatives in the Mono River Basin are funded by the

two countries sharing the river, donors, NGOs and Partners. The Bouclier Climat Project will build on the achievements of previous initiatives and for the ongoing ones, the project actions will be planned to ensure good complementarity and coherence in the basin. In addition, the stakeholder's consultation process which is initiated during this step of the project preparation will be deepened during the full proposal stage to reinforce the participatory approach. This process is essential to emphasize synergies and complementarities and to ensure no overlap or duplication among projects or between the various financing sources.

175. The table below outlines the initiatives for which the project could develop a complementarity.

Table 8: Related projects/programmes in the Mono River Basin and synergies

Project	Objectives	State of implementaion	Funding source	Intervention zone/extend	Link with BOUCLIER-CLIMAT project (Duplication/Complementarity)
Regional Partnership on Water and Environment in Central and West Africa (PREE-ACO)	Setting up the management structures (Local Water Committee); Strengthen the capacities of the Mono basin observatory through training and the installation of measuring equipment.	Under implementation	SIDA/UICN	Regional (Benin-Togo)	**No Duplication:** Contributes to strengthening the actions of component 1 and 3 of the Bouclier project, in particular the achievement of outputs 1.1.1 and 3.1.1. Indeed, the monitoring equipment installed will enable the extension of the basin monitoring network which will be further consolidated by the Bouclier project. In addition, PREE-ACO will support the provision of reliable data for the operation of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS). Similarly, the technical and institutional capacity building actions of PREE-ACO will be an important lever for the development and implementation of the Bouclier project.
WASCAL Programme : Hydrometeorological observation of transboundary basins	Training, acquisition and installation of hydrometeorological measurement equipment in the Mono basin.	Under implementation	German Federal Ministry of Education and Research	Regional (Benin-Togo)	**No Duplication:** Contributes to the implementation of component 1 of the project, in particular the achievement of the hydro-agro-climatic (surface and groundwater, meteorological) monitoring network improvement and data and information production. The measurement networks established in this framework will be strengthened and used for the implementation of the Mono-RCbFEWS.
RIWE-Mono: Regional Initiative for Water and Environment in the Mono River Basin	Generate global environmental benefits through enhanced cooperation between Togo and Benin on the Mono River Basin	Under preparation (PPG stage)	GEF/IUCN	Regional (Benin-Togo)	**No Duplication:** The RIWE project which will be implemented by MBA, GWP-WA and OSS aims at developing the Transboundary Diagnostic Analysis (TDA) with and a Strategic Action Plan (SAP) 2023-2027 for the Mono River Basin. The project will establish the technical and scientific basis (e.g. regional database and hydrological model) as well as tools for long-term planning and governance of water resources in the basin (e.g., TDA/SAP, governance bodies, etc.). Indeed, the RIWE will develop complementarities with the Bouclier Project mainly its component 2 on concrete adaptation actions on the ground.
Initiative for Sustainability, Stability and Security in Africa (Initiative 3S)	Contribute to the setting up of the Mono basin observatory, necessary for the knowledge and monitoring of water resources and ecosystems of the Mono basin.	Under implementation	IFAD	Regional (Benin-Togo)	**No Duplication:** Complementarity between the two projects regarding the training actions and monitoring network and data production for knowledge improvement as well as the Mono-RCbFEWS.
CLIMAFRI project	Co-develop and co-implement adaptation strategies for sustainable flood risk and natural resource management in the transboundary Mono River basin Establish a river basin information system by integrating scientific data with information and knowledge of local stakeholders and communities	2019 - 2022	German Federal Ministry of Education and Research	Regional Lower basin (Benin-Togo)	**No Duplication:** CLIMAFRI's actions are mainly related to the production of scientific data and information. The results of the project will therefore be relevant for the implementation of the Bouclier project 's activities, in particular for the development and deployment of the Mono-RCbFEWS

Project	Objectives	State of implementaion	Funding source	Intervention zone/extend	Link with BOUCLIER-CLIMAT project (Duplication/Complementarity)
	Train professional staff in multiple scientific and technical aspects during the process of establishing the information system and to integrate the information system within the responsible authorities in the (transboundary) region				
WACA Project - West African Coastal Resilience Investment Project	Contribute to improved management of shared resources and risks integrating climate change affecting communities in the south and coastal area of the basin.	2018 - 2023	World Bank	Regional Lower valley of the Mono Basin (Benin-Togo)	**No Duplication:** The complementarities will be in the development of the physical and social investments of component 2 of the project BOUCLIER-CLIMAT/Mono. Thus, the Shield project will reinforce and consolidate the achievements of the WACA project through the scaling up of some of the latter's actions, where possible.
BRIDGE "Building dialogue and governance around rivers »	Contributes to shared water resource management, organization and training of local stakeholders and development of hydro-diplomacy in the basin.	Under implementation	IUCN	Regional (Benin-Togo)	**No Duplication:** Complementarity and reinforcement of the actions of the component 3 of the present initiative with regard to the MBA capacity building. The Bouclier project will definitely consider the results and achievements of this project and build on them when planning the various stakeholder capacity building activities.
Water, Sanitation and Hygiene Sector Support Programme (ProSEHA)	Develop actions for the integrated management of water resources in the Mono basin (protection of ecosystems, food security and capacity building of local stakeholders). Also contribute to the development of management tools (SDAGE, SAGE).	Under implementation	GIZ	National Benin	**No Duplication:** GIZ has long experience in the basin, particularly on issues of drinking water supply and recently on the implementation of IWRM and adaptation to CC. Important achievements are available and will serve as a basis for the project planning, which in turn will contribute to strengthen these achievements. indeed, the actions under the component 1 of the project will built on the ProSEHA project achievements and contribute to they complementarity and strengthening
Lower Mono River Valley Development Project	Contribute to the improvement of food security and poverty alleviation of rural populations	Under implementation	BOAD, BADEA	Regional Benin-Togo	**No Duplication:** All the activities of the BOUCLIER-CLIMAT/Mono project, especially activities under components 1 and 2, present complementarities with this project. Specifically, the Bouclier project will to take into account the planning and the achievements of the project for the planning of its activities under component 2, outcomes 2.2 and 2.3 aiming at the sustainable development of ecosystems and water resources as well as the implementation of other concrete adaptation measures on the ground.
Mono Transboundary Biosphere Reserve Management Project	Improving the conservation of marine and coastal ecosystems and the use of ecosystem services	Start in 2022	European Union	Regional Lower part of the basin	**No Duplication:** The project actions will be concentrated in the downstream and coastal part of the project. Complementarity will be sought with the activities of the Bouclier project to be developed in this part of the basin, in particular those related to Component 2, Outcome 2.2and Output 2.2.1

Project	Objectives	State of implementaion	Funding source	Intervention zone/extend	Link with BOUCLIER-CLIMAT project (Duplication/Complementarity)
AGIR-Eau - Benin	Improve policy framework for IWRM integrating gender and climate change resilience	Start January 2022	GIZ	National Benin	**No Duplication:** The actions of components 1 et 3 of the project will contribute to the complementarity and strengthening of the results of this project: This GIZ support has recently started and focuses on the implementation of IWRM (institutional and field actions) in the national portion of the basin in Benin. It will also support the strengthening of monitoring networks and the production of hydroclimatic data and information. To this end, the Climate Shield project will benefit for the Beninese part from the project's assets, especially for its component 1 (Mono-RCbFEWS) and component 3 (Capacity Building).
Project for the hydro-agricultural development of the Lower Mono Valley	Strengthen food self-sufficiency and improve the standard of living of rural populations by developing an agricultural perimeter with total water control for the cultivation of rice and market garden produce	Closed	BADEA	National Benin	**No Duplication:** The complementarity of the project is linked to the project's component 2, in particular the implementation of income generating activities. BOUCLIER-CLIMAT/Mono project will built on the achievement and best practices of this project
Project for the development of multifunctional hydraulic infrastructures and sustainable management of water resources (PDIHM/GDRE)	Project focusing on water resources data collection, valuation studies and identification of sites for dam construction and improvement of legal frameworks	Under implementation	National budget	National Benin	**No Duplication:** Synergy and complementarity with the component 1 activities with regard to the integrated basin-wide climate risk assessment and monitoring model: The PDHIM project focuses on the management and development of water resources in the Beninese part of the basin: reinforcement of measurement networks as well as the development of water mobilization and development infrastructures (surface and groundwater). PDHIM also plans to develop water from artesian wells, similarly to the BOUCLIER-CLIMAT/Mono project (Component 2). There are several points of complementarity and synergy between the two projects. To this end, the BOUCLIER-CLIMAT/Mono project will absolutely take into account the achievements and planning of PDHIM in order to avoid any duplication
Community-based Marine and Coastal Biodiversity Management Project (PGCBMC)	Contribute to the sustainable management of the biological and ecological diversity (national and international benefit) of coastal wetlands and other associated ecosystems in the coastal zone	Closed	GEF	National Benin	**No Duplication:** The achievements of this initiative, particularly those related to soil protection and conservation, will help to scale up and strengthen some of the achievements of the PGCBMC project
Development of hydro-agriculture downstream of the Nangbeto dam	Contribute to feasibility studies for hydro-agricultural developments and the development of climate change adaptation measures in the Mono basin.	Under implementation	UEMOA - ECOWAS	National Togo	**No Duplication:** Complementarity and reinforcement of the actions of the component 2 of the present initiative with regard to small-scale irrigation development activities. Activities under component 2 of BOUCLIER-CLIMAT/Mono project present complementarities with this project. Indeed, BOUCLIER-CLIMAT/Mono project consider planning and achievements of the to avoid duplication but also de strengthen the project achievement.

Project	Objectives	State of implementaion	Funding source	Intervention zone/extend	Link with BOUCLIER-CLIMAT project (Duplication/Complementarity)
Anié dam and irrigation scheme in Togo	To contribute to the irrigation of the exploitation of the Sino-Togolese society	Under implementation	Sino-Togolese Society	National Togo	**No Duplication:** The complementarity of the project is linked to the project's component 2, in particular the implementation of income generating activities
Local Climate Adaptive Living facility : LoCAL (program)	To achieve two main objectives : • Local climate governance is strengthened and enables the integration of appropriate adaptation responses in local development planning processes. • Access to climate finance at the local level is enhanced and increases the share of adaptation investments in key climate sensitive sectors.	Under preparation (SAP Full proposal)	GCF	National Benin	**No Duplication:** The two projects have common intervention areas such as: the communes of Athiémé, Grand-Popo and Lokossa (in the Mono department) and the commune of Bassila (in the Donga department). The project's complementarity is also linked to Component 1 (early warning system) and Component 2, in particular the improvement of water availability and the preservation of ecosystems.
Scaling up Climate-resilient Rice production in West Africa- RICOWAS	To improve the resilience to climate change and increase the productivity of smallholder rice systems in West Africa using a climate-resilient rice production approach, benefiting 13 ECOWAS countries	Under implementation (2023-2026)	Adaptation Fund	Regional (Benin, Burkina Faso, Ivory Coast, Gambia, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo)	**No Duplication**: The complementarity of the project is linked first to the common intervention area which is the Mono department (in Benin) and in the Maritime region (in Togo). Secondly, this complementarity is also linked to component 2 of the project, in particular the improvement of the availability of water resources (quantity and quality) (Output 2.1.1) and the improvement of the resilience and adaptive capacities of populations to climate change (Output 2.3.1).
Project CREWS Togo : Climate Risks & Early Warning Systems (CREWS)	To improve the Togolese Government's warning services in case of drought, floods and other climatic, hydrological and severe weather phenomena, by strengthening the capacities of the national services in charge of meteorology and climate, hydrology, civil protection, agriculture and food security.	Under implementation (2021-2023)	World Bank and WMO	National Togo	**No Duplication**: The complementarity of the project is linked to the project's component 1 (EWS).
Groundwater for Deep Resilience in Africa (G4DR in Africa)	Sustainable development, protection and planning of groundwater for investments in safety and resilience of populations and ecosystems.	Under preparation (Full proposal)	GEF/FAO	Regional (Benin, Togo)	**No Duplication:** There is complementarity, particularly in terms of protecting drinking water infrastructures against flooding in rural areas

H. Learning and knowledge management

176. Component 3 of the project focuses on documenting and disseminating the knowledge generated, targeting beneficiaries, stakeholders, and other basin organizations. The education sector will play a crucial role in spreading this knowledge to foster a departure from case-based development. Dissemination of best practices is expected to enhance learning outcomes and promote the replication of successful strategies by governmental and community entities within the basin and beyond. Various mechanisms will be used to ensure effective coordination and widespread sharing of the project's achievements across the two-member countries of the MBA.

177. Consequently, at the start of the project, a knowledge management strategy to capitalize on existing climate information, facilitate information sharing among stakeholders, and disseminate project results will be developed. The knowledge shared will be relevant, linked to strategic objectives, practical, replicable, and accessible.

178. To this end, the project will identify, analyze, and share lessons learned that could help design similar projects in the future, as part of actions to build institutional capacity and resilience of vulnerable communities on climate change adaptation practices in the Mono Basin. Lessons learned and best practices on community and ecosystem-based adaptation interventions will be collected regularly through trained local communities.

179. To meet the diverse needs of stakeholders, the project will create and distribute knowledge materials. MBA, based on its experience in producing and disseminating thematic manuals, will develop a knowledge capitalization manual that focuses on best practices in managing climate impacts on water and on effective climate impact management, for use by young people. Additionally, a web platform will be established where project data and information will be systematically shared with the public and made available on partner websites such as OSS, GWP-WA, and MBA. Advocacy notes will also be prepared and disseminated. The project will facilitate the exchange of good practices between countries to encourage interaction and collaboration

180. Existing tools such as the African Water Information System (AWIS) will be used and dissemination of lessons learned will include web-based information dissemination and presentations in national and regional forums. Launched in 2007, the African Water Documentation and Information System (AWIS) is a collaborative initiative spearheaded by institutions including CREPA, OMVS, ANBO, pS-Eau, IOWater, and WEDC. AWIS enhances information management in the African water sector by facilitating the exchange of knowledge and experiences among water professionals, communities, and governments across the continent. Additionally, AWIS plays a pivotal role in capturing and disseminating project results and lessons learned, promoting effective water resource management practices throughout Africa. Other broader dissemination channels may include social media (Facebook, LinkedIn, Twitter), mass media (radio and television services using local languages as well as non-technical languages), and videos for dissemination of good practices. In addition, Regional and global events (conference symposia, various workshops, and meetings) can be used to help disseminate project results and lessons learned.

181. The project focuses on building resilience against recurrent flooding and promoting sustainable, equitable management of water resources and ecosystems. Awareness campaigns will promote the adoption and benefits of climate-resilient practices in other countries. Training and capacity strengthening will follow a flexible framework, allowing for module adjustments as needed. This will enable the customization of content to local conditions, fostering effective information exchange, experiential learning, and the dissemination of new knowledge. The envisioned activities of capacity building and climate change adaptation will promote a proactive approach to climate-resilient planning and development by local authorities in both Togo and Benin. The uptake and sustainability of climate-resilient adaptation solutions beyond the project in other national sub-basins in both countries will be promoted through awareness campaigns that highlight the benefits associated with investing in climate-resilient practices. The list of proposed trainings is presented in the below table.

Table 9: Proposed trainings and capacity strengthening events for the BOUCLIER project

Topics of trainings	Objectives & themes	Type, methods, number of trainings	Project time period	People to be trained
Risk Management and Early Warning Systems	-Early warning systems and hydro-climatic risk management -Modeling and analysis of climate and hydrological data -Governance and institutional management of warning systems	- At least 5 national trainings in-class	1st year: Introduction 2nd year: In-depth training 3rd year: adapted modules adjusted to needs	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff
Wetland and Ecosystem Management	-Management of wetlands and RAMSAR sites -Ecological restoration techniques and coastal ecosystem conservation -Integrated watershed management	- At least 10 national trainings in-class combined with field visits and hands-on training	1st year: Introduction 2nd year: In-depth training 3rd year: adapted modules adjusted to local needs	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff
Nature-Based Solutions and Reforestation	-Nature-based solutions (NbS) for reforestation -Assisted natural regeneration of degraded areas -Sustainable land and ecosystem management practices	- At least 10 national trainings in-class combined with field visits and hands-on training	1st year: Introduction 2nd year: In-depth training 3rd year: adapted modules adjusted to local needs	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff
Land Management and Livestock Production	-Planning and rehabilitation of livestock corridors -Sustainable management of grazing areas -Techniques for combating land degradation -Short-cycle livestock production and integration with cereal and legume cultivation	- At least 10 national trainings in-class combined with field visits and hands-on training	1st year: Introduction 2nd year: In-depth training	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff

	-Intercropping and crop rotation techniques -Integrated management of agricultural and livestock production systems		3rd year: adapted modules adjusted to local needs	
Fishing Techniques and Aquatic Ecosystem Management	-Climate-resilient fishing techniques -Sustainable fishing practices and management of aquatic ecosystems -Impact of climate change on aquatic ecosystems	- At least 10 national trainings in-class combined with field visits and hands-on training	1st year: Introduction 2nd year: In-depth training 3rd year: adapted modules adjusted to local needs	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff
Improved soil management	- Teach principles of good soil management - Identify and teach good soil management practices for each climate zone and rice system	- At least 10 national trainings in-class combined with field visits and hands-on training - Field visits and hands-on trainings	1st year: Introduction 2nd year: In-depth training 3rd year: adapted modules adjusted to local needs	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff
Improved water management	- Teach principles of good water management - Identify and teach good practices for each climate zone and rice system	- At least 10 national trainings in-class combined with field visits and hands-on training - Field visits and hands-on trainings	1st year: Introduction 2nd year: In-depth training 3rd year: adapted modules adjusted to local needs	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff
Equipment and Product Processing	-Use and maintenance of fishing equipment -Processing techniques for fishery products -Management and storage of fishery products -Collection, storage, and processing techniques for agricultural and fishery products -Preservation and packaging of food products -Management of processing and packaging units	- At least 10 national trainings in-class combined with field visits and hands-on training	1st year: Introduction 2nd year: In-depth training 3rd year: adapted modules adjusted to local needs	- ToT for Ministries and extension staff, researchers, NGO staff, farmers' association staff
M&E data collection training	-Implement M&E methodology in a decentralized manner	- 2 regional ToT trainings for NEE staff - 5 national trainings for data collectors	1st year: regional training on M&E system 1st year: national trainings for decentralized implementation of M&E system	- M&E officers of project associated with NEE - Extension, NGO and farmer association staff who collect data in the field

182. In the third quarter of the second year of implementation, a mid-term evaluation of the project will be conducted to review the results achieved, lessons learned, the overall status of the project against plans, partnerships established under the project, and linkages with other initiatives, in order to make forward-looking recommendations regarding the overall relevance, strategy, and approach of the project, and future activities in particular.

183. At the end of the project, a post-project evaluation will be conducted with the different categories of beneficiaries and stakeholders (government agencies, civil society, and local communities) to assess the lessons learned, the effects and impacts of the project, and its sustainability. The evaluation will also examine the overall management of the project, reports and outputs in terms of relevance, quality and applicability. This report will be prepared in close collaboration with the key stakeholders listed above.

184. An appropriate budget (US$1,000,000) will be allocated to ensure the successful implementation of knowledge management and lesson dissemination activities.

I. Consultative process

185. The BOUCLIER-CLIMAT/Mono project is prepared following the three-step approach of the Adaptation Fund: (i) development of the PRE-CONCEPT NOTE, (ii) development of the CONCEPT NOTE and (iii) production of the project document (FULL PROPOSAL). Stakeholder consultation is progressive according to the level of project formulation. This consultative process addresses the description of the approaches developed in the three stages.

186. At the PRE-CONCEPT NOTE stage, the process started with the first consultation with relevant agencies and ministries at the national level in the two-member countries (Benin and Togo). The project idea was then analyzed and validated by the MBA Technical Committee of Experts (gathering representatives of the different sectoral ministries of the two countries) in coherence with the national water resources management policies. Following a regional assessment, the MBA has established mechanisms for the involvement of stakeholders concerned with water and related resources management at the basin level. This facilitates stakeholder consultation during the project development process.

187. At the CONCEPT NOTE stage, the consultative process has been developed through two complementary approaches. The first involved direct meetings with institutional stakeholders such as MBA, the Directorate General for Water, the Country Water Partnership (CWP-Benin), the National Early Warning System (EWS) Focal Point, the Ministry of the Environment, Youth Volunteers for Environment (YVE) NGOs (Benin and Togo), etc. The second was virtual and consisted of meetings with the local authorities and the local communities. For the virtual approach, online questionnaire forms were designed and sent to the targeted actors. The questionnaire was validated by OSS, the Regional Implementation Entity. Table 10 provides an overview of the different categories of stakeholders consulted and a description of their main roles during the project preparation.

188. In addition to the above approaches, a regional consultation workshop took place from April 14th to 15th, 2022 in Benin (Cotonou) to collect the expectations and needs of the participants as well as to agree on the priority aspects for integration in the concept note (CN). The workshop is also an opportunity to exchange with the participants on the scope of the

project and its objectives. The consultative meeting brought together, actors from the Ministry of Water, Environment, Agriculture, local authorities and civil society from Benin and Togo, including representatives from MBA, OSS, and GWP-WA. The detailed report of the consultative meeting is provided in annex 5.

189. The design and implementation of the project is carried out in accordance with OSS guidelines, the Environmental and Social Policy (ESP) of the Adaptation Fund, as well as the national environmental regulations of each member country and the required technical standards. It will be elaborated further during the FULL PROPOSAL phase where all stakeholders will be consulted including beneficiaries, vulnerable groups, women and youth associations, NGOs, etc. Environmental assessment tools such as the Environmental and Social Management Framework (ESMF) and/or Environmental and Social Impact Assessments (ESIA) will be triggered to analyze the environmental risks and impacts that could be generated by the implementation of the project activities in order to plan their management and/or control by means of the specific environmental and social safeguard instruments required for all stages and scales of implementation.

190. Full proposal development process: As in the pre-concept note and concept note stages, the consultation process continued at the full proposal stage with the same spirit of collaboration between the various stakeholders, in particular the OSS, MBA, and GWP-WA. The good practices and lessons learned from these first two stages were considered and internalized in order to improve the participation of all the stakeholders in the project and the consideration of their various needs and recommendations to finalize this third and last stage of the BOUCLIER-CLIMAT/Mono project development process. In view of the various aspects to be addressed, a multi-level consultation process was initiated under the direction and supervision of the OSS and in perfect collaboration with the technical and logistical support of the two regional implementation agencies, namely the ABM (Lead agency) and the GWP-WA (Co-execution). The three levels of this consultation process are as follows:

Visits to the pre-selected sites/areas and in-depth consultations with local stakeholders and potential project beneficiaries: Site visits and meetings were conducted jointly with OSS, ABM, and GWP-WA, and attended by representatives from Benin and Togo including the Directorate in charge of water resources management, the Agency for Civil Protection, and the Designated National Authority. The main goal was to understand and deepen stakeholder expectations and consolidate their commitment to the project. Tools used included data collection questionnaires, consent letters, attendance and photo consent forms, the FPIC Process guide, and a stakeholder interview guide. The site visits in Togo from March 20 to 22, 2023, covered five pre-selected sites: Datcha and "Fin Digue" near the Nangbéto dam in Ogou 2, Haho 2, Aklakou Zongo, and Agbannakin in Lac 2. In Benin, from March 23 to 24, 2023, the visits included Kpatcha-Condji village in Grand Popo, degraded ecosystems in Athiémé, Lake Togbadji between Lokossa and Dogbo, the irrigated perimeter of Dévé in Dogbo, and the community forest of Gbidji. These sites were chosen for their environmental significance and categorized as flood-risk areas, sites of ecological interest (including RAMSAR sites), fluvial ecosystems, multi-use water sites, and headwaters. Key challenges identified included disruption of agricultural cycles, population displacements, flooding-related mobility issues, inadequate infrastructure, insufficient early warning systems, lack of potable water, tributary delimitation, income-generating challenges, land tenure conflicts, farmer-breeder disputes, and limited technical and material capacities. The solutions and community expectations were thoroughly integrated into the final project proposal, enhancing the strategy to address these issues, with further details provided in Annex 6.

(i) **National consultations**: These took place in Togo and Benin respectively, and involved feedback on the results of the site visits. Representatives of ABM, GWP-WA, OSS, Adaptation Fund Focal Points and Water Directorates attended these meetings.

- The Togo stage took place on Wednesday March 22, 2023. Problems identified at the sites visited included riverbank degradation, deforestation, land tenure, silting, pollution, flooding, and access to drinking water and electricity. The Anié 2 site was not visited, but deserved to be considered as far as possible, given its similar vulnerability to the sites visited. The site known as "fin digue" was asked to be given the utmost importance, as it is a heritage site to be preserved. The proven experience of a private player in the field of fish farming observed in the field deserves to be supported and reinforced during the implementation of the project.
- The national consultation for Benin took place on Friday March 24, 2023. The sites visited on behalf of Benin are located in the downstream part of the Mono River, which is particularly prone to flooding. The current operation of the basin's Early Warning System does not take Benin's part of the river into account. This dysfunction must be corrected when the project is implemented. Given the scale of the problems caused by flooding, it was suggested that interventions should be targeted to achieve greater impact and optimize resources. The Dévé rice-growing site deserves special attention, as it offers exploitable potential in terms of stakeholder organization and extension possibilities. Women's groups deserve support to strengthen their income-generating activities.

(ii) **Regional stakeholder consultation workshop**: This hybrid workshop (face-to-face and virtual) was held in Cotonou at the Glory Palace Hotel on Tuesday, March 28, 2023. Thirty-four (34) participants attended this regional workshop, which aimed to agree on the priority aspects to be integrated into the detailed project document to be submitted to the Adaptation Fund (AF).

Table 10: Main actors and their main roles during the project preparation

Key categories of actors	Description of key roles
Mono Basin Authority (MBA), Executive Directorate	- Lead regional organization that will coordinate the project activities execution. - During the project preparation, MBA will facilitate and provide all required data and information. - During the project execution, MBA will facilitate community mobilization as well as the monitoring the project progress.
MBA National Focal Points (in Benin and Togo)	- Support the MBA in data collection as well as identification of Flood Early Warning System (FWS) equipment - Identification of ongoing and planned initiatives and projects at national level - Stakeholder identification and community mobilization
Mono Basin Committee	- Support the MBA in data collection, community mobilization - Identification of ongoing and planned initiatives and projects at the basin scale - Stakeholders identification
Research institutions: WASCAL and Water Departments	- Provide technical and scientific expertise/advice - Provide scientific data and information - Support in project execution. - Member of the Regional Steering Committee.
National Civil Protection Agency in Benin	- Vulnerability assessment - Identification of needs/activities - Identification of Flood Early Warning System (FWS) equipment
Various projects management under implementation Units	- Identification of completed, ongoing and planned initiatives and projects in the mono river basin
National governmental bodies: *Technical departments of the sectors in charge of water, and others in charge of related sectors (agriculture, environment, etc.) in the 2 countries*	- Provide inputs during project preparation and execution. - Participate in both Project management at national level - Member of the Steering Committee to provide technical guidance
Local actors: *Decentralized bodies, Local Coordination Committees*	- Provide guidance and technical assistance for the project preparation on key activities - Support in project execution.
National Adaptation Fund Focal Points	- Provide support to the preparation and execution of the project in the use of satellite data for natural resources and ecosystems monitoring. - Identification of completed, ongoing and planned initiatives and projects in the mono river basin
Civil Organization actors (NGOs) at national and regional levels	- Support to the project management team. - Support in training, community awareness on climate change issues, water resources management and development and advocacy.
Users Socio-professional organizations (farmers, fishermen, etc.); Women and/or youth organizations	- They are among the key project beneficiaries on the ground that will be mobilized through their local institutions to participate in trainings and awareness raising sessions as well as pilot actions implementation at local level. - Provide feedback and lesson learned from project activities since their interventions are directly on the ground.

J. Justification of funding request

191. The objectives of the project are fully in line with the focus of the Adaptation Fund. The measures, mechanisms, capacity building and partnership actions that will be developed and promoted under this project will contribute to improving the resilience of communities to flooding in the Mono river basin. Indeed, one of the major climatic risks in the Mono River Basin is recurrent catastrophic flooding. The main drivers are the frequency of exceptional rain events as presented in section PART I1.4 1.4above. In addition, there is poor management of flash floods and spillages from the Nagbeto dam due to the lack of a reliable warning system for the management of the dam. Other drivers include ecosystem degradation and surface states in the basin that are prone to runoff. As outlined in sections 1.2, 1.5 and 1.7 above and in Table 11 below, the socio-economic and environmental impacts of flooding are enormous and inhibit the real development of the basin's already very poor people. The two countries (Benin and Togo) are developing and implementing various action to better manage this climate risk, with the support of technical and financial partners.

192. The population of the two beneficiary countries are still living below the poverty index. According to the World Bank (2023) the population of these two countries are living below the poverty index. Togo was ranked 162nd in the 2022 Human Development Index (HDI), with a score of 0.539 while Benin ranked 166 with an HDI of 0.525 and it is important to build the resilience of the communities against flood risks and improve their livelihoods, particularly in a changing climate.

193. The water and agriculture sectors are crucial for their economic development of the population in the Mono river basin. The Mono River basin has long been for the communities of Togo and Benin a natural capital around which several socio-economic activities are practiced, including agriculture, livestock, fishing, river transport, etc.

194. In Togo and Benin, the agriculture, livestock and fisheries sector accounts for more than 70% of the active population in both countries. The portions of the Mono Basin do not remain outside this proportion. The agricultural sector occupies about 80% of the population in the entire basin. The water and agriculture sectors are very vulnerable and exposed to various climate risks.

195. The BOUCLIER-CLIMAT/Mono project is intended to provide concrete and long-term adaptation measures mainly in floods management as it builds the resilience of the communities. The following table provides an analysis of the scenarios without intervention in this project and a justification of the full cost of adaptation.). The main actions to be deployed in the field will eventually lead to a significant reduction of the impacts of major climate hazards in the basin (cyclical floods in particular), to the improvement of the livelihoods and living conditions of the populations as well as to the development of water resources and associated ecosystems.

