REQUEST FOR PROJECT/PROGRAMME FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
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CONCEPT NOTE FOR A NATIONL PROJECT

PART I: PROJECT INFORMATION

Project or programme category:	**Ordinary project**
Country:	**Benin**
Project or programme title:	PROJECT TO STENGHTEN FOOD SECURITY AND COMMUNITY RESILIENCE TO CLIMATE CHANGE IN THE COMMUNES OF BOUKOMBE AND BOPA
Type of Implementing Entity :	**National Implementing Entity (NIE)**
Implementing Entity :	**National Fund for Environment and Climate (FNEC)**
Implementing Entity :	Caritas Bénin
Amount of Funding :	3,110, 096.40 US dollars

1-Background and context of the project

The Republic of Benin is a West African state located in the tropical zone between the equator and the Tropic of Cancer (between parallels 6°30' and 12°30' north latitude and meridians 1° and 30°40' east longitude). It is bounded to the north by the Niger River, which is the natural border with the Republic of Niger, to the northwest by Burkina Faso, to the west by Togo, to the east by Nigeria, and to the south by the Atlantic Ocean. Its surface area is 114,763 km².

From north to south, Benin extends for about 700 km. Administratively, it is a decentralized State with twelve (12) departments divided into 77 Communes, four of which have a special status, namely Abomey-Calavi, Cotonou, Porto-Novo and Parakou, 546 districts and 5295 villages and city districts

Benin's **climatology** is characterized by two (2) climatic nuances separated by the latitude of Savè:[1][2]

- in the south, the sub-equatorial (or Beninese) climate subdivided into four (4) seasons with alternating dry seasons (from November to March and from mid-July to mid-September) and rainy seasons (from April to mid-July and from mid-September to October)
- In the north, a Sudanese climate with two seasons: a dry season from November to April and a rainy season from June to September

The central zone of the country has a transitional climate that is similar to a sub-Sudanese climate.

Average annual rainfall varies between 800 and 1,400 mm in the south, compared with 800 to 1,100 mm in the north, and is characterized by a high degree of spatio-temporal variability. The average annual temperature varies between 27° and 29°C.

[1] https://presidence.bj/home/le-benin/geographie/

[2] https://web.facebook.com/1432400200371237/posts/1903476896596896/

More and more, frequent extreme weather events have been observed in the country since the 1950s, reflecting the effectiveness of climate variations and changes (MEHU, 2001)[3].

The relief of Benin is not very uneven and includes:

- a coastal region, low and sandy limited by lagoons;
- a plateau of ferruginous clay;
- a silico-clay plateau, dotted with some undergrowth;
- to the north-west, the Atacora massif (800 meters) ;
- to the north-east, the very fertile silico-clay plains of Niger.

The hydrography includes four large basins:

- the Beninese basin of the Niger River, which includes the Mékrou (410 km), Alibori (338 km), Sota (250 km) rivers ;
- the Volta basin which includes the Volta River and the Pendjari River (380 km) ;
- the Mono-Couffo basin which includes the Couffo (190 km of which 170 km are in Benin), which flows into Lake Ahémé and is connected to the Atlantic Ocean; and the Mono with its 500 km, which serves as a border between Benin and Togo on its lower course of 100 km and flows into the Atlantic Ocean, Lake Ahémé (78 km²), Lake Toho (15 km²) and the Grand-Popo lagoon (15 km²).
- The Ouémé basin, the largest river in the country with a length of 510 km, which flows into Lake Nokoué and uses the Lagos and Cotonou channels to connect to the Atlantic Ocean.

Three (03) types of **vegetation** characterize the country:
:

- the wooded savannah in the northern Sudanese regions ;
- the shrubby savannah in the center with species such as mahogany, Iroko, Samba;
- and the forest in the South and Middle Benin.

The forest heritage is composed of[4] :

- two (02) national parks: Pendjari and "W" of Niger: (829,320 ha); ;
- three (03) hunting zones: Pendjari, Djona, Atacora (422,300 ha);
- forty-four (44) classified forests (1,393,113 ha), of which twenty-six (26) have a management plan (i.e., an area of 1,377,047 ha) and include four (04) state-owned plantations;
- nine (09) reforestation areas (4267 ha);

There are elephants, buffaloes, hippopotamuses, lions, cheetahs, caimans, antelopes, birds, monkeys, reptiles, leopards, insects, etc.

Benin is one of the countries with a high demographic growth. Indeed, the population of Benin has grown from 878,000 in 1910, to 2,106,000 in 1961 and to 6,769,914 in 2002. At the 2013 census, the population was estimated at 10,008,749 inhabitants of both sexes, of which 5,120,929 were women, or 51.2% of the total population. INSAE estimates[5] put the population at 11,884,127 in 2019, with 50.8% women. Benin's population is predominantly young, with a median age of about 16 years (RGPH4, INSAE). The annual inter-censal growth rates are 3.25% between 1992 and 2002 and 3.50% between 2002 and 2013. Since 2002, Benin's population has increased by an average of more than 300,000 inhabitants per year (INSAE, 2015). This high population pressure has negative impacts on environmental resources. These negative repercussions are aggravated by climate variability and extreme weather events that further impact socioeconomic activities and the living conditions of the population, particularly in rural areas (UNDP, 2015).

Faced with this situation, and after ratifying the United Nations Framework Convention on Climate Change (UNFCCC) in 1994, and the Kyoto Protocol in 2002, Benin developed a national strategy for

[3]MEHU (2001). Benin initial national communication on climate change. Cotonou

[4]Annual activities repor 2017, DGEFC

[555]https://insae.bj/statistiques/indicateurs-recents/43-population (Website consulted on 16/06/2021)

the implementation of the Convention in 2003. In addition, Benin has developed three national communications on climate change (MEHU, 2001; MEHU, 2011; MCVDD, 2019), a low-carbon and climate-resilient development strategy 2016 - 2025, as well as its first nationally determined contribution under the Paris Agreement (MCVDD, 2017). In the area of adaptation to climate change, the National Action Program for Adaptation to Climate Change (PANA) was developed in 2008 (MEPN, 2008) and implemented, and the National Plan for Adaptation to Climate Change (PNA) has just been developed and validated (MCVDD, 2021). All these initiatives taken by the government indicate the degree of concern about the problem of climate change in Benin and the measures taken to strengthen the resilience of natural and human systems.

In Benin, the Human Poverty Index (HPI) is estimated at 36.6% at the national level, compared to 47.6% in Atacora (the department to which the commune of Boukombé belongs) and 29.1% in the department of Mono where the commune of Bopa is located. The value of the HPI is a reminder that Benin is a developing country whose poor and vulnerable populations do not have sufficient means to sustainably meet their own needs. According to INSAE (2020)[6], the incidence of monetary poverty estimated at 38.5% in 2019 at the national level is even higher in the departments of Atacora (60.5%) and Mono (43.0%).

Among the eight agro-ecological zones identified in Benin due to the homogeneity of their physical, biological, economic and social characteristics, zones 1, 4, 5 and 8 are the most vulnerable to the adverse effects of climate change (MEPN, 2008). CARITAS BENIN is a non-governmental organization that intervenes in certain Communes of these zones, including Bopa (Agro-ecological Zone 8) and Boukombé (Agro-ecological Zone 4). This project is initiated to contribute to the improvement of the adaptive capacity of the vulnerable populations of these Communes in the face of the adverse effects of climate change. Agriculture in Benin, being essentially rain-fed, is the most affected livelihood.

The analysis of gender tools (profile of access to and control of resources and women's socio-political position) reveals:

- the poor access to and control of land by women;
- the difficulty of accessing and controlling factors of production ;
- Women's poor access to income ;
- the low involvement of women in local decision-making bodies ;
- the existence of a strong socio-cultural and religious hold on women.

In addition, only one in ten women make decisions in the home (including daily budgeting, investments, children ‘s education, family planning, and health care services) compared to seven in ten men who make decisions on the same issues. This notable trend is observed in African society in general.

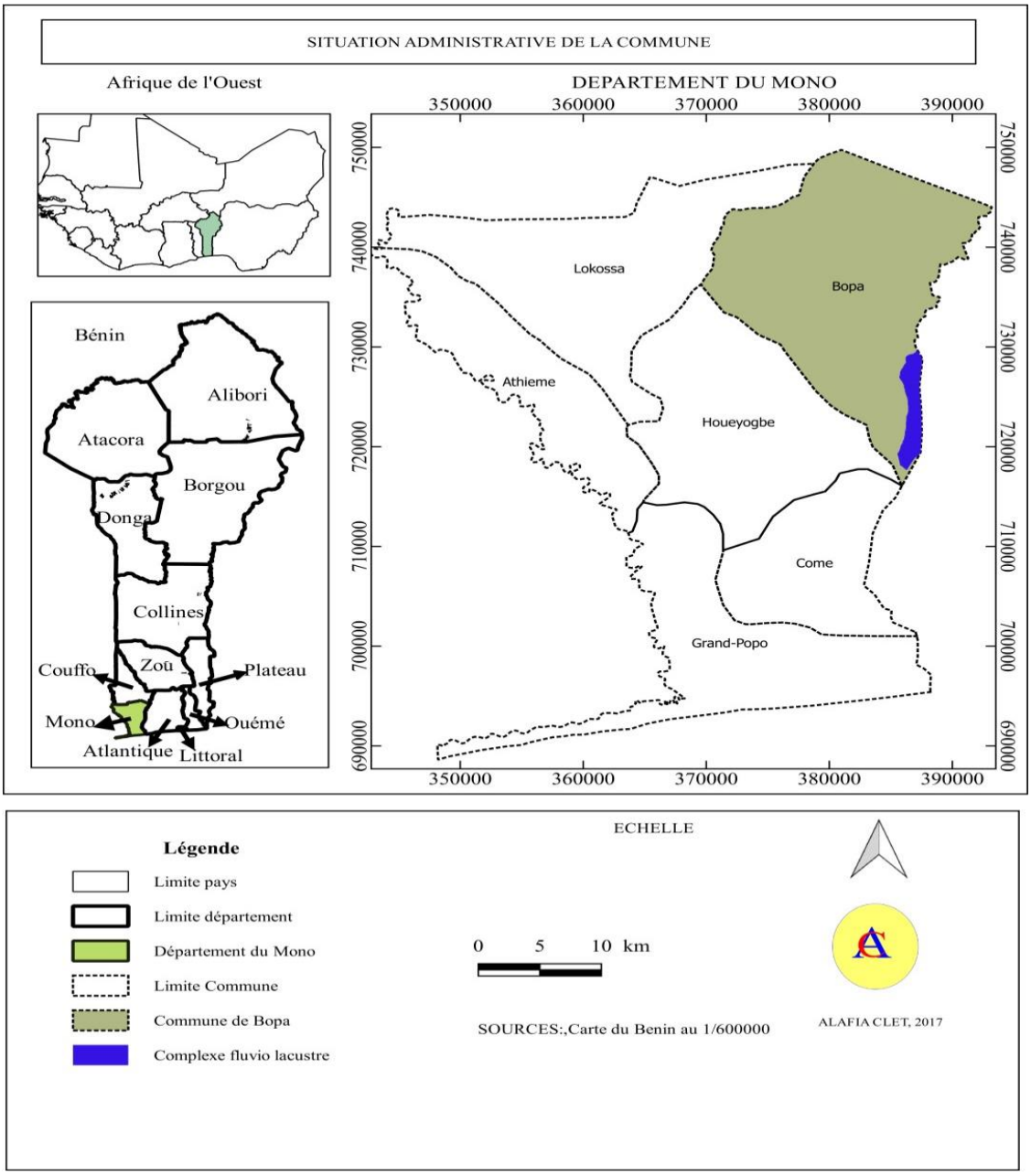
1.1. Geographic and socio-économic Context of the Commune of Bopa

- **Geographic and administrative location**

The Commune of Bopa is located in the southeast of the Department of Mono. It is bordered to the north by the Communes of Dogbo and Lalo, to the south by the Communes of Comé and Houéyogbé, to the east by the Couffo River and Lake Ahémé, which it shares with the Communes of Allada and Kpomassè, and to the west by the Communes of Lokossa and Houéyogbé (map 1). It is in the form of an elongated polygon and covers an area of 365 km2, or 22.74% of the area of Mono and about 0.32% of the total area of the country.

[6] POVERTY NOTE IN 2019

Map 1 : Location of the commune of Bopa



Source : PDC 2018-2022 Commune of Bopa (2017)

The commune of Bopa has eighty-three (83) localities (villages and city districts) spread over seven (7) arrondissements, namely: Agbodji, Badazouin, Gbakpodji, Bopa centre, Lobogo, Possotomè and Yègodoé (table 1). The chief town of the Commune is Bopa.

Table 1 : Arrondissements of the commune of Bopa

Arrondissements	Area (km²)	Number of villages
AGBODJI	33.54	10
BADAZOUIN	107.01	13

BOPA	33.04	14
GBAKPODJI	53.97	8
LOBOGO	61.74	18
POSSOTOME	20.43	8
YEGODOE	55.28	12
Total of Commune	365	83

Source: Commune of Bopa (2017)

- **Socio-economic characteristics**

The dominant branches of activity in the Commune are "Agriculture, Fishing and Hunting" (73.8%), followed by "Trade, Catering and Accommodation" (9.9%) and finally, "Manufacturing Industries" (6.2%) and "Other Services" (6.5%).

99.5% of agricultural households are involved in crop production, of which 50% cultivate cassava, 25% maize and 14% beans/cowpea. Traditional equipment is used by 100% of households for agricultural work.