Table 11: Analysis of the scenarios without the interventions in this project and justification for the need of this request

Project Components	Baseline: Without any support from the Adaptation Fund	Impacts of the proposed project: with the Adaptation Fund support
Component 1: Setting up/ strengthening tools for climate change resilient management of the Mono River basin **(US$ 2,100,000)**	In the current situation, recurrent floods have had significant socio-economic and environmental impacts. For instance, the flood statistics for 2019 are as follows[13]: flooding of approximately 4,100 hectares of land in the downstream part of the basin; About 15,000 households and more than 60,000 people in nearly 200 villages are affected. The damage was estimated at almost 10 billion FCFA (USD 20 million). According to climate projections, flooding will not only become more frequent but also more severe and with it cause more socio-economic damage to the communities. The Mono Basin Authority (MBA) established (in 2019) by Benin and Togo to coordinate the management and development of the Mono River, faces a lack of technical capacity for providing effective or operational response measures for climate risks in the basin (mainly floods and drought) and reliable data and information for long-term monitoring and planning for proper water resources management and adaptation to climate change.	The Bouclier Project will undertake detailed assessments of vulnerabilities, capacities and exposure to floods and drought events in the Mono Basin and the subsequent development of the related risk management framework and capacities of the stakeholders (especially policymakers, disaster managers etc.) to take risk informed decision-making for Floods and Drought events. In addition, the project will bridge the gap in adaptation measures to integrate future scenarios (economic, urban, climate, environment, etc.) into current knowledge (risks mapping, hydrometeorological features) and practices to improve the future planning and design of concrete adaptation measures or interventions It will provide support to the MBA to enhance its technical capacity to manage flood and other climate risk, mainly flood disasters prevention and management through the establishment of response plans as well as the designing and implementation of a Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS).
Component 2: Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures **(US$ 8,750,000)**	Most of the population of the basin lives below the poverty line and is therefore very vulnerable and most resort to activities which further degrade the environment, often increasing their exposure and vulnerability. Despite this situation, very few organized interventions exist in the basin to engage and transform these communities into climate smart livelihoods and facilitate an increase in the resilience of ecosystems and agricultural production systems to the risk of floods/droughts, The basin hosts 2 RAMSAR habitats and it is projected that climate change impacts will interact with existing land use impacts so that ecosystems, including wetlands to make less resilient and more likely to be significantly affected and less able to adapt .Thus there is an urgent need to protect these areas through the subsidy of income-generating activities and environmental benefits covering agricultural, livestock and fisheries production, etc., processing units and the promotion of non-timber forest products (NTFPs) for the benefit of vulnerable communities, in particular women, young people and people living with disabilities.	It is in the plan of the project to establish concrete adaptation activities that will have the impact of enhancing the integrated management of environmental and ecological systems to sustain climate sensitive rural livelihood in the basin. This will include climate-responsive practices such as climate smart agriculture, water harvesting schemes and sustainable groundwater utilization will not only improve agricultural productivity, but also make production more reliable, contributing to household food security. The activities will facilitate the implementation of Ecosystem-Based Adaptation (EBA) activities to support local communities particularly women who currently depend on rain fed farming to increase their agriculture productivity and food security better to withstand the effects of climate change in future. An adaptation planning plan for the Ramsar wetlands will be developed through a risk assessment and this used to build an understanding of the site's history, existing social and institutional setting and pressures, and relevant climate projections and the likely impacts on the critical components, processes and services of the sites, leading to adequate community led management actions to be undertaken. The outputs of the adaptation planning process will be documented in an adaptation plan, and integrated with existing adaptive management processes for the sites.

[13] UNITAR &UNOSTAT (2019). Inondations : Analyse des images du 26 Octobre 2019 - Préfecture de Lacs, Région Maritime, Togo. FL20191029TGO. http://floodlist.com/africa/togo-benin-mono-river-floods-october-november-2019; https://www.unitar.org/maps/map/2963
https://www.worldbank.org/en/publication/human-capital

Component 3: Strengthening the capacities of different actors, share knowledge and raise awareness among all beneficiaries at different levels **(US$ 1,000,000)**	The Mono River Basin key challenges for adaptation to the impacts of climate change are a lack of data and information on current and future flood hazards and risks. The communities have limited awareness on the risks and adaptation actions. The local institutions suffer from lack of capacity to plan and implement climate resilient and cost-effective interventions and particular with the communities at local communities. The lack of climate knowledge and awareness: lack of educational and training opportunities, lack of technical assistance, information products and services further limit the ability of the communities to integrate effectively climate risk into their daily livelihood activities This leaves the communities highly vulnerable and with no coordinated responses to the risks and disasters and often suffering loss of lives, infrastructure, and poor health outcomes.	The project aims to enhance the development of innovative knowledge management mechanisms for information exchange; training and learning; data creation and analysis; dissemination of lessons learned and best practices and the use of management and decision support tools, and skills for processing and valorization of satellite data in the management of climate risks floods. The awareness of local communities to the impacts of climate change (land degradation, desertification, etc.). They will promote adaptation solutions and be able to facilitate the implementation of adaptation actions with a possibility to scale up the interventions in other sites found in the basin. The systematic coordination between transboundary countries will facilitate the achievement of the common objective to develop concrete risk reduction and climate adaptation measures. Additionally, the project will develop capacities of beneficiaries to review or develop new policy frameworks to integrate climate risks to land, water, environment, livelihood with development plans and practices at local, national and transboundary level on the Mono River Basin. The building of the capacity of local institutions to plan and implement climate resilient and cost-effective interventions already identified capacity shortfalls in the national, district and at local communities. The requested resources from the AF will further facilitate sharing of project results and lessons learned through the use of existing and popular platforms such as electronic and print media, telecom that are easily accessible by the stakeholders will be utilized.

K. Project sustainability

196. The BOUCLIER-CLIMAT project plans to improve the resilience of communities in the Mono River Basin through investments and capacity building of actors, particularly institutions, NGOs working in the basin and vulnerable communities, in order to capitalize on and sustain the benefits and achievements.

197. By the end of this project, the actions could inspire the implementation of similar activities in other parts of the basin that have not benefited from the present interventions. These activities could also serve as a basis for the implementation of future projects.

198. For more efficiency, the following aspects of the sustainability will be targeted during the project preparation and its implementation: financial, institutional, environmental, technical and social sustainability. Another crucial aspect to strengthen the project sustainability is to ensure the sustainability of the realized investments and infrastructure as well as their long-term operation and maintenance with the involvement and commitments of the stakeholders at all levels (local, national and regional/transboundary).

199. **Environmental sustainability:** To ground the environmental sustainability the project through component 2, outcome 2.1 will build resilience of water resources to the impacts of CC through of the groundwater utilization will be through implementing activities that increase groundwater recharge and decrease discharge. Such activities include catchment management activities, improved water availability through promotion of water-saving irrigation technologies (drip irrigation), groundwater recharge and in-ground rainwater harvesting. These interventions will continue to provide benefits to communities beyond the Project lifespan so as to meet their current and future demands.

200. In strengthening the resilience of communities, the project will facilitate the resilience of production systems (land, soil, biodiversity, ecosystems, etc.), for the resilient development of communities. The degradation of the aquatic and terrestrial ecosystems of the river basin is due to anthropogenic pressure on the resources and unsustainable practices in the Mono basin. These degradations include: erosion of the coastal ecosystem, invasive aquatic species, increased sedimentation in rivers, depletion of soils and loss of vegetation cover. Priority actions aimed at the rehabilitation and preservation of degraded areas in the basin will contribute to the objective of strengthening the resilience of ecosystems in the basin, with special emphasis given to the two RAMSAR areas in the basin where wetland management plans incorporating climate change aspects will be developed/updated. Likewise, the river banks show advanced degradation areas in many places and the project will contribute to reversing this trend of land and ecosystem degradation in the basin and to their preservation, all of which is important for the strengthening of community resilience and could contribute to the improvement of the knowledge of the natural risks to which the ecological and human systems of the basin are exposed, and then anticipate the protection measures required to safeguard ecosystem functions.

201. In line with the Social and Environment Policy of the Adaptation Fund, an Environmental and Social Management Framework (ESMF) will be developed as a guide on handling environmental and social issues during project implementation. In addition to the Social and Environmental Impact Assessments, baseline studies and KAP surveys on the status of EWS, climate resilient technologies for water supply, source protection, and waste management will ensure

that such interventions are in tandem with sustainable environmental protection are supported. Periodic monitoring and evaluation to track any changes that could have adverse impacts to the environment and their timely mitigation measures will be considered during the implementation phase of the project

202. **Social and economic sustainability:** The BOUCLIER-CLIMAT project is designed to ensure its socio-economic sustainability through supporting capacity building actions in developing Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS). Establishment for effective flood management in the Mono River basin, source protection measures, catchment management measures, that will enable communities, community leaders and other stakeholders at national, regional, district and local levels within the catchment. Issues of social, cultural and other social values of local communities will be priority issues considered in proposing interventions. Recognition of the role of women and youth in the implementation of the project by all stakeholders is also expected to contribute to sustainability.

203. The project activities will be further refined with the communities through consultation and participatory processes before full scale implementation is undertaken. This will create ownership by communities to project interventions and to their sustainability. Component 2 intends to Improve the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures deploy concrete actions on the ground to strengthen communities' adaptation and resilience. The priority proposed actions include the rehabilitation and protection of about 500 ha of land (headwaters of rivers and degraded river banks) by biophysical protection means (reforestation, agroforestry, assisted Natural Regeneration, etc.), the installation of about 2000 linear meters of mechanical bank protection, the implementation of income generating activities (IGAs) and capacity building actions targeting at least 6500 direct beneficiaries in vulnerable areas.

204. Overall, the implementation of the project activities through component 2 aims to strengthen and diversify the livelihoods and incomes o income-generating activities (IGAs) focusing on those main community-based activities with positive environmental impacts is certainly one way to increase the financial inclusion and therefore resilience of these communities Revolving funds (Low-interest micro-credits) for income-generating activities (IGAs) targeting activities such as small-scale irrigation/ market gardening, fishing, livestock, non-timber forest product processing, ecotourism, beekeeping products for the benefit of women and young people, etc.)

205. The implementation of revolving funds will enable to reach a large number of beneficiaries and will contribute to not only the activities scaling-up but also to the action's sustainability. Indirectly, the whole basin population will be impacted by the project's actions. The project will also enable them to develop economic opportunities through activities such as Non-Timber Forest Products processing and traditional and resilient fishing practices. These actions will help to strengthen the organizational capacity of the communities, enabling them to access micro-credit, enter into direct partnerships with the private sector and empower them well beyond the lifetime of the project.

206. In posterity the promoted social cohesion among groups aids planning for adaptive and climate resilient socio-economic activities such as day to-day operation of public sanitation facilities by women through charging user fees in order to remain socially and economically productive even at project closure. Economically, it is anticipated that reduced losses of assets, lives and other properties as well as reduced waterborne diseases resulting from implementation of Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) and climate resilient water supply infrastructure, sanitation facilities, source protection and waste management that lead to improved capacity for communities to adapt to floods and landslides; will eventually help communities and other stakeholders to enhance incomes, improve livelihoods and ensure economic sustainability.

207. **Institutional, legal sustainability:** The project sustainability has been thoughtfully anchored on its institutional and implementation arrangement, which aims to strengthen ownership of the project by the protected areas' management authorities selected by the two countries. The project is aligned with the national and subnational policies of the two countries. In this sense, the project will work with national and local authorities that are responsible for local development and climate change adaptation, who will constitute key stakeholders for the execution of the project´s activities alongside other strategic partners. This strategy will ensure the required resources are allocated for the long-term maintenance and operation of the project activities. Additionally, the implementation of activities involving key government institutions contributes to guarantee ownership and sustainability once the Project comes to an end. As the activities then become internalized by the ministry in charge.

208. The improvement of knowledge and the development of skills constitute elements of structuring of the actors of the sectors concerned and a lever for performance the BOUCLIER-CLIMAT project will provide in-kind support (staff and resources) to complete activities proposed under the project, such as development of flood and drought risks maps and how they are impacted by climate scenarios. The BOUCLIER-CLIMAT project includes the introduction of new technologies, implement new techniques for the management, adaptation and resilience of populations to the impacts of climate risks in the Mono River basin such as the development and establishment a community-based approach focusing on empowering communities in vulnerable localities to monitor flood risks and prepare for adaptation and resilience, through a coordinated regional approach facilitating hydro-climatic risk modelling at the river basin scale, (ii) more realistic forecasting and adoption of synergistic and effective solutions/interventions, (iii) partnership approach for data/information exchange, experience sharing between national stakeholders and the MBA. This promotes transparent decision making to prevent conflicts over the use of shared resources (water, soil and associated ecosystems) in the Mono basin.

209. Finally, a cooperative management mechanism of the system between the two countries is a necessary condition to guarantee its effectiveness and especially its sustainability. As a result, an institutional and regulatory mechanisms of both countries will be strengthened. In each of the countries concerned, the existing Local Early Warning Units in localities exposed to hydro-climatic risks will be strengthened and revitalized to ensure effective observation, collection and

dissemination of information to protect vulnerable people. They will be supported by community relays. The required trainings and different awareness sessions will reinforce the ownership of the project will conduct the necessary capacity building activities to secure technical capacities are in place for the O&M of these.

210. Another technically important issue is that the long-term sustainability of the project achievements will be ensured by the MBA who will receive the meteorological, hydrological and climatological data and related products from the National Meteorological and Hydrological Services (NMHSs) in the two countries. To this end, formal commitments will have to be obtained from the competent national bodies of both countries in order to guarantee the provision of the required data and information in real time (Example of commitment letters).The government institutions will sign agreements with the Project for the transfer of all procured instruments and will provide a commitment letter where they shall assign a specific department for the proper operation and maintenance of all the procured weather and hydrometeorological instruments to ensure long-term maintenance.

211. Long-term operation/implementation of the Mono-RCbFEWS, maintenance of the investments and infrastructure and stakeholders' commitments at the post-project phase:

212. **For Component 1 (Outcome 1.1),** the sustainability of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) and the equipment and infrastructure acquired for this purpose requires a commitment from both countries to ensure adequate funding for their operation and maintenance after the end of the project. The economic benefits of the EWS can be used to convince governments to commit to funding these operations. Indeed, about 0.5-1.0% of the annual flood damage costs that will be avoided after Mono-RCbFEWS deployment could be enough to keep the equipment operating[14]. Similarly, the MBA, which will be the regional management structure of the Mono-RCbFEWS, will have to include in its annual budget and in the budget lines of its various projects related to the EWS, financial resources to cover the operating and maintenance costs of the Mono-RCbFEWS equipment and infrastructure. Other potential sources of funding could be sought from national and regional institutions such as the National Climate Funds (e.g., FNEC in Benin). A strategic partnership/agreement could be established with the Communauté Electrique du Bénin (CEB), which operates the Nangbéto hydroelectric dam, to obtain a financial contribution for the maintenance and management of the Mono-RCbFEWS, as the CEB is one of the main beneficiaries of the warning tool. In addition to ensuring sustainable financing, the technical capacities of all actors involved must be strengthened and serviced. To this end, the relevant technical services in charge of meteorology, hydrology, civil security/disaster management in both countries, the MBA, the technical services of the basin municipalities, the national offices of GWP-WA in both countries, etc., will have to be involved in all the stages of setting up the process and trained technically to this end. The experiences and achievements of similar projects/actions in other basins involving the two countries (as the WMO's Hycos project in the Niger and Volta basins; the CREWS projects in the Volta basin funded by the Adaptation Fund, ECOWAS Hydromet Initiative, etc.) will be highly valuable for the MBA and the stakeholders involved in the management of the project and the capitalization of its achievements. Another technically important issue is that the long-term sustainability of the project achievements will be ensured by the MBA who will receive the meteorological, hydrological and climatological data and related products from the National Meteorological and Hydrological Services (NMHSs) in the two countries. To this end, formal commitments will have to be obtained from the competent national bodies of both countries in order to guarantee the provision of the required data and information in real time (Example of commitment letters).

213. **For the component 2 activities,** the emphasis will be on strengthening the technical capacities of the actors of the local services of the public bodies in charge of infrastructures and equipment maintenance (Departments in charge of water, agriculture, rural engineering, environment, etc.). The beneficiaries will also be technically trained in order to ensure the primary maintenance of the equipment. Since the implementation of most of the activities will generate economic benefits, a maintenance fund could be created and fed by a part of the annual benefits (2 to 3%) generated. Part of this resource will be used to ensure the maintenance and replacement of equipment. The MBA should also be able to monitor and support beneficiaries in the management of infrastructure. MBA would also initiate new projects for additional funding for the scaling up of the different actions in other parts of the basin. **For Component 3,** The role of the MBA will be of paramount importance for the dissemination of the project's achievements and the sensitization of the actors after the project's closure. The monitoring and operation of the equipment and sites for communicating the results of the project and their renewal will be handled by the MBA, which will have to provide for its annual operating budget, the required financial resources, and the qualified personnel needed to do so.

214. The costs of the various operations needed to adequately ensure the sustainability of the project will be refined at the full proposal phase.

L. Environmental and social impacts and risks

215. The BOUCLIER-CLIMAT project will align with the environmental and social (E&S) principles of the Adaptation Fund Policy during its preparation as well as implementation. Indeed, the preliminary environmental and social assessment carried out for the project concept note concludes that the implementation of BOUCLIER-CLIMAT project activities is likely to have specific impacts in some intervention areas but these impacts can be easily mitigated. A detailed E&S impact assessment, including mitigation measures and E&S management framework, will be carried out during the FULL PROPOSAL phase of the project document. The results of the preliminary assessment are presented in the table below.

[14] According to a recent report of the ECOWAS, the benefit-cost ratio of EWS implementation services ranges from 7 to 10 for each dollar invested (Strengthening Weather, Climate, and Water Services In West Africa – ECOWAS HYDROMET INITIATIVE - https://ecowas.int/wp-content/uploads/2022/03/ECOWAS-Hydromet-Initiative.pdf)

Table 12: Preliminary results of the E&S assessment for the BOUCLIER-CLIMAT project

Checklist of E&S principles	No further assessment required for compliance	Potential impacts and risks further assessment and management required for compliance
Compliance with the Law		- Risk: The risk of non-compliance with all domestic and international laws and regulations could occurs during the implementation of the project - Potential Impact: Low The preparation of this ESMF with ESMP takes into account national and international laws and regulations in the formulation of the project. In addition, the work involved the relevant institutions in Benin and Togo, as well as the human resources available at ABM and OSS, who will ensure compliance with regulations and laws during project implementation. The project will set up a mechanism to monitor compliance with laws and regulations in the implementation of the project. Furthermore, the proposed project has been developed in line with international standards on climate change, biodiversity, land conservation, water resources, ecosystem management and poverty reduction. It considers selected national and regional priorities, policies, plans and technical standards for climate change adaptation and sustainable development. With regard to the Environmental and Social Assessment, a detailed study has been carried out during the preparation of the full proposal. OSS as the project's regional implementing entity with the support of the MBA and GWP will ensure the strict application of this principle. Particular attention will be paid for the specific intervention related to the Transboundary Biosphere Reserve of the Mono and the RAMSAR sites.
Access and Equity		- Risk: Since the basin surface area is very unevenly distributed between the two countries (12% in Benin and 88% in Togo), the use of surface area as a key to repartition could be a significant mismatch and a potential source of conflict between the two countries - Potential Impact: Low to medium The project will seek to ensure fair and equitable access to the benefits of the project. During the feasibility studies for the full proposal elaboration, mechanisms and approaches will be identified to ensure equitable access to project benefits. All the relevant stakeholders from both countries will participate in this process to avoid any potential conflict related to this issue. - Risk: Inequalities between women, men, children and particularly vulnerable groups. - Potential Impact: Low The project will promote equitable access to project resources by potential beneficiaries, with particular emphasis on women's and youth groups. The project will ensure the participation of all stakeholders in project activities without discrimination and with the aim of ensuring fair and equitable access to project benefits, including for women and men as well as marginalized groups. The project team will ensure that project activities do not adversely affect users' existing rights to shared natural resources, particularly water, and guarantee equitable benefits from project investments.
Marginalized and Vulnerable Groups		- Risk: Possibility that vulnerable and marginalized groups will have insufficient access to the project services such as warning, IAGs, knowledge or technological devices, etc. - Potential Impact: Low To reach and ensure the protection of marginalized and vulnerable groups, including women, youth, orphans, the elderly, and people with disabilities, the E&S assessment of the project will be based on a participatory approach, incorporating consultations with communities to identify the best approaches for their inclusion. Also, the vulnerability study commissioned will help to better target beneficiaries. The study was carried out using a participatory approach, incorporating consultations with communities to identify the best approaches for their inclusion. A Stakeholder Mobilization Plan (PMPP) and a Workforce Management Procedure (PGMO) will be developed up prior to project implementation to help avoid the exclusion of any category of the community. The project will conduct comprehensive community awareness-raising in target localities, including with vulnerable groups, female-headed households, youth, etc; It will also establish as election criteria that encourage strong involvement of vulnerable groups.
Human Rights	No discrimination will be promoted in the implementation of the project whether it is related to ethnicity, age, gender or even educational level. The project design is based on a consultative approach involving various stakeholders. All activities will be carried out in accordance with established international human rights.	Risk : Some people, because of their ethnicity, gender, disability, etc., could be excluded from participating in the project. Potential impact : Low The design of the project is based on a participatory approach involving various stakeholders with no consideration of ethnicity, age, gender, educational level or disability. Furthermore, during the preparation of the present study, this risk was studied and measures are proposed in the ESMP to take into account respect for human rights in the implementation of the project. - The project will ensure that when a beneficiary group or community is funded, all members of that group or community can participate fully in the activities and enjoy the benefits generated. - Raise awareness among project staff about gender-based violence (GBV), sexual exploitation and abuse (SEA)/sexual harassment (SH) and violence against children (VCE). - Develop and implement a complaint management mechanism for GBV, SEA/SSH and ECV. Prepare and sign a code of conduct for all those involved in the project. This code of conduct must take into account all aspects of gender-based violence (GBV), sexual exploitation and abuse (SEA)/sexual harassment (SH) and violence against children (VCE).
Gender Equality and Women's Empowerment		- Risk: In some parts of the project area, women do not have the same rights as men (participation in decision-making and access to information etc.) but this is not ruled by statutory law but rather by local and common practice. - Potential Impact: Medium Given this risk, the project places particular emphasis on women's and youth groups, especially for capacity building on innovative and resilient agricultural practices. Moreover, advocacy, information and awareness-raising activities conducted by women and men leaders and religious leaders are planned in order to reverse the tendencies of exclusion and separation. A plan for training and energizing women in connection with the FA's gender policies will be integrated into the project's activities in these areas and then implemented. - The project will ensure that when a beneficiary group or community is funded, all members of that group or community can participate fully in the activities and enjoy the benefits generated. - Raise awareness among project staff about gender-based violence (GBV), sexual exploitation and abuse (SEA)/sexual harassment (SH) and violence against children (VCE). - Develop and implement a complaint management mechanism for GBV, SEA/SSH and ECV. Prepare and sign a code of conduct for all those involved in the project. This code of conduct must take into account all aspects of gender-based violence (GBV), sexual exploitation and abuse (SEA)/sexual harassment (SH) and violence against children (VCE).

Core Labor Rights		- Risk: In the region, gender pay inequality and child labor are risks that could arise and therefore affect the successful implementation of the project even there is no legal rule which govern these practices - Potential Impact: Medium During the E&S assessment, particular attention will be paid to the labor codes in force and the labor laws and regulations of both countries will be respected. In addition, the project will ensure that labor laws are taken into account during the implementation of the project. In fact, no major infrastructure such as hydroelectric dams are planned. Child labor and unequal pay for men and women will be prohibited.
Indigenous Peoples	There are no indigenous people or tribes noted in the Mono River Basin that will be affected by the project activities	
Involuntary Resettlement	The implementation of the project activities will not require the displacement of communities from their locations. The project will work with communities in their locations and on a voluntary basis. Therefore, no resettlement or even relocation to new locations is foreseen.	As some of the sites affected by the project are occupied by people carrying out certain activities, if the implementation of project activities requires them to move, the project will ensure that a Resettlement Action Plan (RAP) is drawn up and implemented for these people affected by the project.
Protection of Natural Habitats		- Risk: possible influence on the environmental and ecological equilibrium, especially in areas of particular sensitivity such as the RAMSAR sites and the Mono Transboundary Biosphere Reserve (TBR) - Potential Impact: Low The BOUCLIER-CLIMAT project promotes soil and water conservation (SWC) measures. The adoption of SWC practices could lead to some producers/people converting other land. For the specific cases of the RAMSAR sites and the Mono Transboundary Biosphere Reserve (TBR), as indicated in Section A, (Component 2 and Output 2.1.1), the planned activities (2.2.1.3 and 2.2.1.4) in these areas will focus mainly on the protection and restoration of ecosystems with the aim in the short, medium and long term of maximizing environmental benefits. In any case, for each project site that is likely to be affected by the implementation of project activities, an environmental and social screening will first be carried out to categorize the site in terms of environmental and social impact, and then, depending on the case, an environmental and social impact assessment (ESIA) will be carried out, either simple or complete, and, if necessary, mitigation measures will be defined. If required, for the Fazao-Malfakassa National Park and TBR sites, an Environmental and Social Management Plan (ESMP) will be developed and implemented. Thus, a more in-depth assessment to identify the project's risks to the natural habitat is required, through an E&S assessment to be conducted at the full proposal stage.
Conservation of Biological Diversity		- Risk: Biological diversity slightly affected due to land conversion - Potential Impact: Low Although the project envisages ecosystem-based approaches, the possible conversion of land for agricultural production (i.e for small scale irrigation activities) may affect biological diversity. Awareness raising sessions will be organized to guide people in selecting new land for agricultural production to avoid negative environmental impacts. Further consultations and assessments will be required in the development of the Environmental and Social Management Framework (ESMF) for the proposed project. This will be further assessed during the full proposal stage to identify any impacts and risks regarding this principle
Climate Change	No further assessment required. The activities of the proposed project aim to strengthen the resilience of ecosystems and populations to climate change by improving access to climate data through the establishment of efficient Mono-RCbFEWS and capacity building of risk and disaster management institutions and organizations. Innovative practices will also be developed and adopted by the community at the grassroots level.	Rational use of synthetic mineral fertilizers, with priority given to organic fertilizers (use of animal droppings to fertilize crops). Practice agroforestry and reinforce reforestation already planned as part of the project. Use low-emission machinery. Favoring the use of solar panels for IGAs requiring electricity
Pollution Prevention and Resource Efficiency	The adaptation strategies based on ecosystems such as mangrove restoration and the valorization of non-timber forest products (NTFPs) will contribute to the sustainable management of forest resources and may reduce the pressure on land.	The project will encourage good pest management practices, reduce dependence on pesticides, use registered pesticides or bio-pesticides and avoid the harmful effects of chemically synthesised mineral fertilisers on soil and water. It will also ensure that organic manure (animal droppings) is used to reduce the use of chemical fertilisers and limit soil and water contamination in nearby water bodies. The restoration of river banks planned as part of the project will also reduce soil erosion and hence water pollution.
Public Health	The project will not have negative impacts on public health. On the contrary, the increased income generated by the introduction of new income-generating activities can be used for other household needs such as schooling for children, access to health care and/or investment in other economic activities.	The project implementing and execution entities are dedicated to ensuring water tanks safety through various measures like proper sizing, clear signposting, and robust protection. Grassed strips or strategic reforestation will safeguard reservoir perimeters. Raising community awareness about drowning risks is crucial. The project will conduct targeted educational initiatives to empower individuals in risk mitigation. Additionally, the project will educate local communities about water-related diseases like malaria, typhoid fever, and amoebic dysentery. Through information dissemination and advocacy for preventive measures like sanitation and mosquito control, the project aims to combat these health hazards effectively. Furthermore, the project will collaborate with relevant authorities to integrate target localities into the national epidemiological surveillance system's intervention program, thereby enhancing community health and well-being by addressing potential disease outbreaks promptly and systematically
Physical and Cultural Heritage		- Risk: According to the CLIMAFRI Project advisory studies, the bed stream and floodplain contain sites of cultural and spiritual importance which could be impacted if some activities have to be undertaken in such zones - Potential Impact: Low The communities in the basin should be consulted on which parts of the basin to exploit in the installation of facilities and in the implementation of the BOUCLIER-CLIMAT project activities.
Lands and Soil Conservation	The promotion of agroforestry, restoration of mangroves and reforestation of resilient forest species on the banks of the Mono River will limit the risks of erosion linked either to the overflow of the river or to maximum rainfall (above 20mm). Moreover, thanks to soils enriched with organic matter, the soil's capacity to retain nutrients and water is improved. Through reforestation, more carbon will be sequestered.	The project will promote the use of organic manure (livestock droppings) to reduce the need for chemical fertilizers and limit soil contamination. The restoration of riverbanks planned as part of the project will also reduce soil erosion. The project will encourage good pest management practices, reduce dependence on pesticides, use registered pesticides or bio-pesticides and avoid the harmful effects of synthetic mineral fertilizers on soils.

PART III IMPLEMENTATION ARRANGEMENTS

A. Project implementation and management arrangements

216.The institutional arrangement for the project management will be as follows:

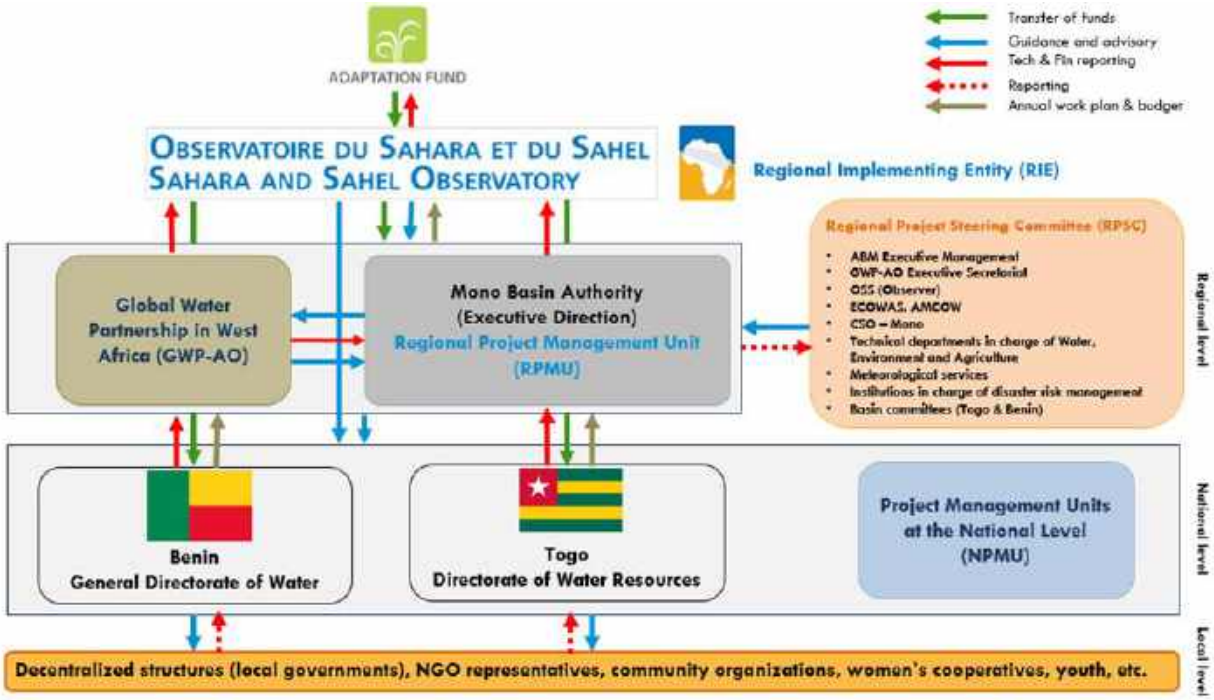


Figure 10: Project institutional arrangements

217.**Regional Implementing Entity (RIE):** The project will be implemented by the Sahara and Sahel Observatory (OSS), which will serve as the Regional Implementing Entity (RIE) and will be responsible for all financial, monitoring and reporting aspects of the Adaptation Fund. OSS has several years of experience working with both countries in the preparation and implementation of several development projects. This experience will facilitate exchanges with key national partners and the successful implementation of the project.