It is important to note that in this Commune, there are approximately 26% female heads of household. The analysis of gender tools (profile of access to and control of resources and women's socio-political position) reveals:

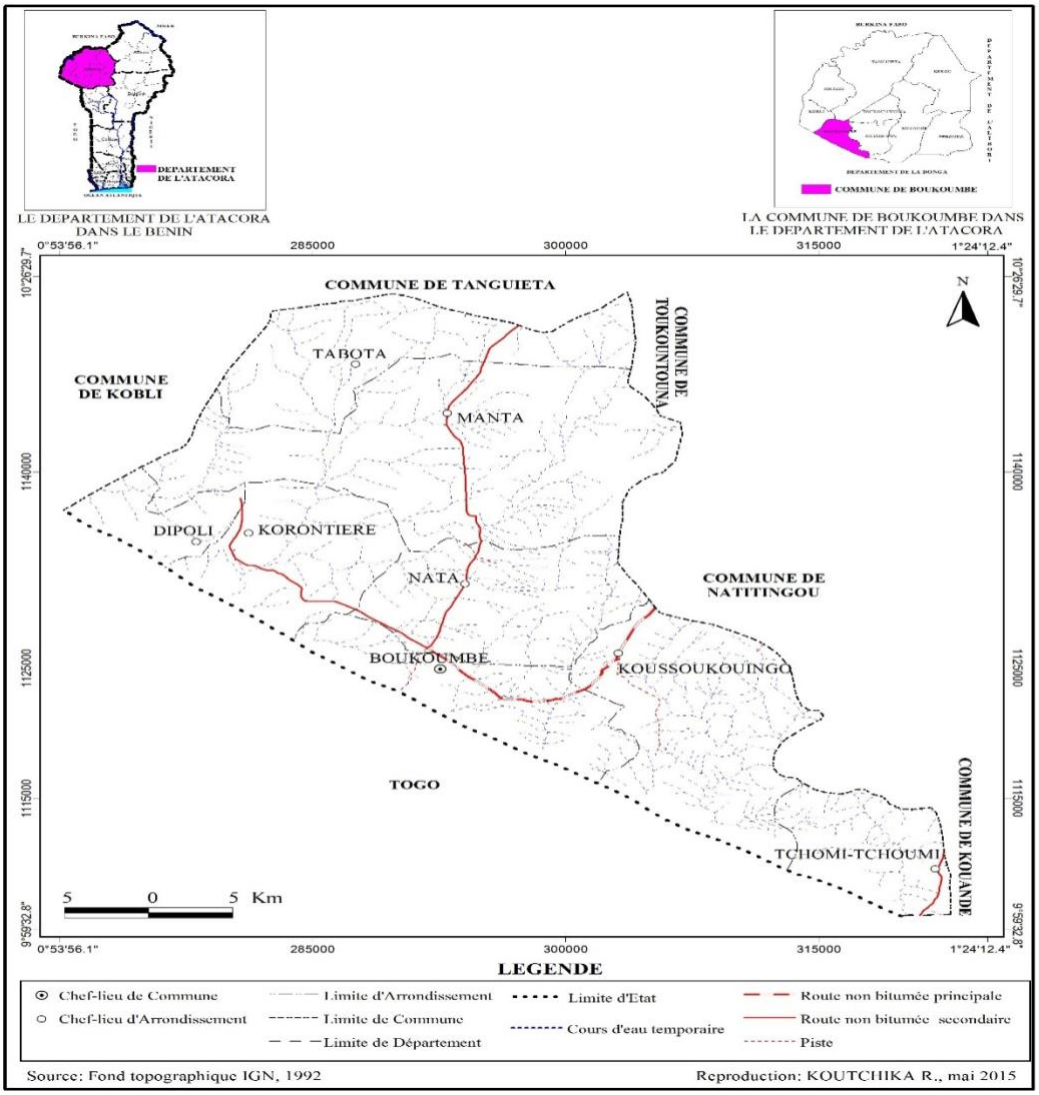
- the low level of access to and control of land by women ;
- the difficulty of accessing and controlling factors of production ;
- Women's poor access to income ;
- the low involvement of women in local decision-making bodies ;
- the existence of a strong socio-cultural and religious hold on women.

According to this graph, only one in ten women make decisions in the home (including daily budgeting, investments, children's education, family planning, and health care services) compared to seven in ten men who make decisions on the same issues. This notable trend is observed in the community and in society at large.

1.2. Geographic and socioeconomic context of Boukombé

- **Geographic location**

The Commune of Boukombé is located between 10° and 10°40' north latitude and 0°75' and 1°30' east longitude. Located in the Sudanian zone, it covers an area of 1036 km2 (Commune de Boukombé, 2005; MdSC, 2010), bordered to the northeast by the Commune of Tanguiéta, to the northwest by the Commune of Cobly, to the south by the Commune of Natitingou, to the east by the Commune of Toucountouna, and to the west by the Republic of Togo (Map 2).



Map 2 : Geographic location of the commune of Boukombé

Source : PLACC Boukombé (2015)

- **Socio-demographic data**

The results of the last general population and housing census (RGPH4) indicate the cosmopolitan status and social characteristics of the commune of Boukombé. The commune includes several socio-cultural groups dominated by the Bètammaribè, who constitute the majority group. The enclave nature of the communities in a territory with a steep relief and subject to strong erosion gives them socio-demographic characteristics that are on the fringe of the average characteristics of the Atacora Department (Table 4).

Table 2: Sociological and demographic data

Aspects	Description/Data
Dominant socio-cultural groups	Otammari; Others : Lamba, Gangamba, Bèberibè or Yindé, Djerma, Peulhs, Fon, Adja, Bariba, Dendi, Yoruba, Cotocoli, Tchokossi
Population	82,450 inhabitants, including 41,971 women and 40,479 men
Number of households	13 608
Household size	6.1
Household size at department level	7.2
Population density	86.15 hbt/km2
Growth rate (2002 to 2013)	2,86%
Share of population living in urban areas (RGPH 3)	27.81%
Share of the population aged 0 to 14 years (RGPH 3)	48.14%
Share of the population aged 15 to 59 years	46.15%
Number of agricultural population	52, 306 hbts
Number of agricultural households	9, 412
Human Poverty Index	52.0
Incidence of non-monetary poverty	52.0
Incidence of subsistence poverty	75.5
Multidimensional poverty rate	74.0
Destination of migration flows outside the commune	Within the commune : Village near Togo (Koutayagou and Diboni) Inside Benin: Communes of Kouandé, Kérou, Péhunco, and the départements of Borgou, Donga, Alibori and Collines ; Outside: Togo and Nigeria
	Reasons: Search for fertile land, employment, autonomy; family conflicts, etc.
Origin of migration flows to the commune	Villages close to Togo such as Koutayagou and Diboni, neighboring communes and the departments of Donga, Borgou, Alibori, Collines and Plateau. These migrations sometimes reach neighboring countries such as Nigeria, Togo and Ghana

Source: INSAE, RGPH4 2013

- **Distribution and evolution of the population of the commune of Boukombé**

Households and populations are unevenly distributed among the arrondissements of the Commune of Boukombé. The most populous district (Boukombé district) is home to nearly 29% of the households and 27.15% of the total population of the commune. It is followed by the arrondissements of Manta, Tabota, and Natta. The least populated arrondissement is Koussoucoingou. Women outnumber men in all arrondissements of Boukombé.

Between the third and fourth general population and housing censuses (RGPH3 and RGPH4), Table 5 shows that the population of the Commune increased from 60,568 to 82,450 inhabitants, a growth

rate of 2.57%.

Table 3: Evolution of the population frm 1979 to 2016

Arrondissements	Sup_Km²	Pop_1979	Pop_1992	Pop_2002	Pop_2013	Pop_2016
Boukombé	126	13373	16044	16843	22 386	24613
Dipoli	48	0	5901	5959	9 393	10932
Korontière	93	7770	5883	6826	9 221	10193
Koussoucoingou	207	5144	3859	3589	4 388	4692
Manta	185	7052	10456	10683	13 633	14787
Natta	184	6421	7768	7857	11 239	12663
Tabota	114	7289	8285	8811	12 190	13583
Total	**957**	**47049**	**58196**	**60568**	**82 450**	**91 464**

1.3. Climatic and environmental context of the project areas

1.3.1. Climatic and environmntal context of the Commune of Bopa

- **Climate**

In the NAPA 1 report for the Commune, the rainfall and temperature data used here are respectively for the Commune of Bopa and Cotonou (synoptic station near Bopa), due to the non-existence of temperature data for the Commune of Bopa from ASECNA.

Precipitations and annual rainfall variability

Figure 2 shows the umbrothermal diagram for the commune of Bopa.

According to BAGNOULS and GAUSSEN (1953), a dry month is one in which rainfall is less than twice the average monthly temperature (P<2T). In light of this theory, the figure below shows that the Commune of Bopa is characterized by a subequatorial climate with four seasons:

- a long dry season (from November to March) ;
- a long rainy season (from March to July) ;
- a short dry season (July to August) ;
- a short rainy season (September to November).

The annual rainfall in the commune varies between 54.2mm and 1204.7mm of water. The months of June and September are generally the wettest in the year with respective averages of 173.66mm and 119.01mm of rainfall. From December to March, the continental trade wind (or harmattan) blows, which is a dry and hot wind.

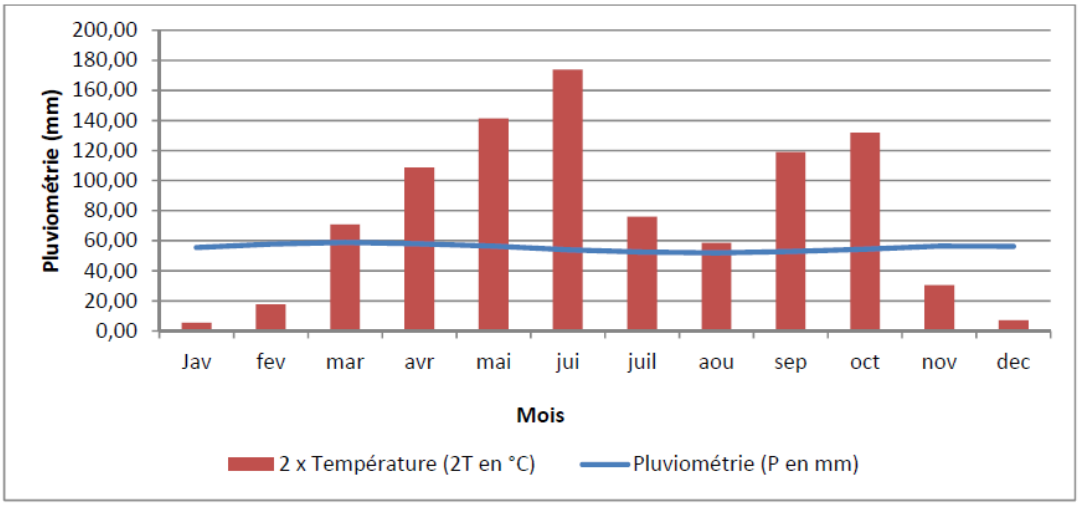


Figure n°1: Umbrothermal Diagram of the commune of Bopa
(ASECNA data, 2015)

The climatic variability of the commune of Bopa was addressed through the analysis of monthly and annual rainfall. Figure No. 3 shows the decadal evolution of monthly rainfall averages in the commune of Bopa. Three ten-year averages were considered in the analysis. These are 1984-1993, 1994-2003 and 2004-2013. The second decade appears to be the wettest with a value of 9381.60 mm of rain. There is a great variability in the distribution of monthly rainfall across the decades of the rainfall series. Indeed, while September is the wettest month of the first decade, during the second and third decades it is respectively June and May that are the wettest. This analysis shows a climatic dysfunction at the commune level likely to have negative impacts on the agriculture and livestock sector.

Furthermore, with regard to the data recorded for the cumulative annual rainfall over the three decades, we also note a variability in the distribution of rainfall from one decade to another. In fact, the cumulative annual rainfall during the second decade recorded an increase of about 17.8% compared to the previous decade. On the other hand, in the third decade, the cumulative rainfall recorded a decrease of about 1.26% compared to the second decade.

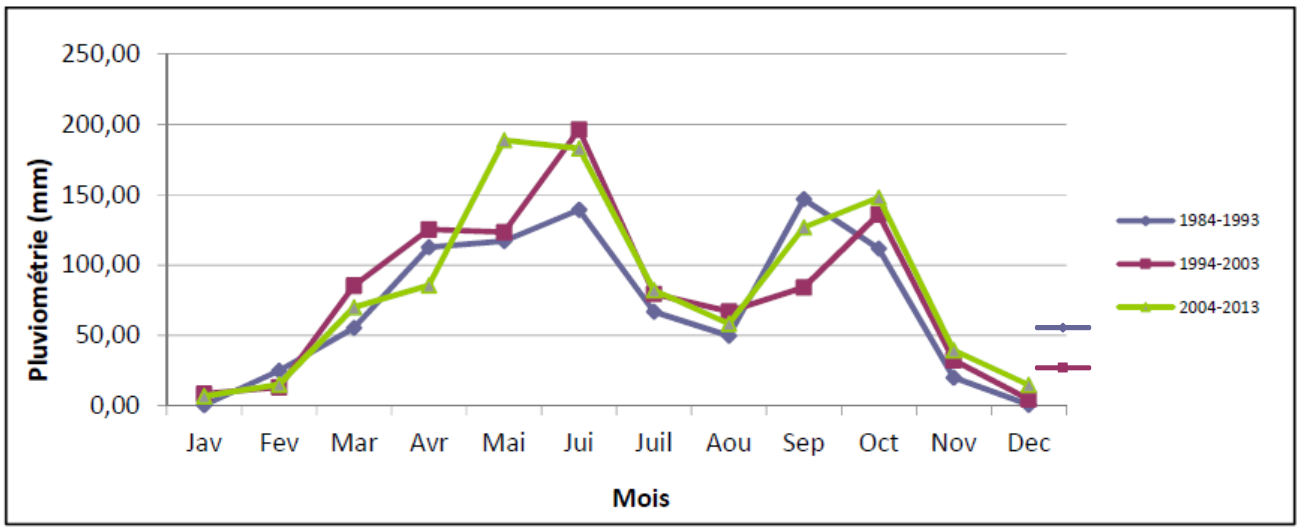


Figure n°2: Ten-year trend in monthly rainfall in the commune of Bopa
(ASECNA data, 2015)

Figure No. 3 shows the evolution of the Rainfall Index in Bopa from 1984 to 2013.

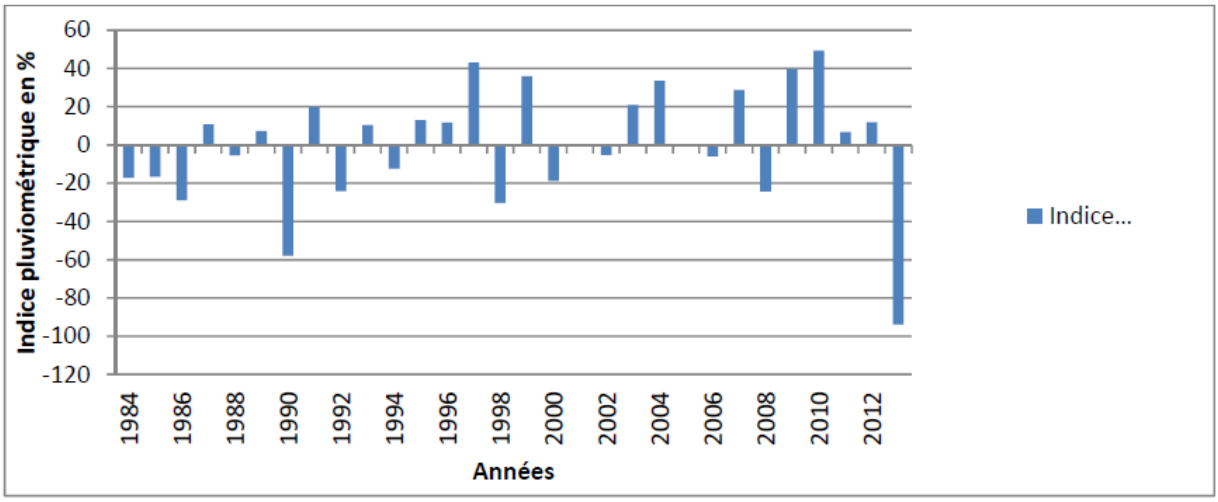


Figure n°3: Rainfall index in Bopa from 1984 to 2013.
(ASECNA data, 2015)

Figures 4 and 5 show that over 30 years of observations (1984 to 2013), rainfall has varied between 54.2 mm and 1324 mm with a high variability and an annual average of 887 mm. In addition, there is an almost regular alternation of wet and dry years; the driest year in the rainfall series considered is 2013 with a deviation of nearly 90% from the average, while the wettest year is 2010 with a deviation of 50% from the average (Figure No. 4).

The large differences between extremes that occur abruptly from year to year indicate the importance of climatic disturbances and justify the disruption of the overall water cycle observed in the commune of Bopa. These analyses attest to the effectiveness of climate change in the commune of Bopa.

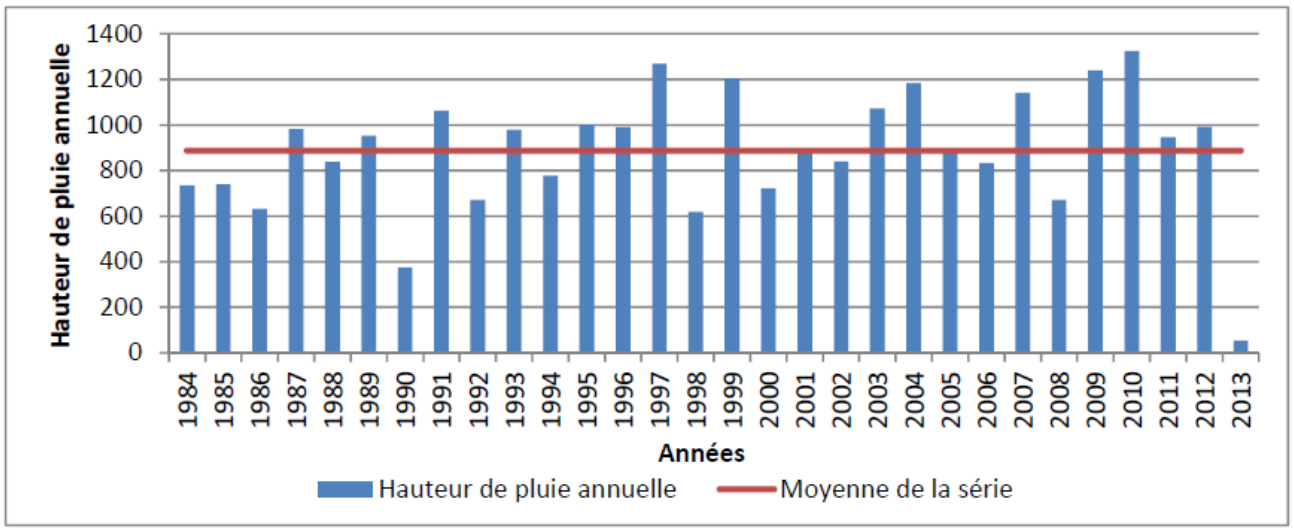


Figure n°4: Histogram of annual rainfall in Bopa
(ASECNA data, 2015)

Figure No. 6 presents the evolution of the rainfall trend from 1984 to 2013 in the commune of Bopa. From the reading of this figure, four critical surplus years against two critical deficit years following the rainfall series. The most critical wet year is that of 2010 with a deviation of 20% from the positive threshold and the most critical dry year is that of 2013 with a deviation of 60% from the negative threshold.

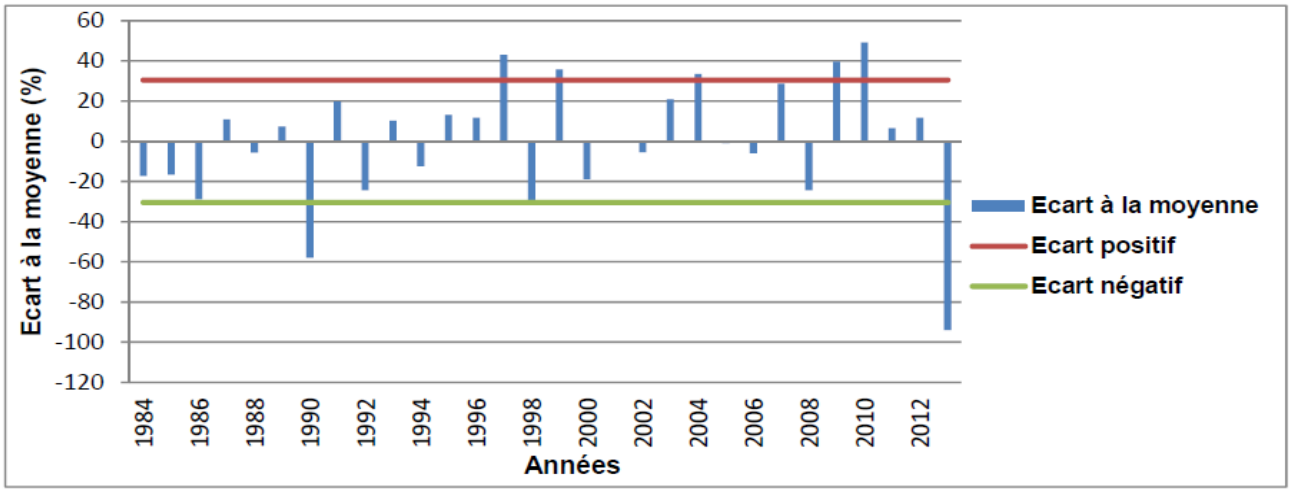


Figure n°5: Deviation from the average monthly rainfall in the commune of Bopa.
(ASECNA data, 2015)

Temperature

The evolution of the average temperature in Cotonou reported on the commune of Bopa from 1984 to 2013 shows a general upward trend (Figure No. 7). The deviations from the normal average temperature recorded each year during the same period are approximately -2.5°C to +2°C and show an upward trend from 1998 to 2013 (Figure 8)

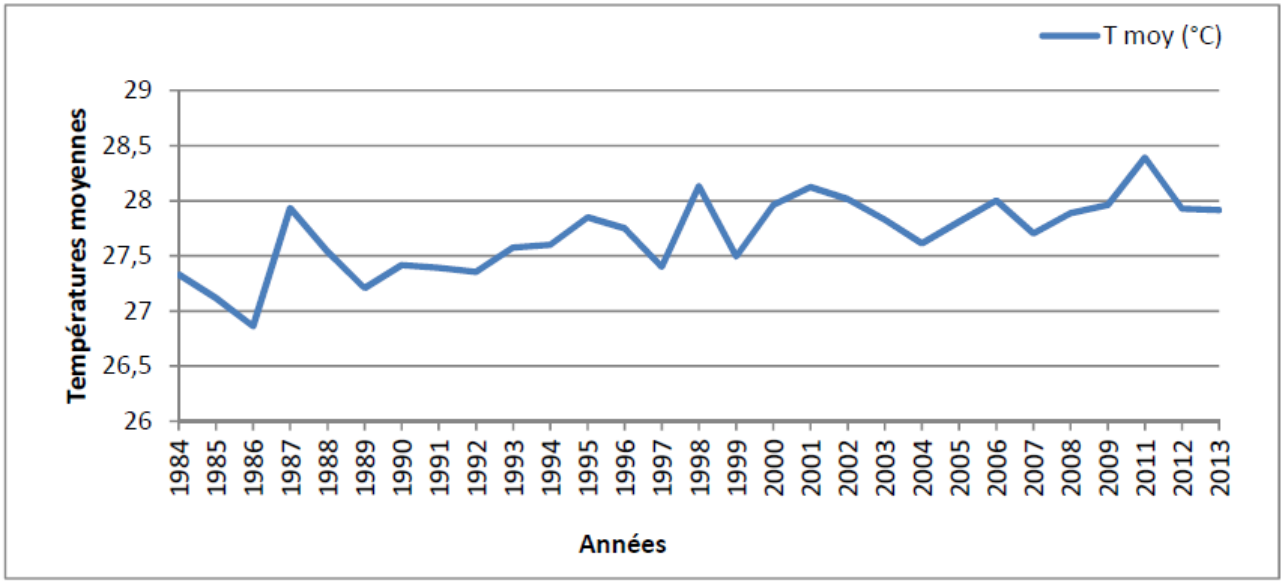


Figure n°6: Evolution of average temperatures in Cotonou
(ASECNA data, 2015)

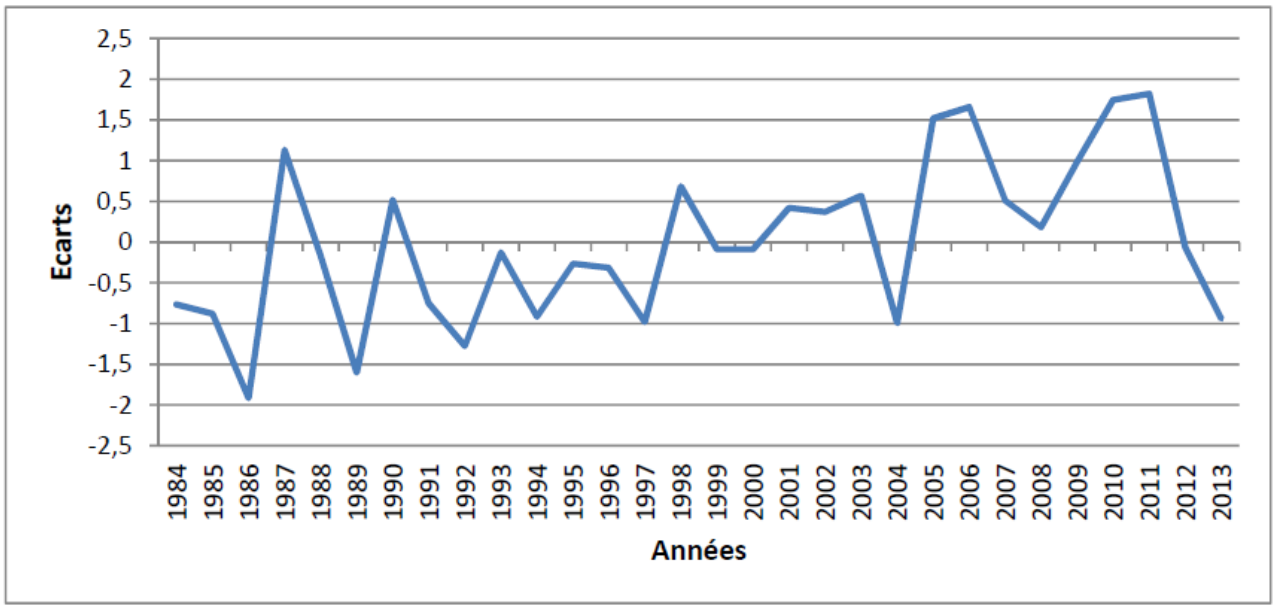
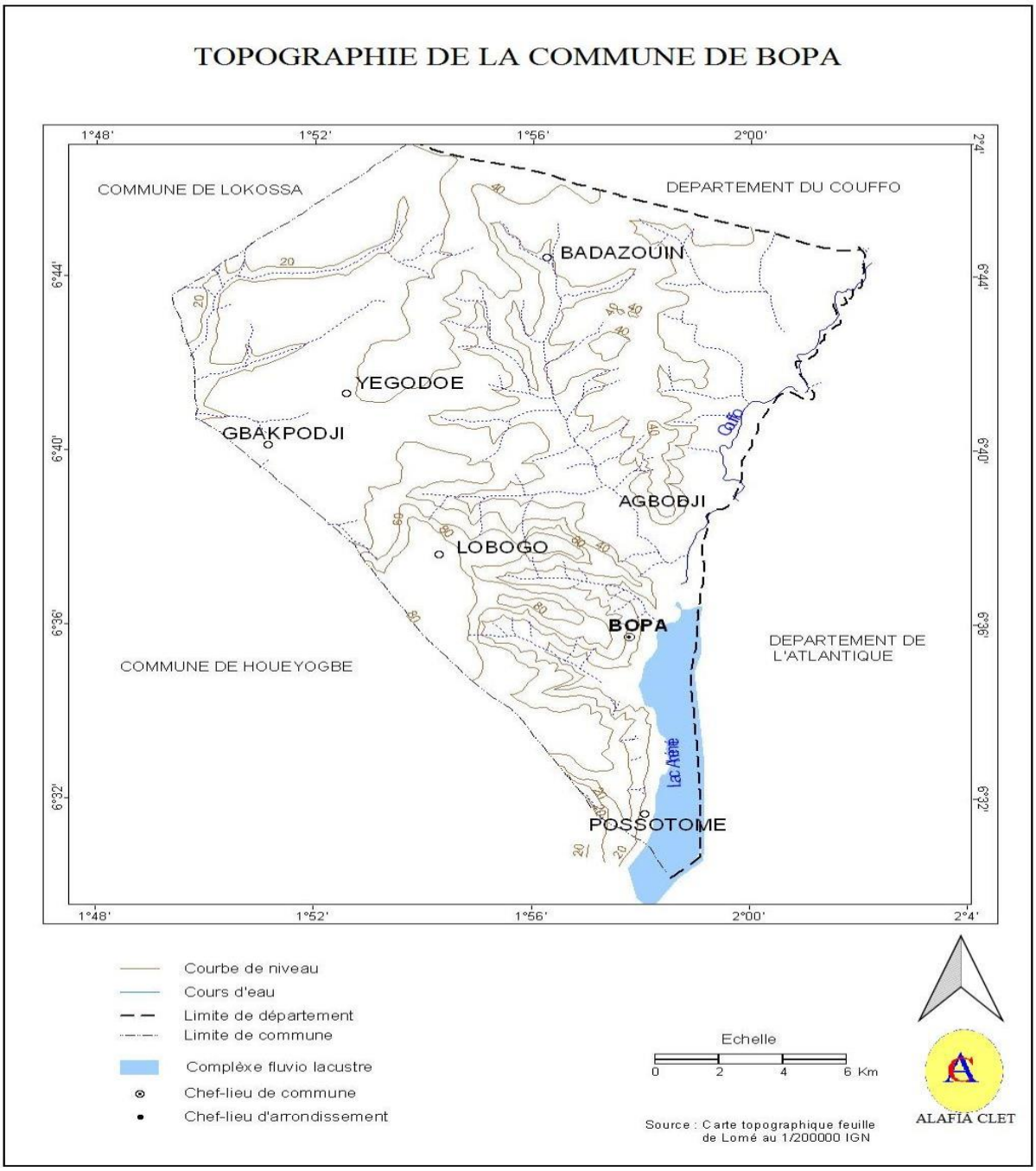


Figure n°7: Interannual variability of the average temperature in Cotonou
(ASECNA data, 2015)

- **Relief**

The Commune of Bopa is built on a moderately uneven relief with an altitude that varies between 0 and 80 meters (map 3). It presents a set of tectonic Shifts consisting of plateaus, depressions and watersheds. The depression zones are mainly observed in the arrondissements of Lobogo and Bopa, and to a lesser extent in the arrondissements of Yègodoé and Badazouin. The Commune is located on two watersheds. A large part of the commune drains to the east towards Couffo and Lake Ahémé and the other part to the west towards Mono.