218.**Executing Entities:** The project execution will involve all stakeholders at regional, national and local levels, as follows:

Regional level:

219.**Regional Executing Entity (REE):** The project will be executed by a consortium of partners, led by MBA in cooperation with GWP-WA, acting as Regional Executing Entities. MBA will coordinate and execute the project at the regional level and will ensure particularly the coordination of project activities of components 1 and 2 in close collaboration with the 2 National Executing Entities (NEEs) in the 2 countries and the GWP-WA. The GWP-WA, beyond the general technical support to MBA, will ensure more particularly the supervision of the activities related to the component 3 of the project, namely capacity building and trainings activities as well as lessons learned and project results dissemination. In this arrangement, OSS, with its expertise in the field of setting up early warning systems, will play the role of an executing partner, providing technical support, particularly in the design and implementation of the flood early warning system planned under Component 1 of the project.

220.A Regional Project Management Unit (R-PMU) will be established and hosted by MBA Executive Direction, composed of key human resources defined in the table below. This team will be assisted by ABM's administrative and technical experts. The team will be approved by the RIE upon delivery of a No-objection request on ToRs detailing their roles and responsibilities based on merit and skills.

Table 13. Roles and responsibilities of R-PMU Key Staff

Staff	#	Role and responsibilities
Project Coordinator	1	- Overall strategy and direction; - Coordination at regional level; - Stakeholder engagement at regional and national level; - Oversight management, M&E, consolidation of reporting, learning and documenting - Organization of the regional steering committee meetings and events - Development of regional Annual Work Plan and Budget - Development of regional Procurement Plan - Compilation of technical and financial reports
M&E Expert	1	- Overall responsibility for M&E implementation; - Coordinate data collection and analysis; - Ensure reporting to OSS;
Technical assistant	1	- Provide technical support to project planned activities - Contribute to M&E implementation

		- Contribute to project reporting - Contribute to elaborate ToRs, user manuals, and other technical documents. - Assist with project planning and scheduling,
Administrative and Finance Assistant	1	- Overall responsibility of Finance and administration; - Assist in the preparation of budgets; - Manage records and receipts; - Reconcile daily, monthly and yearly transactions; - Provide administrative support to the region - Prepare financial reports

221. **Regional Project Steering Committee (RPSC):** The Regional Project Steering Committee (RPSC) will be the highest decision-making organ for the entire project. It will meet once a year to evaluate the results of the project and provide guidance for its effective management. The CPRP will be composed of permanent representatives of the MBA, GWP-WA, civil society organizations (PNE-Benin, PNE-Togo, representatives of the basin committees), technical directorates in charge of water, environment and agriculture in both countries, and the African Ministers' Council on Water (AMCOW)/ECOWAS. The OSS will be an observer member of the CPRP. Other institutions, organizations and agencies may also participate in the RPSC depending on the themes and topics to be discussed in order to bring their expertise and advice to the project. The members of the RPSC must be represented at a level that allows them to make independent decisions.

Table 14: Members of the RPSC

Institution	Number of representatives
Executive Directorate of MBA	2
Executive Secretariat of GWP-WA	2
Technical departments in charge of Water	2
Technical departments in charge of Environment	2
Technical departments in charge of Agriculture	2
Civil Society Organizations	5
ECOWAS/AMCOW	1
OSS (observer)	2
Institutions to be invited depending on topics to be discussed	
Meteorological Services	1
Structures in charge of disaster risk management	1
Others	1

National level:

222. **The National Executing Entities (NEE):** The Regional Project Management Unit (R-PMU) will be supported by the "National Project Management Units (N-PMU)" hosted by the General Directorate of Water, under the Ministry of Water and Mines in Benin and the Directorate of Water Resources, under the Ministry of Water and Village Hydraulics in Togo. The N-PMUs will involve the Directorates of the sectoral ministries in charge of the environment and climate as well as GWP-WA representatives in both countries. As the project includes important activities of national and local scope, the N-PMU will oversee the implementation of activities at the local level through NGOs, local enterprises and beneficiary groups (representatives of socio-professional/community organizations, women's cooperatives, youth cooperatives, etc.). A project coordinator will be appointed in each N-PMU to manage and coordinate all activities at country level. He/she will work with a project team composed of at least the following profiles: (i) a monitoring and evaluation officer, a technical assistant, and an administrative and financial officer (see roles and responsibilities in the table below). Consultants may be recruited for specific tasks.

Table 15. Roles and responsibilities of N-PMU Key Staff

Staff	#	Role and responsibilities
Project Coordinator	1	- Overall strategy and direction; - Coordination at national level; - Stakeholder engagement at national level; - Development of national Annual Work Plan and Budget; - Development of national Procurement Plan; - Oversight management, M&E, consolidation of reporting, learning and documenting at national level.
M&E Expert	1	- Overall responsibility for M&E implementation; - Coordinate data collection at national level; - Reporting to OSS
Technical assistant	1	- Provide technical support to project planned activities at national level - Contribute to M&E implementation - Contribute to project reporting - Contribute to elaborate ToRs, user manuals, and other technical documents. - Assist with project planning and scheduling,
Administrative and Finance Assistant	1	- Overall responsibility of Finance and administration; - Assist in the preparation of budgets; - Manage records and receipts; - Reconcile daily, monthly and yearly transactions; - Provide administrative support - Prepare financial reports

223.The following table gives an overview of the roles and functions of the different entities:

Table 16. Roles and functions of Project Implementing and Executing Entities and stakeholders

No.	Entities	Role and functions
Overall		
1	Sahara and Sahel Observatory (OSS): Regional Implementing Entity	- Oversee overall financial and monitoring aspects of the BOUCLIER project; - Reporting of project consolidated results to the Adaptation Fund; - Approval of project annual work plan and budget at the regional level; - Approval of annual financial and technical reports; - Provide administrative and management support to the REE.
Regional Level		
2	Mono Basin Authority (MBA): Regional Executing Entity	- Project management and execution at the regional level; - Ensure compliance with the project regional dimension; - Provide Technical Advice, guidance, support to the project (Component 1 and 2); - Communication, networking and partnership building; - Supporting NEE in Benin and Togo; - Stakeholder engagement at regional level; - Monitoring and evaluation at the regional level and M&E data collecting; - Provide technical and financial reports to OSS based on national reports; - Organize Regional Project Steering Committee meetings.
3	Global Water Partnership-West Africa (GWP-WA): Regional Executing Entity/Partner	- Supervise project execution activities of Component 3; - Provide Technical Advice, guidance and support to the project at regional and national levels; - Ensure capacity building, trainings and lessons learned and project results dissemination; - Contribute in monitoring and evaluation at the regional level and M&E data collecting.
4	Sahara and Sahel Observatory (OSS): Regional Executing Partner	- Oversee the design and development of the early warning system prototype; - Contribute to the implementation and operationalization of the Mono River flood early warning system.
5	Regional Project Steering Committee (RPSC)	- Meet once a year and provide strategic direction for the project at the regional level (Meetings will be organized back-to-back with other technical meetings); - Evaluate the results of the project and provide guidance for its effective management; - Facilitate cooperation between all project partners and facilitate collaboration between the Project and other relevant programmes, projects and initiatives in the two countries; - Advise on issues and problems arising during project implementation.
National Level		
6 7	General Directorate of Water, under the Ministry of Water and Mines in Benin Directorate of Water Resources, under the Ministry of Water and Village Hydraulics in Togo	- Coordinate project management and execution at the national level; - Manage execution of project activities at community-level; - Ensure that project activities are implemented according to plan and have a positive impact on the beneficiaries; - Ensure compliance with national technical standards and integration with government programmes; - Consolidate the results from the project sites and link with the RPSC; - Ensure monitoring and evaluation at national level; - Ensure stakeholder engagement at national level; - Provide technical and financial reports to MBA as REE.
8	National and local Governments (Benin and Togo Ministries of Water, Environment and Agriculture)	- Create a conducive environment for the program execution especially by mobilizing technical experts at the national level where needed; - Provide political support and advocacy; - Provide policy guidance; - Ensure national and local government engagement and participation; - Ensure ownership and sustainability; - Disseminate project results in national and international forums.

B. Financial and Project Risk Management

224.Since the project is multinational, it is expected that there will be financial and project management risks during project implementation. Due to the different political and geographic contexts of the countries, it is expected that they will face similar or different challenges and risks. Problems may be exacerbated by possible political instabilities. Overall, the anticipated project risks are summarized by country in the table below:

Table 17. Main financial and project risks and mitigation measures

Risk	Country	Rating	Risk Mitigation Measure
Low collaboration amongst the relevant technical institutions at national level	Benin, Togo	Medium	- The involved institutions have been identified, consulted, and will be continuously engaged throughout the project development and implementation, - Activities to be executed will be agreed upon with the respective departments, - During the early stages of project implementation, progress reviews, and other significant milestones, institutions will be engaged and brought together.
Regional Executing Entity is understaffed and can't reach the management requirements	MBA	Medium	- A Regional Project Management Unit (R-PMU) will be established and hosted by MBA, composed of appointed staff and reinforced by recruited experts. - A capacity building program will be put in place to improve the project team in project management, financial management, monitoring and evaluation, etc.
National executing entities are understaffed and can't reach the requirements	Benin, Togo	Medium	- A National Project Management Unit (N-PMU) will be established in each country and hosted by the Directory in charge of water, composed of appointed staff and reinforced by recruited experts. - A capacity building program will be put in place to improve the project teams in project management, financial management, monitoring and evaluation, etc.
Lack of political will to implement the project at local or national level	Benin, Togo	Low	- National and local authorities were involved in the consultations during the project development phase and demonstrated their commitment to the project; - Every effort will be made to ensure that project activities are carried out with the participation of all relevant stakeholders, including government departments and local structures, in order to effectively contribute to conflict resolution, where appropriate.
Different pace of project implementation across different countries has the potential to cause delays in overall project implementation and impact regional activities	Benin, Togo	Medium	- OSS will establish and strengthen project management units at both the regional and country levels to monitor, report, and take corrective action as needed to ensure project progress. - Regular progress reports will be discussed, and annual implementation plans developed at the country level to guide activities.
Delay in the implementation of project activities	Benin, Togo	Medium	- Develop the first annual work plan and budget, prioritizing activities such as baseline study development, capacity needs assessment, and training module development. - Draft and discuss ToRs for these activities promptly after signing the grant agreement with the AF to anticipate their implementation, as they are time-consuming. - Use OSS procurement procedures if national procedures are expected to be slow.
Conflicts between transhumance pastoralists and smallholder farmers, and among fishermen across the border	Benin, Togo	Medium	- Involve traditional leaders in project planning, implementation, monitoring, and evaluation. - Conduct mass sensitization on the project's relevance during the initiation stage. - Adhere to all local formal and informal regulations. - Provide conflict management training.
Delays in recruitment or appointment of critical staff for the project	Benin, Togo	Low	- TORs for project staff will be drafted and prepared ahead of the scheduled commencement of the project to ensure a smooth and efficient start. - Recruitments will be made as early as possible within the project timeline to allow sufficient time for orientation, training, and integration into the project team
Project financial management	Benin, Togo	Low	- Strengthen project financial management and accountability systems using approved procedures in compliance with Adaptation Fund and OSS regulations and standards. - Enforce strict adherence to role separation in financial management.
Poor monitoring and evaluation and delayed delivery of outputs	Benin, Togo	Low	- Develop a detailed participatory M&E framework with key project partners. - Conduct regular follow-ups by NEEs and REE to ensure timely and continuous implementation of the monitoring and evaluation system.

C. Environmental and Social Risk Management, in line with the ESP of the AF

Environmental and Social Management Plan

225. The table below sets out the possible negative environmental and social impacts and risks and the possible mitigation measures. These negative impacts and risks may arise in any of the project phases, i.e. selection of intervention sites and project beneficiaries, preparation of the ESIA, construction of infrastructure, project operationalisation, etc.

Table 18. Summary of Potential Impacts and Mitigation measures of the Project in line with the AF 15 Principles

E&S principles Checklist and risk rating	Potential impacts	Mitigation measures
Compliance with the law	Poor integration of environmental and social issues relating to the Adaptation Fund's ESP principles into the implementation of activities (ESIA and ESMP)	The project will ensure that ESIAs of activities are carried out in accordance with the Adaptation Fund's environmental and social policy and national procedures.
	Weak capacity of stakeholders to implement environmental and social measures in accordance with national legislation and the principles of the Adaptation Fund	The project will ensure that the technical and organisational capacities of the beneficiaries are strengthened so that they can implement the measures contained in the Environmental and Social Management Plan. The project management unit will ensure that on-site support by the technical services is effective and beneficial to the full implementation of environmental and social measures in accordance with current legislation.
Access and equity	Risk of increased inequalities between women, men, children and particularly vulnerable groups	The project must promote equitable access to project resources by potential beneficiaries, with particular emphasis on women and youth groups. The project will ensure the participation of all stakeholders in project activities without discrimination and with the aim of ensuring fair and equitable access to project benefits, including for women and men and marginalised groups. The project team will ensure that project activities do not adversely affect existing user rights to shared natural resources, particularly water, and guarantee equitable benefits from project investments.
	Risk of non-participation of certain members of the beneficiary groups in the preparation and implementation of the activity	The project will ensure that when a beneficiary group or community is funded, all members of that group or community are able to participate fully in the activities and enjoy the benefits generated.
	Risk of gender-based violence (GBV), sexual exploitation and abuse (SEA), sexual harassment (SH) and violence against children (VAC)	Raise awareness among project staff about gender-based violence (GBV), sexual exploitation and abuse (SEA)/sexual harassment (SH) and violence against children (VCE). Develop and implement a complaints management mechanism for GBV, EAS/HS and ECV. Prepare and have signed a code of conduct for all those involved in the project. This code of conduct must take into account all aspects of gender-based violence (GBV), sexual exploitation and abuse (SEA)/sexual harassment (SH) and violence against children (VCE).
Marginalised and vulnerable groups	Risk of marginalised and vulnerable groups not being involved in the project	The project will specifically target the most vulnerable groups and those most exposed to climate change in the target communities. To achieve this, the project will use the following measures: • Ensure that project activities target and help the most vulnerable to become more resilient to climate change, including women, female-headed households, young people and people living with disabilities; • conduct comprehensive community awareness-raising campaigns in the target localities, including with vulnerable groups, female-headed households, young people, etc; • establish selection criteria that encourage the strong involvement of vulnerable groups.
Human rights	Risk of conflict between beneficiaries over the use of water from infrastructures set up by the project	Raise awareness among water users and set up an infrastructure management committee bringing together all sections of the community. Set up an operational complaints management mechanism (CMM) for the project.
Gender equality and women's empowerment	Inadequate consideration of gender in project implementation	The project must promote gender mainstreaming in the various activities. Women and young people must be heavily involved in technical and organisational capacity-building activities, so that they are better equipped to participate fully in the planning, decision-making and implementation of activities. The selection criteria for beneficiaries must take gender into account, as provided for in the project. The project management unit will ensure that at least

E&S principles Checklist and risk rating	Potential impacts	Mitigation measures
		50% of direct beneficiaries are women and 50% of all beneficiaries are young people.
Core labour rights	Risks to workers' health and safety	The project management unit will include clear environmental and social clauses in the tender documents and contracts for companies and service providers working on the project. The project will ensure that companies and other stakeholders are aware of the provisions of the Labour Code and that they sign the code of good conduct.
	Risk of children working outside the law.	The project will raise awareness among beneficiaries of the labour code and children's rights in order to eliminate the worst working conditions for children. The project will ensure that all those involved sign the code of good conduct.
	Risk of conflict linked to not using local labour and not buying building materials, nurseries, etc. from the community.	Ensure the recruitment of local labour with equal skills. If necessary, use ordinary workers. Acquire building materials, nurseries, etc. available from communities
Indigenous peoples	As indigenous peoples and individuals are equal to all others, there will be no discrimination in terms of origin or identity in the services provided by the BOUCLIER-CLIMAT/Mono Project.	
Involuntary resettlement	Risk of involuntary displacement and resettlement of populations	As some of the sites affected by the project are occupied by people carrying out certain activities, if the implementation of project activities requires them to move, the project will ensure that a Resettlement Action Plan (RAP) is drawn up and implemented for these people affected by the project.
Protection of natural habitats	Limited loss of vegetation and wildlife habitats	The management unit will include in the CAD environmental clauses for the management of vegetation and wildlife habitats that may be found on sites where water mobilisation infrastructures such as water reservoirs are built. Strictly limit work to the areas required. The project will ensure that investments do not encroach on protected areas, buffer zones and natural habitats. All activities having negative interactions with these areas will be directly eliminated during the selection phase.
Conservation of Biological Diversity	Risk of loss of biodiversity	The project will build the capacity of beneficiaries in pest management (use of pesticides, for example), which could be a cause of the elimination of certain species. Draw up and implement a pest management plan (PMP).
Climate change	Air pollution through greenhouse gas (GHG) emissions	Rational use of synthetic mineral fertilisers, with preference given to organic fertilisers (use of animal droppings to fertilise farmland). To practise agroforestry and reinforce the reforestation already planned as part of the project. Use less emissive equipment. Favour the use of solar panels for IGAs requiring electricity.
Pollution prevention and resource efficiency	Risk of soil and water contamination by pollutants	The project will encourage good pest management practices, reduce dependence on pesticides, use registered pesticides or bio-pesticides and avoid the harmful effects of chemically synthesised mineral fertilisers on soil and water. The project will recruit an expert with experience in pest and pesticide management to draw up and implement a capacity-building plan for stakeholders involved in integrated pest and pesticide management. This expert will prepare and disseminate an integrated pest management plan to be used by beneficiaries and technical agents whose technical capacities have been strengthened accordingly. The project will ensure that organic manure (animal droppings) is used to reduce the use of chemical fertilisers and limit soil and water contamination in

E&S principles Checklist and risk rating	Potential impacts	Mitigation measures
		nearby water bodies. The restoration of river banks planned as part of the project will also reduce soil erosion and hence water pollution.
Public health	Risk of poisoning by inhalation or by drinking water contaminated by fertilisers or pesticides	The project will implement the above measures to limit water and soil pollution in order to reduce the risk of harm to people's health. If chemical pesticides need to be used, the project will ensure that they are WHO class III or U registered pesticides or bio-pesticides that are less hazardous to human health. Capacity-building actions on pesticide application, should the integrated pest management alternatives prove ineffective in dealing with the problem. The project will raise awareness of the need to wear appropriate plant protection treatment equipment and of hygiene measures.
	Risk of drowning in reservoirs	The project management unit will ensure that the water reservoirs are sized, signposted and well protected so as to reduce this risk. The edges of water reservoirs must be protected by grassed strips or reforestation with appropriate species. People need to be made aware of the risks of drowning.
	Development of water-related diseases	The project will inform and raise awareness among local people about water-related diseases and measures to combat them (malaria, typhoid fever, amoebic dysentery, etc.). The project will take steps to ensure that the project's target localities are included in the epidemiological surveillance system's intervention programme at country level.
	Risks of contamination and spread of COVID-19, STI/HIV/AIDS for workers and local populations	Regularly carry out mass awareness-raising campaigns for workers and people in the villages affected by the project on COVID-19, STIs and HIV-AIDS. Distribute condoms at mass awareness-raising events. Systematically distribute condoms to the company's workers and employees, while at the same time making them aware of the risks associated with EAS/HS and the related penalties, up to and including dismissal. Monitoring the risks of contamination by STIs, HIV/AIDS and COVID-19 through voluntary screening of the company's workers and employees, as well as the general public.
Physical and cultural heritage	Risk of destruction of physical assets in the event of accidental findings	Ensuring strict compliance with the guidelines for uncovering archaeological remains.
Land and soil conservation	Risk of soil degradation	The project should ensure the use of organic manure (animal droppings) to reduce the use of chemical fertilisers and limit soil contamination. The restoration of river banks planned as part of the project will also reduce soil erosion. The project will encourage good pest management practices, reduce dependence on pesticides, use registered pesticides or bio-pesticides and avoid the harmful effects of chemically synthesised mineral fertilisers on the soil.

226. The measures proposed above are generic measures for demonstration purposes. Studies of the activities will make it possible to identify the environmental and social risks and impacts specific to each activity, in accordance with the principles of the Adaptation Fund, and to propose appropriate mitigation and compensation measures. Each activity will have a specific Environmental and Social Management Plan reflecting the reality of the site, the specific activities to be undertaken and the responsibilities of the stakeholders

Unidentified Sub-Projects (USP)

Compliance with Adaptation Fund policies

227. All activities implemented under the USP modality will adhere to the AF Policies to which the BOUCLIER Project is subject to. These policies include: (i) The Adaptation Fund Environmental and Social Policy rev. March 2016 (AF ESP), which sets out the requirements for IEs to assess and manage environmental and social risks in project implementation. The AF ESP defines the E&S Principles that AF projects abide by as well as defining the adoption of measures to avoid, or where avoidance is impossible to minimize or mitigate those risks during implementation. Any USP identified and

implemented in the BOUCLIER Project will, without exception, comply with the E&S Principles defined in the AF ESP ; (ii) The Adaptation Fund Gender Policy and Action Plan March 2016 (AF GP), which defines the objectives and principles that AF funded projects shall comply with in order to secure the uphold of women's rights as universal human rights, and in order to attain the goal of gender equality and the equal treatment of women and men. Any USP identified and implemented in the BOUCLIER Project will, without exception, comply with the Main Principles defined in the AF GP.

228. The USP Policy for BOUCLIER is furthermore informed and guided by the AF Guidance Document, published on May 2021, stating "*Further Compliance with the Environmental and Social Policy and the Gender Policy of the Fund: Update of the Project/Programme Performance Report and guidance for unidentified sub-projects*" (AFB/B.32-33/7).

Compliance with OSS Environmental and Social Safeguards

229. The Environmental and Social Safeguards (ESS) of the BOUCLIER Project, and inherently for the USPs, are assured through OSS policies and procedures which are based on the International Finance Corporation (IFC) Environmental and Social Sustainability Framework. This ensures that potential risks and impacts are iteratively identified, mitigated and monitored throughout the life-cycle of the Project.

230. The Environment and Social risk management is completed through two main stages: (a) Preliminary Risk Screening with respect to the ten Performance Standards (PS) prescribed in OSS E&S policy that all projects should comply with. This phase is implemented during project preparation and leads to a categorization of the project according to its risk level; (b) On-going Risk Screening of the project interventions during the implementation phase. Activity-wise risk management is governed by OSS' risk management procedure which is in line with the internationally recognized standards, and more specifically the ISO 31000:2009, Risk management - Principles and guidelines.

231. Operational procedures will be implemented to ensure a continuous screening of all project activities and interventions for the identification of arising risks and impacts.

Adherence to National Technical standards

232. Equally, for compliance with the AF ESP and GP, with OSS ESS, and in line with these, the BOUCLIER project is compliant with national laws and adheres to all National Technical Standards that apply to the project. As such, all activities implemented as USPs will comply with these laws and standards.

233. All national laws and technical standards identified during the development of the FP and apply to the BOUCLIER project have been listed in tables 19, 20, and 21 and will be subject to updating if and when necessary for activities with USPs. Any USP identified and implemented in the BOUCLIER project will, without exception, comply with the identified national laws and technical standards of the 2 project countries. The USP's environmental screening and potential ESIA should be in line with the national laws and regulations as the activities will be executed at the national level. If some of the USPs require detailed assessments or specific ESIA the involvement of national authorities in charge of these aspects will be ensured.

Unidentified Sub-Projects (USPs) in the BOUCLIER Project

234. The USP policy applies to activities that have been identified as USPs, and of which the detailed scale, scope and location, and other technical aspects are not yet fully identified at the time of full proposal development.

235. As part of the project development process, baseline data was collected and verified through a detailed questionnaire specific to the planned project activities. In the same framework, activity 2.1.1.1. is one of the first activities to be carried out after the project launch. This will have a determining role in the USP protocol as it will provide and identify the details and modalities to be respected and implemented to ensure the successful execution of all project activities, especially those identified as USPs during the development of the project document.

236. Once the necessary clarifications and details related to the implementation of the activities identified as USPs have been provided through Activity 2.1.1.1, the EEs will conduct a specific and detailed environmental, social and gender assessment moving forward. This assessment will be done by national regulations and standards for conducting an assessment such as an EIA and under the supervision of OSS to ensure compliance with OSS and AF safeguards. The costs related to the environmental, social and gender assessment will be charged on the budget line of each activity as stated in the project detailed budget.

Procedures for identification and validation of USPs

237. Overall, in the ESMP for the BOUCLIER project, procedures are defined in case significant risks are identified. As such, when impacts or risks are determined, activity-wide E&S assessment will be conducted which, in turn, will lead to the identification of activity-specific E&S management measures that need to be incorporated into the project execution. Identification, treatment and monitoring of identified risk and mitigation measures will be managed using a Risk Register. The process will be governed by the Risk Management Procedure of the AF and OSS.

238. Throughout all the project's phases, OSS will ensure a thorough identification of all the risks related to the USPs according to the 15 ESP. The identification and validation process will be launched during the different stages of project implementation. This aspect will be included in the different official project documents such as i) the project implementation manual (a chapter listing the responsibilities of the executing entities for this aspect and guidelines in line with OSS and AF standards and requirements will be formulated ; ii) the Procurement Plan (PP) and Annual Work Plan and Budget (AWPB) (a budget will be clearly identified for these activities) ; iii) the Terms of Reference for the recruitment of consultants/firms for the elaboration of the different studies and iv) the concept notes of the workshops/trainings and meetings related to activities that includes USPs. Also, during the different supervision and audit missions that OSS will conduct in the project countries, the national and local project teams will be sensitized to this aspect.

239. During the assessments process to be undertaken in each specific project location for all USP for all ESP principles, a particular attention will be given to the identification of marginalized and vulnerable groups (beyond women and youth), indigenous people, ethnic groups, and socio-professional groups as well as child labor and SLM considerations.

240. For each Unidentified Sub-Project, ESIA will be carried out to predict and assess the potential environmental and social impacts and design appropriate mitigation, management and monitoring measures. The process will follow national standards, AF and OSS Policies and will include the following steps:

- **Screening**: It is a tool for predicting, understanding and assessing potential sub-project/activity impacts. In other words, it aims to determine if a sub-project/ activity is likely to have significant environmental and social effects. Aligning with the 15 principles of the AF, the purpose of Screening is to determine whether or not an EIA is required;
- **Scoping**: If a full ESIA is required, scoping establishes the studies that will be required as part of the ESIA process including the identification of data availability and gaps. It determines the appropriate spatial and temporal scopes for the assessment and suggests suitable survey and research methodologies;
- **Impact Prediction and Evaluation**: This is the main part of the ESIA and involves analyzing the impacts identified in the scoping to determine their nature, temporal and spatial scale, extent and effect. Impact analysis requires input from relevant experts, including agronomists, ecologists, biologists, sociologists and economists. Once the potential impacts are fully understood, it is necessary to judge the significance of each impact, to determine whether it is acceptable, requires mitigation or is unacceptable. Consultations with local stakeholders is vital at this stage, and particular attention should be given to vulnerable and disadvantaged communities and risks arising from involuntary resettlement. Successfully identifying and addressing significant impacts at this stage can be key to obtaining both a formal and informal license to operate;
- **Mitigation**: aims to eliminate or reduce negative sub-project/activity impacts through suggesting appropriate measures;
- **Environmental and Social Management Plan (ESMP) and its monitoring**: Also called an Environmental Action Plan (EAP), it defines resources, roles and responsibilities required to manage sub-project/activity impacts and implement mitigation measures. The ESMP forms a link between the ESIA and the Social and Environmental Management System/entity. The central elements of a ESMP should include a detailed description of the activities planned to mitigate impacts, a time line and identification of resources to ensure the ESMP can be delivered, and a communication plan that indicates how progress in the implementation of the mitigation measures will be disclosed. The ESMP should also define monitoring requirements or indicators to determine whether mitigation is successful or needs to be improved or changed;
- **Evaluation**: Also called The Environmental Impact Statement (EIS), is the physical report on the ESIA process and findings. The EIS should provide a clear review of potential impacts and how they have been or will be mitigated. The report often forms the basis of public consultation activities and is the document that is presented to regulatory authorities as the basis for decision making.

USPs exclusion criteria:

241. The approval of Unidentified Sub-Projects will be based on the application of the above-described methodology. This will include the assessment of technical, economic, social, and environmental compliance with AF and OSS policies. Furthermore, under AF guidelines to define exclusion criteria for USPs, OSS takes into account the following:

- **Displacement of populations**: A wide and well-structured consultative process involving local authorities, communities and marginalized groups representatives already done during the project development phase will be implemented. This will be the approach BOUCLIER project is adopting to avoid displacement and livelihoods loss during execution of project activities and USPs taking into account the AF standards and the ESMP.
- **Areas affected by acute social conflicts**: At the project inception phase the baseline study will among others assess the security aspects in the project zones and will refine the selection criteria of site selection to avoid areas where social conflict could impede the execution of the project activities. Thus, the USPs in such areas will not be considered.
- **Construction of infrastructures** (water collection structures, along with actions aimed at the protection, improvement, and sustainable management of groundwater and artesian wells in the downstream part of the basin, holds strategic importance for the environmental and social sustainability of the region). These infrastructures are essential to ensure efficient water resource management while preserving local ecosystems. The implementation of these actions must rigorously adhere to the environmental and social policy requirements of the Fund and the OSS, in order to minimize potential negative impacts. To achieve this, strict monitoring mechanisms will be established, accompanied by continuous stakeholder consultation, ensuring that the needs and concerns of local communities are addressed throughout the process. In accordance with the USPs methodology, these infrastructures will undergo a thorough preliminary assessment, and non-viable interventions will be excluded, ensuring that only sustainable and beneficial interventions are retained.
- **Rehabilitation and establishment of transhumance corridors**: At the regional and national levels, policies and procedures related to these interventions are being reviewed and updated. These revisions aim to adopt a sedentarization approach in Benin to better address current needs. These interventions will be classified as USP,

and the necessary monitoring will be carried out in accordance with the project's Environmental and Social Management Plan to ensure effective implementation and adherence to standards.

- **Water irrigation techniques**: Application of water-intensive irrigation techniques will be excluded in the framework of this project's activities. There will only be the promotion of resilient irrigation techniques. To this end, storage tanks and wells will be installed to support farmers for irrigation in the project intervention areas. These infrastructures will be screened according to the USPs methodology and non-viable will be avoided.
- **Energy-intensive irrigation techniques**: The project will promote the use of Renewable Energy (RE) sources for irrigation activities (pumping and others). The application of the USPs methodology described above will exclude the use of non-renewable energy sources, which will create potential environmental and social risks, and will ensure a thorough assessment of the potential risks that may arise from irrigation activities.
- **Irrigation with poor quality water**: Knowledge of the rate of decrease of nutrients from soils resulting from poor water quality application is essential for long-term planning of crop production while minimizing the impact on groundwater quality. In light of the above, a USP will not be characterized and categorized as a USP based on the use of poor water quality as this is a regional project with shared aquifers and shallow ground water.
- **Land Tenure System (LTS):** No USPs that requires land acquisition with significant resettlement impact, will be eligible for support under the BOUCLIER project. To minimize land acquisition and its impacts: (i) the consultative process that is constantly ongoing and a collaborative approach to identify the suitable spots to be utilized for the project activities will be strengthened, (ii) there will be negotiated agreements with beneficiary and communities for usage of land, and (iii) there will be no significant adverse environmental or social impact from the USPs.
- **Use of heavy machinery**: Based on USP categorization, heavy machinery will not be considered and the application of EIAs during project implementation will be taken into account as part of the ESMP developed and baseline to be updated accordingly. Impacts such as soil compaction leading to increased density of the soil, reduced air volume and a reduced ability to drain off surplus water as well supporting terraforming leading to land dereliction will be avoided.

Project Grievance Mechanism

242. The proposed project will utilize the existing OSS grievance mechanism to allow affected populations to raise concerns that are not complying with its social and environmental policies or commitments.

243. OSS has established a grievance mechanism through its procedures, which is an independent mechanism whereby a matter, resulting from a project financed or implemented by OSS may file a complaint. The grievance mechanism, which is made available to stakeholders in OSS website, is part of the environmental and social policy to address compliance as well as lodging USPs identified and grievance cases that may arise during implementation by OSS where a public guideline defines the complaint resolution mechanism. It aims to establish an effective dialogue between those affected by the projects' it finances and all interested parties, to resolve the problem(s) the origin of a request, without seeking to assign responsibility or fault to any of these parties.

244. **At the OSS (RIE) level:** the grievance mechanism is coordinated and managed by OSS environmental and social committee (OESC). Communities and other stakeholders which will be affected by the project can submit complaints to OSS, the RIE of the present project by: mail, email, fax or phone to the address indicated. Complainants may also refer the matter to the Ad hoc Complaint Handing Mechanism (ACHM) of the Adaptation Fund if the RIE is not responsive or are not content with the outcome of their complaint.

Sahara and Sahel Observatory Boulevard du Leader Yasser Arafat BP 31 Tunis Carthage 1080 Tunisia Tel: (+216) 71 206 633/634 Fax: (+216) 71 206 636 Email: doleances@oss.org.tn or boc@oss.org.tn	Adaptation Fund Board Secretariat Mail stop: MSN P-4-4-400 1818 H Street NW Washington DC 20433 USA Tel: 001-202-478-7347 Email: afbsec@adaptation-fund.org

245. **At the project level:** The NEEs are the contact point for any project-related complaints from stakeholders in each country. The National project management with the support of the REE should respond promptly and appropriately with the support of the OESC. Where the complaint cannot be managed at the project level, the NEE or REE will direct the complainants to OSS for further action. The complainants will provide complete information in the form for proper assessment of the complaint(s). It will be the responsibility of the NEE and REE, under the control of OSS, to ensure that all relevant stakeholders are adequately informed about the grievance mechanism through awareness and sensitization campaigns highlighting the issue of potential USPs and how to address them. This mechanism will be made available and widely diffused during the launching workshops and the meetings and trainings. The guideline of grievance mechanism will be made available on the project and the regional executing entity website. The procedures on how to submit the complaint are available on the website of the OSS or directly at Grievance Mechanism Guide. If the OESC finds that a complaint is eligible, the OESC composes internal and/or external experts' team to investigate the case and proposes options for the complainant to consider.

Country	Complains reception
Regional	Mono Basin Authority, GWP-WA
Benin	General Directorate of Water, under the Ministry of Water and Mines in Benin
Togo	Directorate of Water Resources, under the Ministry of Water and Village Hydraulics in Togo

246. **Complaint Handling Process – Filling-in a complaint:** Anyone or communities affected by project activities can fill in their complaint or claim in several forms and several ways. In accordance with the principle of accessibility and depending on the context, the method of filing complaints will be diversified: *i) At the national or regional level,* complaints will be addressed directly to the OSS or the AF via the contacts presented above and via social networks; and *ii) At the local level,* complaints can be addressed to local authorities; or NEEs. Contacts of NEEs and REE will be made public at the beginning of the project execution.

247. The mechanism will use all possible means and channels (traditional and modern) to receive complaints or claims (anonymous or not). These will include, among others: Telephone call, the phone is widely spread in the target area; Self-referral during supervision missions; Facts noted during meetings or a field visit; Social networks (WhatsApp, etc.), web page of the project, email address of the project, OSS website; Mail via complaint boxes in the localities concerned by the project.

248. Receipt and registration of complaints**:** this is ensured by the NEE, which is responsible for receiving all complaints related to the project activities and impacts. Complaints received will be recorded upon receipt and the traceability procedure will be established. They are generally classified into 2 groups: (a) Non-sensitive complaints related to the implementation process, including choices, methods, results achieved; and (b) Sensitive complaints generally concern personal misconduct such as corruption, sexual abuse, discrimination.

249. The NEE will send a formal acknowledgment (by email or letter) within a maximum of one week. In this, the recipient will be informed of the next steps and if necessary, he/she will be asked to provide clarifications or additional information for a better understanding of the problem.

250. Complaint handling**:** This involves verifying the eligibility of the complaint to the mechanism and ensuring that the complaint is related to the project's activities or commitments. The aim will be to establish the link between the facts denounced and the project's activities and impacts. The eligibility assessment will also determine whether the case should be dealt with under the Project-specific grievance mechanism or referred to other mechanisms (whistleblowing, etc.).

251. In the case of unfounded complaints**,** it is essential to conduct the necessary investigations to preserve the project's reputation. This task is the responsibility of the REE and the NEEs. Unfounded complaints include among others those that have a lack of necessary information or are the result of rumors or malicious persons, which may harm the proper conduct of the project. Public complaints or accusations broadcasted to a wider audience that are considered unfounded complaints will be addressed at IE and REE and NEEs, and may be followed by a formal statement.

252. In the *case of* well-founded complaints*,* two kind of responses can be applied: (i) direct response and action to resolve the complaint; and (ii) broad and thorough audit is required, and joint investigations, dialogues, and negotiations could be conducted to reach a substantial resolution. This may involve extending the team to national and local experts.

253. Following the audit and investigations, a contextually appropriate and formal explanatory response is given to the complainant. It should include the procedures to be followed by the NEE to manage the complaint or propose the appropriate bodies to be contacted for cases that do not fall into their responsibilities.

D. Monitoring and Evaluation Arrangements and Budgeted M&E Plan

254. The project's Monitoring and Evaluation (M&E) framework will play a critical role in ensuring that progress in input delivery, work schedules, and planned and achieved output targets is regularly monitored and evaluated. This framework will involve gathering data and information, analyzing it, and reporting it to partners and stakeholders. Through Output 3.1.3, Component 3 will objectively evaluate the project's components and activities, including their design, implementation and results. To this end, it will focus on strategic issues such as project relevance, effectiveness, efficiency, impact, and sustainability.

255. In order to ensure the highest level of accuracy and consistency in the monitoring and evaluation process, the project will use the methodologies established by the Adaptation Fund (AF) for reporting on core impact indicators and adhere to other guidelines for monitoring, evaluation, and reporting. By doing so, the project will be able to produce reliable and high-quality reports on its progress and impact, which can be used to guide future decision-making and project improvements. Overall, the M&E framework will serve as a key tool in enhancing project performance and accountability

256. The R-PMU, housed at MBA, will be responsible for the project's Monitoring and Evaluation (M&E), including organizing project evaluations, approving annual work plans, and monitoring project progress. In collaboration with other related initiatives and institutions within the country and region, the R-PMU will identify issues and recommend corrective actions to ensure timely delivery of project results. During implementation, the R-PMU, in coordination with MBA and GWP-WA, will prioritize areas and issues of mutual interest in a cost-effective manner. A dedicated M&E Expert will be recruited by the R-PMU to oversee data collection with national and local teams and assume overall responsibility for M&E.

257. In practice, the project will utilize national M&E experts from both countries to collect and report activity indicators regularly to the R-PMU. Additionally, the N-PMU M&E expert and essential national EE staff will conduct routine visits to the project sites for monitoring.

258. To ensure effective project monitoring and evaluation, a comprehensive M&E framework and plan will be established, tracking processes, outcomes, and impacts involving all stakeholders. The plan will incorporate data from executing partners and outline specific actions for ongoing evaluations and final assessments. Additionally, the project will implement strong financial accountability and auditing systems to evaluate efficiency, with financial reporting aligned with contractual agreements. Regular quarterly and annual reports will be produced, accompanied by detailed financial analyses and annual audits to maintain transparency and accountability with OSS and the AF.

259. **Monitoring and Evaluation entities -** To enable optimal monitoring and detailed data interpretation, the M&E system for the BOUCLIER-CLIMAT/Mono project will be managed by various entities. Table 19 below, provides an overview of the involved entities along with their specific roles and responsibilities

Table 19. Roles and Responsibilities for M&E Management

Entity	Roles and responsibilities
Regional Project Steering Committee (RPSC)	- Review and validating annual work and budget plans. - Supervise and coordinate program implementation and budget execution. - Consult regularly with stakeholders to ensure project alignment and collaboration. - Evaluate project progress through annual reports to identify successes and areas for improvement.
RIE (OSS)	- Conduct comprehensive reviews and grant approvals for the annual work plan and budget. - Undertake thorough reviews and grant approvals for annual progress and completion reports. - Continuously monitor the implementation of recommendations to ensure successful integration. - Provide direction and utilize management decision-making to align the project with established objectives.
Regional Project Management Unit (led by MBA and GWP-WA)	- Develop the project's operational plan, along with the annual work plan and budget. - Monitor the execution of the project's operational plan, annual work plan, and budget. - Develop effective tools for collecting, processing, analyzing, and disseminating data. - Coordinate the collection, processing, analysis, and dissemination of data and information. - Prepare and consolidate quarterly activity reports, annual progress reports, and the project completion report. - Disseminate project evaluation and monitoring reports to appropriate stakeholders. - Implement necessary decisions and corrective actions to ensure the project's success.
National Project Management Units (led by National EEs)	- Contribute to the validation of the project's annual work plan and budget. - Monitor project implementation at the national level to ensure adherence to established objectives. - Collect, process, analyze, and manage project data to support effective decision-making. - Oversee monitoring and conduct targeted studies to enhance project success. - Prepare and submit quarterly and annual progress reports to the Regional Project Management Unit (R-PMU). - Support the dissemination of project monitoring and evaluation reports to relevant stakeholders. - Implement recommendations and decisions at both national and local levels to ensure successful project outcomes.

260. **Planning** - Operational planning for the project will adhere to the logical framework and the four-year BOUCLIER-CLIMAT/Mono work plan. The REEs, together with National Executing Entities, will draft annual work plans and budgets detailing required activities and financial resources. These plans will be reviewed and approved by the RPSC before submission to OSS for final no-objection.

261. **Project Launch** - The REEs, in collaboration with OSS, will conduct an inception workshop in the first quarter of the project with national facilitators from the NEE and key stakeholders from Benin and Togo, including community, governmental, and civil society representatives. This workshop is designed to finalize the project's implementation plans, goals, and M&E system. During the session, participants will review the initial Regional and National Annual Work Plans and Budgets, which will subsequently be reviewed and approved by the Steering Committees. The workshop will also cover the project's objectives, define team roles, explain decision-making structures, and discuss upcoming Steering Committee meetings.

262. **Developing the M&E system –** In the project's early stages, the REEs will establish a monitoring and evaluation (M&E) system and draft the Project M&E Manual, taking regional and national capacities into account. Operational mechanisms tailored to each country will ensure harmonized monitoring. A tracking methodology, in line with the Adaptation Fund's guidelines, will be developed and tested within the first six months, then adopted by all participating countries and the REEs for ongoing project use. Flexibility will allow for local adaptations, and a regionally managed database accessible via a dashboard will support monitoring efforts.

263. **M&E tracking tools trainings** - A regional trainers' workshop and national trainings will be organized by the REEs and NEEs for the utilization of data tracking tools. The aim is to establish a simple yet robust methodology enabling field agents and beneficiaries to collect data. The regional training will focus on instructing national M&E officers, responsible for national data. Subsequently, they will train field agents and farmers at the national level tasked with field data collection.

264. **Baseline Study** - As per the BOUCLIER-CLIMAT/Mono project's Results Framework, the baseline survey will assess the living conditions, income, climate vulnerability, gender gaps, production, market potential for climate-resilient livelihood options, and other socio-ecological data relevant to the project. The survey will collect data from a representative sample of the targeted population and will be conducted annually to measure progress and adjust as required.

265. **Quarterly Monitoring & Evaluation Meetings -** According to the implementation plans, quarterly monitoring reports will be prepared by NEEs' project units and shared with the R-PMU, who will include them in a regional report submitted to OSS. These reports will update on activity execution, short-term results, early lessons, and best practices, with technical and financial monitoring updates. Additionally, N-PMU and the R-PMU representatives, including the M&E expert and

project coordinators, will meet quarterly with MBA, GWP-WA, and OSS to report on activities, results, and address challenges.

266. **Annual Monitoring -** The annual progress report will be based on the 4 quarterly reports and will consist of an annual review of the implementation status. The report will update on the annual work plan and its implementation, guided by a set of outputs and targets, and the corresponding verification of achievements compared to the Results Framework. The report will also cover monitoring of financial and technical project progress, and the work plan for the next year. Based on the content, a Project Performance Report will be compiled by OSS and submitted to the AF for follow-up. MBA and GWP-WA staff will conduct annual monitoring meetings to the project sites and review monthly indicators, reports, and activities. They will also visit the installations and interview representatives of the participating communities and local authorities.

267. **Mid-term review -** The mid-term review and final evaluation are important components of the BOUCLIER-CLIMAT/Mono project's monitoring and evaluation framework. The mid-term review will take place two years after the project start and will focus on progress made towards achieving project outcomes, as well as identifying weaknesses in project implementation. An external consultant will conduct the review, and the results will be used to make recommendations for better implementation during the second part of the project.

268. **Final Project Evaluation -** The final evaluation will take place at the project's end, three months prior to the RPSC meeting, and will assess the project's results against the targets set in the Results Framework. The evaluation will focus on the project's impacts and the sustainability of results, and will provide recommendations for future projects and for replicating and scaling up the project. Like the mid-term review, the final evaluation will be conducted by an external consultant, and the results will be presented during a project closure workshop.

269. **Project Completion Report -** Finally, during the last three months of the project, the project team will prepare a comprehensive final project completion report that summarizes the results achieved, lessons learned, challenges encountered, and areas where results may not have been achieved or where other results were achieved than expected. The final report will also include recommendations for the implementation and sustainability of future projects.

270. **Monitoring of the ESMP -** The ESMP monitoring program presents the indicators to monitor the mitigation and improvement measures.

271. Given that the BOUCLIER-CLIMAT/Mono Project under component 2 includes Unidentified Sub-Projects (USPs), the M&E system that will be developed and operationalized will consider their existence. This will be subjected to the guidelines developed in line with the AF guidelines on USPs to monitor and address their related risks and impacts. A robust bottom-up approach will be undertaken and will include the beneficiaries during the selection of activities and their execution. This monitoring will be through the following actors:

272. **Implementing entity:** All Environmental and Social (E&S) monitoring activities will be conducted under the supervision of the E&S Committee (ESCO) of the implementing entity (OSS), which will send monitoring reports to the Adaptation Fund. In accordance with the ES policy of the Adaptation Fund, project monitoring and evaluation by the implementing entity must take into account all identified environmental and social risks and impacts. OSS will carry out monitoring and evaluation missions and will ensure the proper execution of the project according to the project schedule and that the funds are allocated for activities planned.

273. In the event of a grievance, the ESCO will clarify the situation and find the appropriate solutions to the problems posed. The annual reports to be submitted by OSS to the Adaptation Fund on the project implementation will include a section on the status of implementation of the ESMP and how the E&S risks/impacts are avoided, minimized or mitigated. The reports shall also include a description of the shortcoming corrections. The mid-term and final evaluation reports will also include an assessment of the project's performance in relation to E&S risks and grievance management.

274. **Regional Executing Entity (REE)**: The REE will be responsible for the supervision of the 2 NEEs activities related to monitoring the ESMP at local level and for submission of the ESMP report to OSS. This report will consider the management of the 15 principles of the Adaptation Fund. This report should include grievance management.

275. Quarterly, the REE will gather the reports from the NEEs, who will rely on a bottom-up feedback system with community inputs. In order to ensure relevant monitoring, regular field visits will be organized i) to inspect and verify the efficiency of the mitigation measures and ii) to check the extent of the foreseen impacts. Given that this is a regional project, the impacts may also be regional and the limited expertise of the NEEs might not be sufficient to monitor these impacts adequately. The REE and the RIE will carry out regular field missions for close monitoring of risks, impacts and mitigation measures, especially those with a regional connotation. In this context, the involvement of all implementing and executing entities is necessary to ensure adequate monitoring of mitigation measures at the local, national and regional levels. The ESMP report should be submitted to OSS on a yearly basis.

276. **National Executing Entities (NEE):** The NEEs will be responsible for coordinating and monitoring environmental and social indicators. The NEE will also be in charge of analyzing data, managing local information systems and supervising the baseline establishment at the beginning of the project. The NEE will prepare quarterly reports and submit them to the REE.

277. **Local Communities**: The ESIA monitoring will also include a community-based component. In fact, the project plans to carry out training and capacity-building sessions for the benefit of local agents and communities, in data collection and monitoring. Communities will be informed about the activity risks and involved in implementing and monitoring mitigation measures.

Table 20. Roles and Responsibilities of M&E Program

Actor Involved	Responsibility/Role
Implementing Entity (OSS)	OSS will integrate mitigation measures as a fundamental part of its ESMP, aligning with AF standards and ESP principles..
Regional Executing Entity (REE)	The REE will actively monitor and communicate the ESIA/ESMP, incorporating its grievance mechanism, to pertinent stakeholders and beneficiaries. It will diligently ensure that project implementation strictly adheres to the applicable national and standard regulatory frameworks. Additionally, the REE will conduct thorough monitoring of ESMP measure execution and diligently evaluate their effectiveness.
National Executing Entities (NEE)	Each NEE is tasked with overseeing the project's daily execution and conducting ongoing monitoring, identifying any emerging risks to both society and the environment as the project progresses. This proactive approach allows for timely implementation of supportive measures and necessary mitigation strategies.
Local Communities/ Project Partners	They will provide valuable insights on potential emerging social and environmental risks throughout the project's duration and offer support in implementing and monitoring mitigation measures, drawing upon their expertise and knowledge.

Table 21. Monitoring & Evaluation Work Plan and Budget

Type of activity	Responsible parties	Budget (USD)	Timeline																			
			Y1				Y2				Y3				Y4				Y5			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project Implementation Manual	REE	10,000.00																				
Design of M&E system and Manual	REE & EEs	20,000.00																				
Baseline studies	2 NEE, 2 REE	30,000.00																				
Quarterly M&E Meetings and reports	M&E Officers, PMU staff and key management staff of the EEs	40,000.00																				
Quarterly Field visits for measuring the project results for each target and reporting on activities	M&E officers, Focal points of the EEs	120,000.00																				
Annual Field visits for joint review of the project results, progress and activities	OSS, Focal points of the EEs	300,000 (100,000.00 OSS + 60,000.00 EEs + 140,000.00 REEs)																				
Annual monitoring reports	PMUs at regional and national levels, M&E officers	30,000.00																				
Annual audit	External-2 NEE- 2 REE	20,000.00																				
Annual RSPC meetings, including workshop on results and M&E systems	RSPC members, PMUs, M&E Officers	15,000.00																				
Mid-term evaluation	External/OSS	30,000.00																				
Project completion report	OSS and EEs focal points	60,000.00 (30,000.00 OSS +30,000.00 EEs)																				
Final evaluation	External/OSS	30,000.00																				
Final project audit	External/OSS	20,000.00																				
Total Cost		**725,000.00**																				

Ongoing

Milestones/Deliverable

278. For the M&E functions, the budget and breakdown of the RIE and EEs fees is in the detailed budget in Table 25 (Part III, Section G) which includes notes and types of M&E activities that will be utilized for the supervision of M&E functions. Also, the BOUCLIER results framework in table xx indicates the related means of verification to achieve the targeted results.

E. Project results framework including milestones, targets and indicators.

279. The details for the implementation of the results framework will be determined in the M&E manual, which will be developed at the beginning of the project. It will be possible to disaggregate many of the indicators, for example, beneficiaries will be able to be grouped according to country, climate zone, gender and age

Table 22: BOUCLIER Results Framework

Result (Project Objective(s))	Project Objectives Indicator(s)	Baseline	Milestones (after 2 years)	End of project targets	Means of verification	Responsible Parties	Risks and Assumptions
Objective: Strengthen the resilience of vulnerable communities in the Mono River Basin through building adaptive capacity to the risks of recurrent flooding and promoting the sustainable and equitable use and management of water resources and related ecosystems	Degree of resilience improvement of vulnerable communities in the Mono River Basin to recurrent flooding and climate change, measured by the number of communities with improved access to early warning information	0	50%	100%	• Scientific assessment report of resilience, Study, and Investigation • Report, Disaster monitoring Report, • Report on Improving the living Condition of the Target Population	OSS, REE, NEE, 2 countries	• Political stability and government commitment exist and is maintained; • Integration with Local and National Systems; • Community Engagement and Trust ; • Political will
	Number of disaster risk reduction plans developed and implemented	0	05 disaster risk reduction plans developed and implemented	10			Agencies and communities continue to use the information provided by EWS and knowledge gained in the pilot tests
	Number of early warning systems established and functional	0	0	01 Early Warning System is deployed in the Mono basin and its neighbouring localities			Favourable context to constructive exchanges at a country level about risks early warning of and disasters
	Number of beneficiaries sensitized and aware of predicted adverse impacts of climate change, desegregated by gender	0	50,000 direct beneficiaries (55% women and 70% youth) (1,5 million of people in the basin, indirectly)	90,000 direct beneficiaries (55% women and 70% youth) (3 million of people in the basin, indirectly)			• Effective participation of people from national structures and communities interested in taking part in activities; • Politicization in the choic e of the target beneficiaries in the localities
	Number of hectares of land restored and/or protected through ecosystem-based adaptation measures	0	500 ha	2000 ha	M&E incl. gender assessments and reports		• Ecological and Climatic Stability • Community Engagement and Indigenous Knowledge
	Proportion (%) of smallholder farmers, fishermen and pastoralists with increased incomes	0	At least 20% of smallholder farmers and pastoralists with increased incomes.	At least 70% of smallholder farmers and pastoralists with increased incomes.	• Project implementation reports • Field visits / M&E reports • Interviews with smallholder farmers and pastoralists and community leaders		• Participation of the population in selected pilot sites experiencing chronic flooding events • Politicization in the choice of the target beneficiaries in the localities
Component 1: Setting up/strengthening tools for climate change resilient management of the Mono River basin							
Outcome 1.1: Establishment of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) for effective flood management in the Mono River basin	Number of early warning systems established and functional in the Mono basin and its neighbouring localities	0	0	1	Mono-RCbFEWS monitoring report, activities reports, fields reports	OSS, REE, NEE, 2 countries	Favorable political conditions in the countries and support from the transboundary organization (MBA) for the implementation and operationalization of the EWS.
	Number of beneficiaries of the Mono-RCbFEWS	0	50,000 direct beneficiaries	500	Mono-RCbFEWS monitoring report, activities reports, fields reports		Representatives of the national hydrological and meteorological agencies use the products and services delivered in future work or projects.
	Contingency plans developed and validated	0	5	10	M&E report, activities reports, fields reports		Representatives of the national hydrological and meteorological agencies use the products and services delivered in future work or projects.
	Number of Mono-RCbFEWS prototype designed and validated	*Poor early warning systems exist in the*	1	1	Study reports, workshops report, activities reports		

Output 1.1.1: Mono-RCbFEWS designed and validated	Early warning systems (EWS) and national/regional warning plans report	*focal countries* ***E****W information rarely received*	At least 3	At least 3		OSS, REE, NEE, 2 countries	Massive reduction of socio-economic and environmental damage caused by flood risks
	Reports and documents on institutional anchoring of Mono-RCbFEWS		At least 3	At least 3			
	Number of stakeholders informed about the EWS and national workshops		50,000	500,000			
	Number of regional and national workshops		At least 3	At least 5			
Output 1.1.2: Mono-RCbFEWS functional and deployed	EWS established and functional	*Poor early warning systems exist in the focal countries EW information rarely received*	1	1	Study reports, workshops report, activity report		Favorable political conditions in the countries and support from the transboundary organization (MBA) for the implementation and operationalization of the EWS.
	Number of people informed about flood risk events in the basin through the EWS established		50,000 direct beneficiaries (55% women and 70% youth)	90,000 direct beneficiaries (55% women and 70% youth)			Participation of the population in selected pilot sites experiencing chronic flooding events
	Number of monitoring and surveillance equipments materials		10	20			Anticipate and take the necessary measures to avoid cumbersome procurement procedures .
	Number of EW information centers/units		At least 1	At least 3			
	Number of warning messages dissemination kits beacons, flags, sirens, signaling devices, speakers, telephones		17 kits	34 kits			
	Number of warning messages produced and disseminated		34	170			
	Number of experts on water issues related to the regional platform		5	10			Difficulty in mobilizing experts from government structures responsible for water management
	Number of platform of water experts		0	1			
Output 1.1.3: Disaster emergency management plans are set up and operational	Number of disaster emergency management plans established and operational	*Poor emergency disaster management plans at national level At regional level, no emergency disaster plan*	5	10	Study report, workshop reports,		Agencies and communities continue to use the information provided by EWS and knowledge gained in the pilot tests
	Number of the contingency plans developed		17	34			Participation of the population in selected pilot sites experiencing chronic flooding events
	Number of regional and national validation workshops		3	6			
	Number of blank operations implemented		3	6			
Component 2: **Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures**							
Outcome 2.1: Enhanced resilience of water resources to the impacts of CC and overexploitation	Number of New Water Structures Built or Rehabilitated	N/A	7	15	• Meetings reports • Report of technical development studies • Works reports	REE, NEE, 2 countries	• Politicization in the choice of the target beneficiaries in the localities; • Construction difficulty due to terrain;
	Number of protected and sustainably managed sites for groundwater preservation	N/A	2	4			
	Number of beneficiaries with access to good quality and sufficient water, desagregated by gender	0	5,000 direct beneficiaries (60% women and 70%youth)	15,000 direct beneficiaries (60% women and 70%youth)			Appropriation of the actions by the stakeholders
Output 2.1.1: The availability of water resources (quantity and quality) improved and their use rationalized	Number of Baseline/specific studies conducted for the most vulnerable sites	0	5	5	• Meetings reports • Report of technical development studies • Works reports · Training & workshop reports	REE, NEE, 2 countries	Appropriation of the actions by the stakeholders
	Number of intervention sites identified	0	34	34			• Politicization in the choice of the target project areas; • Construction difficulty due to terrain;
	Number of Community based Adaptation Action Plans	0	17	34			
	Number of runoff collection structures constructed	N/A	2	4			• Politicization in the choice of the target beneficiaries in the localities; • Construction difficulty due to terrain;
	Number of wells and boreholes rehabilitated or constructed	N/A	5	20			
	Number of people benefiting from improved water supply	0	5,000 direct beneficiaries (60% women and 70%youth)	15,000 direct beneficiaries (60% women and 70%youth)			Appropriation of the actions by the stakeholders
	Number of protected and sustainably managed sites for groundwater preservation	N/A	2	4			• Politicization in the choice of the target beneficiaries in the localities; • Construction difficulty due to terrain;
	Number of hectares under hydro-agricultural development	0	500	1,25			
	Number of local water committee restructured / set up under the project	0	17	34			