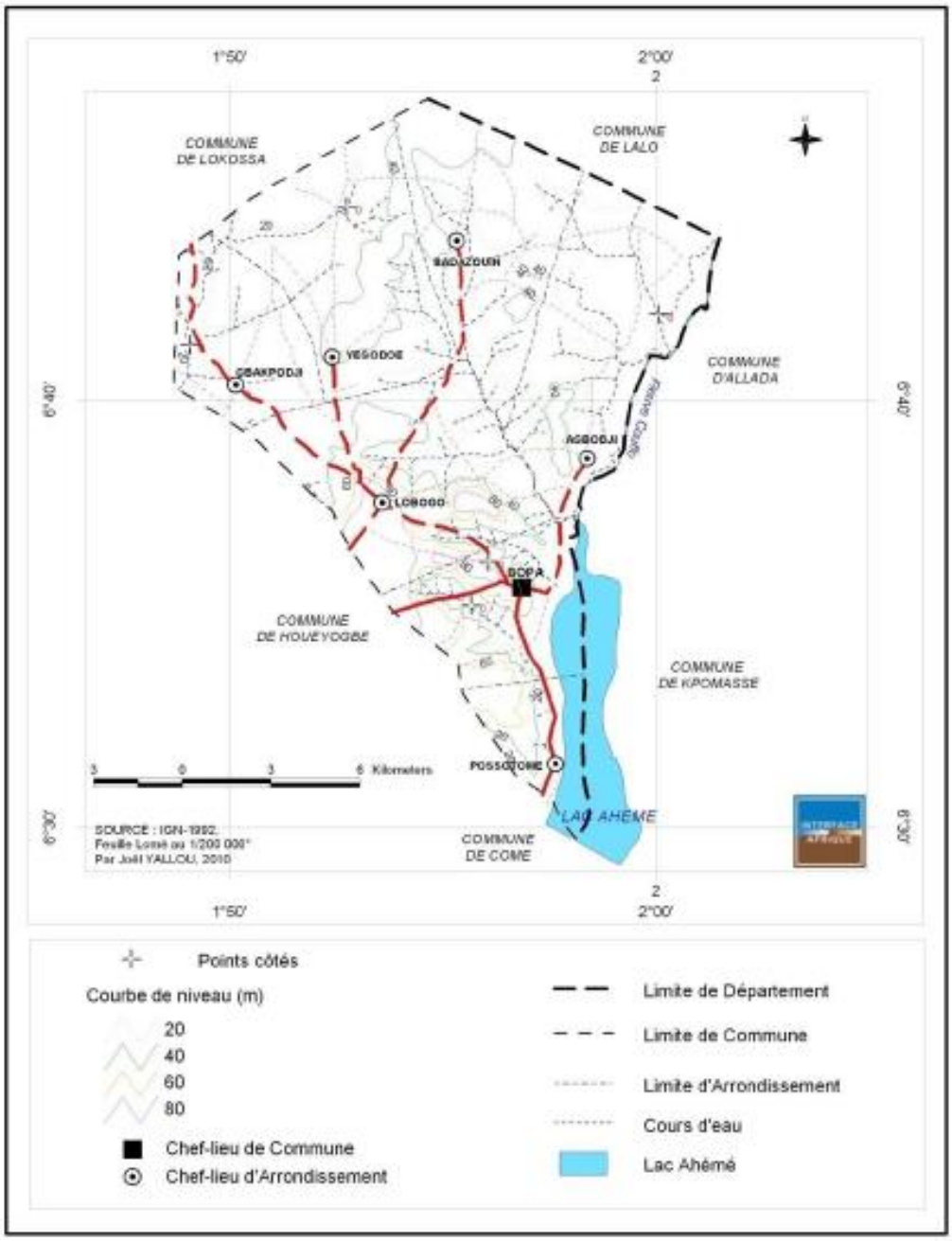


Map 3 : Topographic map of the commune of Bopa

- **Hydrography**

The Commune of Bopa is characterized by a river-lake complex dominated by Lake Ahémé (map 4). This river-lake complex receives the waters of the Couffo River in the northern part of the Commune. In addition to this river-lake complex, there are other watercourses of considerable importance that drain the cultivated areas. It includes:

- ☞ ''Hasso'' at Tanvè in the Arrondissement of Lobogo and ;
- ☞ Kplatoè at Mèdétogbo in the Arrondissement of Agbodji.



Map 4 : Topography and Hydrography of the commune of Bopa
Source : SDAC Bopa

There are also many seasonal water bodies (Sodou, Houantoè, Diko, Hlouinvi, etc.). In addition, there are the wetlands or natural water collectors of Sèhougbato, Houègbo, Hassonou, Agboh, Agbodji, Bolimey, Kpindji (Bopa) and Tohonou. In fact, certain areas such as the arrondissement of Agbodji and part of Badazouin are located in marshy region.

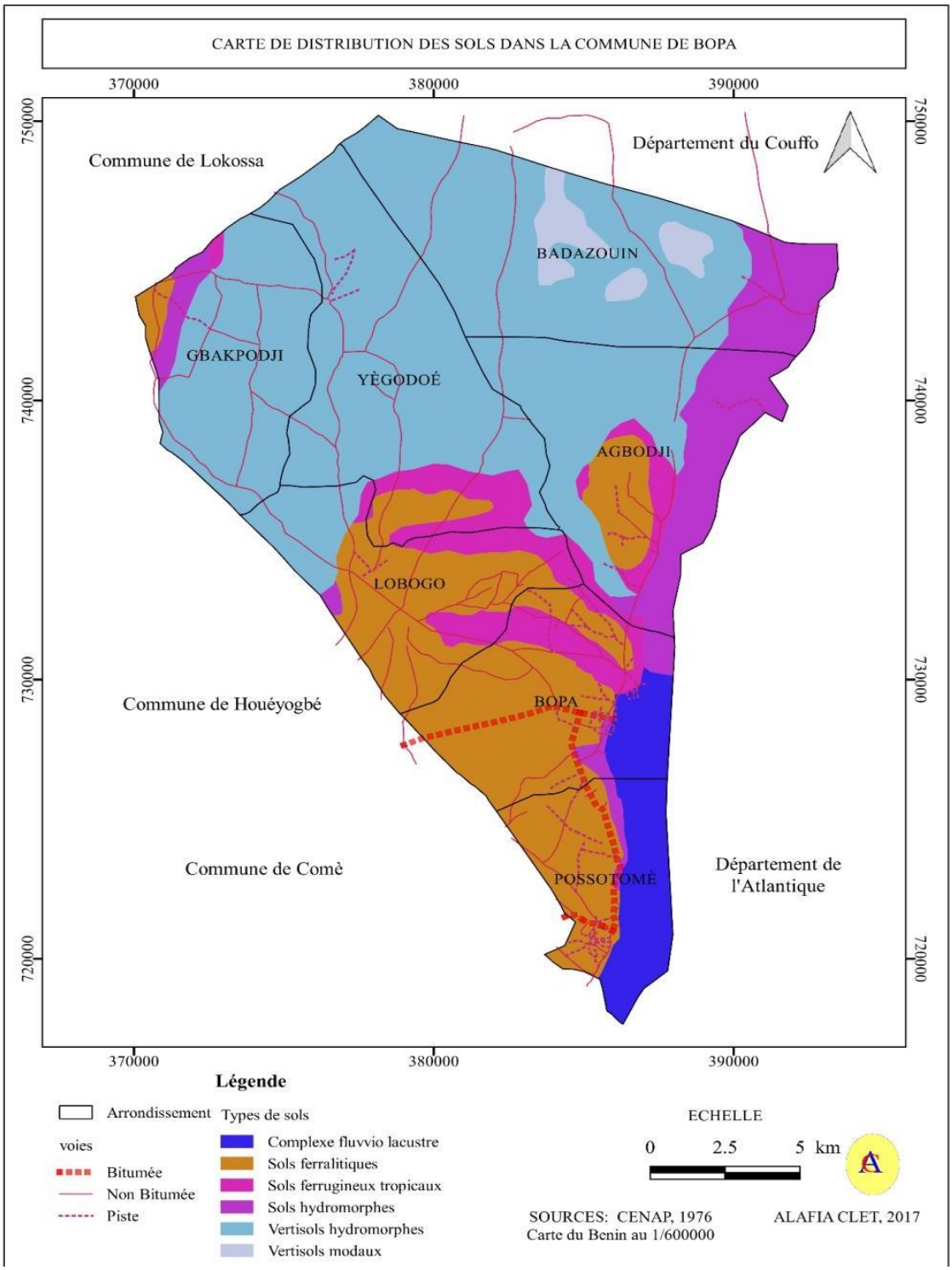
- **Soils**

The Commune of Bopa has a diversity of soils (Map 5) that are favorable to agricultural practices. These different soils can be grouped into three (03) major groups represented on the pedological map (see map 1) of the commune of Bopa. These are:

☞ **Vertisol-hydromorphic or black earth.** These are clay soils with a poor physical structure. These black soils cover more than half of the total area of the commune, i.e., 20,106 ha, or 55%. They cover the arrondissements of Badazouin, Yègodoé, Gbakpodji, Agbodji and part of

Lobogo ;

- **Ferralitic soils or bar soils on loose sediment:** This type of soil covers more than 20% of the total area of the commune, i.e. 8267 ha. It is located in the arrondissements of Possotomè, Bopa and the southern part of Lobogo ;
- **Hydromorphic soils**: This type of soil is made up of wetland areas (valleys and basins) and covers part of the arrondissements of Bopa, Possotomè and Agbodji. These are sandy-clay soils covering more than 10% of the total area of the commune. These soils exist in three different natures, namely: moderately organic and humid in Gley, mineral or slightly humid in deep Gley and mineral or slightly humid in pseudo-Gley.



Map 5 : Soil map

- **Flora and fauna**

The biological framework covers the fauna and flora resources of the Commune. Bopa has very few fauna resources due to the degradation of the forest ecosystems that constitute their habitats. There are rodents (hares, aulacodes, rats, squirrels), mammals (hippopotamuses, antelopes, monkeys, etc.), reptiles (monitor lizards, pythons, snakes, etc.),; avian fauna (terns, cormorants, weaverbirds, sparrowhawks, kingfishers and grey herons);

amphibians (toads and frogs), crabs, fish (tilapia and various fish). In terms of flora, the vegetation cover is dominated by mosaics of crops and fallow land that may be under oil palm trees on approximately 22,418 ha, or 61.42% of the territory of the commune of Bopa. Forest and fruit plantations also play an important role in the land use of the commune with about 9,688 ha, including many small private plantations of *Acacia auriculiformis, Eucalyptus camaldulensis, Terminalia sp, Tectona grandis (teak), Khaya senegalensis (cauliflower), and Mangifera indica (*mango tree*).*

Some natural humid or semi-humid forests remain as relics of sacred forests, including those of Zoungbo-mission and Agbodji centre, both in Gbedècomè in Lobogo and Sèhomi in the arrondissement of Possotomè. The species found there are *Adansonia digitata (*baobab*), Ceiba pentandra (*cheese tree or kapok tree*), Milicia excelsa (*iroko*), Triplochyton scleroxylon (*samba*), Antiaris toxicaria*.

We note the presence of swamps along the shores of Lake Ahémé where the aquatic vegetation consists of *Rhizophora racemosa* (red mangrove), *Avicennia africana* (white mangrove) and *Acrosticum aureum* (mangrove fern). In addition to the marshy grasslands and mangroves, the low vegetation consists mainly of grasses (Panicum maximum), Cyperus sp, Imperata cylindrica.

1.3.2. Climatic and enironmental context of the Commune of Boukombé

- **Climate**

The climate of Boukombé is tropical Sudanian with two seasons: the rainy season (April to October), dominated by monsoon flows, and the dry season (November to March), marked during the early months by the harmattan.

Precipitations and annual rainfall variability

The average annual rainfall during the standard climatological period 1981-2010 is 1053.6 mm. August and September are the wettest months (more than 40% of annual rainfall) and March and April are the hottest months.

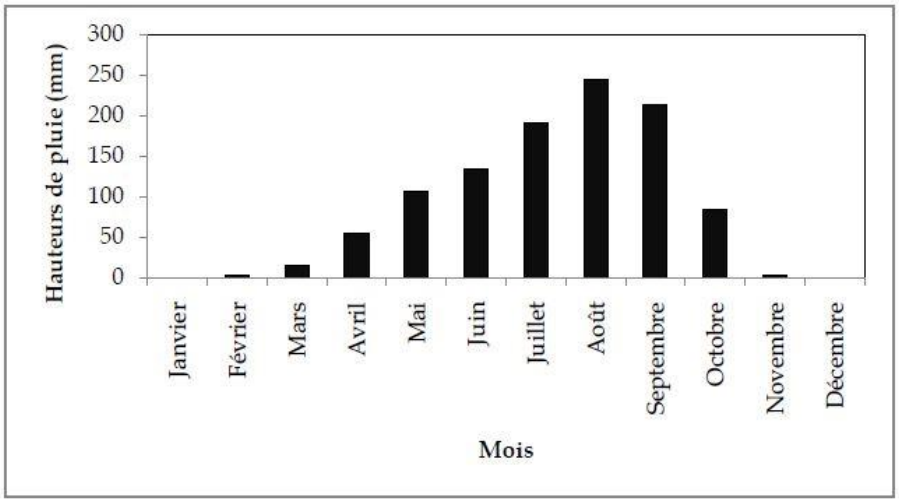


Figure 8: Rainfall pattern in the Commune of Boukombé (1981-2010).
(ASECNA data, 2015)

A significant variability of annual rainfall has been observed in recent decades in the region, the rainfall indices reflect the instability in the rainfall supply (Figure 9).