	Level of implementation of action plans for adaptation measures for each local water committee	0	40%	100% (activities planned with Project BOUCLIER-CLIMAT/MONO support)			
Outcome 2.2: Preservation of Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) through effective implementation of adaptation measures against the impacts of climate change	Area in hectares of Mono Basin ecosystems preserved through the implemented adaptation measures against the effects of climate change	0	350	1000	• Meetings reports • Report of technical development studies • Works reports	REE, NEE, 2 countries	• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
Output 2.2.1: Basin ecosystems, especially those in RAMSAR areas, are rehabilitated and preserved	*Number of hectares of ecosystems managed using nature-based solutions*	0	1000	2000	• Meetings reports • Report of technical development studies • Works reports	REE, NEE, 2 countries	• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
	Number of management plan developed or updated with the support of the project	0	2	4		REE, NEE, 2 countries	
	Number of tree nurseries under a Public Private Partnership	0	5	10		REE, NEE, 2 countries	
	Number of individuals and groups trained and equiped in nursery establishment and management	0	10 (Enhanced capacity of 10 associations or cooperatives in setting up nurseries)	20 (Enhanced capacity of 10 associations or cooperatives in setting up nurseries)		REE, NEE, 2 countries	
	Number of seedlings produced and utilized for reforestation and rehabilitation activities	0	1,000,000 seedlings produced	3,000,000 seedlings produced		REE, NEE, 2 countries	
	Number of hectares of RAMSAR sites, wetlands and mangroves restorated and protected under the project	0	1000	2000		REE, NEE, 2 countries	
Outcome 2.3: Implementation of adaptation measures for the benefit of the population	*Percentage increase in income for communities engaged in these value chains*	0	30% (60% women and 70%youth)	70% (60% women and 70%youth)	ME report, activities reports, fields reports	REE, NEE, 2 countries	
	Number of households benefiting of the implemented adaptation measure	0	500	3000			Integration of gender in the choice of beneficiaries
Output 2.3.1: Agricultural resilient practices adopted and enhanced	*Number of hectares of fodder crop planted (ha)*	0	250	500	ME reports, studies reports, workshops reports, activities reports	REE, NEE, 2 countries	Farmer organizations committed to participate in the project
	Linear distance of pasture passage corridor developed and validated (Km)	0	200	500			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
	Number of farmers adopting fodder crop planting	0	1	5			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
	Number of farmers adopting short-cycle livestock production integrated with cereal and legume cultivation	0	3	10			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
	Number of short-cycle livestock species distributed to households	0	50	100			• Active participation of all stakeholder groups in project activities
	Percentage of livestock breeders with improved access to veterinary services	0	30%	100%			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
Output 2.3.2: Improved and sustainable fishing is supported.	*Number of fishermen adopting climate-resilient aquaculture practices*	01 (A private developer practicing aquaculture in the basin of the Nangbéto Dam)	50 (40% women and 70%youth)	125 (40% women and 70%youth)			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
	Number of fishermen and processors provided with appropriate equipment and materials for sustainable fishing and fish processing		50 (40% women and 70%youth)	125 (40% women and 70%youth)			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities

	Number of fishermen trained in climate-resilient fishing techniques	0	50 (40% women and 70%youth)	125 (40% women and 70%youth)			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
Output 2.3.3: Resilience and adaptive capacities of populations to Climate Change improved by installing value chains of agricultural and fishery products	*Number of infrastructure and processing units identified for agricultural and fishery products.*	0	10	30			• Accessibility of favorable sites • Active participation of all stakeholder groups in project activities
	Number of stakeholders and farmers trained in the technical management and transformation of agricultural and fishery products	0	150	500			Active participation of all stakeholder groups in project activities
	Number of marketing and sales processes established for agricultural and fishery products.	0	1	4			Active participation of all stakeholder groups in project activities
Component 3: **Strengthening the capacities of different actors, share knowledge and raise awareness among all beneficiaries at different levels**							
Outcome 3.1: Mobilized and sensitized stakeholders through communication and capacity-building activities	*Number of stakeholders mobilized and sensitized through communication and capacity-building activities*	0	3,100 direct beneficiaries (51% women and 70% youth)	10,000 direct beneficiaries (51% women and 70%youth)	ME reports, studies reports, workshops reports, activities reports	OSS, REE, NEE, 2 countries	Active participation of all stakeholder groups in project activities
Output 3.1.1: Practitioners, technicians and decision-makers are sensitized and trained on technical and environmental aspects of the project	*Number of institutional capacity-building needs assessment reports*	0	4	4	ME reports, studies reports, workshops reports, activities reports	OSS, REE, NEE, 2 countries	Active participation of all stakeholder groups in the activities
	Number of training materials developed for capacity development programs	0	10	10			
	Number of national institutions that have received targeted training of trainers (ToTs) and capacity-building initiatives	0	15 institutions	25 institutions			
	Number of practitioners, technicians, and decision-makers trained on technical and environmental aspects of the project	0	100	300			
Output 3.1.2: Communities in target areas are sensitized and trained on climate change resilience issues.	*Number of special awareness plans developed for grassroots communities on climate change and adaptation*	0	2	2			
	Number of awareness campaigns conducted and workshops organized on climate change resilience issues	0	4	10			
	Number of people among the populations informed and sensitized on climate change, resilience and adaptation	0	4000	10000			
	Number of educational and interactive sessions conducted on Early Warning Systems (EWS)	0	4	10			
	Number of community members trained on interpreting warning signals and responding effectively to minimize risks	0	2000	5000			
Output 3.1.3. BOUCLIER CLIMAT project results and lessons learned are disseminated and shared	*Number of communication strategy prepared under the project*	0	1	1			
	Number of communication plan prepared under the project	0	1	1			
	Number of people reached through dissemination activities	0	40,000 direct beneficiaries	90,000 direct beneficiaries (55% women and 70% youth)			
	Number of reports on the project's inception workshop, periodic and annual reports on its implementation, signposts at field action sites, dedicated project webpage, and presentations at relevant events produced and disseminated	0	15	40			
	Number of stakeholders well informed and actively participating in promoting and implementing the project	0	500	1500			
	Number of exchange visits organized	0	5	20			
	Number of participatory workshops organized	0	5	20			
	Number of project stakeholders, institutions, and basin organizations from the West African sub-region engaged in discussions, exchange of experiences, and lessons learned	0	50	100			
	Number of knowledge products including publication disseminated through external platforms	0	5	15			

Adaptation Fund Core indicators for the project:

275.**The** Adaption Fund Core Indicators will be monitored for the project as per below:

Table 23: Core Indicators for the project

	Baseline	Target at project approval
Direct beneficiaries supported by the project	0	90,000
Female direct beneficiaries	0	49,500
Youth direct beneficiaries	0	40,500
Indirect beneficiaries supported by the project	0	1,500,000
Female indirect beneficiaries	0	825,000
Youth indirect beneficiaries	0	675,000
	Baseline	**Target at project approval**
Sector Climate change adaptation actions		
Targeted Asset 1) Health and Social Infrastructure *(developed/improved)* i) *IGAs* ii) *Provision of Small competitive grants* 2) Physical asset *(produced/improved/strengthened)* *i) Innovative water harvesting and storage infrastructure produced* *ii) Mini-irrigation and delivery system produced* *iii) Water wells improved* **iv)** *Groundwater sources improved* **v)** *Agrosilvopastoral system improved* **vi)** *Climate smart agricultural infrastructure*	0	Refer to the result framework
Changes in Asset *(Quantitative or qualitative depending on the asset)* **1)** Health and Social Infrastructure *(developed/improved)* **2)** *IGAs developed and credits provided* *2*) Physical asset *(produced/improved/strengthened)* i) Innovative water harvesting and storage infrastructure produced ii) Mini-irrigation and delivery system produced iii) Water wells improved iv) Groundwater sources improved **v)** Agro-silvopastoral system improved vi) Climate smart agricultural infrastructure produced	<u>Management of Groundwater and Artesian Wells:</u> Overexploitation, pollution, lack of local management. <u>Strengthening Water Management Bodies:</u> Weak local governance, usage conflicts. <u>Management Plans for Wetlands (RAMSAR Sites):</u> Outdated plans, climate impact not considered. <u>Rehabilitation of Livestock Corridors and Grazing Areas:</u> Land degradation, overgrazing, user conflicts. <u>Access to Veterinary Services and Agricultural Technologies:</u> Limited access, traditional practices, climate vulnerability.	<u>Management of Groundwater and Artesian Wells:</u> Enhanced protection, sustainable management by communities, improved water quality. <u>Strengthening Water Management Bodies:</u> Establishment of Water Users Organizations (WUOs), better collective management, reduced conflicts. <u>Management Plans for Wetlands (RAMSAR Sites):</u> Updated plans incorporating climate change, sustainable management, enhanced biodiversity protection. <u>Rehabilitation of Livestock Corridors and Grazing Areas:</u> Rehabilitated corridors and grazing areas, sustainable management, conflict reduction. <u>Access to Veterinary Services and Agricultural Technologies:</u> Improved access to veterinary services, adoption of smart agricultural technologies, better resilience and food security.
	Baseline	**Target at project approval**
Household income targets: i) Total number of households ii) Number of households with increase in income	 0 0	 15,000 15,000
Number of households iii) Total number of households targeted with trainings and adaptation action	0	15,000
Number of Early Warning Systems i) Total number of EWS	0	1

F. Alignment with the Results Framework of Adaptation Fund

Table 24. BOUCLIER-CLIMAT/MONO alignment with AF results Framework

Project Objective(s)[15]	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Strengthen the resilience of vulnerable communities in the Mono River Basin through building adaptive capacity to the risks of recurrent flooding and promoting the sustainable and equitable use and management of water resources and related ecosystems	Number of communities covered by improved warning system and weather information	Outcome 1: Reduced exposure to climate-related hazards and threats	1. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis	**14,000,000**
		Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic & environmental losses	2.2 No. of people with reduced risk to extreme weather events	
	Number of communties sensitized and aware of predicted adverse impacts of climate change	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1 Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	
	Improved Infrastructure to strengthen the adaptative capacity of the community	Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	4.2. Physical infrastructure improved to withstand climate change and variability-induced stress	
	Improved ecosystem services for the benefit of the communites	Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5. Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Component 1: Setting up/strengthening tools for climate change resilient management of the Mono River basin				
Outcome 1.1: Regional Early Warning System (EWS) Establishment for effective flood management in the Mono River basin	Number of communities covered by the early warning system developed and functioning	***Output 1.1:*** Risk and vulnerability assessments conducted and updated	1.2 No. of early warning systems (by scale) and no. of beneficiaries covered	**2,100,000**
		Output 1.2: Targeted population groups covered by adequate risk reduction systems	1.2.1. Percentage of target population covered by adequate risk-reduction systems	
		Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	
			2.1.2 No. of targeted institutions with increased capacity to minimize exposure	

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

			to climate variability risks (by type, sector and scale)	
Component 2: Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures				
Outcome 2.1: Resilience of water resources to the impacts of CC and overexploitation is strengthened	Improved water availability and water access for the community	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	**2,550,000**
Outcome 2.2: Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) preserved through implementation of adaptation measures against the effects of climate change	Number of Mono Basin ecosystems preserved through the implemented adaptation measures against the effects of climate change	Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1. No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	**3,200,000**
Outcome 2.3: Implemented adaptation measures for the benefit of the population	Number of households/populations benefiting of the implemented adaptation measure	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	**3,000,000**
Component 3: Strengthening the capacities of different actors, share knowledge and raise awareness among all beneficiaries at different levels				
Outcome 3.1: Mobilized and sensitized stakeholders through communication and capacity building activities	Number of stakeholders mobilized and sensitized through communication and capacity building activities	Output 3.1: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1 No. of news outlets in the local press and media that have covered the topic	**1,000,000**
		Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.1 No. of technical committees/associations formed to ensure transfer of knowledge	
			3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	

G. Detailed budget (US$)

Table 25. BOUCLIER-CLIMAT/MONO detailed budget

Components/Outcomes/Outputs/Activities	Regional	Benin	Togo	Total Budget	Budget notes activities
Component 1: Setting up/strengthening tools for climate change resilient management of the Mono River basin	**1 485 000,00 USD**	***307 500,00 USD***	***307 500,00 USD***	**2 100 000,00 USD**	
Outcome 1.1. Establishment of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) for effective flood management in the Mono River basin	**1 485 000,00 USD**	***307 500,00 USD***	***307 500,00 USD***	**2 100 000,00 USD**	
Output 1.1.1. Mono-RCbFEWS designed and validated	**155 000,00 USD**	***22 500,00 USD***	***22 500,00 USD***	**200 000,00 USD**	
Activity 1.1.1.1: Carry out an inventory of early warning systems (EWS) and national/regional warning plans for hydro-climatic hazards and establish a detailed technical assessment of functioning and operability (data, models, etc.) and institutional (governance, etc.)	25 000,00 USD	*7 500,00 USD*	*7 500,00 USD*	**40 000,00 USD**	*International consultancy for the inventory of regional/national EWS and warning plans in Benin and Togo;* *National workshops for Inventory validation*
Activity 1.1.1.2: Develop a prototype of Mono-RCbFEWS at the scale of the basin in connexion with the national and local devices and define the investments to be carried out (data production, equipment, etc.) using the supporting tools (modeling, flood forecasting), web platform, etc.	80 000,00 USD			**80 000,00 USD**	*Consultancy for the development of regional EWS prototype , define the investments to be carried out and the operation and maintenance plan*
Activity 1.1.1.3: Ensure the institutional anchoring of Mono-RCbFEWS at the regional and national levels, including community aspects to be integrated at different levels of alert management and the feedback mechanism	20 000,00 USD			**20 000,00 USD**	*Consultancy for EWS institutional anchoring, including community aspects*
Activity 1.1.1.4: Validate the studies and the Mono-RCbFEWS prototype by the project stakeholders through workshops (2 national workshops and 1 regional workshop)	30 000,00 USD	*15 000,00 USD*	*15 000,00 USD*	**60 000,00 USD**	*Regional and national workshops*
Output 1.1.2: Mono-RCbFEWS functional and deployed	**1 010 000,00 USD**	***195 000,00 USD***	***195 000,00 USD***	**1 400 000,00 USD**	
Activity 1.1.2.1: Acquire and set up remote monitoring/surveillance stations (hydrometric, meteorological, water level gauges, piezometers, real-time remote transmission system, etc.)	300 000,00 USD			**300 000,00 USD**	*Acquire and set up monitoring/surveillance stations* *Acquire an setup computer equipment and dissemination tools*
Activity 1.1.2.2: Construct/renovate and equip EW information centers with deploying equipment: IT equipment (servers, processing units, software, GPS, etc.)	290 000,00 USD	*15 000,00 USD*	*15 000,00 USD*	**320 000,00 USD**	*Consultancy for the construction/renovation and equipment of EW information centers* *Acquire of IT equipment*
Activity 1.1.2.3: Acquire tools and materials to broadcast the warning messages to the population	120 000,00 USD	*110 000,00 USD*	*110 000,00 USD*	**340 000,00 USD**	*Acquire tools and materials to broadcast the warning messages (local radio equipment, motos and vehicles)*
Activity 1.1.2.4: Produce and disseminate the warning messages (bulletin, maps, radio message synthesis, SMS, digital media).	180 000,00 USD			**180 000,00 USD**	*Consultancy for messages production and dissimination in official and local languages*
Activity 1.1.2.5: Develop/revise water information sharing frameworks at regional and national levels and implement an action plan to operationalize them	120 000,00 USD	*70 000,00 USD*	*70 000,00 USD*	**260 000,00 USD**	*National and International consultancy* *National and regional workshops*
Output 1.1.3: Disaster emergency management plans set up and operational	**320 000,00 USD**	***90 000,00 USD***	***90 000,00 USD***	**500 000,00 USD**	
Activity 1.1.3.1: Develop and/or update warning emergency and resilience plans for communities facing hydro-climatic risks	80 000,00 USD	*35 000,00 USD*	*35 000,00 USD*	**150 000,00 USD**	*Consultancy for developing/updating warning and resilience plans for communities* *Local (Communal) workshop for validation* *Regional workshop for validation and knowledge/ best practices exchange*
Activity 1.1.3.2: Monitor the EWS, feedback mechanism and its contingency plans	70 000,00 USD	*35 000,00 USD*	*35 000,00 USD*	**140 000,00 USD**	*Regional & National workshop for EWS evaluation / feedback mechanism* *Consultancy for improving the EWS based on the collected feedbacks*
Activity 1.1.3.3: Implement blank operations (Tests) to validate the different components of the Mono-RCbFEWS	170 000,00 USD	*20 000,00 USD*	*20 000,00 USD*	**210 000,00 USD**	*Blank operations at the regional and national levels* *Consultancy for filling the gaps identified in the white operations (equipment, modules,hydrological data collection, forecasts improvement, resilience plans, etc)*
Component 2: Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures	**1 306 000,00 USD**	***2 942 000,00 USD***	***4 502 000,00 USD***	**8 750 000,00 USD**	
Outcome 2.1: Enhanced resilience of water resources to the impacts of CC and overexploitation	**316 000,00 USD**	***887 000,00 USD***	***1 287 000,00 USD***	**2 490 000,00 USD**	

Output 2.1.1: The availability of water resources (quantity and quality) is improved and their use rationalized	**316 000,00 USD**	***887 000,00 USD***	***1 287 000,00 USD***	**2 490 000,00 USD**	
Activity 2.1.1.1: Carry out a baseline study to identify localities in vulnerable zones with areas (riverbanks, headwaters and agricultural land) heavily degraded by water erosion and/or other agricultural practices.	66 000,00 USD	*23 000,00 USD*	*23 000,00 USD*	**112 000,00 USD**	*Consultancy for a baseline study* *Local consultation meeting, national and regional workshops*
Activity 2.1.1.2: Develop community based Adaptation Action Plans specific for the most vulnerable sites / areas identified in the baseline	50 000,00 USD	*59 000,00 USD*	*59 000,00 USD*	**168 000,00 USD**	*Consultancies for specific studies* *Local consultation meeting* *National and regional workshops*
Activity 2.1.1.3: Construct gray small runoff collection structures ("boulis", run-off collection basin, etc.) at the headwater of basins to support groundwater recharge and the promotion of agro-sylvo-pastoral activities	50 000,00 USD	*235 000,00 USD*	*605 000,00 USD*	**890 000,00 USD**	*Consultancies for technical studies* *National and regional workshops for studies validation* *4 runoff collection structures and 20 wells and boreholes rehabilitated or constructed* *Acquire Materials and Goods including pumps, solar panels packages, small tools, tricycle for beneficiaries* *Support to the implementation of proposed agro-sylvo-pastoral activities at the head of basin*
Activity 2.1.1.4: Implement actions for the protection, enhancement and sustainable management of groundwater and artesian wells in the downstream part of the basin	50 000,00 USD	*370 000,00 USD*	*330 000,00 USD*	**750 000,00 USD**	*Consultation for the preparation of the technical (design) and financial document for the protection, enhancement, and sustainable management of artesian wells in the downstream part of the basin.* *Local consultation meeting* *National and Regional workshop for studies validation* *Support for the implementation of proposed activities for the protection, enhancement, and sustainable management of groundwater and artesian wells in the downstream part of the basin* *Capacity building of the community (training and coaching)* *Materials and goods*
Activity 2.1.1.5: Strengthen community/local water management bodies (establish Water Users Organizations)	100 000,00 USD	*200 000,00 USD*	*270 000,00 USD*	**570 000,00 USD**	*Technical Assistance to enhance / structure community/local water management bodies and preparation of a plan to implement adaptation measures including capacity building* *Support inclunding capacity building to the community/local water management bodies to implement their plans of adaptation measures* *Local consultation meeting and monitoring*
Outcome 2.2: Preservation of Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) through effective implementation of adaptation measures against the impacts of climate change	**380 000,00 USD**	***561 000,00 USD***	***1 069 000,00 USD***	**2 010 000,00 USD**	
Output 2.2.1: Basin ecosystems, especially those in RAMSAR areas, rehabilitated and preserved	**380 000,00 USD**	***561 000,00 USD***	***1 069 000,00 USD***	**2 010 000,00 USD**	
Activity 2.2.1.1: Develop/update wetland management plans for the RAMSAR sites incorporating climate change aspects	110 000,00 USD	*35 000,00 USD*	*35 000,00 USD*	**180 000,00 USD**	*Consultancy for the development/ update of 4 wetland management plans* *Local consultation meeting* *National and regional workshops*
Activity 2.2.1.2: Implement "Nature-based Solutions (NbS)" approach to ensure reforestation and assisted natural regeneration of degraded areas	230 000,00 USD	*306 000,00 USD*	*594 000,00 USD*	**1 130 000,00 USD**	*Consultancy to prepare the technical and financial documents to implement the activitiy through the NbS approach based on the results of the the Activity 2.2.1.1* *Local consultation meeting* *National and regional workshops* *Support to the implementation of the Activity based on the prepared technical and financial documents* *Support to the local population to implement income generation activities leading to reduce the human pressures on the natural resources* *Capacity building of the community* *Materials and Goods* *Monitoring including travels and buying a vehicule*
Activity 2.2.1.3: Establish tree nurseries under a Public Private Partnership (PPP) arrangement	10 000,00 USD	*70 000,00 USD*	*160 000,00 USD*	**240 000,00 USD**	*Establishment of 34 nurseries and organization of 2 training sessions in each country* *Provision of equipment and advice on seedling production*
Activity 2.2.1.4: Undertake actions to restore and protect RAMSAR sites: wetlands and mangroves in the downstream part of the basin	30 000,00 USD	*150 000,00 USD*	*280 000,00 USD*	**460 000,00 USD**	*Local training workshops to implement the wetland management plans* *Support to the implementation of the updated/ prepared wetland management plans (Restoration of 600 ha and 3 million plants to be produced and planted)* *Materials and Goods including technical assistance for the implementation of actions / Monitoring including travels*

Outcome 2.3: Implementation of adaptation measures for the benefit of the population	**610 000,00 USD**	***1 494 000,00 USD***	***2 146 000,00 USD***	**4 250 000,00 USD**	
Output 2.3.1: Resilient agro-sylvo-pastoral practices adopted and enhanced	**140 000,00 USD**	***361 000,00 USD***	***499 000,00 USD***	**1 000 000,00 USD**	
Activity 2.3.1.1: Set up / rehabilitate livestock corridors and grazing areas in order to limit the generalized land degradation	100 000,00 USD	*114 000,00 USD*	*169 000,00 USD*	**383 000,00 USD**	*Consultancy for a feasbility study and preparation a technical and financial detailed documents* *Local consultation meeting* *National workshop / Regional workshop* *Works/ consultancy / Materials and Goods monitoring including travels*
Activity 2.3.1.2: Promote and support the planting of fodder crops to enhance livestock nutrition	20 000,00 USD	*67 000,00 USD*	*100 000,00 USD*	**187 000,00 USD**	*Consultancy for the farmers training to adopt forage crops* *Local consultation meeting* *Advisory support/Works* *Materials and Goods* *monitoring including travels*
Activity 2.3.1.3: Integration and Promotion of Short-Cycle Livestock Production with Cereal and Legume Cultivation		*105 000,00 USD*	*105 000,00 USD*	**210 000,00 USD**	*Consultancy for identification and farmers training to adopt short-cycle livestock production* *Short-cycle livestock species for households* *Local consultation meeting* *Advisory support/Works* *Materials and Goods* *monitoring including travels*
Activity 2.3.1.4: Facilitate farmers' access to veterinary services	20 000,00 USD	*75 000,00 USD*	*125 000,00 USD*	**220 000,00 USD**	*Advisory support/Works / Materials and Goods / monitoring including travels*
Output 2.3.2: Improved and sustainable fishing is supported	**150 000,00 USD**	***260 000,00 USD***	***340 000,00 USD***	**750 000,00 USD**	
Activity 2.3.2.1: Conduct Climate-Resilient Fishing Techniques Trainings (CRFTTs) to educate fishermen on adapted practices for enhancing water ecosystem sustainability	50 000,00 USD	*15 000,00 USD*	*15 000,00 USD*	**80 000,00 USD**	*Consultancy and 10 trainings*
Activity 2.3.2.2: Introduce and support climate-resilient aquaculture practices as an alternative or complementary livelihood for fishing communities	50 000,00 USD	*150 000,00 USD*	*200 000,00 USD*	**400 000,00 USD**	*Consultancy for technical studies* *National and regional workshops* *Works*
Activity 2.3.2.3: Equip fishermen and processors with inputs and tools	50 000,00 USD	*95 000,00 USD*	*125 000,00 USD*	**270 000,00 USD**	*Equipment and Works*
Output 2.3.3: Resilience and adaptive capacities of populations to Climate Change improved by installing value chains of agricultural and fishery products	**320 000,00 USD**	***873 000,00 USD***	***1 307 000,00 USD***	**2 500 000,00 USD**	
Activity 2.3.3.1: Identify the needs for infrastructure and processing units for agricultural and fishery products (palm nuts, soya, cassava, rice, etc.) for vulnerable and disadvantaged communities in the basin	110 000,00 USD	*29 000,00 USD*	*41 000,00 USD*	**180 000,00 USD**	*Consultancy* *Local consultation meeting* *National and regional workshops*
Activity 2.3.3.2: Train stakeholders and farmers on the technical management and transformation of agricultural and fishery products and their development.	30 000,00 USD	*80 000,00 USD*	*130 000,00 USD*	**240 000,00 USD**	*Consultancy and trainings (local, national and regional levels)*
Activity 2.3.3.3: Set up /support collection, storage, transformation, conservation and packaging units for agricultural and fishery products (palm nuts, soybeans, cassava, rice, etc.)	130 000,00 USD	*744 000,00 USD*	*1 116 000,00 USD*	**1 990 000,00 USD**	*Support to design and establish the transformation units and their transfer to the beneficiary populations* *Materials and goods* *Capacity building and coaching to the beneficiaries of the transformation units* *Monitoring including travels*
Activity 2.3.3.4: Establish a marketing and sales process	50 000,00 USD	*20 000,00 USD*	*20 000,00 USD*	**90 000,00 USD**	*Consultancies*
Component 3: Strengthening the capacities of different actors, share knowledge and raise awareness among all beneficiaries at different levels	**460 000,00 USD**	***270 000,00 USD***	***270 000,00 USD***	**1 000 000,00 USD**	
Outcome 3.1: Mobilized and sensitized stakeholders through communication and capacity building activities	**460 000,00 USD**	***270 000,00 USD***	***270 000,00 USD***	**1 000 000,00 USD**	
Output 3.1.1: Practitioners, technicians, extension agents and decision-makers sensitized and trained on technical and environmental aspects of the project	**230 000,00 USD**	***65 000,00 USD***	***65 000,00 USD***	**360 000,00 USD**	
Activity 3.1.1.1: Conduct a needs assessment for the institutions involved in the project, evaluate their capacities to manage climate risks in the basin and define their priorities for capacity building	80 000,00 USD	*15 000,00 USD*	*15 000,00 USD*	**110 000,00 USD**	*Consultancy* *National workshop* *Regional Workshop*
Activity 3.1.1.2: Develop training materials for the capacity development program of the institutions, based on the needs assessment	60 000,00 USD			**60 000,00 USD**	*Consultancy*

Activity 3.1.1.3: Implement targeted training of trainers (ToTs) and capacity-building initiatives for national institutions in the project area, addressing a variety of specified topics (EWS alerts interpretation, water management, RAMSAR sites protection, agricultural and fishing activities, value chain)	90 000,00 USD	*50 000,00 USD*	*50 000,00 USD*	**190 000,00 USD**	*Consultancy* *National training workshop* *Regional training Workshop*
Output 3.1.2: Communities in target areas sensitized and trained on climate change resilience and EWS issues.	**80 000,00 USD**	***125 000,00 USD***	***125 000,00 USD***	**330 000,00 USD**	
Activity 3.1.2.1: Develop a special awareness plan for grassroots communities on the issue of Climate Change and means of adaptation, with particular emphasis on considering endogenous know-how	80 000,00 USD	*25 000,00 USD*	*25 000,00 USD*	**130 000,00 USD**	*Consultancy* *Local consultation meeting* *Regional & National training Workshop*
Activity 3.1.2.2: Conduct sessions to familiarize communities with the functioning and importance of Early Warning Systems and provide hands-on training on interpreting warning signals and responding effectively to minimize risks		*100 000,00 USD*	*100 000,00 USD*	**200 000,00 USD**	*Conduct awareness campaign*
Output 3.1.3. BOUCLIER-CLIMAT/Mono project results and lessons learned disseminated and shared	**150 000,00 USD**	***80 000,00 USD***	***80 000,00 USD***	**310 000,00 USD**	
Activity 3.1.3.1: Develop the project's communication plan and strategy, in conjunction with those of the MBA	60 000,00 USD	*25 000,00 USD*	*25 000,00 USD*	**110 000,00 USD**	*Consultancy* *Regional & National training workshop*
Activity 3.1.3.2: Ensure effective dissemination of project achievements and lessons learned through exchange visits	80 000,00 USD	*20 000,00 USD*	*20 000,00 USD*	**120 000,00 USD**	*Implement actions included in the communication plan* *Workshops* *Participation to major events at regional and global levels to share results*
Activity 3.1.3.3: Organize participatory workshops in the target areas to engage with community members in facilitating discussions on specified topics (water management, RAMSAR sites protection, agricultural and fishing activities, value chain)	10 000,00 USD	*35 000,00 USD*	*35 000,00 USD*	**80 000,00 USD**	*Study tours* *Consultation workshop with communities*
Subtotal All Components	**3 251 000,00 USD**	***3 519 500,00 USD***	***5 079 500,00 USD***	**11 850 000,00 USD**	
Project Execution Costs 8,9%	900 000,00 USD	*80 000,00 USD*	*80 000,00 USD*	**1 060 000,00 USD**	
Project inception launch activities	30 000,00 USD			**30 000,00 USD**	*Workshop and travel*
Project coordination and management fees	500 000,00 USD	*50 000,00 USD*	*50 000,00 USD*	**600 000,00 USD**	*Salaries and management fees (M&E, safeguards compliance (AF/OSS), gender and communication), Staffing costs, and project related activity expenditures (Monitoring and evaluation costs; Costs related to drafting progress reports and financial reports*
Operating costs for regional and national entities	200 000,00 USD	*20 000,00 USD*	*20 000,00 USD*	**240 000,00 USD**	*Travel, DSA, printing, support staff, steering committee/other meetings*
Equipment	40 000,00 USD	*10 000,00 USD*	*10 000,00 USD*	**60 000,00 USD**	*IT Equipment*
Audit/Final evaluation	20 000,00 USD			**20 000,00 USD**	*Consultancy*
Monitoring & Evaluation by Project Team	110 000,00 USD			**110 000,00 USD**	*Consultancies and travel : Costs related to drafting progress reports and financial reports ; Consultation with project stakeholders (meetings, workshops) ;*
Total Project Costs	**4 151 000,00 USD**	***3 599 500,00 USD***	***5 159 500,00 USD***	**12 910 000,00 USD**	
Project Implementation Costs 8,4%				**1 090 000,00 USD**	
Implementation and Coordination Management Fees : Salaries and fees of experts in charge of the project overall supervision, planning, daily management, implementation, compliance (ESP and GP), M&E, Communication and Gender advisor, Consultancies				**600 000,00 USD**	*Salaries and Management fees*
Equipment – USD25,000 Supervision and travel expenses for M&E - USD 80,000 Mid-term evaluation – USD30,000 Final project audit – USD 20,000 Final project evaluation– USD 30,000 Participation in workshops and steering committee meetings – USD 35,000 Financial management, accounting, administrative follow-up				**290 000,00 USD**	*Annual Field visits for M&E, ESMP Monitoring, quality assurance and joint review of the project results, progress and activities and financial reporting, Mid-term evaluation, Final Project report, Final project audit, Final project evaluation: Travel, DSA, as well as equipment and consumables etc.*
Financial audit: Financial management monitoring fees in line with the requirements of the Adaptation Fund, financial reports, procurement procedures, accounting, audits, etc.				**200 000,00 USD**	*Consultancies, management fees, External audit fees, Administrative staff* *salaries or part of it*
GRANT AMOUNT				**14 000 000,00 USD**	