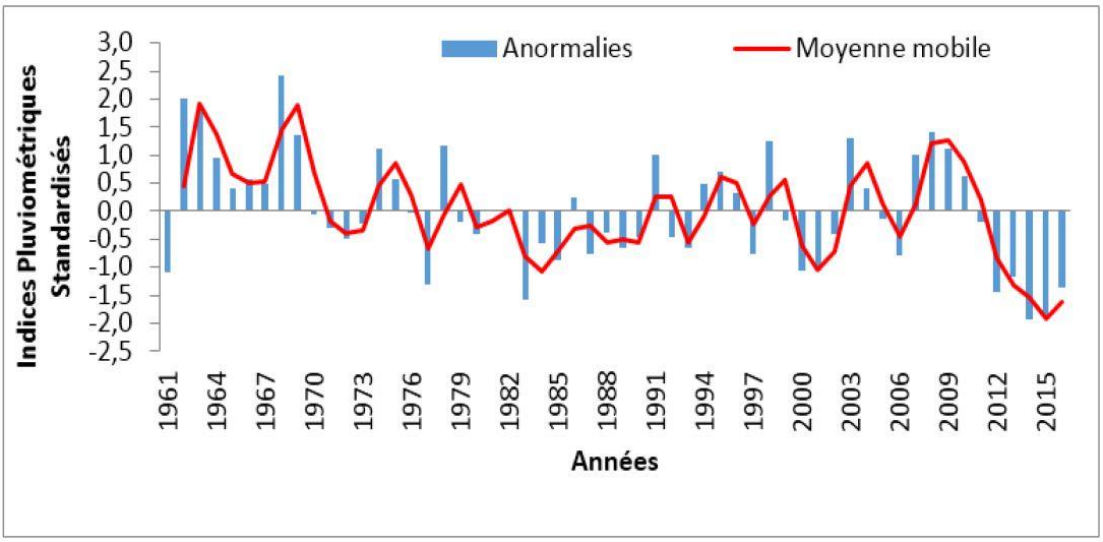


Figure 9 : Rainfall indices for the 1961-2016 period in the Boukombé-Natitingou region.

Source : Agbanou,*et al*. (2018)[7]

The positive and negative anomalies reflect rainfall surpluses and deficits respectively. Figure 9 shows the variability of rainfall indices over the period 1981-2016 over two main periods. The period from 1961 to 1970 is characterized by positive anomalies, which reflects a generally wet period. On the other hand, the period 1970 -2016 is characterized by globally negative anomalies (globally dry period). This finding suggests that the region has entered a period of climatic dryness that could create survival problems for populations.

Temperature

The average annual temperature is 28°C while relative humidity varies from 27.1% to 82.8% (Wala and Sinsin, 2010).

The annual average temperatures of the Natitingou synoptic station, which is representative of the region, show an increasing trend of slope 0.02 between 1961 and 2015 (Figure 9). The analysis of the evolution of the decennial averages over the same period shows after each decade, an increase in temperature ranging from 0.10°C to 0.61°C. In particular, the decade 2001 - 2010 was warmer in the region with temperature averages equal to 27.64°C against an average of 27.32°C for the previous decade, an increase of 0.32°C.

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[7]Thierry Agbanou, Djafarou Abdoulaye, Guimmongui Abib Sabi Orou Bogo, Martin Paegelow, Brice Tente. Rainfall variability and its impact on vegetation cover in the Natitingou Boukombé sector in northwestern Benin. Afrique Science, 2018, 14 (3), pp.182 - 191. ffhal-02001707f

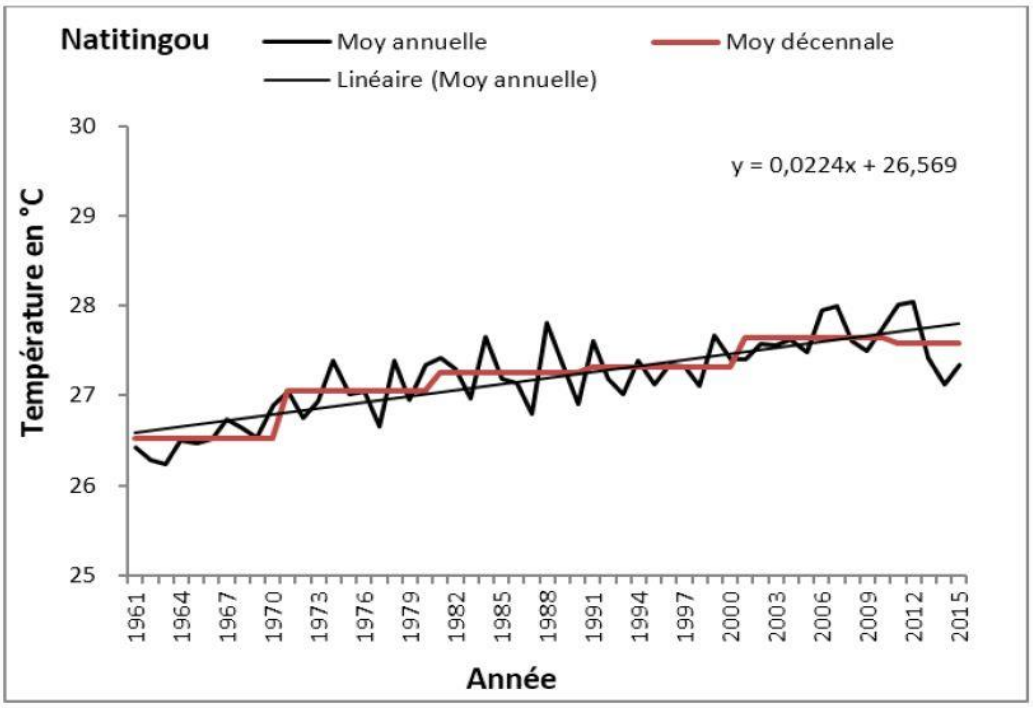

Figure 10: Annual and decadal variation of the average temperature in Natitingou

Source : Ouorou Yerima *et al.* (2020)[8]

- **Relief and hydrography**

The commune of Boukombé is difficult to access because of its **relief** and orography, which are the cause of its isolation and the strong erosion of the land. The steep relief is due to the Atacora chain, which is oriented north-south with the last link of the Atacora chain to the east (Figure 11).

The hydrographic network. The hydrographic network is composed of rivers and water bodies, the most important of which are located in the districts of Manta, Koussoucoingou, Natta and Tabota. The main rivers are the Koumagou, Kouniti, Perma and Yarpao, and there are 22 springs and a few ponds in the arrondissements of Boukombé, Korontière, Manta and Dipoli. Agricultural activities are developed around these ponds.

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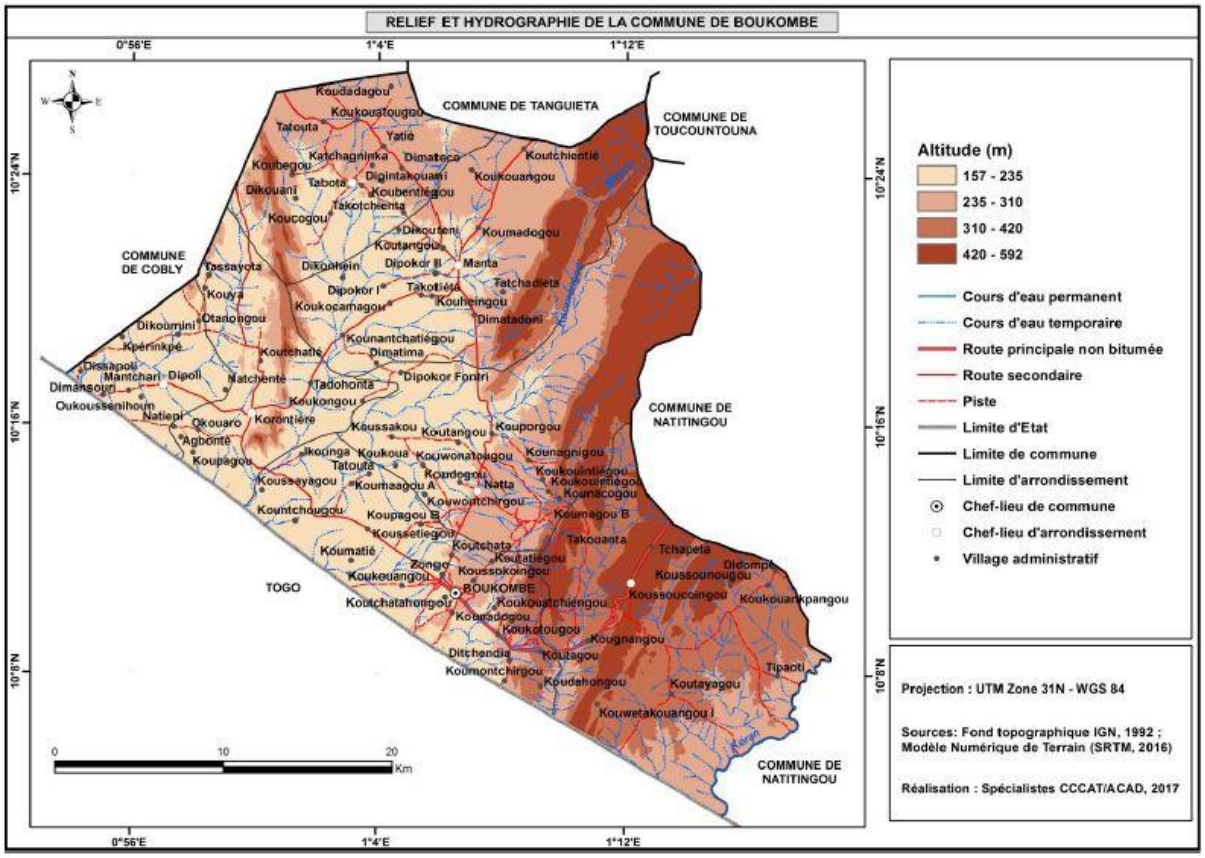
[8]Léa Guèguè OUOROU YERIMA, Gyslain HOUNTO, Isidore YOLOU, Ibouraïma YABI and Fulgence AFOUDA (2020). Climatic variability and agricultural production in agro-ecological zone III in northern Benin. AfriqueSCIENCE 16(2) (2020) 76 – 85



Map 3 : Relief and hydrography of the commune

- **Soils and vegetation**

The soil types most commonly encountered in the Commune of Boukombé are leached tropical ferruginous soils, characterized by a low organic matter content, a sandy texture, and a structure that is particulate and susceptible to erosion. Hydromorphic soils are also found in the Wetlands, with good fertility potential. Large Wetlands exist in the western zone (Korontière, Ouest Manta, Ouest Tabota). There are many small Wetlands that are used for rice cultivation.

Despite the constraints associated with their use, the soils of the commune are used for the production of cotton, cereals (corn, sorghum, small millet, and fonio), and grain legumes. Thus, voandzou and groundnuts are grown in the Koussoucoingou arrondissement, cowpeas in several localities, roots and tubers, notably sweet potatoes, potatoes, taro and yams in Koukongou, and cassava in Koutchatié in Korontière. The schist soils are particularly favorable for fonio production in the Manta arrondissement. There has been a decline in soil fertility and a reduction in food production.

The vegetation of the Commune is dominated by clear and wooded savannahs. The Sahelian landscape has already taken root. *Adansonia digitata* (baobab), *Borassus aethiopum* (palmyra Palm), *Parkia biglobosa* (African locust bean), *Vittelaria paradoxa* (shea tree), *Diospyros mespiliformis*, *Ceiba pentandra* (kapok tree), *Blighia sapida* (false mahogany) and *Tamarindus indica* (tamarind tree) are the most common woody species. Around the settlements, there are physical signs of deforestation due to heavy agricultural encroachment. The fauna is characterized by the rarity of animal species. The wildlife population consists of deer, agouti, rabbit, rat, partridge, wild guinea fowl, etc.

Human activities are profoundly modifying the Commune's landscape (Table 6). The land use units have changed significantly in 20 years (between 1995 and 2015): the areas of open forest and wooded savannah and forest galleries have declined by 17% and 25% respectively, to the benefit of fields and fallows, plantations, and settlements, whose areas have increased by 4.7%, 18%, and 115% respectively during the same

period...

Table 4: Synthèse des superficies des unités d'occupation du sol de 1995 et 2015

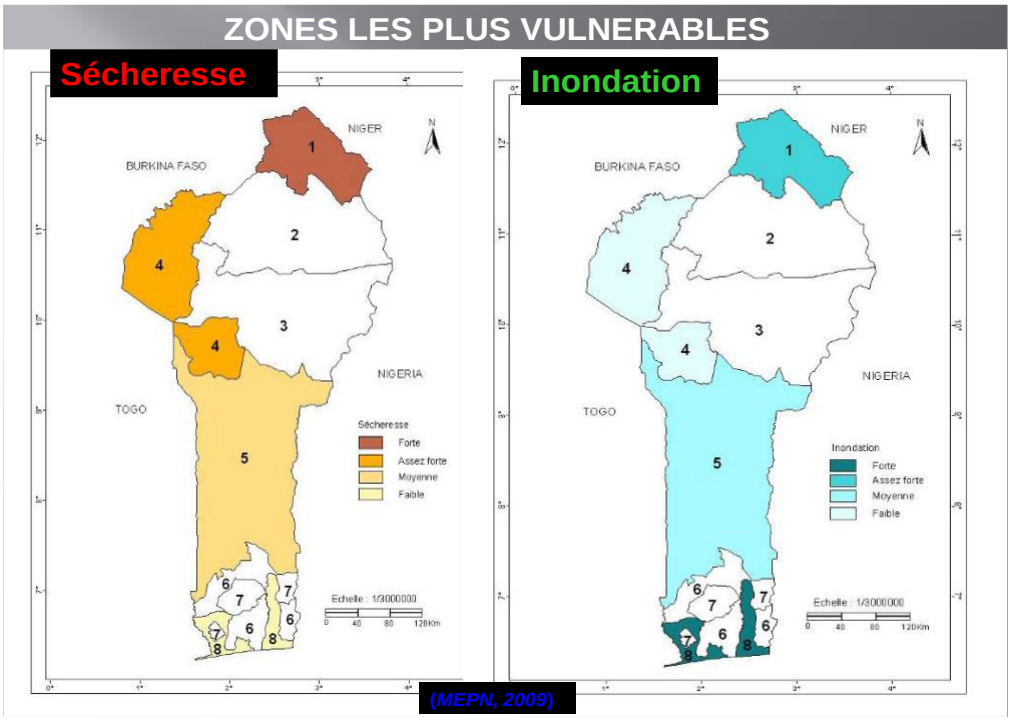
Land use units	1995		2015		Evolution 1995-2015 (%)
	S (Km²)	P (%)	S (Km²)	P (%)	
Gallery forest	10.99	1.12	8.23	0.84	-25.1
Open forest and wooded savanna	117.20	11.92	97.04	9.87	-17.2
Saxicolous savanna	84.64	8.60	89.63	9.11	5.9
Wooded and shrubby savannah	460.11	46.78	454.51	46.21	-1.2
Plantation	0.54	0.05	0.64	0.07	18.5
Field and fallow mosaic	301.37	30.64	315.49	32.07	4.7
Rock outcrop	0.67	0.07	0.67	0.07	0
Settlement	8.09	0.82	17.38	1.77	114.9
Total	**983.60**	**100**	**983.60**	**100**	

1.4. . – Vulnerability of the project areas

Benin is potentially vulnerable to environmental and climatic crises, the damage of which is perceptible in all environmental and social components of the country. The work carried out as part of the joint assessment of vulnerability to climate change in the most vulnerable geographical areas of Benin (PANA, 2008) has established the following results:

- Drought, floods and late and heavy rains constitute three major climate risks in Benin;
- Violent winds and excessive heat are also two climatic risks that can be very important in certain localities, in certain situations.

Furthermore, Benin is divided into eight agro-ecological zones based on climatic and agro-pedological parameters, cropping systems, population density, plant cover and certain constraints. The four most vulnerable agro-ecological zones have received special attention under the PANA1 project. These include agro-ecological zones 1 (extreme north of Benin), 4 (North Donga West-Atacora zone), 5 (Central cotton zone) and 8 (fisheries zone). The location of these zones is shown on Map 6 below:



Map 6 : Level of exposure to drought and flood risks in the most vulnerable agro-ecological zones of Benin

It should be noted that the NAPA1 project interventions covered 9 villages in the 9 targeted communes. Many other communes and villages in these four most vulnerable agro-ecological zones have not been able to benefit from these actions. While flooding is the primary risk in the south (agro-ecological zone 8), drought remains very pronounced in the north (agro-ecological zones 1 and 4). According to projections to 2025, all three agricultural sub-sectors (crop, livestock and fisheries production) are vulnerable to climate change, but to varying degrees. Therefore, the following options could help the communities concerned to better adapt:

- Establishment of an early warning and disaster management system,
- development of crop and livestock production systems adapted to climate change
- water management in agricultural systems,
- promotion of aquaculture in fisheries areas[9].

In addition, studies conducted as part of Benin's preparation for access to the Green Climate Fund show that in Benin (PPB-FVC, 2017), according to rainfall projections, in the southern region of Benin (at latitudes below 7.5°N), there could be practically unchanging annual rainfall up to the year 2100, compared to the reference period (1971 - 2000). North of this latitude, a slight increase would be observed, up to 13% and 15% in 2100, respectively in the northwest and northeast. On a monthly scale, a decrease in rainfall could reach 21% by 2100 in the month of April in the south of the country. As for the North, the projections did not indicate a precise trend on a monthly scale. The temperature projections for Benin indicate an increase in all regions by 2100. The highest temperature increase would be 3.27°C, compared to the reference period 1971 - 2000, while the lowest value would be 2.6°C in the southwestern part. This trend is likely to result in a water deficit under certain conditions, as the increase in temperature generally leads to an increase in potential evapotranspiration (PET).

1.4.1. Justification for the choice of localities to host the project

The programs developed by Caritas Benin for the benefit of vulnerable populations in certain vulnerable communes are struggling to lift the beneficiaries out of their precariousness because of the severity of the effects of climate change. The present project has therefore identified agro-ecological zones 4 and 8, mainly the communes of Boukombé and Bopa.

Stakeholder and community consultation missions were organized in the arrondissements of Manta and Natta in the commune of Boukombé and in the arrondissements of Badazoui and Yègodoé in the commune of Bopa, in order to better understand the causes, manifestations and effects of climate change on community livelihoods.

Several reasons determined the choice of these arrondissements. First, the two targeted communes are part of Caritas Benin's focus areas where community resilience to climate change projects had been or are being implemented, without having covered the selected villages and arrondissements.

From a demographic point of view, these arrondissements are among the most populated rural arrondissements of the concerned communes (Manta 13,633 inhabitants, Natta 11,239 inhabitants, Badazoui 16,163 inhabitants, Yègodoé 15,237 inhabitants) and have more women than men.
Moreover, agriculture is the dominant economic activity in these localities and is the main source of wealth creation. It employs about 85% of the active population

[9]Second national communication of the republic of Benin on climate change, june 2011

(Boukombé) and 99.5% of the agricultural households that work in the vegetable sub-sector. In the specific case of Bopa, the two selected arrondissements are all located in the black soil zone, which is very favorable to agriculture, but due to the negative effects of climate change, a decline in agricultural yields has been noted. In the commune of Boukombé, the food production situation remains unsatisfactory.

- **Climate and environmental risks and their impacts in the commune of Bopa**

The manifestations of climate change, for most populations, are expressed differently and are not the same depending on the environment. In Bopa, the main climatic risks are flooding, pockets of drought, and violent winds.
The effects of these risks are felt in the agricultural, livestock, fishing and agri-food processing sectors. The impacts are manifested by losses in yield and financial profitability, high mortality in the various types of livestock, the gradual disappearance of certain activities, and difficulties in carrying out certain activities such as processing.

In order to cope with the effects of climate change, the populations have developed a number of adaptation strategies:

- The modification of sowing periods (earlier than expected or later) ;
- The conversion to other crops such as rice in areas that are generally flooded, such as Agbodji, and soybeans, whose plants are resistant to flooding as long as they are not completely submerged.
- The use of indicators such as the flight of the hawk or the leafing out of the iroko to identify the right time for harvesting or sowing, with an accuracy that seems to diminish with time ;
- The installation of crops according to toposequences;
- The use of improved varieties. The use of improved varieties, particularly maize seed.
- Conversion to other activities such as trade and resale..

The table of climatic risks identified by arrondissement and the table of the vulnerability matrix (Tables 7 and 8) are presented below

Table 5: Climate risks identified by arrondissement of Bopa

Sector	Identified climate hazards			
	hazard 1	**hazard 2**	**hazard 3**	**hazard 4**
Badazouin	Intense rain/ Flooding	Late rain/ Drought pocket	Excessive heat/ Heat wave	Strong winds/ Increase in frequency and severity of strong winds
Yègodoé	Intense rain/ Flooding	Late rain/ Drought pocket	Excessive heat/ Heat wave	Strong winds/ Increase in frequency and severity of strong winds

Source : Field surveys, March 2021

Table 6 : Vulnerability matrix in the commune of Bopa

<table>
<tr><th>Target climate variable Variable</th><th>Hazard</th><th>Sensitivity element</th><th>Impacts</th></tr>
<tr><td rowspan="4">Intense rainfall</td><td rowspan="4">Increase in the frequency of floods, which occur mainly from April onwards (for the last ten years almost every year, compared to a return period of 3 years over the last 3 decades)</td><td colspan="2">Crop production (priority crops: maize, soya, beans, selected palms) other crops: sugar cane, tomatoes
and
Processing activities of cassava into gari, maize into flour and patties, oil palm into palm oil, soap and liquor (sodabi), soybean into milk and cheese etc.</td></tr>
<tr><td>• Hydro-morphic soils (67% of the soils of the commune)
• Position of farms (e.g. in depressions)
• Soil waterlogging due to excess water from artesian wells
• Delay in the availability of improved seeds (in the case of corn)
• Absence of seed producers in the commune</td><td>• Crop destruction estimated at 75% on average
• Maize: destruction of fields and loss of about 100% in case of flooding (300,000 to 600,000 F for good years against 0 for bad years)
• Soybeans: destruction of soybean fields and 100% loss when intense rains occur at harvest time;
• Crop destruction Loss assessment has increased to the range of 40%-100% loss 30 years ago, to 60%-100% loss (for almost 10 years) for crops such as corn.
• Limited availability of soybean raw material for cheese and milk processing.
• Low availability of raw materials from agricultural production (maize, cassava, soybean, oil palm) for processing activities
• Amplifies food insecurity</td></tr>
<tr><td colspan="2">Animal production (poultry, rabbits, goats and pigs, bees)</td></tr>
<tr><td></td><td>• Increased prevalence of avian diseases;
• Increased mortality
• Restricted mobility and increased stress
• Low availability of feed due to destruction of production by floods and for feed production
• Limited availability of cassava processing residues for pig feed due to low yields in cassava fields
• Low availability of feed due to flooding and feed production
• Increased production costs due to the purchase of feed for mixed breed pigs
• proliferation of pathogens leading to the death of livestock
• Mortality rates (poultry and goats) and epidemics
• Proliferation of harmful germs
• High mortality between 50%-100%.</td></tr>
</table>

Target climate variable Variable	Hazard	Sensitivity element	Impacts
	Increased intense runoff	Increased intense runoff	
		• Filling of the watercourse with sediments and branches of acadja • Destruction of mangrove plantations • Use of prohibited fishing gear	• Decrease in the depth of Lake Ahémé due to silting • Destruction of spawning areas • Decrease in fish catch estimated at 66 to 75% (for the last fifteen years, a night of fishing has brought in 200 to 1000 FCFA compared to 3000-4000 FCFA in the 1980s)
Late rains (about thirty years ago, the first rains came in February; for the last ten years or so, even at the end of March, no rain has fallen) + (in the past, maize was sown around February 15 and harvested in April; nowadays, even at the end of March, sowing has not yet been done) / Random modification of the rainy season	Augmentation de la longueur des poches de sècheresses (désormais de 2 à 4 semaines) / Modification aléatoire de la saison des pluies	Crop production (priority crops: maize, soybean, bean, selected palm) other crops: sugar cane, tomato, etc.	
		The endogenous methods of seasonal forecasting no longer make it possible to predict the seasons (this is the case, for example, of the "Gangan" and "Holih" birds that announce the beginning and end of the rains, which 30 years ago enabled farmers to know when to sow and harvest. Similarly, despite the sacrifices to deities that in the past helped to attract the rains are no longer effective	• Random modification of the agricultural calendar • Increased water stress of crops • Even the rice crop (April to June) adopted because of the intense rains in April is affected by pockets of drought • Proliferation of invasive plants ("azuimanh" in local language) that affect the corn crop • Decrease in crop productivity
Temperature	Temperature Increased frequency and severity of excessive heat (heat wave)	Crop production (corn, rice, soybeans, etc.)	
			• Increased frequency of crop watering • Decreased productivity of off-season crops estimated at 40%.
		Animal production (poultry, goats and pigs, fry)	
			• High mortality after farrowing (rabbit and poultry) • Goat mortality estimated at 70%. • Increased stress in pigs and rabbits • High mortality of pigs • Decreased productivity of fish species
Strong winds	Strong winds/ Increased frequency and severity of strong winds	Crop production	
		• Slash-and-burn farming • Driven hunt • Straw roofing of houses	• Increased fire frequency • Destruction of homes and harvested products

Source : Field survey data, March 2021

These data from the field survey are supported by the results established by the PANA 1 project in its vulnerability assessment report in the commune of Bopa.

- **Climatic and environmental risks and their impacts in the commune of Boukombé**

The main climatic risks facing the commune of Boukombé are drought, rising temperatures, and high winds. In addition to these risks, there is the delay of rains, their sudden arrival, and their abrupt cessation.

These risks have an impact on certain sectors of activity in the commune, such as agriculture, livestock, fishing and food processing.

As in the commune of Bopa, climate change has impacts on the various indicators used to monitor the different activities of these sectors:

- Loss of financial profitability ;
- Loss of yield ;
- High mortality in the different types of livestock;
- Progressive disappearance of certain activities;
- Difficulty in carrying out certain activities such as processing ;
- Progressive and accelerated drying up of water resources ;
- Progressive evolution of famine.

Faced with these difficulties, the populations have developed some adaptation strategies, including:

- The adoption of improved seeds such as maize (EVTT 90, EVTT 97, SYNEE 2000) ;
- the conversion to the production of drought-resistant crops such as fonio;
- the creation of market gardening wells reinforced by the AMSANA project:
- The long-distance route in search of water:
- the construction of bunds for irrigated crops such as rice;
- Composting;
- Improved water management techniques for livestock ;
- the use of bark in livestock rations to deal with certain diseases ;

The table below shows the climatic risks identified by arrondissement and the vulnerability matrix (tables 9 and 10).