H. Disbursement schedule with time-bound milestones

Table 26. Project budget by component and year

Components/Outcomes/Outputs/Activities	Total Budget	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Component 1: Setting up/strengthening tools for climate change resilient management of the Mono River basin	**2 100 000,00 USD**	**460 000,00 USD**	**900 000,00 USD**	**430 000,00 USD**	**200 000,00 USD**	**110 000,00 USD**
Outcome 1.1. Establishment of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) for effective flood management in the Mono River basin	**2 100 000,00 USD**	**460 000,00 USD**	**900 000,00 USD**	**430 000,00 USD**	**200 000,00 USD**	**110 000,00 USD**
Output 1.1.1. Mono-RCbFEWS designed and validated	**200 000,00 USD**	***90 000,00 USD***	***110 000,00 USD***	***- USD***	***- USD***	***- USD***
Activity 1.1.1.1: Carry out an inventory of early warning systems (EWS) and national/regional warning plans for hydro-climatic hazards and establish a detailed technical assessment of functioning and operability (data, models, etc.) and institutional (governance, etc.)	**40 000,00 USD**	***40 000,00 USD***				
Activity 1.1.1.2: Develop a prototype of Mono-RCbFEWS at the scale of the basin in connexion with the national and local devices and define the investments to be carried out (data production, equipment, etc.) using the supporting tools (modeling, flood forecasting), web platform, etc.	**80 000,00 USD**	***30 000,00 USD***	***50 000,00 USD***			
Activity 1.1.1.3: Ensure the institutional anchoring of Mono-RCbFEWS at the regional and national levels, including community aspects to be integrated at different levels of alert management and the feedback mechanism	**20 000,00 USD**	***20 000,00 USD***				
Activity 1.1.1.4: Validate the studies and the Mono-RCbFEWS prototype by the project stakeholders through workshops (2 national workshops and 1 regional workshop)	**60 000,00 USD**		***60 000,00 USD***			
Output 1.1.2: Mono-RCbFEWS functional and deployed	**1 400 000,00 USD**	***370 000,00 USD***	***660 000,00 USD***	***270 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***
Activity 1.1.2.1: Acquire and set up remote monitoring/surveillance stations (hydrometric, meteorological, water level gauges, piezometers, real-time remote transmission system, etc.)	**300 000,00 USD**		***250 000,00 USD***	***50 000,00 USD***		
Activity 1.1.2.2: Construct/renovate and equip EW information centers with deploying equipment: IT equipment (servers, processing units, software, GPS, etc.)	**320 000,00 USD**	***240 000,00 USD***	***80 000,00 USD***			
Activity 1.1.2.3: Acquire tools and materials to broadcast the warning messages to the population	**340 000,00 USD**		***170 000,00 USD***	***170 000,00 USD***		
Activity 1.1.2.4: Produce and disseminate the warning messages (bulletin, maps, radio message synthesis, SMS, digital media).	**180 000,00 USD**		***30 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***
Activity 1.1.2.5: Develop/revise water information sharing frameworks at regional and national levels and implement an action plan to operationalize them	**260 000,00 USD**	***130 000,00 USD***	***130 000,00 USD***			
Output 1.1.3: Disaster emergency management plans set up and operational	**500 000,00 USD**	***- USD***	***130 000,00 USD***	***160 000,00 USD***	***150 000,00 USD***	***60 000,00 USD***
Activity 1.1.3.1: Develop and/or update warning emergency and resilience plans for communities facing hydro-climatic risks	**150 000,00 USD**		***100 000,00 USD***	***50 000,00 USD***		

Activity 1.1.3.2: Monitor the EWS, feedback mechanism and its contingency plans	**140 000,00 USD**			***20 000,00 USD***	***60 000,00 USD***	***60 000,00 USD***
Activity 1.1.3.3: Implement blank operations (Tests) to validate the different components of the Mono-RCbFEWS	**210 000,00 USD**		***30 000,00 USD***	***90 000,00 USD***	***90 000,00 USD***	
Component 2: Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures	**8 750 000,00 USD**	***1 577 000,00 USD***	***2 335 000,00 USD***	***2 340 000,00 USD***	***1 985 000,00 USD***	***513 000,00 USD***
Outcome 2.1: Enhanced resilience of water resources to the impacts of CC and overexploitation	**2 490 000,00 USD**	***540 000,00 USD***	***700 000,00 USD***	***750 000,00 USD***	***500 000,00 USD***	***- USD***
Output 2.1.1: The availability of water resources (quantity and quality) improved and their use rationalized	**2 490 000,00 USD**	***540 000,00 USD***	***700 000,00 USD***	***750 000,00 USD***	***500 000,00 USD***	***- USD***
Activity 2.1.1.1: Carry out a baseline study to identify localities in vulnerable zones with areas (riverbanks, headwaters and agricultural land) heavily degraded by water erosion and/or other agricultural practices.	**112 000,00 USD**	***112 000,00 USD***				
Activity 2.1.1.2: Develop community based Adaptation Action Plans specific for the most vulnerable sites / areas identified in the baseline	**168 000,00 USD**	***168 000,00 USD***				
Activity 2.1.1.3: Construct gray small runoff collection structures (“boulis”, run-off collection basin, etc.) at the headwater of basins to support groundwater recharge and the promotion of agro-sylvo-pastoral activities	**890 000,00 USD**	***90 000,00 USD***	***300 000,00 USD***	***300 000,00 USD***	***200 000,00 USD***	
Activity 2.1.1.4: Implement actions for the protection, enhancement and sustainable management of groundwater and artesian wells in the downstream part of the basin	**750 000,00 USD**	***50 000,00 USD***	***200 000,00 USD***	***250 000,00 USD***	***250 000,00 USD***	
Activity 2.1.1.5: Strengthen community/local water management bodies (establish Water Users Organizations)	**570 000,00 USD**	***120 000,00 USD***	***200 000,00 USD***	***200 000,00 USD***	***50 000,00 USD***	
Outcome 2.2: Preservation of Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) through effective implementation of adaptation measures against the impacts of climate change	**2 010 000,00 USD**	***430 000,00 USD***	***540 000,00 USD***	***480 000,00 USD***	***460 000,00 USD***	***100 000,00 USD***
Output 2.2.1: Basin ecosystems, especially those in RAMSAR areas, rehabilitated and preserved	**2 010 000,00 USD**	***430 000,00 USD***	***540 000,00 USD***	***480 000,00 USD***	***460 000,00 USD***	***100 000,00 USD***
Activity 2.2.1.1: Develop/update wetland management plans for the RAMSAR sites incorporating climate change aspects	**180 000,00 USD**	***80 000,00 USD***	***80 000,00 USD***	***20 000,00 USD***		
Activity 2.2.1.2: Implement "Nature-based Solutions (NbS)" approach to ensure reforestation and assisted natural regeneration of degraded areas	**1 130 000,00 USD**	***230 000,00 USD***	***300 000,00 USD***	***300 000,00 USD***	***300 000,00 USD***	
Activity 2.2.1.3: Establish tree nurseries under a Public Private Partnership (PPP) arrangement	**240 000,00 USD**	***60 000,00 USD***	***60 000,00 USD***	***60 000,00 USD***	***60 000,00 USD***	
Activity 2.2.1.4: Undertake actions to restore and protect RAMSAR sites: wetlands and mangroves in the downstream part of the basin	**460 000,00 USD**	***60 000,00 USD***	***100 000,00 USD***	***100 000,00 USD***	***100 000,00 USD***	***100 000,00 USD***
Outcome 2.3: Implementation of adaptation measures for the benefit of the population	**4 250 000,00 USD**	***607 000,00 USD***	***1 095 000,00 USD***	***1 110 000,00 USD***	***1 025 000,00 USD***	***413 000,00 USD***
Output 2.3.1: Agricultural resilient practices adopted and enhanced	**1 000 000,00 USD**	***137 000,00 USD***	***280 000,00 USD***	***290 000,00 USD***	***280 000,00 USD***	***13 000,00 USD***

Activity 2.3.1.1: Set up / rehabilitate livestock corridors and grazing areas in order to limit the generalized land degradation	**383 000,00 USD**	***50 000,00 USD***	***100 000,00 USD***	***110 000,00 USD***	***110 000,00 USD***	***13 000,00 USD***
Activity 2.3.1.2: Promote and support the planting of fodder crops to enhance livestock nutrition	**187 000,00 USD**	***37 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***	
Activity 2.3.1.3: Integration and Promotion of Short-Cycle Livestock Production with Cereal and Legume Cultivation	**210 000,00 USD**	***30 000,00 USD***	***60 000,00 USD***	***60 000,00 USD***	***60 000,00 USD***	
Activity 2.3.1.4: Facilitate farmers' access to veterinary services	**220 000,00 USD**	***20 000,00 USD***	***70 000,00 USD***	***70 000,00 USD***	***60 000,00 USD***	
Output 2.3.2: Improved and sustainable fishing is supported	**750 000,00 USD**	***170 000,00 USD***	***200 000,00 USD***	***205 000,00 USD***	***175 000,00 USD***	***- USD***
Activity 2.3.2.1: Conduct Climate-Resilient Fishing Techniques Trainings (CRFTTs) to educate fishermen on adapted practices for enhancing water ecosystem sustainability	**80 000,00 USD**	***20 000,00 USD***	***30 000,00 USD***	***30 000,00 USD***		
Activity 2.3.2.2: Introduce and support climate-resilient aquaculture practices as an alternative or complementary livelihood for fishing communities	**400 000,00 USD**	***100 000,00 USD***	***100 000,00 USD***	***100 000,00 USD***	***100 000,00 USD***	
Activity 2.3.2.3: Equip fishermen and processors with inputs and tools	**270 000,00 USD**	***50 000,00 USD***	***70 000,00 USD***	***75 000,00 USD***	***75 000,00 USD***	
Output 2.3.3: Resilience and adaptive capacities of populations to Climate Change improved by installing value chains of agricultural and fishery products	**2 500 000,00 USD**	***300 000,00 USD***	***615 000,00 USD***	***615 000,00 USD***	***570 000,00 USD***	***400 000,00 USD***
Activity 2.3.3.1: Identify the needs for infrastructure and processing units for agricultural and fishery products (palm nuts, soya, cassava, rice, etc.) for vulnerable and disadvantaged communities in the basin	**180 000,00 USD**	***180 000,00 USD***				
Activity 2.3.3.2: Train stakeholders and farmers on the technical management and transformation of agricultural and fishery products and their development.	**240 000,00 USD**	***30 000,00 USD***	***70 000,00 USD***	***70 000,00 USD***	***70 000,00 USD***	
Activity 2.3.3.3: Set up /support collection, storage, transformation, conservation and packaging units for agricultural and fishery products (palm nuts, soybeans, cassava, rice, etc.)	**1 990 000,00 USD**	***90 000,00 USD***	***500 000,00 USD***	***500 000,00 USD***	***500 000,00 USD***	***400 000,00 USD***
Activity 2.3.3.4: Establish a marketing and sales process	**90 000,00 USD**		***45 000,00 USD***	***45 000,00 USD***		
Component 3: Strengthening the capacities of different actors, sharing knowledge and raising awareness among all beneficiaries at different levels	**1 000 000,00 USD**	***350 000,00 USD***	***275 000,00 USD***	***175 000,00 USD***	***100 000,00 USD***	***100 000,00 USD***
Outcome 3.1: Mobilized and sensitized stakeholders through communication and capacity building activities	**1 000 000,00 USD**	***350 000,00 USD***	***275 000,00 USD***	***175 000,00 USD***	***100 000,00 USD***	***100 000,00 USD***
Output 3.1.1: Practitioners, technicians, extension agents and decision-makers sensitized and trained on technical and environmental aspects of the project	**360 000,00 USD**	***180 000,00 USD***	***105 000,00 USD***	***75 000,00 USD***	***- USD***	***- USD***
Activity 3.1.1.1: Conduct a needs assessment for the institutions involved in the project, evaluate their capacities to manage climate risks in the basin and define their priorities for capacity building	**110 000,00 USD**	***110 000,00 USD***				
Activity 3.1.1.2: Develop training materials for the capacity development program of the institutions, based on the needs assessment	**60 000,00 USD**	***30 000,00 USD***	***30 000,00 USD***			

Activity 3.1.1.3: Implement targeted training of trainers (ToTs) and capacity-building initiatives for national institutions in the project area, addressing a variety of specified topics (EWS alerts interpretation, water management, RAMSAR sites protection, agricultural and fishing activities, value chain)	**190 000,00 USD**	***40 000,00 USD***	***75 000,00 USD***	***75 000,00 USD***		
Output 3.1.2: Communities in target areas sensitized and trained on climate change resilience and EWS issues.	**330 000,00 USD**	***60 000,00 USD***	***120 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***
Activity 3.1.2.1: Develop a special awareness plan for grassroots communities on the issue of Climate Change and means of adaptation, with particular emphasis on considering endogenous know-how	**130 000,00 USD**	***60 000,00 USD***	***70 000,00 USD***			
Activity 3.1.2.2: Conduct sessions to familiarize communities with the functioning and importance of Early Warning Systems and provide hands-on training on interpreting warning signals and responding effectively to minimize risks	**200 000,00 USD**		***50 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***
Output 3.1.3. BOUCLIER-CLIMAT/Mono project results and lessons learned disseminated and shared	**310 000,00 USD**	***110 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***	***50 000,00 USD***
Activity 3.1.3.1: Develop the project's communication plan and strategy, in conjunction with those of the MBA	**110 000,00 USD**	***110 000,00 USD***				
Activity 3.1.3.2: Ensure effective dissemination of project achievements and lessons learned through exchange visits	**120 000,00 USD**		***30 000,00 USD***	***30 000,00 USD***	***30 000,00 USD***	***30 000,00 USD***
Activity 3.1.3.3: Organize participatory workshops in the target areas to engage with community members in facilitating discussions on specified topics (water management, RAMSAR sites protection, agricultural and fishing activities, value chain)	**80 000,00 USD**		***20 000,00 USD***	***20 000,00 USD***	***20 000,00 USD***	***20 000,00 USD***
Subtotal All Components	**11 850 000,00 USD**	***2 387 000,00 USD***	***3 510 000,00 USD***	***2 945 000,00 USD***	***2 285 000,00 USD***	***723 000,00 USD***
Project Execution Costs 8,9%	**1 060 000,00 USD**	***240 000,00 USD***	***210 000,00 USD***	***210 000,00 USD***	***190 000,00 USD***	***210 000,00 USD***
Project inception launch activities	**30 000,00 USD**	***30 000,00 USD***				
Project coordination and management fees	**600 000,00 USD**	***120 000,00 USD***	***120 000,00 USD***	***120 000,00 USD***	***120 000,00 USD***	***120 000,00 USD***
Operating costs for regional and national entities	**240 000,00 USD**	***48 000,00 USD***	***48 000,00 USD***	***48 000,00 USD***	***48 000,00 USD***	***48 000,00 USD***
Equipment	**60 000,00 USD**	***20 000,00 USD***	***20 000,00 USD***	***20 000,00 USD***		
Audit/Final evaluation	**20 000,00 USD**					***20 000,00 USD***
Monitoring & Evaluation by Project Team	**110 000,00 USD**	***22 000,00 USD***	***22 000,00 USD***	***22 000,00 USD***	***22 000,00 USD***	***22 000,00 USD***
Total Project Costs	**12 910 000,00 USD**	***2 627 000,00 USD***	***3 720 000,00 USD***	***3 155 000,00 USD***	***2 475 000,00 USD***	***933 000,00 USD***
Project Implementation Costs 8,4%	**1 090 000,00 USD**	***218 000,00 USD***	***218 000,00 USD***	***218 000,00 USD***	***218 000,00 USD***	***218 000,00 USD***
GRANT AMOUNT	**14 000 000,00 USD**	***2 845 000,00 USD***	***3 938 000,00 USD***	***3 373 000,00 USD***	***2 693 000,00 USD***	***1 151 000,00 USD***

Table 27. Disbursement summary tab according to AF template (in USD)

	Upon Agreement signature	One year after Project Start	Two years after Project Start	Three years after Project Start	Four years after Project Start	Total
Schedule date	**October 2024**	**September 2025**	**September 2026**	**September 2027**	**September 2028**	
Project Funds	3,563,000	3,569,500	2,868,500	2,141,000	768,000	**12,910,000**
Implementing Entity Fees	218,000	218,000	218,000	218,000	218,000	**1,090,000**
Total	**3,781,000**	**3,787,500**	**3,086,500**	**2,359,000**	**986,000**	**14,000,000**

Table 28. BOUCLIER-CLIMAT/Mono activities' timeline

Project Components	Expected Outcomes	Expected Outputs	Activities	Year1				Year2				Year3				Year4				Year5			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C1: Setting up/strengthening tools for climate change resilient management of the Mono River basin	**Outcome 1.1: Establishment of the Mono Regional Community-based Flood Early Warning System (Mono-RCbFEWS) for effective flood management in the Mono River basin**	Output 1.1.1: Mono-RCbFEWS designed and validated	Activity 1.1.1.1: Carry out an inventory of early warning systems (EWS) and national/regional warning plans for hydro-climatic hazards and establish a detailed technical assessment of functioning and operability (data, models, etc.) and institutional (governance, etc.)																					
			Activity 1.1.1.2: Develop a prototype of Mono-RCbFEWS at the scale of the basin in connexion with the national and local devices and define the investments to be carried out (data production, equipment, etc.) using the supporting tools (modeling, flood forecasting), web platform, etc.																					
			Activity 1.1.1.3: Ensure the institutional anchoring of Mono-RCbFEWS at the regional and national levels, including community aspects to be integrated at different levels of alert management and the feedback mechanism																					
			Activity 1.1.1.4: Validate the studies and the Mono-RCbFEWS prototype by the project stakeholders through workshops (2 national workshops and 1 regional workshop)																					
		Output 1.1.2: Mono-RCbFEWS functional and deployed	Activity 1.1.2.1: Acquire and set up remote monitoring/surveillance stations (hydrometric, meteorological, water level gauges, piezometers, real-time remote transmission system, etc.)																					
			Activity 1.1.2.2: Construct/renovate and equip EW information centers with deploying equipment: IT equipment (servers, processing units, software, GPS, etc.)																					
			Activity 1.1.2.3: Acquire tools and materials to broadcast the warning messages to the population																					
			Activity 1.1.2.4: Produce and disseminate the warning messages (bulletin, maps, radio message synthesis, SMS, digital media).																					
			Activity 1.1.2.5: Develop/revise water information sharing frameworks at regional and national levels and implement an action plan to operationalize them																					
		Output 1.1.3: Disaster emergency management plans set up and operational	Activity 1.1.3.1: Develop and/or update warning emergency and resilience plans for communities facing hydro-climatic risks																					
			Activity 1.1.3.2: Monitor the EWS, feedback mechanism and its contingency plans																					
			Activity 1.1.3.3: Implement blank operations (Tests) to validate the different components of the Mono-RCbFEWS																					
C2: Improving the resilience of the most vulnerable ecosystems and people in the basin to the impacts of Climate Change through concrete adaptation measures	**Outcome 2.1: Enhanced resilience of water resources to the impacts of CC and overexploitation**	Output 2.1.1: The availability of water resources (quantity and quality) improved and their use rationalized	Activity 2.1.1.1: Carry out a baseline study to identify localities in vulnerable zones with areas (riverbanks, headwaters and agricultural land) heavily degraded by water erosion and/or other agricultural practices.																					
			Activity 2.1.1.2: Develop community based Adaptation Action Plans specific for the most vulnerable sites / areas identified in the baseline																					
			Activity 2.1.1.3: Construct gray small runoff collection structures ("boulis", run-off collection basin, etc.) at the headwater of basins to support groundwater recharge and the promotion of agro-sylvo-pastoral activities																					
			Activity 2.1.1.4: Implement actions for the protection, enhancement and sustainable management of groundwater and artesian wells in the downstream part of the basin																					
			Activity 2.1.1.5: Strengthen community/local water management bodies (establish Water Users Organizations)																					

	Outcome 2.2: Preservation of Mono Basin ecosystems (soil resources, plant biodiversity, animal biodiversity ...) through effective implementation of adaptation measures against the impacts of climate change	Output 2.2.1: Basin ecosystems, especially those in RAMSAR areas, rehabilitated and preserved	Activity 2.2.1.1: Develop/update wetland management plans for the RAMSAR sites incorporating climate change aspects
			Activity 2.2.1.2: Implement "Nature-based Solutions (NbS)" approach to ensure reforestation and assisted natural regeneration of degraded areas
			Activity 2.2.1.3: Establish tree nurseries under a Public Private Partnership (PPP) arrangement
			Activity 2.2.1.4: Undertake actions to restore and protect RAMSAR sites: wetlands and mangroves in the downstream part of the basin
	Outcome 2.3: Implementation of adaptation measures for the benefit of the population	Output 2.3.1: Agricultural resilient practices adopted and enhanced	Activity 2.3.1.1: Set up / rehabilitate livestock corridors and grazing areas in order to limit the generalized land degradation
			Activity 2.3.1.2: Promote and support the planting of fodder crops to enhance livestock nutrition
			Activity 2.3.1.3: Integration and Promotion of Short-Cycle Livestock Production with Cereal and Legume Cultivation
			Activity 2.3.1.4: Facilitate farmers' access to veterinary services
		Output 2.3.2: Improved and sustainable fishing is supported	Activity 2.3.2.1: Conduct Climate-Resilient Fishing Techniques Trainings (CRFTTs) to educate fishermen on adapted practices for enhancing water ecosystem sustainability
			Activity 2.3.2.2: Introduce and support climate-resilient aquaculture practices as an alternative or complementary livelihood for fishing communities
			Activity 2.3.2.3: Equip fishermen and processors with inputs and tools
		Output 2.3.3: Resilience and adaptive capacities of populations to Climate Change improved by installing value chains of agricultural and fishery products	Activity 2.3.3.1: Identify the needs for infrastructure and processing units for agricultural and fishery products (palm nuts, soya, cassava, rice, etc.) for vulnerable and disadvantaged communities in the basin
			Activity 2.3.3.2: Train stakeholders and farmers on the technical management and transformation of agricultural and fishery products and their development.
			Activity 2.3.3.3: Set up /support collection, storage, transformation, conservation and packaging units for agricultural and fishery products (palm nuts, soybeans, cassava, rice, etc.)
			Activity 2.3.3.4: Establish a marketing and sales process
C3: Strengthening the capacities of different actors, sharing knowledge and raising awareness among all beneficiaries at different levels	**Outcome 3.1: Mobilized and sensitized stakeholders through communication and capacity building activities**	Output 3.1.1: Practitioners, technicians, extension agents and decision-makers sensitized and trained on technical and environmental aspects of the project	Activity 3.1.1.1: Conduct a needs assessment for the institutions involved in the project, evaluate their capacities to manage climate risks in the basin and define their priorities for capacity building
			Activity 3.1.1.2: Develop training materials for the capacity development program of the institutions, based on the needs assessment
			Activity 3.1.1.3: Implement targeted training of trainers (ToTs) and capacity-building initiatives for national institutions in the project area, addressing a variety of specified topics (EWS alerts interpretation, water management, RAMSAR sites protection, agricultural and fishing activities, value chain)
		Output 3.1.2: Communities in target areas sensitized and trained on climate change resilience and EWS issues.	Activity 3.1.2.1: Develop a special awareness plan for grassroots communities on the issue of Climate Change and means of adaptation, with particular emphasis on considering endogenous know-how
			Activity 3.1.2.2: Conduct sessions to familiarize communities with the functioning and importance of Early Warning Systems and provide hands-on training on interpreting warning signals and responding effectively to minimize risks
		Output 3.1.3. BOUCLIER-CLIMAT/Mono project results and lessons learned disseminated and shared	Activity 3.1.3.1: Develop the project's communication plan and strategy, in conjunction with those of the MBA
			Activity 3.1.3.2: Ensure effective dissemination of project achievements and lessons learned through exchange visits
			Activity 3.1.3.3: Organize participatory workshops in the target areas to engage with community members in facilitating discussions on specified topics (water management, RAMSAR sites protection, agricultural and fishing activities, value chain)

PART IV. Endorsement by governments and certification by the IE

A. Record of endorsement on behalf of the government

BENIN	Prof. Martin Pépin AÏNA Director General for Environment and Climate Ministère du Cadre de vie et du Développement Durable	Date *: April 28, 2023*
TOGO	Mme. Méry YAOU Environment Director Ministry of the Environment and Forest Resources	Date *: April, 13, 2023*

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (ECOWAS, CAADP, NAP, NAPA, NDC,..) and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this regional project.

Mr. Nabil BEN KHATRA – *Executive Secretary of the Sahara and Sahel Observatory (OSS) as the Implementing Entity Coordinator*

Date: **September 2nd, 2024**	Tel.: **(+216) 71 206 633** Email: nabil.benkhatra@oss.org.tn; boc@oss.org.tn
Project Contact Person: **Mrs. Khaoula JAOUI**	
Tel. and Email: **(+216) 71 206 633 – khaoula.jaoui@oss.org.tn**	

Annexes

Annex 1: Endorsement Letters

MINISTERE DU CADRE DE VIE, DES TRANSPORTS, CHARGE DU DEVELOPPEMENT DURABLE
REPUBLIQUE DU BENIN

01 BP 3502 - 01 BP 3621
Cotonou
Tél. : + 229 21 31 4712
dgec_mcvdd@cadredevie.bj

Cotonou, le 28 Août 2023

N° 0302 /DGEC/MCVDD/DGCC/SD

Letter of Endorsement by Government

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

Subject : Endorsement for the « Towards a climate risks shield in the Mono River Basin (Benin, Togo) : Strengthening adaptation and resilience to climate change through integrated water resources ad flood management project.

In my capacity as designated authority for the Adapatation Fund in Benin, I confirm that the above regional project proposal is in accordance with the government's national priorities in implementing adapatation activities to reduce adverse impacts of and risks, posed by climate change in the Mono River Basin.

Accordingly, I am pleased to endorse the above project proposal with support from Adaptation Fund. If approved, the project will be implemented by the Sahara and Sahel Observatory (OSS) and executed by the Mono Basin Authority (MBA) and the Global Water Partnership-West Africa (GWP-AO).

Sincerely,

Le Directeur Général

Prof. Martin Pépin AÏNA
General Director for environnement and climat
National Designated Authority for Adapatation Fund

AUTORITE DU BASSIN DU MONO
SECRETARIAT / ABM
Arrivée, le 05/05/23 à 11h52mn
Sous le N° 076

MINISTERE DE L'ENVIRONNEMENT
ET DES RESSOURCES FORESTIERES

SECRETARIAT GENERAL

DIRECTION DE L'ENVIRONNEMENT

N° 002 /DE/AND-FA

REPUBLIQUE TOGOLAISE
Travail-Liberté-Patrie

MEHV
SECRETARIAT CENTRAL
Arrivée le 14 AVR 2023
N° d'Enregistrement
Remis à

Letter of Endorsement by Government

ADAPTATION FUND

Lomé, le 13 AVR 2023

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

Subject: Endorsement for the "**Towards a climate risks shield in the Mono River Basin (Benin, Togo):** *Strengthening adaptation and resilience to climate change through integrated water resources and flood management*" project.

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

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the **Sahara and Sahel Observatory (OSS)** and executed by the **Mono Basin Authority (MBA)** and the **Global Water Partnership – West Africa (GWP-AO)**.

Sincerely,

Méry YAOU
National Designed Authority
Director of Environment

Annex 2: Environmental and Social Impact Assessment (ESIA) and Environment and Social Management Plan (ESMP)

Summary of the report (full report available: link)

Introduction

The Adaptation Fund is a financial mechanism that supports adaptation projects in developing countries that are vulnerable to the adverse effects of climate change. The Bouclier-Climat/Mono Project is one such project, located in the Mono basin of Benin and Togo. Its goal is to address the environmental and social impacts of climate change and align with national procedures and the Adaptation Fund's environmental and social policy. The project includes activities such as forest restoration, sustainable agriculture, and water management, with a focus on community involvement, equitable benefits, and minimizing negative impacts. The aim is to enhance the resilience of the Mono basin's ecosystems and communities to the impacts of climate change.

Context

Project background

The Bouclier-Climat/Mono Project is a joint initiative between the governments of Benin and Togo, aimed at addressing the environmental and social impacts of climate change in the Mono basin. The Mono basin is a transboundary region that is shared by the two countries and is home to a diverse range of ecosystems, including forests, wetlands, and coastal areas. The basin is also home to a large and growing population, which is highly dependent on the natural resources of the region for their livelihoods. The Mono River transboundary basin covers an area of around 24,300 km² between latitudes 6°16′ and 9°20′ North and longitudes 0°42′ and 2°25′ East, extending over 3,000 km² in Benin and 21,300 km² in Togo. Its main course is almost 530 km long (north to south). The basin's natural resources are of vital importance to the socio-economic development of both countries. However, the basin faces major challenges if it is to respond sustainably to ever-increasing development needs and contribute fully to improving the living conditions of its populations. These challenges are essentially linked to the significant environmental degradation in the basin, which is being exacerbated by the adverse effects of climate change, making communities and ecosystems highly vulnerable.

The impacts of climate change in the Mono basin are expected to be significant and wide-ranging. These impacts include changes in rainfall patterns, which are likely to lead to increased incidence of droughts and floods; rising temperatures, which will affect the health and productivity of crops and livestock; and sea-level rise, which will affect the coastal communities and ecosystems of the region.

To better identify the basin's cross-border environmental problems and challenges, and put in place suitable approaches to their management, in 2014 the two states created the Mono Basin Authority (ABM). The ABM's main mission is to ensure the sustainable management of the basin through the integrated, equitable and concerted management of water resources and associated ecosystems. In line with the same vision of strengthening the resilience of the populations of the Mono River basin, the ABM Executive Management has initiated the regional "Bouclier-Climat/Mono" project, with technical support from the Sahara and Sahel Observatory (OSS) and the West African Regional Water Partnership (GWP-AO).