Tableau 7: Risques identifiés par arrondissement

Sector	Identified climate hazards			
	hazard 1	**hazard 2**	**hazard 3**	**hazard 4**
Manta	Rarity of rain/drought	Late rain/drought pocket	Excessive heat/heat wave	Strong winds/ Increased frequency and severity of strong winds
Natta	Rareté des pluies/sècheresse	Late rain/drought pocket	Excessive heat/heat wave	Strong winds/ Increased frequency and severity of strong winds

Source : Field survey data, March 2021

Table 8: Vulnérability matrix in the Commune of Boukombé

Target climate variable	Hazard	Sensitivity element	Impacts
Rarity of rainfall	Seasonal drought (The rain disappears when the need is greater) Delay in the onset of rains, scarcity and randomness of rains with the feeling that farmers no longer know when to plant)	On water resources	
			• Compared to the 1980s, the disappearance of several streams / lowering of the water table, which near the rivers was flush (about 1 m from the ground) and which has dropped to about 60 m nowadays • Partial filling and rapid drying up of dams (e.g. Dipoko-Fontri dam) • Lowering of the static groundwater level • Water fetching made more difficult for women who have to wake up earlier and walk a longer distance to fetch water (nowadays they walk 4 times the distance they used to) • Very low water availability and poor water quality (unclean water) for domestic and socio-economic uses (school canteens) • low water availability for domestic and socio-economic uses
		On crop production Priority crops in Manta: corn, fonio, sorghum, rice, market gardening) Priority crops in Natta: sorghum, maize, fonio, soybean, market gardening and processing	
			• Decrease in the production of sorghum whose robust stems are used to fence the market gardening farms against the cattle l • The sowing of fonio, which used to be done in April (because of the first rains), is now done in June (and by "chance") • Proliferation of worms and invasive plants (striga) that affect crops • Decrease in maize production estimated at 50 to 100%. (0 to 3 bags/0.25 ha nowadays against 6 bags/0.25 ha before). • Decline in soybean production estimated at 50 to 90% (1 to 5 bags/ha compared to 8 bags/ha previously) • Low availability of resources for compost production and manufacturing • Limited availability of water resources for watering vegetable crops • Complete cessation of market gardening activities since 2016, whereas 10 years ago market gardening was practiced normally (in the arrondissement in particular) • Low availability of raw materials (fonio, rice, cassava) for processing activities • Decline in fonio processing capacity, estimated at 66.6% (when there is water, 6 bags are processed satisfactorily; when there is not enough water, as has been the case in recent years, only 2 bags are processed, and this is with an unsatisfactory cleanliness rate)
		On animal production (e.g. poultry, goats, cattle)	
			• Limited availability of water resources for livestock watering • Scarcity of fodder causes difficulties in feeding livestock • Difficulty in feeding and watering leads to a gradual loss of interest in livestock production • Conflicts of use due to the fact that people and herders share the land (DICON1) • Increased mortality rate • Decrease in the laying capacity of guinea fowl (which represent 75% of the poultry raised and poultry occupies 80% of the farm) due to poor watering • Conflicts of use due to the fact that people and breeders share the same source • Increase in guinea fowl mortality (estimated at 80-100%)

Target climate variable	Hazard	Sensitivity element	Impacts
		On fisheries production	
		Use of pesticides leached by runoff water that is discharged into water points and streams, which is harmful to aquatic life	• Decline in fish production over the past ten years compared to the 1980s and 1990s when fishing was abundant even near Boukombé. • Fishing is disappearing in the commune • Low availability of water resources to maintain fish ponds in water • Increased production costs due to the purchase of water for fish farming • Increase in the mortality rate of fish • Decline or even progressive disappearance of fishing activity.
Late rains Increase in the length of pockets of drought (30 years ago, at the beginning of the season, pockets of drought lasting no more than 2 weeks were noted, as opposed to pockets of drought lasting at least 2 to 3 weeks at the beginning of the season for the last ten years) + It no longer rains normally and therefore there is a lack of control over the seasons + Shift of the beginning of the rainy season (about thirty years ago, the beginning of the season was in April or even early May; for the past ten years, the rains have not settled until June, the month of planting)		Crop production, priority crop	
	Increase in the length of pockets of drought (for the past ten years, there have been pockets of drought for two weeks during the rainiest month of August, whereas thirty years ago, the month of August did not record any pockets of drought) Shift of the beginning of the rainy season to June and the peak of the season to September Shift of seasons : September becomes the rainiest month instead of August		• Annual decrease in yields of around 10% for various crops, the most affected of which are corn, sorghum, fonio, rice, legumes (cowpea, soybeans and pigeon peas), etc.y • High mortality of African locust bean, shea and palmyra trees (which die on their own) • The sowing of fonio, which used to be done in April (because of the first rains), is now done in June (and by "chance") • The good harvests are hazardous ("we cultivate by chance (fonio)") • Impossibility of growing vegetables after January because surface waters dry up, resulting in a 60% loss • Approximately 84% loss for rice (before 6 bags/0.25 ha and today 1.5 bags/0.25 ha)
		On animal production	
			• Disappearance of several avian species, including oxpeckers, crows and birds that herald the end of the rainy season and are used endogenously for seasonal forecasting
Temperature	Increase in the frequency and severity of excessive heat (heat wave)	On animal production (poultry, especially guinea fowl, goats, cattle, :)	

Target climate variable	Hazard	Sensitivity element	Impacts
			• Augmentation de la mortalité • High mortality of poultry left to roam to feed and thus subjected to excessive heat
Strong winds (In the past, on a scale of 30 years back, strong winds existed but were not as devastating)	High winds/ Increase in frequency and severity of high winds (Previously, strong winds were observed at the beginning of the season, allowing mangoes and shea nuts to fall and facilitating harvesting) + Strong winds/ Increase in the frequency and severity of strong winds (increasingly strong winds in the last ten years, compared to thirty years ago, when winds of this category were hardly noticeable except at the beginning of the rainy season to announce the arrival of the rains)		• More pronounced uprooting and destruction of crops • Increased vulnerability of income-generating activities to high winds • The wind of the past was not as destructive as today's wind, which makes unripe shea and African locust bean fall, thus hindering harvesting • Uprooting of crops (e.g. Sorghum)

Source : Field survey data, March 2021.

These data are supported by the results of the vulnerability study conducted under the Benin Green Climate Fund Readiness Project (BCP-GCF, 2017).

- **Future climate variability in the project areas**

In general, the climate projections carried out under the RCP 2.6, RCP 4.5 and RCP 8.5 scenarios at the 2030, 2050, 2070 and 2080 horizons show a mixed evolution of precipitation and an increasing trend in temperatures in the Bopa and Boukombé communes region.

With regard to rainfall, according to the outputs of the CSIRO-mk3.6.0 model used in the context of the work to prepare Benin's Third National Communication on climate change, in the commune o Bopa, rainfall in the wettest months would remain practically unchanged until 2080, all climate scenarios taken together; rainfall in the wettest months would be significantly lower than the 1981-2010 climate normal, particularly during the second rainy season. In Boukombé, a generalized decrease in rainfall will affect the Commune during the first phase of the rainy season, from April/May to August/September (see Figure 4).

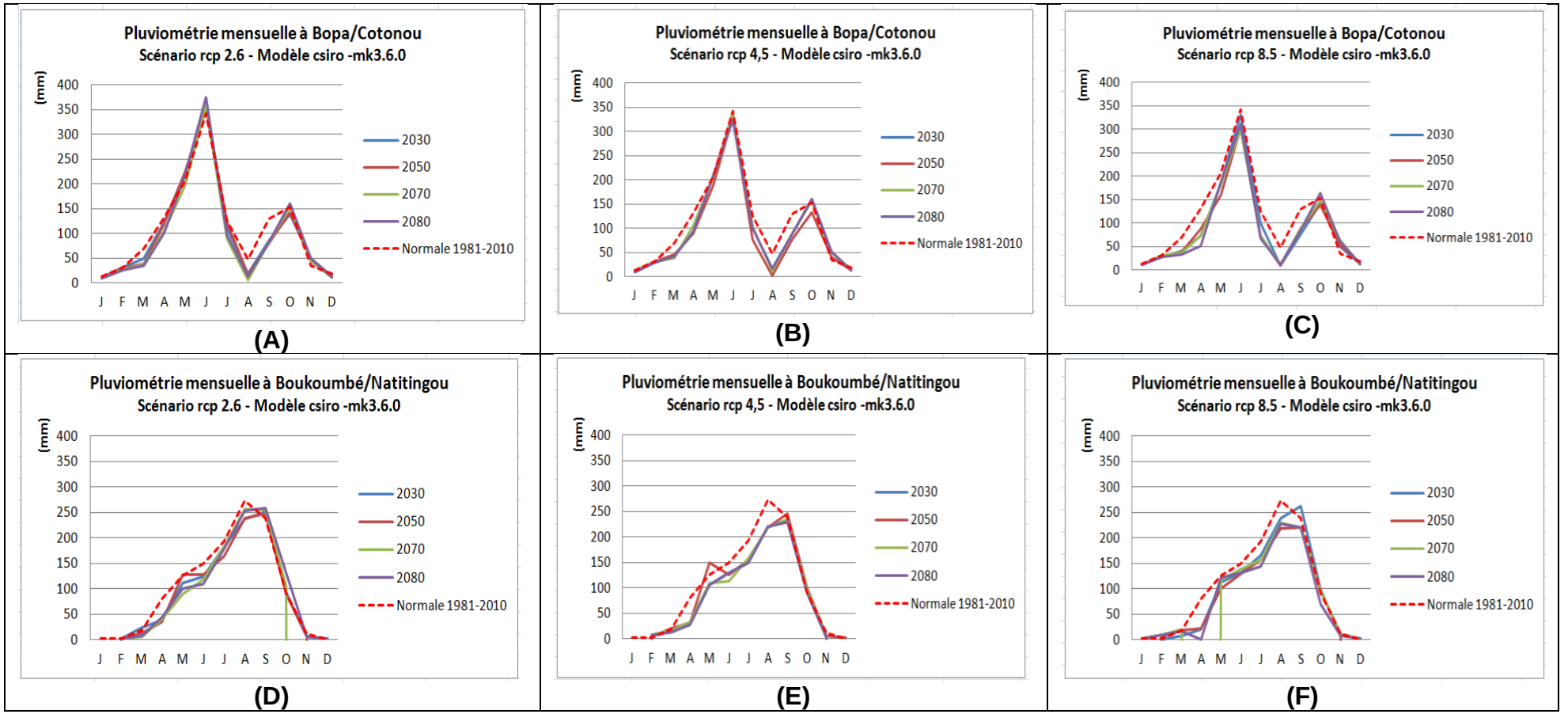


Figure 11 : Monthly rainfall of the climate normal (1981-2010) and rainfall projection according to the CSIRO Mk3 6.0 climate model under the *RCP.2.6, RCP.4.5* and RCP.8.5 scenarios in the regions of Bopa and Boukombé (represented by the synoptic stations of Cotonou airport and Natitingou).

Concerning temperatures, the upward trend observed during the past decades will continue in the future, especially for monthly maximum and minimum temperatures as shown in Figures 5 and 6. Deviations from normal, which hardly reach 2° in the optimistic scenario RCP 2.6, could exceed 5°C during the months of March-April in Boukombé in the pessimistic scenario RCP 8.5 (Figures 5 and 6).

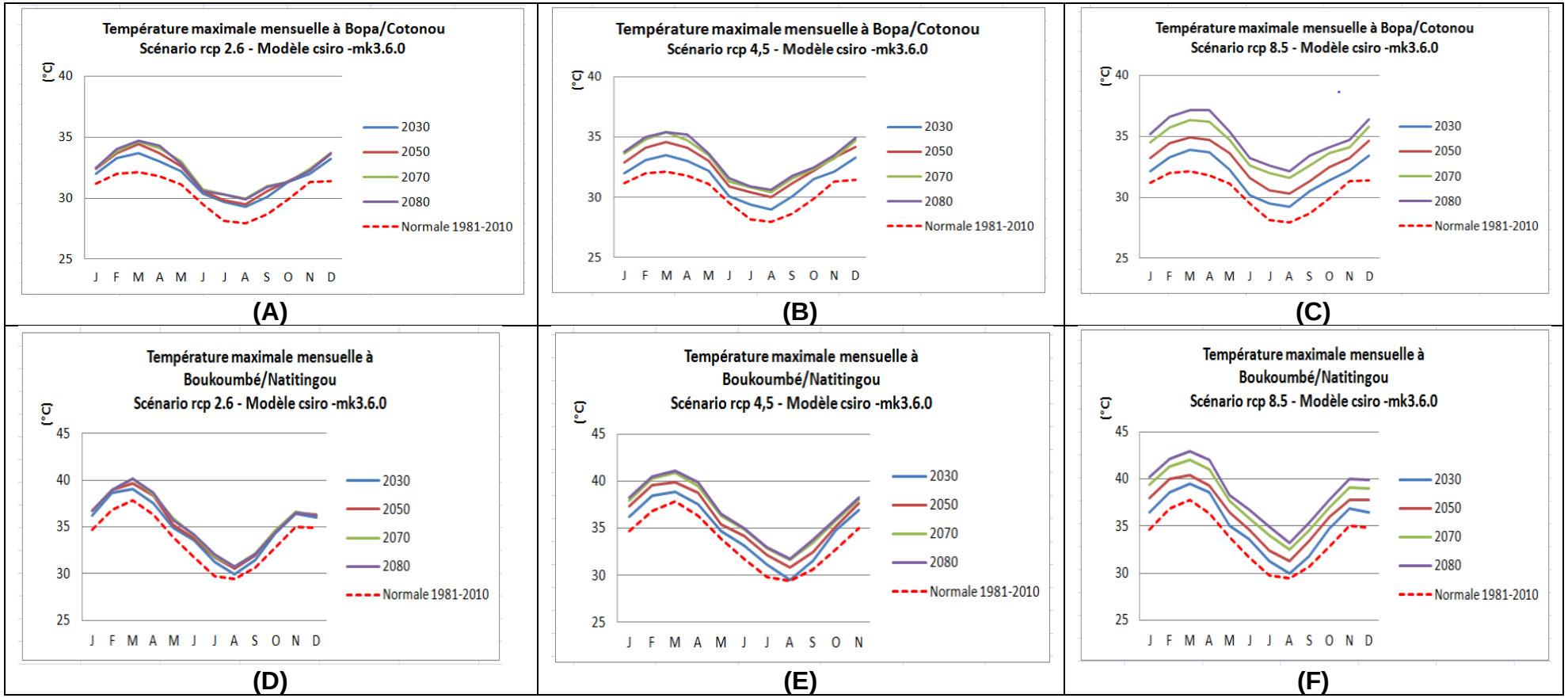


Figure 12 : Monthly maximum temperature of the climate normal (1981-2010) and projection of monthly maximum temperatures according to the CSIRO Mk3 6.0 climate model under the *RCP.2.6, RCP.4.5 and RCP.8.5* scenarios in the Bopa and Boukombé regions (represented by the Cotonou airport and Natitingou synoptic stations).