The Bouclier-Climat/Mono Project is designed to address these impacts and to enhance the resilience of the Mono basin's ecosystems and communities to the impacts of climate change. The project will achieve this through a range of activities, including the restoration of degraded forests, the promotion of sustainable agriculture practices, the improvement of water management, and the strengthening of the capacity of local communities to adapt to the impacts of climate change. The project is being implemented in accordance with the policies, strategies, and plans adopted by the governments of Benin and Togo in matters of climate change and protection of water and forest ecosystems. The project is also subject to the Adaptation Fund's environmental and social policy, which provides a framework for ensuring that the project's activities are carried out in a manner that is environmentally and socially sustainable. The project is being implemented by the ministries responsible for the environment, water, agriculture, and territorial administration and local authorities in the two countries, with the support of the Adaptation Fund and other international partners.

Project Objectives

The Climate-Mono Shield Project has several specific objectives that will contribute to the overall goal of enhancing the resilience of the Mono basin's ecosystems and communities to the impacts of climate change. These objectives include:

- Restoring and conserving the Mono basin's forests and other critical ecosystems: The project will support activities to restore degraded forests and protect remaining forest areas, including the establishment of community-based forest management systems and the promotion of agroforestry practices.
- Promoting sustainable agriculture and food security: The project will work with smallholder farmers to promote the adoption of climate-resilient agriculture practices, such as conservation agriculture, integrated pest management, and the use of drought-tolerant crop varieties. It will also support the development of value chains for climate-resilient crops and livestock.
- Improving water management and access to clean water: The project will support the construction of small-scale water infrastructure, such as rainwater harvesting systems and wells, to improve access to clean water for communities in the Mono basin. It will also promote the adoption of water-saving technologies and practices, such as drip irrigation and the use of water-efficient crops.
- Strengthening the capacity of communities and institutions to adapt to climate change: The project will provide training and other capacity-building support to communities, local governments, and other institutions in the Mono

basin to help them better understand and respond to the impacts of climate change. It will also support the development of early warning systems and disaster risk reduction plans.

- Fostering gender equality and social inclusion: The project will prioritize the participation and empowerment of women, youth, and other marginalized groups in project activities and decision-making processes. It will also support the development of income-generating activities and other opportunities for these groups.

Policy and Regulatory Frameworks:

Policy, institutional and legal framework

The Climate-Mono Shield Project is being implemented by the policies, strategies, and plans adopted by the governments of Benin and Togo in matters of climate change and protection of water and forest ecosystems.

The project is also subject to the Adaptation Fund's environmental and social policy, which provides a framework for ensuring that the project's activities are carried out in a manner that is environmentally and socially sustainable.

Relevant international texts adopted and ratified by the two beneficiary countries (Benin and Togo), and dealing specifically with environmental protection, will apply to the Bouclier-Climat/Mono Project. These include international conventions signed and ratified by the two beneficiary countries.

Institutional Framework

At the institutional level, the ministries involved in the Climate-Mono Shield Project are:

- Ministries responsible for the environment, through national environmental assessment agencies: (i) Beninese Environment Agency (ABE), Togolese National Environment Management Agency (ANGE)
- Ministries in charge of water
- Ministries in charge of Agriculture Ministries in charge of territorial administration and local authorities
- The Mono Basin Authority (ABM) is also a key institution in the project, as it was created by the governments of Benin and Togo in 2014 to ensure the sustainable management of the Mono basin. The ABM's main mission is to ensure the integrated, equitable and concerted management of water resources and associated ecosystems in the basin.

Description of the environmental and social baseline conditions of the project sites in each country

Benin

- **Geographic Location and Target Area:** The project site in Benin is situated in the Mono basin, which spans an area of approximately 3,000 km² (12% of the country's territory). The main course of the Mono River is almost 530 km long (north to south).
- **Topography, Geology, and Soils:** The basin is characterized by a wetland complex comprising freshwater aquatic ecosystems fed by three major tributaries (Ogou, Anié, and Amou) and extensive marine and coastal ecosystems. The region includes gallery forests, grasslands, mangroves, and forest plantations, as well as specific ecosystems that constitute protected areas such as the Fazao-Malfakassa National Park and the Mono Transboundary Biosphere Reserve (RBT).
- **Hydrology:** The climate in the area is sub-Sudanese or tropical, with a single rainy season in the northern part, upstream of the Mono River, and Sudano-Guinean or sub-equatorial, with two rainy seasons in the southern part, downstream of the river. Average annual rainfall in the Mono basin ranges from 900 mm in the southeast to 1,200 mm in the northwestern highlands.
- **Land Use:** The primary sector (agriculture, livestock, and fishing) accounts for over 70% of the working population in the Mono basin. Rainfed and subsistence farming remain the main activity in the watershed, accounting for almost 77% of households on the Benin side.
- **Terrestrial Flora and Fauna:** The Mono basin is home to a diverse range of flora and fauna. The basin includes specific ecosystems that constitute protected areas such as the Fazao-Malfakassa National Park and the Mono Transboundary Biosphere Reserve (RBT), which underline the efforts of both governments to conserve biodiversity.

Togo

- **Geographic Location and Target Area:** The project site in Togo is also located within the Mono basin, covering an area of approximately 21,300 km² (88% of the country's territory).
- **Topography, Geology, and Soils:** The basin is characterized by a similar landscape as the one in Benin, with a wetland complex, gallery forests, grasslands, mangroves, and forest plantations.
- **Hydrology:** The climate is also similar to that of Benin, with a sub-Sudanese or tropical climate in the northern part and a Sudano-Guinean or sub-equatorial climate in the southern part. Average annual rainfall in the Mono basin ranges from 900 mm in the southeast to 1,200 mm in the northwestern highlands.
- **Land Use:** The primary sector (agriculture, livestock, and fishing) is the main source of employment in the Mono basin in Togo.

- **Terrestrial Flora and Fauna:** The Mono basin in Togo also supports a diverse range of flora and fauna. The basin includes specific ecosystems that constitute protected areas such as the Fazao-Malfakassa National Park and the Mono Transboundary Biosphere Reserve (RBT), which are crucial for biodiversity conservation.

Socio-economic landscape:

The socio-economic landscape of the Mono basin in both Benin and Togo is predominantly rural and heavily reliant on the primary sector. In Benin, the basin has an estimated population of around 1.5 million in 2022, growing at 3.17% annually, with about 70% living in rural areas. The economy primarily revolves around agriculture, livestock, and fishing, employing over 70% of the working population. Similarly, in Togo, the Mono basin's population is approximately 3.7 million in 2022, with a growth rate of 2.5%, and is mostly rural. The primary sector is also the main source of employment and economic activity, focusing on agriculture, livestock, and fishing.

Summary of key environmental and social issues in proposed project sites

- **Land Access Issue**: the project may encounter difficulties accessing land for its activities due to the intricate and overlapping land tenure systems prevalent in the area.
- **Social Exclusion and Gender Inequality:** there's a risk that the project might not sufficiently address the needs and concerns of marginalized groups, such as women, youth, and ethnic minorities, potentially deepening social disparities and exclusion.
- **Health:** communities could face health hazards from the project, including the increased likelihood of waterborne diseases due to inadequate water and sanitation facilities.
- **High Expectations:** there's a possibility of heightened community expectations, which, if not met, could lead to disillusionment and conflict within the affected communities.
- **Deforestation and Land Degradation**: the project's activities might contribute to deforestation and land degradation, posing significant environmental and livelihood challenges for local communities.
- **Pollution:** environmental pollution, particularly soil and water contamination resulting from the use of agrochemicals and improper waste disposal, could emerge as detrimental consequences of the project.

Environmental and social risk identification and description

The Environmental and Social Risk Identification and Description for the Climate-Mono Shield Project involves a systematic approach to identify and assess potential environmental and social risks associated with the project. The project is designed to guide the selection of activities, the preparation of Environmental and Social Impact Assessments (ESIAs), and the implementation of ESIAs in accordance with the national procedures of Benin and Togo, as well as the Adaptation Fund's environmental and social policy. The project considers the orientations of various policies, strategies, plans, and programs adopted by the governments of Benin and Togo related to climate change and the protection of water and forest ecosystems. The project is also subject to several international texts dealing specifically with environmental protection, as well as various national laws and regulations related to environmental and social impact assessments, water, land, forestry, gender equity, labor, and natural habitat protection. The project's environmental and social management plan includes potential positive impacts, negative impacts and risks, and mitigation measures.

Environnemental and Social Risk Management Plan and Measures

The project is expected to bring numerous positive impacts, including economic, social, and environmental benefits. Economically, it will improve conditions for vulnerable groups, promote gender equity, and empower women, creating jobs, enhancing food security, and increasing community resilience to flooding. Socially, it will reduce migration and rural exodus, improve inclusion, and better the conditions for marginalized groups, ensuring their participation in decision-making. Environmentally, it will enhance ecosystem services in the wetlands of the Mono basin, ensure sustainable soil management, reduce agricultural land expansion, contribute to GHG emission mitigation through carbon sequestration, and improve stakeholders' capacity for implementing climate-resilient practices.

Despite these benefits, the project also poses several risks that require careful management. Compliance with environmental and social laws is essential to address poor integration of these issues, which can be mitigated by ensuring ESIAs align with the Adaptation Fund's policies and national procedures, and by strengthening stakeholders' technical and organizational capacities. To prevent increasing inequalities, equitable access to project resources, especially for women and youth, must be promoted, and participation from all community members ensured. Addressing gender-based violence, sexual exploitation and abuse, and violence against children through awareness, complaint mechanisms, and a stringent code of conduct is crucial.

Marginalized and vulnerable groups should be specifically targeted and involved, ensuring they benefit equally from the project. Potential conflicts over water use can be mitigated by raising awareness, establishing a management committee, and implementing a grievance mechanism. Gender considerations should be integrated into all activities, ensuring strong participation from women and youth, with a target of 50% of beneficiaries. Workers' health and safety must be protected by including environmental and social clauses in contracts, raising awareness of labor provisions, and eliminating child labor.

Discrimination against indigenous peoples must be prevented, ensuring equality and non-discrimination in project services. Involuntary resettlement should be addressed with a comprehensive Resettlement Action Plan. Protecting natural habitats and biodiversity is essential, requiring environmental clauses in contracts, capacity building in pest management, and the

implementation of a Pest Management Plan. Climate change mitigation measures include rational use of synthetic fertilizers, promoting agroforestry, and using low-emission machinery.

To prevent pollution, good pest management practices should be promoted, using registered pesticides or bio-pesticides, and minimizing synthetic fertilizer use. Public health risks such as poisoning from contaminated water and soil, drowning in reservoirs, and the spread of water-related diseases, COVID-19, STI/HIV/AIDS must be managed through awareness campaigns, proper pesticide use, and protective measures for water reservoirs. Lastly, the destruction of physical and cultural heritage should be avoided by adhering to guidelines for discovering archaeological remains, and soil conservation should be promoted through the use of organic manure and limiting chemical fertilizers.

Environmental monitoring program

The environmental and social due diligence program will adhere to national procedures and the Adaptation Fund's environmental and social policy. This program includes several phases and steps, each with specific actions and responsible actors.

- **Regional Implementing Entity (RIE)**

The Sahara and Sahel Observatory (OSS) acts as the Regional Implementing Entity. OSS oversees the environmental and social classification of activities, validates the Terms of Reference (TOR) for Environmental and Social Impact Assessments (ESIAs), and ensures all activities align with the Adaptation Fund's Environmental and Social Policy (ESP). OSS is responsible for disseminating ESIA results to stakeholders, supervising the implementation of the Environmental and Social Management Plan (ESMP), and submitting periodic reports to the Adaptation Fund.

- **Regional Executing Entity (REE)**

The Regional Executing Entity comprises the Project Management Unit (PMU) under the guidance of OSS. The PMU prepares activity notices, formulates TORs for ESIAs, and submits these to OSS and the National Environment Agencies. During the implementation phase, the PMU integrates environmental and social measures into project documents, oversees capacity-building activities, and ensures compliance with environmental and social guidelines. Additionally, the PMU manages grievances, monitors ESMP implementation, and prepares monitoring reports for OSS.

- **National Executing Entities (NEE)**

In Benin, the Beninese Environment Agency (ABE), and in Togo, the Togolese National Environment Management Agency (ANGE), serve as the National Executing Entities. They validate the TORs, authorize ESIA preparation, and approve environmental and social classifications. These agencies play a critical role in monitoring ESMP implementation, supported by technical departments such as agriculture, water, livestock, public health, and human rights. They are also involved in stakeholder consultations, addressing grievances, and ensuring the effective implementation of environmental and social measures.

- **Local Communities**

Local communities, including beneficiaries of project activities, play a crucial role in the environmental monitoring program. They are involved in consultations during the preparation of ESIAs to voice their concerns and priorities, ensuring the project aligns with local needs and mitigates potential negative impacts. Communities also participate in the implementation of environmental and social measures, particularly in field technology development and capacity-building activities. They are encouraged to use grievance mechanisms provided by OSS, the PMU, and the national environmental agencies to report any issues or adverse impacts resulting from the project.

Capacity strengthening program

The Capacity Strengthening Program for the project comprises a comprehensive set of initiatives designed to enhance the understanding and capabilities of stakeholders engaged in environmental and social management. Commencing with a National Workshop, the program aims to acquaint participants with the principles and policies of the Adaptation Fund's Environmental and Social Policy, providing them with essential technical tools for effective engagement. Led by environmental experts, this workshop precedes the formulation of Environmental and Social Impact Assessment (ESIA) reports and the implementation of management plans, ensuring stakeholders are well-prepared for their roles. Following this, on-site support will be extended to stakeholders, offering practical training and guidance in the implementation of environmental and social measures outlined in the project's management plans. Additionally, the development of an Integrated Pest and Pesticide Management Toolbox aims to equip extension services and beneficiaries with resources for integrated pest management practices. Furthermore, comprehensive training sessions will be conducted to build stakeholder capacity in environmental and social assessment and integration, ensuring proficiency in techniques such as ESIA and Vulnerable Community Engagement (VCE). Concurrently, information and awareness campaigns will be launched to disseminate vital information on environmental issues, including COVID-19, HIV/AIDS, and sustainable resource management. This holistic approach to capacity strengthening endeavors to empower stakeholders across various sectors and levels, fostering a collaborative environment for the successful implementation of environmental and social measures throughout the project's lifecycle.

Annex 3: Gender Assessment and Action Plan

Summary of the report (full report available: link)

OVERVIEW OF PROJECT

Project Background

The BOUCLIER-CLIMAT/MONO project is an initiative that aims to improve the climate change resilience and adaptation capacity of the populations in the transboundary Mono River watershed, which is shared between Benin and Togo. The project is being planned and implemented by the Mono Basin Authority (MBA), with the assistance of the Sahara and Sahel Observatory (OSS), the Global Water Partnership in West Africa (GWP-WA), and financial support from the Adaptation Fund (AF).

The project targets poor and vulnerable categories, seeks gender equality, and promotes the inclusion of all socio-professional groups and communities. These principles are the major guidelines for the management of any development project and are the basis for the "gender assessment and integration into the project activities" study.

This study comes after an initial gender assessment was carried out during the development of the project's concept note. Its objective is to deepen the assessment of gender and social inequality and to identify gender equality and inclusion-promoting actions in the planning and implementation of the BOUCLIER project. This will help to strengthen the climate change adaptation and resilience capacities of the basin populations.

Project Objectives

The project's overall objective is to strengthen the resilience of vulnerable communities in the Mono River Basin by building adaptive capacity to the risks of recurrent flooding and promoting the sustainable and equitable use and management of water resources and related ecosystems. More specifically the project will:

- Ensure the long-term monitoring of climate risks through the production of reliable scientific data and information, at local, national and transboundary levels in the Mono River Basin;
- Develop and implement a regional flood early warning system for vulnerable community's disaster risk reduction;
- Implement concrete adaptation actions to build the resilience of the most vulnerable communities;
- Strengthen the institutional and technical capacities of the MBA and its stakeholders.

The project will directly benefit approximately 90,000 individuals and indirectly impact 2,950,120 residents, with 52% of them aged between 15 and 59 and 51% being women.

METHODOLOGY

The methodology for assessing gender considerations within the BOUCLIER-CLIMAT/MONO project is comprehensive and meticulous. It initiates with a thorough review of documentary sources provided by the project's environmental and social impact assessment team. This review is complemented by an exhaustive analysis of relevant interventions within the project's basin and analogous contexts. Methodological frameworks from esteemed entities such as the OSS, FA, and GWP-AO serve as guiding principles, including the utilization of an adapted checklist to gather sex-disaggregated data. Official documentation from both countries is rigorously scrutinized to bolster the credibility of findings and analyses. Proposed gender integration measures undergo a rigorous evaluation process, with adjustments made as deemed necessary. Despite constraints such as the project's expansive intervention area and limited availability of local data, dedicated efforts are made to ensure the validity and reliability of the assessment. Areas requiring further study are identified for subsequent action and resolution.

FINDINGS OF THE GENDER ASSESSMENT

Institutional framework promoting gender aspects in two countries:

- International protocols and frameworks ratified by countries in support of gender equality, women's empowerment and Human Rights

International Text	Benin	Togo
Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) - 1979	Signed (11-1981) Ratified (03-1992)	Accession (09-1983)
Fundamental Conventions of the International Labour Organization	Ratification of all 8 conventions	Ratification of all 8 conventions
International Covenant on Civil and Political Rights	Accession (03-1992)	Accession (05-1984)
International Covenant on Economic, Social and Cultural Rights	Accession (03-1992)	Accession (05-1984)
International Convention on the Elimination of All Forms of Racial Discrimination	Signed (02-1967) Ratified (11-2001)	Accession (09-1972)
Optional Protocol to the Convention on the Elimination of All Forms of Discrimination Against Women (OP-CEDAW) - 1999	Signed (05-2000) Ratified (09-2019)	
Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol) - 2003	Signed (02-2004) Ratified (09-2005)	Signed (12-2003) Ratified (10-2005)

- National frameworks, policies, plans and programs on gender equality in Togo and Benin

Country	Policies, plans and programs on gender equality
Benin	• Constitution of Benin of 1990: prohibits discrimination based on race, sex and religion, and grant men and women equal economic and social rights as citizens. Article 26 establishes the general principle of equality between men and women, and Article 6 proclaims the equality of Beninese citizens of both sexes.

	• National Policy for Gender Promotion (2009) Aims to achieve gender parity between the sexes, within the larger context of sustainable development. • Strategic Guidelines for Development (2011). This espouses promotion of gender inequality, women's empowerment, and improved social protection within the larger framework of development
Togo	• The Togolese Constitution guarantees gender equality and prohibits discrimination based on sex. • The National Policy for Gender Equity and Equality (PNEEG) was adopted in 2011 and revised in 2019. It aims to promote gender equality and women's empowerment in all sectors of society. • The National Strategy and Action Plan (SNEEG) for the implementation of the PNEEG was also developed. • The Ministry of Social Action, Women's Promotion and Literacy (MASPFA) is responsible for promoting gender equality and women's empowerment in Togo. • A network of gender focal points has been established in most ministries to mainstream gender in their policies and programs.

Demographic and socio-economic characteristics

This analysis is conducted for all two countries, identifying human development, education and gender gap index. It has to be considered that women's response and ability to cope with climate change issues depend on the robustness of their underlying health and well-being and the extent of their control over economic resources and access to economic and financial resources.

Table 1: Context Profile of the Two Countries in the Transboundary Mono River Basin

Indicators	Bénin	Togo
Human Development Index (HDI 2021)	166th	162nd
Gender Inequality Index (GII), 2021	0.602; 152nd / 170	0.580; 149th / 170
Gender Equality Index (GEI) 2019	0.433	0.401
Gender Index in the SDGs, 2022	53.7; 117th / 144	49.2; 127th / 144
Proportion of Female Population (%)	51.2 (2013, RGPH4)	51.3 (RGPH5, 2022)
Proportion of Rural Population (%)	55.4 (2013, RGPH4)	57.0 (RGPH5, 2022)
Proportion of Rural Female Population (%)	51.1 (2013, RGPH4)	51.2% (RGPH5, 2022)
Proportion of Rural Female Household Heads (%)	15.8% (2021, RNA)	18.6% (2012, RNA)
Proportion of Population Under 15 Years	46 (2013, RGPH4)	42 (2010, RGPH4)
Proportion of Population Under 35 Years	77.84 (2013, RGPH4)	75.5 (2010, RGPH4)
Poverty Rate (%)	38.5 (2022)	45.5 (2018)
Illiteracy Rate (%)	51.4 (2021, RNA)	41.8 (2012, RNA)
Proportion of Population Over 15 Years Old, Owning a GSM Phone (Findex, 2021)	72%	68%
Proportion of Population Over 15 Years Old, Holding a Mobile Account (Findex, 2021)	37%	36%
Proportion of Rural Population Over 15 Years Old, Holding a Mobile Account (Findex, 2021)	32%	31%
Proportion of Basin Population (4,723,280 in 2023)	39%	61%

Benin :

The estimated population of Benin in 2020 is 13,754,688, with females constituting 50.06% of the population. Benin's landmass is approximately twice the size of Togo, with a population density of 122 peoples per square kilometer. The populace is most densely concentrated in coastal areas and the delta of the Mono River. Agriculture and commerce/logistics engage the majority of the population, with 37.5% and 36.4% of women employed in these sectors, respectively. Women often bear the responsibility of domestic tasks such as water and fuel collection, as well as caregiving for children and the elderly. However, the education level of women in Benin lags behind that of men, with fewer women completing secondary education and a lower average number of schooling years. Additionally, the unemployment rate is higher for women (4.5%) compared to men (3.2%) in Benin. Women-led households constitute 24.9% of all households in Benin, with a higher prevalence in urban areas and among women with higher education levels.

Togo :

Togo's estimated population in 2020 is 8,492,333, with females representing 50.24% of the population. The country has a population density of 149 people per square kilometer, with concentrations in coastal areas and the delta of the Mono River. Agriculture is the primary occupation for the rural populace, with women actively participating in all stages of production. Similar to Benin, women in Togo also carry out domestic responsibilities such as water and fuel collection, as well as childcare and eldercare. However, like in Benin, women in Togo also experience lower educational attainment compared to men, with fewer women completing secondary education and fewer years of schooling on average. Interestingly, the unemployment rate is higher for men (12.3%) than for women (7.4%) in Togo. Women-led households account for 27.4% of all households in Togo.

GENDER VIS-A-VIS PROJECT ACTIVITIES

Country analysis

Benin

Gender and rural agricultural labor: In Benin, rural women are essential to agriculture, carrying out 60 to 80% of the work and providing up to 44% of the labor needed to feed their families. They handle domestic tasks such as water and fuel collection, food processing, and gathering natural products, in addition to participating in agricultural production activities like land clearing, sowing, weeding, and harvesting. Women face challenges in accessing land and are often involved in post-harvest activities like processing and marketing. They primarily manage subsistence farming in small gardens while men dominate fishing and hunting.

Gender and land: In the Mono Basin, agricultural production, mainly of food crops, associated with livestock breeding, is the main activity of the population. Household farms or family farms are on average 19% and 22% managed by women in the Togolese and Beninese territories of the basin, respectively. Although numerically dominant in the rural population of the basin, women manage less than a quarter of the household farms. The heads of household farms are generally women over 40 years old or widows.

Gender and agricultural value chains: At the national level in Benin, women are strongly involved in the rice value chain. They represent 61% of the labor force in rice production, 57% in threshing, 90% in parboiling, and 69% in rice marketing. However, their contribution to the value chain is not always valued or recognized.

Gender and access to resources: Women have limited access to agricultural credit and rarely own agricultural land. They are underrepresented in professional agricultural organizations and have limited access to agricultural advice and mechanization services. Customary practices often restrict women's land rights, despite formal laws granting equal rights. Empowering rural women in Benin is essential for improving food security and economic productivity. Providing them with better access to agricultural resources, credit, education, and decision-making processes can significantly enhance their roles and contributions to both their households and the broader economy.

Togo:

Gender and rural agricultural labor: In Togo, women are integral to all stages of agricultural production, including weeding, sowing, harvesting, storage, and the transformation and marketing of products. Rural women typically manage two types of plots: a "personal" plot, acquired after marriage and usually small, used to support the family, and a "common" or family farm, where men hold control over the enjoyment of the produce and task distribution, particularly in polygamous households. The division of agricultural activities between men and women is less distinct, with similar levels of participation in various areas of the basin. Women predominantly handle domestic chores, post-harvest processing, and the marketing of agricultural products.

Gender and land: In the Mono Basin, agricultural production, mainly of food crops, associated with livestock breeding, is the main activity of the population. Household farms or family farms are on average 19% and 22% managed by women in the Togolese and Beninese territories of the basin, respectively. Although numerically dominant in the rural population of the basin, women manage less than a quarter of the household farms. The heads of household farms are generally women over 40 years old or widows.

Gender and agricultural value chains: women are involved in all stages of the agricultural value chain, from production to marketing. However, they face many challenges and constraints that limit their ability to fully participate and benefit from these activities.

Access to Resources: Women's access to credit is limited, although microcredit is more accessible in Togo than in Benin. Women rarely own agricultural land and often access land through precarious means like leasing. They are underrepresented in professional agricultural organizations and have limited access to mechanization services.

Gender issues surveyed over stakeholder consultations

Main Constraints	Support Needs	Suggestions for Project Design
Limited technical capacities, insufficient resources, and inadequate equipment in women's economic activities.	Providing training on modern techniques, ensuring access to necessary equipment.	Introduction of flood-resistant crops and improved agricultural practices.
Women’s limited access to resources such as land and credit.	Improving women's access to land and credit.	Capacity building and training for women in modern agricultural techniques and other income-generating activities.
Impact of climate change, such as flooding, affecting women's agricultural activities.	Establishing and strengthening support mechanisms for women, such as local microfinance initiatives and women's cooperatives.	Developing projects to support women’s economic empowerment and manage their economic activities effectively.

Project responses to climate change gender inequalities

The project has identified limited access to land ownership and control for women and a significant gender gap in access to financial resources. Women's workloads are disproportionately high due to unpaid domestic labour, and cultural and legal barriers further restrict their empowerment.

To address these gender inequalities, the project aims to ensure the active participation of women, men, and youth in all project activities, facilitated through gender-sensitive community consultations and workshops. The project seeks to improve women's access to land through legal reforms and community-based schemes and enhance their access to financial

resources by partnering with microfinance institutions to develop gender-responsive financial products. Targeted support for women's access to agricultural inputs, such as improved seeds and fertilizers, is also a key strategy.

Capacity-building efforts include conducting gender training to raise awareness and build capacity, supporting women's leadership and entrepreneurship, and establishing and strengthening women's groups and networks. The project has developed gender-sensitive indicators to track progress and impact, implemented robust monitoring and evaluation frameworks, and adapted project activities based on ongoing gender assessments.

In implementation, the project has facilitated community land allocation to women, ensuring secure tenure, and partnered with financial institutions to provide tailored microcredit schemes. Training sessions on climate-smart agriculture and financial literacy have been conducted for women farmers, and women's cooperatives have been established to foster peer learning and collective action. Awareness campaigns on gender equality and the impacts of climate change have been launched, and local leaders and policymakers have been engaged to advocate for gender-responsive policies and practices.

The project's comprehensive approach to addressing gender inequalities enhances the resilience and adaptive capacity of all community members in the Mono River Basin. The project empowers women and strengthens climate change adaptation efforts' overall effectiveness and sustainability by promoting equitable participation, improving access to resources, and building capacity. Continuous monitoring and adaptive management ensure that gender equality is integrated into all project implementation aspects, fostering a more inclusive and resilient community.

GENDER ACTION PLAN

The Gender Action Plan (GAP) for the BOUCLIER-CLIMAT/MONO project aims to address and mitigate gender inequalities exacerbated by climate change. It outlines specific actions to ensure the inclusion and empowerment of women, men, and youth in the Mono River Basin, enhancing their resilience and adaptive capacity to climate impacts.

Actions and Strategies

To promote equitable participation, the project will conduct gender-sensitive community consultations to gather input and ensure inclusive participation in project planning and implementation. The project will facilitate the inclusion of women and youth in local decision-making bodies and project committees. Additionally, awareness campaigns will be implemented to highlight the importance of gender equality in climate change adaptation and resilience.

In improving resource access, the project will advocate for legal reforms and support community-based land allocation schemes to secure women's land tenure. Partnerships with microfinance institutions will be established to develop gender-responsive financial products and services tailored to women's needs. Targeted support will be provided for women's access to improved seeds, fertilizers, irrigation systems, and other agricultural inputs. Technological support will be ensured through training and subsidies to make agricultural machinery and technology accessible to women.

Building capacity and empowerment will involve regular gender training for project staff, local authorities, and community members to raise awareness and build capacity for gender-sensitive approaches. Leadership programs will be developed and implemented to support women's roles in community leadership and project management. Training and support for women's entrepreneurship will be offered, including business planning, financial literacy, and market access. Women's groups and networks will be established and supported to enhance their collective bargaining power and influence.

Monitoring and evaluating progress will be achieved by developing and utilizing gender-sensitive indicators to track and assess the impact of gender integration in the project. A robust monitoring and evaluation framework will be implemented, including regular gender assessments and feedback mechanisms. Project activities will be adapted based on ongoing evaluations to address emerging gender issues and ensure continuous improvement.

Annex 4: Cost-Effectiveness Analysis

Summary of Study Report for Full Proposal (full report available: link)

INTRODUCTION

The Mono River basin, covering 24,300 km², is a significant transboundary river basin in West Africa, shared between Benin (12%) and Togo (88%). It features distinct climatic zones: a sub-equatorial zone with two rainy and two dry seasons in the south, and a tropical zone with one rainy and one dry season. Over the past 30 years, the basin has seen an average annual rainfall of 1200 mm, with temperatures ranging from 26°C to 28°C. The basin's natural resources have historically supported various socio-economic activities, including agriculture, livestock, fishing, mining, and river transport.

Despite these economic activities, most of the population in the basin lives below the poverty line, with GDP per capita estimated in 2019 at $1,201 for Benin and $845 for Togo. Increasingly frequent and severe floods pose significant challenges, with major events causing widespread damage and loss of life. For instance, the 2010 flood affected 680,000 people in Benin, killing 46 and causing over a million dollars in agricultural losses, while in Togo, it affected over 5.9 million people with damages estimated at $38 million.

These flooding risks are exacerbated by climate change, land use changes, and population growth. The transboundary land use impacts agriculture, food production, water security, and hydropower, increasing pressure on natural resources like water and forests. Benin and Togo share common challenges in disaster management and climate change impacts, particularly due to the heavy reliance on climate-dependent income-generating activities. Regular flooding severely affects vulnerable communities, leading to significant losses and damage.

Climate change has disrupted fragile livelihoods, reducing the availability and access to quality water, with cascading effects on food security, nutrition, health, ecosystem balance, family income, education, employment, rural exodus, social conflicts, and family stability. Malnutrition and food insecurity are critical issues stemming from agricultural sector problems and climate change impacts. Rising temperatures and decreasing precipitation threaten groundwater, the main drinking water source, and could lead to decreased river flow and water table levels, with increased groundwater salinity due to sea level rise.

The primary climate change impacts on agriculture and livestock include irregular rainfall and increased temperatures, creating critical conditions for vulnerable households. This situation, worsened by deep structural and governance issues, forms a vicious cycle linking governance, climate change, disasters, vulnerability, and poverty, which intensifies with each disaster.

To improve the lives and resilience of communities in these cross-border areas, the governments of Benin and Togo, in collaboration with regional and national partners, have launched the Bouclier-Climat/Mono Project. This project aims to strengthen systems and capacities in the Mono River Basin for climate change and hydrological management. Implemented by the Sahara and Sahel Observatory (OSS) in close cooperation with Benin, Togo, and regional bodies like the Mono Basin Authority (MBA) and Global Water Partnership in West Africa (GWP WA), the project seeks to bolster resilience to recurrent flooding and promote sustainable water resource management.

The project's specific objectives are to:

- Ensure long-term climate risk monitoring by producing reliable scientific data and information at local, national, and transboundary levels in the Mono River Basin.
- Develop and implement a regional flood early warning system to reduce disaster risks for vulnerable communities.
- Implement concrete adaptation actions to enhance the resilience of the most vulnerable communities.
- Strengthen the institutional and technical capacities of the MBA and its stakeholders.

The project's main ambition is to enhance the resilience of vulnerable communities in the transboundary Mono River Basin through various on-ground adaptation actions and capacity building of key stakeholders. The field actions aim to significantly reduce the impacts of major climate hazards (particularly cyclical floods), improve livelihoods and living conditions, and develop water resources and associated ecosystems. The Bouclier-Climat project will be implemented using a participatory and inclusive regional approach, involving all basin stakeholders, as it is a shared space requiring coordinated actions between the two states.

The project is organized around three components:

1) Establishing/strengthening climate-resilient management tools for the Mono River Basin.
2) Improving the resilience of the most vulnerable ecosystems and people in the basin through concrete adaptation measures.
3) Strengthening the capacities of different actors, sharing knowledge, and raising awareness among all beneficiaries at various levels.

ALTERNATIVES CONSIDERED FOR THE COST-EFFECTIVENESS STUDY

The BOUCLIER-CLIMAT project will create significant economic, social and environmental benefits and impact at household, community, national and regional levels. This cost-effectiveness analysis will evaluate two alternatives:

- Alternative 1: The alternative to the BOUCLIER-CLIMAT project, no project intervention, with the related economic, environmental and social problems.
- Alternative 2: The economic, environmental and social benefits that the proposed BOUCLIERCLIMAT project are expected to create to increased environmental protection, resilience, livelihoods diversification, mitigation benefits and climate change adaptation.

Table 2: Comparison project – no project potential expenditure for beneficiaries reached in 5 years

	Unity Cost for 5 year of the project (USD)	Number of bénéficiaries	Total USD
With The BOUCLIER-CLIMAT/Mono project	233.33	90,000 Direct beneficiaries (15,000 Household)	14,000,000.00
Without The BOUCLIER-CLIMAT/Mono project	850.00	90,000 Direct beneficiaries (15,000 Household)	51,000,000.00
Emergency aid	170 USD/year (Humanitarian Aid/Beneficiary/Year)	Difference with the project	37,000,000.00

The BOUCLIER-CLIMAT/Mono project, with a budget of $14,000,000, supports 15,000 households (around 90,000 beneficiaries) at an average cost of $233 per beneficiary. In contrast, providing emergency assistance (one meal a day) would cost about $51 million, nearly three times the project's budget. The project is thus cost-effective, spending significantly less per beneficiary and offering long-lasting environmental, social, and sustainability benefits.

Alternative 1: The project BOUCLIER-CLIMAT/Mono is not implemented

If the BOUCLIER-CLIMAT project is not implemented, the current conditions for communities in the river basin will remain unchanged. This means the land will not be rehabilitated, RAMSAR sites will remain unprotected, revenue-generating activities will not be developed, and the early warning system will not be improved. Consequently, agriculture, the main livelihood for communities, will not improve, and adaptation measures will not be implemented, leading to insufficient agricultural production to meet population demand.

In such a scenario, the pressure on natural resources, including vegetation, soils, and water, is expected to increase, resulting in overuse, degradation, potential conflicts, rural exodus, and both inter-regional and international emigration. To mitigate these effects, adaptation measures and resilience strengthening are essential. Without an effective early warning system, communities are at risk of losing their production, assets, and even lives.

Providing food assistance to the direct beneficiaries (and potentially many more) of the project due to the lack of an early warning system would incur significant costs. Without sustainable management of surface water and groundwater, and without implementing organic and regenerative agriculture programs and valorizing non-timber forest products (NTFPs), we will face:

- Declining agricultural productivity due to land degradation and loss of soil fertility.
- High adaptation costs, necessitating provisional investments for vulnerable communities in the basin.
- Loss of terrestrial and aquatic biodiversity.
- Increased dependency on food and financial aid.
- Conflicts between various users of the basin's water resources, including:
  - **Farmers and herders**: Frequent conflicts around water bodies in the Mono basin, often involving transhumant herders. Some villages even organize night watches over market gardening operations by water bodies.
  - **Fishermen**: Conflicts around Lake Ahémé due to inappropriate fishing techniques and gear, use of weirs preventing marine fish migration, fine mesh nets reducing fish productivity, and unbaited longlines posing dangers to both fishery resources and fishermen.
  - **Populations affected by floods and the Electrical Community of Benin**: Conflicts arise from floods in the lower Mono valley following sluice gate openings to reduce dam pressure. Authorities in affected communes, particularly Athiémé, have not found lasting solutions with the Electrical Community of Benin.

Without effective coordination at the Mono Basin level to enable global thinking and local action, avoiding new disasters will be impossible.

Alternative 2: The project BOUCLIER-CLIMAT is implemented

The proposed alternative to the current situation leverages a tested approach from other climate change adaptation and mitigation projects. This approach aims to make communities more informed about risks, enhance the efficiency of different actors, and lead communities towards more economically, socially (including gender considerations), and environmentally sustainable production. For the Early Warning System (EWS), previous assessments have already highlighted the economic, social, and environmental benefits of reducing risks associated with extreme events.

In terms of water management improvement systems and the installation of revenue-generating activities for vegetable production (irrigated), the project will compare traditional cultivation methods with improved, climate-adapted methods. These methods include more intensive production, better water management (such as drip irrigation), and ecologically sustainable systems (like solar probes). Additionally, the project will compare the production of economically valuable plants, including fruit trees and medicinal plants. Recognizing the importance of forest maintenance, the project will also implement a community forest management system that prioritizes the valorization of non-timber forest products (NTFPs). This will stimulate income-generating activities in this sector.

For other agricultural crops, the project will compare traditional production methods (without the project) with adapted production methods. Specifically, it will compare the production of cereals and tubers, usually produced for self-consumption (not irrigated), with vegetable production irrigated by furrow row using motor pumps (diesel or petrol), versus vegetables irrigated with a drip system using motor pumps or solar systems. The analysis also includes the installation of a nursery fed by a solar and drip system.

The analysis shows that traditional models yield significantly lower income than the improved methods. Implementing the project will substantially increase community income. Considering the diversity of beneficiaries, the project also examines income-generating activities such as fishing, aquaculture, and the breeding of small and large ruminants and poultry. To ensure real resilience, diversify income sources, and capitalize on the various opportunities the territory offers, the previous agricultural activities are compared with other potential income sources. For each, the initial investment, economic and financial sustainability, and Internal Rate of Return (IRR) were calculated.

A significant component of the project, both in terms of budget and focus, is the creation of small businesses and income-generating activities. The project proposes to encourage community collaboration through small agricultural cooperatives that aim to implement small agricultural businesses. These activities will primarily aim to strengthen the role and involvement of women, promoting their social and economic empowerment. The analysis compared eight main activities based on the area's environmental potential, social situation, and potential market for the products. For these activities, the installation cost of the investment, current costs, inputs, and the sustainability of the investment were calculated. The results were compiled into a single table, along with investments related to agricultural activities, to provide a comprehensive overview of development possibilities in the target areas.

COST-EFFECTIVENESS STUDY FOR THE ALTERNATIVES

The cost-effectiveness analysis compares alternatives for diversifying income sources by assessing the production costs, yields, and benefits of improved methods versus conventional methods. This comparison includes detailed input and labor costs per hectare, expected yields (kg/ha), plot income (yield x price), and plot benefits (yield - costs). Agricultural activities were compared with other high-potential, climate-adaptive activities for small business creation and income for cooperatives and households. The analysis considered initial expenses, operating costs, and profits to calculate the Internal Rate of Return (IRR) for various investments.

Income-generating activities included nine non-agricultural sectors (NTFPs, fishing, aquaculture, beekeeping, goat farming, sheep farming, cattle breeding, poultry farming) and five agricultural sectors (climate-resilient rice production, tubers, horticulture and fruit growing with motor pump and furrow irrigation, motor pump with drip irrigation, solar system with electropump and drip irrigation, and nursery fruit and medicinal plants with solar system and electropump and drip irrigation), totalling 14 activities. The analysis examined initial investments, management costs, annual earnings, and profits. IRR was calculated at five years (end of the project) and ten years (five years post-project). Cattle breeding showed the lowest IRR (19%), followed by sheep production (29%). Beekeeping, NTFPs, aquaculture, and goat production had the highest IRRs at 58%, 56%, 45%, and 44%, respectively.

Environmental and social aspects suggest prioritizing combined goat and sheep farming due to their complementary feeding habits and higher efficiency compared to cattle. Fishing and aquaculture also showed great potential, with considerations for environmental sustainability and suitable areas for tank digging. NTFP valorization and beekeeping demonstrated high potential, with significant productivity gains reported in other countries through the provision of protection and extraction kits. Women traditionally manage the extraction, filtering, and bottling phases, handling all inputs of the activity.

FINANCIAL ANALYSIS

The financial analysis for the project's cost-effectiveness is detailed in Table 5. The financial profitability of the project investment is determined by examining the project cost components and the estimated financial benefits derived from the project interventions using the following financial appraisal techniques: i) Cash flow; ii) Benefit-cost ratio;iii) Net present value (NPV); iv) Internal rate of return (IRR)

Table 3: Financial analysis for project cost-effectiveness

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
A. Cost Components						
Component 1	420,000.00	420,000.00	420,000.00	420,000.00	420,000.00	2,100,000.00
Component 2	1,750,000.00	1,750,000.00	1,750,000.00	1,750,000.00	1,750,000.00	8,750,000.00
Component 3	200,000.00	200,000.00	200,000.00	200,000.00	200,000.00	1,000,000.00
Execution costs (management units)	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	1,050,000.00
Implementation costs (management units)	220,000.00	220,000.00	220,000.00	220,000.00	220,000.00	1,100,000.00
Total costs (A)	2,800,000.00	2,800,000.00	2,800,000.00	2,800,000.00	2,800,000.00	14,000,000.00
B. Financial benefits						
Study/Consultancy Benefits						
Benefits for Income generation Activity	2,117,264.94	4,234,529.87	6,351,794.81	8,469,059.74	10,586,324.68	31,758,974.03
Total financial benefits (B)	2,117,264.94	4,234,529.87	6,351,794.81	8,469,059.74	10,586,324.68	31,758,974.03
Cash flow (BA)	-682,735.06	1,434,529.87	3,551,794.81	5,669,059.74	7,786,324.68	17,758,974.03
Benefit Cost Ration (B/A)	0.76	1.51	2.27	3.02	3.78	2.27
Net Present Value (NPV)						15,483,692.75
Internal Rate of Return (IRR)						40%

Annex 5: Regional Consultation Workshop Report

Summary of the report (full report available: link)

BOUCLIER-CLIMAT/Mono project « Strengthening adaptation and resilience to climate change through integrated water resources and flood management in the Mono River Basin, shared by Benin and Togo »

Cotonou, March 28, 2023

Context of the project

The BOUCLIER-CLIMAT/MONO project, initiated by the Sahara and Sahel Observatory (OSS) in collaboration with the Mono Basin Authority (MBA) and the Global Water Partnership in West Africa (GWP-WA), aims to address the many challenges faced by communities in the Mono River Basin shared by Benin and Togo. The primary objective is to strengthen the resilience of vulnerable communities by promoting sustainable and equitable management of water resources and associated ecosystems. The project is built around three main components: establishing resilient management tools, improving the resilience of ecosystems and populations, and building capacity through knowledge-sharing and awareness-raising activities.

Workshop Objectives and Expected Results

Held on March 28, 2023, in Cotonou, the regional stakeholder consultation workshop marked the final step in a comprehensive consultation process. The workshop sought to present and discuss the outcomes of consultations with local and national stakeholders, exchange information on the initial results of thematic studies, and reach an agreement on the priorities to be included in the detailed project document. It also aimed to deepen the understanding of stakeholder expectations and needs, ensuring that the project aligns with their perspectives. Expected results included the validation of the project's development process, components, outcomes, outputs, and budget, along with agreement on the institutional arrangements for successful project implementation.

Methodology

The workshop employed a hybrid format, allowing for both in-person and online participation. Preliminary activities included visits to potential intervention sites and in-depth consultations with local stakeholders and beneficiaries in both Togo and Benin. A working meeting between OSS, MBA, and GWP-WA partners was held to prepare for the regional consultation. During the workshop, the agenda was presented and validated, followed by detailed presentations on various aspects of the project, including the outcomes of thematic studies.

Participants

The workshop brought together 34 participants, comprising representatives from the MBA Executive Management, OSS Executive Secretariat, GWP-WA Executive Secretariat, and other national and regional institutions and stakeholders from Benin and Togo. Civil society organizations and consultants also took part, contributing their insights and expertise to the discussions.

Working Documents

Several key documents were utilized during the workshop, including the project concept note, preliminary results from thematic studies (gender analysis, cost-effectiveness assessment, vulnerability assessment, and environmental and social impact assessment), and proposals for institutional arrangements. These documents provided a foundation for informed discussions and decision-making.

Workshop Workflow

The workshop's structure ensured a comprehensive exploration of the project's components and stakeholder contributions. The opening ceremony, chaired by the Secretary General of the Ministry of Water and Mines of Benin, featured speeches from key representatives of OSS, MBA, and GWP-WA, who highlighted the project's importance in addressing climate change impacts in the Mono Basin. Following the introduction and validation of the workshop agenda, presentations outlined the project development process and the roles and missions of MBA, GWP-WA, and OSS.

A significant portion of the workshop was dedicated to presenting and discussing the preliminary results of thematic studies, covering gender analysis, cost-effectiveness assessment, vulnerability assessment, and environmental and social impact assessment. These presentations provided critical insights into the project's potential impacts and areas for improvement.

Discussions on the proposed institutional arrangements focused on ensuring an effective setup for project implementation. Participants validated the institutional framework, emphasizing the roles and responsibilities of the various entities involved. The workshop concluded with a summary of the exchanges and the formulation of recommendations to be integrated into the detailed project document.

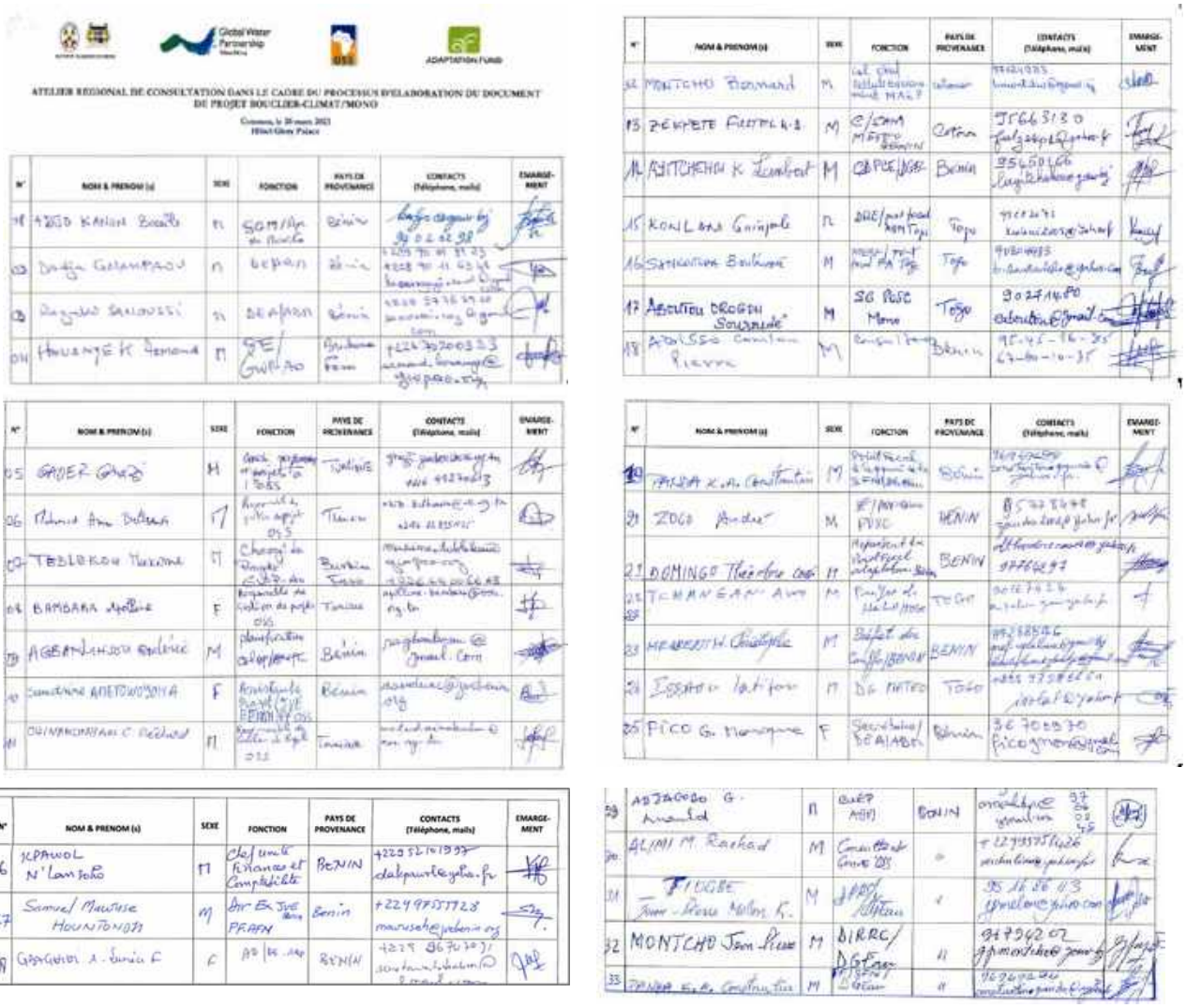
The closing ceremony featured expressions of gratitude and positive reflections from the participants. The Prefect of Couffo and Chairman of the Mono Basin Committee in Benin delivered the closing remarks, praising the workshop's success in meeting its objectives and fostering a sense of commitment among stakeholders. The workshop was deemed a success, having facilitated valuable discussions on climate change-driven challenges, the selection criteria for potential intervention sites, and the activities to be undertaken. Participants appreciated the initial results of the thematic studies and agreed on the institutional arrangements necessary for the effective implementation of the project.

The workshop played a crucial role in advancing the BOUCLIER-CLIMAT/MONO project. It provided a platform for stakeholders to align on project priorities, validate preliminary findings, and agree on a robust framework for implementation, ensuring that the project is well-positioned to enhance the resilience of communities in the Mono River Basin.

Table 4: summary of the recommendations

Category	Recommendations
National and Local Authorities	1. Ensure land security for investment sites before project commencement. 2. Share additional site proposals located in vulnerable municipalities with MBA. 3. Strengthen women's participation in public consultations related to the project.
Project Partners	1. Consider drought and water stress in the criteria for pilot site selection. 2. Ensure synergy with the Volta Flood and Drought Management (VFDM) project for EWS implementation. 3. Consider the representativeness of women's associations in the Steering Committee.
Consultants	1. Integrate gender dimension in vulnerability analysis. 2. Use gender transformative approach and propose actions to reduce gender inequalities in project implementation. 3. Consider community perceptions in vulnerability analysis and project content development. 4. Restructure ESIA methodology based on the project concept note and site visits. 5. Conduct spatial analyses of hydro-climatic parameters to identify hotspots and flood-prone areas. 6. Adopt and promote the concept note during the conduct of various studies by all consultants. 7. Adhere to deadlines for providing the various deliverables of preparatory thematic studies.

Table 5: List of the workshop participants



Annex 6. Mission Consultation Report

Summary of the report (full report available: link)

Consultation Process with Stakeholders in the Framework of Developing the Detailed Project Document for the BOUCLIER-CLIMAT/Mono Project (Benin and Togo)

Context and Objectives

The BOUCLIER-CLIMAT/MONO project was submitted to the Adaptation Fund (AF) following a three-step approval process. The first two steps, involving the submission of the pre-concept note and the concept note, were successively approved by the AF Board. These two BOUCLIER-CLIMAT/MONO project documents are available on the AF's website. The third and final step involves the development of the complete project document (Full Proposal) to be submitted to the AF to secure the necessary funding for its implementation. At this stage, all detailed information must be provided, including that resulting from thematic studies and considering the comments from the AF's evaluation of the concept note.

In this regard, the Sahara and Sahel Observatory (OSS), as the Regional Implementing Entity (RIE), received a Project Formulation Grant (PFG) from the AF for the development of the full proposal of the project. According to AF requirements, a consultation process with stakeholders at the Mono Basin's local, national, and regional levels was conducted to ensure their ownership of the project and address their needs. This consultation process also included a more detailed assessment of pre-selected sites in potential project intervention areas and the various site and beneficiary pre-selection criteria defined during previous project development phases, which will be applied during project activities implementation.

From March 20 to 28, 2023, the OSS, in collaboration with regional implementing partners (Mono River Authority-MBA- and the Global Water Partnership in West Africa - GWP-WA) and national project partners, conducted a consultation process. This process facilitated meetings with national and local stakeholders, as well as beneficiaries at potential project intervention sites in Benin and Togo.

The overall objective of the consultation process is to deepen the expectations of all stakeholders and the needs of beneficiaries while consolidating their commitment and support for the project. The information, proposals, and recommendations resulting from these discussions will be taken into account in the development of the full proposal, which will be submitted to the AF. These consultations also enabled potential beneficiaries to better understand the project's scope, benefits, as well as the risks and constraints that might be associated with the project's activities.

The consultation process also aims to confirm the commitment of local authorities and representatives of beneficiaries (women's associations, youth groups, etc.), and their effective ownership of the project. Visits to potential intervention sites were carried out to ensure the feasibility of the project's activities and their compliance with on-the-ground realities. These visits helped assess the environmental and socio-economic conditions of the targeted areas, as well as the needs and expectations of local communities. With this information, the project's intervention strategies will be adapted to ensure the effectiveness and sustainability of the proposed solutions.

Stakeholder Consultation Process

The stakeholder consultation process was conducted by the OSS in collaboration with the ABM and GWP-WA, along with national partners from Benin and Togo. The ABM was also responsible for all logistical and organizational aspects related to the preparation and execution of both the field missions and the regional stakeholder consultation workshop. The consultation process was carried out at three levels (local, national, and regional) according to the following steps:

- **March 20-22, 2023, in Togo**: Visits to potential intervention sites in pre-selected communes and in-depth consultations with local actors and potential beneficiaries.
- **March 23-24, 2023, in Benin**: Visits to potential intervention sites in pre-selected communes and in-depth consultations with local actors and potential beneficiaries.
- **March 27, 2023, in Benin**: Working meeting between OSS, ABM, and GWP-WA partners.

Due to travel disruptions experienced by the OSS delegation, a virtual session was held on March 20, 2023, to frame the consultation process with stakeholders and visits to pre-selected sites. The OSS also provided several working documents to the mission, including: (i) the mission's concept note; (ii) the data collection questionnaire; (iii) consent letters to be signed by representatives of the populations, local authorities, and traditional leaders; (iv) attendance lists and consent forms for photos and videos; (v) the FPIC Process guide; (vi) the visit agenda; and (vii) the interview guide for consultations with stakeholders.

This session enabled representatives from ABM, OSS, and GWP-WA to: (i) agree on the mission's objectives and expected results at each site to be visited; (ii) exclude the use of the data collection questionnaire due to the nature and duration of the field mission; (iii) refine the interview guide for stakeholder consultations, ensuring complementarity with the consultant teams conducting thematic studies; (iv) identify the necessary secondary data and information to be collected from certain sectoral actors on the ground; and (v) clarify the format of synthesis meetings in each country.

In-depth consultations with Local Stakeholders and Site Visits in Togo

From March 20 to 22, 2023, consultations and site visits were conducted in Togo. The mission began with a meeting with the Director of Water Resources, who is the ABM Focal Point in Togo, and the FA Focal Point Representative in Togo. The five preselected sites visited were Datcha, Fin Digue (downstream of the Nangbéto Dam) in Ogou 2, Haho 2, Aklakou Zongo, and Agbannakin in the commune of Lac 2.

- **Datcha Site**

The visit to the Datcha site, located in the village of Datcha in the Ogou 2 commune about 150 km north of Lomé, revealed several issues, including the degradation of river banks and the gallery forest, soil erosion, and silting. Conflicts between farmers and herders were also noted. The primary needs and expectations identified by the local communities include the restoration of degraded lands, the demarcation and protection of easement strips, the establishment of passage corridors for cattle, and the development of income-generating activities (IGAs) through market gardening. The community committed to supporting all project activities, participating in training on modern market gardening techniques, and providing appropriate equipment. They also agreed to relocate parcels from riverbanks to upstream areas.

- **Fin Digue Site**

The visit to the Fin Digue site, located about 200 km from Lomé and involved in fish farming and agriculture, identified issues such as the silting and pollution of the reservoir and conflicts between farmers and herders. The needs and expectations included capacity building on water and soil conservation techniques, improved pesticide management, feasibility studies for managing siltation and pollution, irrigation equipment for market gardeners, infrastructure for potable water and electricity, and support for microcredit schemes for women.

- **Haho 2 Site**

The Haho 2 site, located in Asrama, north of the Togodo protected area, faces issues related to forest degradation and challenges in CO2 sequestration. The local community expressed the need for reforestation of 22 hectares, the adoption of Nature-Based Solutions (NbS), and capacity building for sustainable forest management.

- **Aklakou Zongo Site**

The Aklakou Zongo site, located in southern Togo near the Benin border, experiences annual flooding causing significant damage and waste management issues. The community's needs and expectations include water storage structures for market gardening and fish farming, community sensitization on respecting watercourse easements, waste collection, treatment, and valorization, and dredging of tributaries.

- **Agbannakin Site**

The Agbannakin site, situated in southern Togo near Grand-Popo, Benin, faces severe annual flooding with significant impacts and inadequate sanitation and potable water infrastructure. The community needs dredging of the river and permanent opening of the mouth at Grand-Popo, early flood warning systems, construction of water retention structures, short-cycle agricultural seeds, construction of resilient infrastructure such as schools and health centers, support for income-generating activities like fish farming and livestock, and access to microfinance, training, and literacy programs.

In-depth consultations with Local Stakeholders and Site Visits in Benin

From March 23 to 24, 2023, the delegation conducted consultations and site visits in Benin. Participants included representatives of the Director General of Water, the Director General of the National Fund for Environment and Climate (DGFNEC), and the Director General of Environment and Climate (DGEC), who is the FA Focal Point in Benin. The five preselected sites visited were Kpatcha-Condji, Athiémé, Lake Togbadji, Dévé Irrigated Perimeter, and Gbidji Community Forest.

- **Kpatcha-Condji Site**

The Kpatcha-Condji site, located in Djanglanmey, Grand Popo, Mono Department, faces issues such as annual floods since 2010, with severe impacts in 2022, saline groundwater, and agricultural productivity limited to one season per year. The community expressed the need for the construction of elevated pathways for mobility during floods, water reservoirs for dry season irrigation, promotion of short-cycle seeds, improved potable water supply, demarcation of grazing areas and cattle corridors, technical and equipment support for women's activities, strengthening of microfinance systems, and the development of income-generating activities like fish farming and irrigation.

- **Athiémé Site**

The Athiémé site, located in the Commune of Athiémé, Mono Department, experiences annual floods causing severe damage, riverbank erosion, and silting. The community needs stabilization and protection of riverbanks, reforestation and soil conservation measures, construction of drainage channels and culverts, development of income-generating activities (IGAs) through irrigated perimeters and fish ponds, and in-depth studies to understand flood causes.

- **Lake Togbadji Site**

The Lake Togbadji site, shared by Lokossa and Dogbo communes, faces issues such as overfishing, water pollution, and degradation of lake banks. The needs and expectations include conservation measures for water and soil, capacity building for women's groups in soybean and cassava processing, acquisition of irrigation equipment, and the development of additional income-generating activities.

- **Dévé Irrigated Perimeter Site**

The Dévé Irrigated Perimeter site, located in Dogbo, Couffo Department, has decreased agricultural productivity and insufficient irrigation water. The community expressed the need for the rehabilitation of the site with year-round water availability, rehabilitation of protective dikes and pumping stations, extension of the site for increased employment, acquisition of agricultural equipment, and technical capacity building for farmers.

- **Gbidji Community Forest Site**

The Gbidji Community Forest site, located in Gbidji, Couffo Department, faces issues of poaching and illegal exploitation of forest resources. The community needs to update and implement the forest management plan, fence the area to prevent poaching, support alternative income-generating activities, and build capacity for sustainable forest management.

Conclusion

The consultations and site visits in Togo and Benin successfully identified key issues and needs across various sites. The gathered data and stakeholder feedback will be incorporated into the final project proposal, ensuring a comprehensive and responsive approach to enhancing adaptation and resilience to climate change in the Mono River Basin.

Attendance lists

https://osstun-my.sharepoint.com/:f:/g/personal/apolline_bambara_oss_org_tn/En_sJ8xtbplAv9fDPVJNb1UBtCahjRbsHmouhIjpOr9KjA?e=LxfPbi

Letters of agreement

https://osstun-my.sharepoint.com/:f:/g/personal/apolline_bambara_oss_org_tn/EnXYmy8M1jxGoWrIuzUeMKIBAyvYay3n_iZ4q68dOI0Hww?e=1DETmX