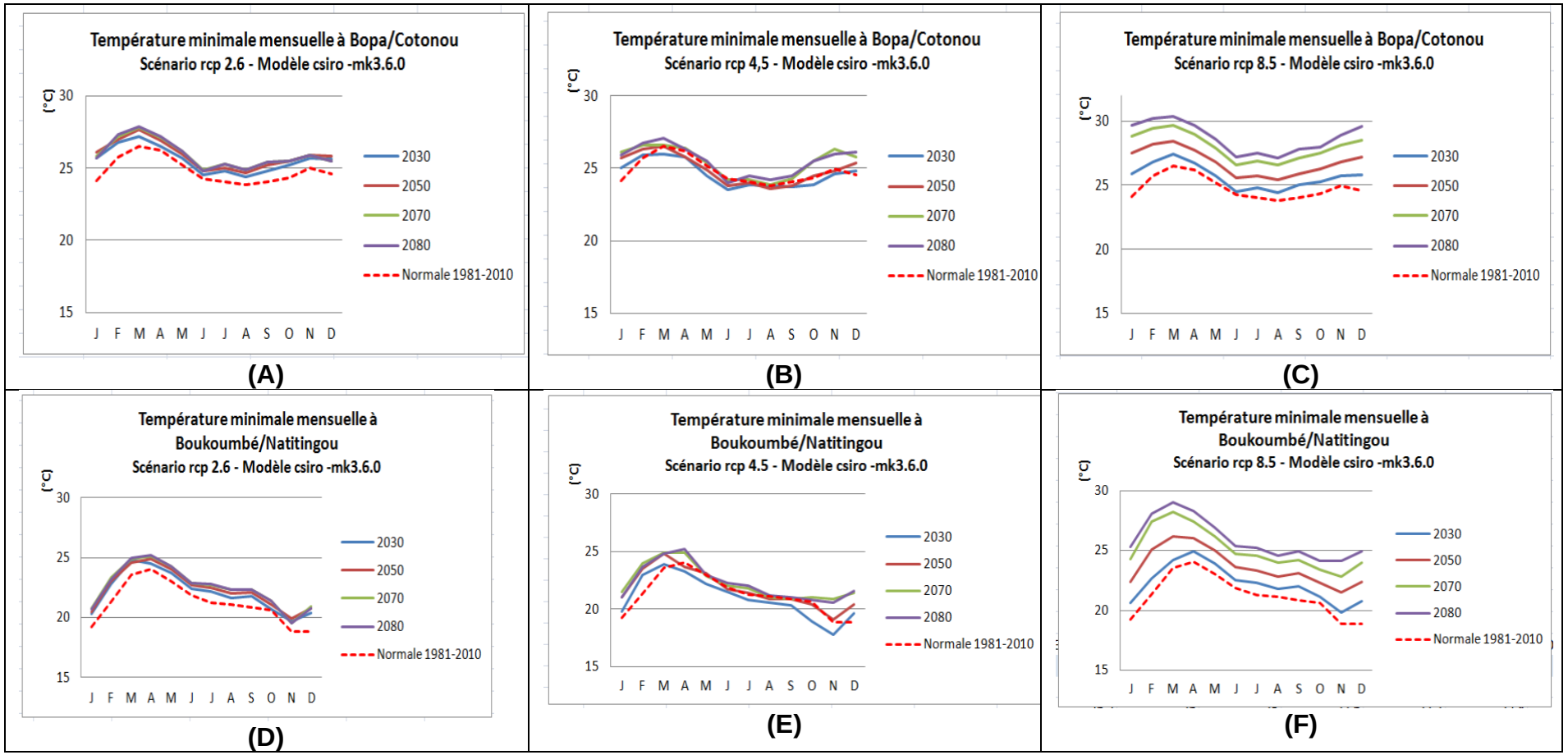


Figure 13 : Monthly minimum temperature of the climate normal (1981-2010) and projection of monthly minimum temperatures according to the CSIRO Mk3 6.0 climate model under the *RCP.2.6, RCP.4.5 and RCP.8.5* scenarios in the regions of Bopa and Boukombé (represented by the synoptic stations of Cotonou airport and Natitingou)

The analysis of future climatic variability thus reveals a tendency (i) to maintain rainfall in the wettest months and a rainfall deficit in the driest months in the Commune of Bopa, (ii) to a generalized rainfall deficit in the first phase of the agricultural season in Boukombé, and (iii) to an increase in minimum and maximum temperatures in the two Communes.

- **Effects of future climate variability**

The downward trend in rainfall in the months that are usually less rainy, particularly those of the short rainy season, will make it increasingly difficult to meet the water needs of crops in the second agricultural season in Bopa. In Boukombé, the rainfall deficit will affect the entire active vegetation phase of the crops and will require appropriate provisions for the success of the commune's only agricultural season. However, it should be noted that according to a recent analysis of rainfall in Boukombé, the rainfall deficit would be relatively low by 2050 on an annual scale and under the RCP 4.5 scenario, not exceeding 3% (*Akponipkè et al., 2020*)[10].

The persistence of the rising temperature trend in the two Communes will lead to an increase in potential evapotranspiration and difficulties in supplying water to the population, livestock and crops.

1.4.2. **Vulnerability analysis and adaptation initiatives in the project areas**

The government, with support from the Global Environment Facility (GEF) and UNDP, developed and implemented the PANA1 project (2010-2014), whose interventions covered 9 villages in 9 communes. This project to strengthen the capacities of farming communities to adapt to climate change in the four (04) most vulnerable agro-ecological zones (1, 4, 5, 8) of Benin has achieved convincing results that have had a very positive impact on the livelihoods and strategies of vulnerable beneficiary groups. In the commune of Bopa, the conclusive results obtained by the NAPA1 in the village of Sèhomi deserve to be duplicated in other villages with the same agroecological characteristics. Similarly, in this commune, Caritas Benin implemented a USAID-funded project to strengthen community resilience to the adverse effects of climate change (C-RAFT) between 2015 and 2017. This project focused more on community preparedness and risk awareness but did not focus on people's adaptation to the adverse effects of climate change. In Boukombé, Caritas Benin is building the capacities of rural women for their economic empowerment. It has also implemented for the 2017-2018 period, a Support Project for Food Security and Women's Empowerment (PASAAF) and a Project to Improve Food Security through the Promotion of Agroecology. Upon evaluation of these different initiatives, communities expressed the need to be supported to better adapt to the increasingly pronounced drought and flooding in these regions for a sustainable improvement in household food security. This is why the present project plans not only to reinforce the achievements of the previous interventions but also to accompany the vulnerable populations in the identification and adoption of local strategies of adaptation to climate change.

In both Boukombé and Bopa, the units of exposure most vulnerable to climate change remain similar as highlighted by NAPA (2008). Indeed, in the northern agro-ecological zones, watersheds, food crops, water resources, small-scale farmers, herders, emerging market gardeners and farmers, and fishermen are highly exposed to climate risks. The same is true in the southern agro-ecological zones for food crops, land, water resources, human health, biodiversity, small-scale farmers, fishermen and pastoralists[11]. This means that climate change is a permanent threat to the development of Benin's communes. Thus, reducing the impacts of climate change on vulnerable livelihoods requires that appropriate adaptation techniques be developed to ensure sufficient agricultural production to guarantee food security in the most exposed

[10]Akponikpè P.B.I., P. Tovihoudji, B. Lokonon, J. Amègnaglo, R. Yégbèmey et E. Kpadonou (2020). Etude de vulnérabilité sectorielle face aux changements climatiques au Bénin : Extension au Pôle de Développement Agricole III (PDA III, Atacora-Ouest). Secteur : Agriculture. Rapport Final. Projet d'Appui Scientifique aux processus de Plans Nationaux d'Adaptation (PAS-PNA). GIZ – MCVDD, Cotonou. 83 p.

[11]MEPN (2008). Programme d'action nationale d'Adaptation aux changements climatiques du Bénin (PANA-Bénin), Cotonou.

localities.

The main food crops grown in the communes of Bopa and Boukombé are cereals, pulses, tubers and root crops, and market garden crops. In recent years, the relative balance of production or annual sown areas has been broken in favor of more resilient food crops or those benefiting from adaptation measures. In Bopa, for example, recurrent floods that destroy the efforts of producers in the rice-growing basins have led to a drastic reduction in sowing, or even to the abandonment of the crop (Table 11).

Table 9 : Changes in the area planted to food crops in the commune of Bopa

CROPS	Area sown (in hectare)									
	2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
	Planned	Achieved	Planned	Achieved	Planned	Achieved	Planned	Achieved	Planned	Achieved
Maize	10402	9517	10131	9211	11215	9838	10920	9838	9114	6751
Rice	135	145	58	53	71	62	77	69	31	23
Total Cereales	10537	9662	10189	9264	11286	9900	10997	9907	9145	6774
Cowpeas	801	777	770	700	811	711	800	721	344	255
Poigeon peas	0	0	3	2	1	1	1	1	10	16
Soybean	10	15	28	26	17	15	17	15	31	23
Total Legumes	811	792	801	728	829	727	818	737	385	294
Cassava	4052	3105	3488	3171	3390	2974	3301	2974	3289	2436
Sweet potato	112	99	34	31	60	53	59	53	62	46
Total Roots and Tubers	4164	3204	3522	3202	3450	3027	3360	3027	3351	2482
Tomato	506	397	466	423	234	205	228	205	288	213
Chili	179	165	180	163	119	104	115	104	157	116
Leaf vegetables	113	118	30	27	124	109	113	102	247	183
Total vegetable crops	798	680	676	613	477	418	456	411	692	512

Source : Commune of Bopa Communal Development Plan 2018-2022 (2017)

The same is true for tomatoes, for which less than 60% of the area planted at the beginning of the 2010s has now been planted.

In the commune of Boukombé, rice production, which benefits from a few rudimentary developments with water control, as part of the endogenous adaptation strategies developed by local communities, has supplanted traditional cereals as of the 2013-2014 season (Table 12). Sorghum, which is more drought tolerant than maize, has seen a steady increase in production since 2011. Fonio, which is well adapted to the ecology of the region, is maintained with sustained production levels.

Table 10 : Evolution of food production in the commune of Boukombé

Crops	Production (in tons)

	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Maize	9 965	6 752	8 334	8 964	8 750	9366	12361
Sorghm	2 611	2 734	2 977	3 052	3 233	3410	3850
Small millet	1 134	1 724	1 526	1 383	1 599	1655	1929
Rice	7 958	4 859	10 183	11 915	11 293	14590	14707
Fonio	1 575	1 070	1 353	1 531	1 867	1238	1280
Total Cereals	**23 243**	**17 139**	**24 372**	**26 845**	**26742**	**30 259**	**34127**
Yam	13 762	8 022	10 323	12 874	13 643	14742	16380
Cassava	361	508	607	879	1 182	949	1008
Sweet potato	1 042	1 541	1 586	2 246	2 665	2528	2780
Taro	638	622	605	604	611	589	609
Total Rots and Tubers	**15803**	**10693**	**13121**	**16603**	**18101**	**18 808**	**20777**
Cowpea/bens	3 639	1 537	2 438	3 117	4 619	2425	2969
Voandzou	6 590	3 539	6 376	3 064	3 898	3197	2722
Soybeans	70	51	112	186	528	214	240
Total Légumes	**10 299**	**5 127**	**8 926**	**6 367**	**9045**	**5836**	**5931**
Tomato	879	1 022	874	1 029	251	1403	1513
Chilli	497	247	434	603	519	943	980
Okra	1 911	2 240	1 752	2 737	4 469	2419	2796
Leaf vegetables	128	136	9	10	254	483	504
Total vegetable crops	**3 415**	**3 645**	**3 069**	**4 379**	**5493**	**5248**	**5793**

Source : DDAEP/Atacora data, Natitingou (2021)

According to the perception of the people interviewed, several factors make Beninese communities more vulnerable. These include poverty, which prevents them from having access to resources, means and opportunities to prepare for or adequately deal with the occurrence of a disaster; food insecurity, which is related to problems of food availability and accessibility; and environmental degradation, deforestation and irrational land use, which create precarious conditions that aggravate the effects of disasters. In addition to these, there is the lack of education and information of the populations at risk, who are often unaware of good practices for survival in the event of disasters.

As noted above, the most recurrent climatic and environmental risks in the project's target localities are floods, drought, late and heavy rains, strong winds, excessive heat, pockets of drought, etc. In Benin, floods are the most frequent hazard in the country. In Benin, floods are often caused by heavy rains accompanied by flooding of major river systems in their respective basins. Several factors, including the destruction of vegetation cover for agricultural and housing purposes in the river basins, contribute to the amplification of these floods during flood periods. These floods often cause significant material[12] and financial damage as well as loss of life. The enormous damage caused by the 2010 floods that affected 55 communes, including Bopa and Boukombé out of 77, is still vivid in the minds of many Beninese (UNDP, 2011).

As for drought, it mainly affects the north of the country where it is recurrent in communes such as Boukombé and also other regions of the country periodically. This drought is both meteorological (rainfall deficit) and hydrological (insufficient water resources) in origin. In deficit years, not only do the rainy seasons begin with a delay

[12]Destruction de champs de cultures, d'habitations, des infrastructures sociocommunautaires faisant ainsi de nombreux déplacés, les crises alimentaires, l'apparition des maladies hydriques, etc.

that is sometimes very pronounced (20 to 45 days)[13] but they are also marked by rainfall breaks at the very heart of the season and end early. Thus, the agricultural calendar is disrupted and, as a result, production declines, as is the case in the commune of Boukombé (PCC, 2014). Moreover, the increasingly frequent occurrence of particularly rainy years in Benin leads to food, socioeconomic and health crises that are sometimes catastrophic.

All in all, the populations of the localities targeted by the project are vulnerable to varying degrees to the climatic and environmental risks described above, and their effects on the economic activities of vulnerable groups are just as significant. According to the sectoral documents consulted (Plan de Développement Communal, Plan de Contingence Communal) and the people interviewed in both Boukombé and Bopa, livelihoods (agriculture, livestock, fishing), food security, and water resources are the most at-risk exposure units, and the social groups most affected are small-scale farmers, including women, youth, minority groups, livestock breeders, and fishermen. The impacts of climate risks include soaring food prices, food insecurity, malnutrition, undernourishment, reduced incomes and increased poverty.

Assessment of food and nutritional security in the target localities

In addition to the risks associated with climate change, for which communities in the target localities need to be supported to achieve resilience through sustainable adaptation strategies, there is the situation of the threat to food and nutritional security, which is associated with the vulnerability of the poorest groups.

Indeed, Benin has recently experienced several crises that suggest a deterioration of food and nutritional security for vulnerable groups, the appearance of new groups at risk and negative repercussions on education, health and the protection of children and vulnerable groups. These include the floods of 2007, 2009 and 2010, which destabilized agricultural production, but above all, the global food crisis and rising prices, with their impact on the availability of and access to essential foodstuffs. According to the Global Analysis of Vulnerability, Food Security (AGVSA, 2013), food insecurity has affected 1.1 million people compared to 972,000 people in 2009. In other words, about 11% of households were food insecure and 23% had poor food consumption that was inadequate to lead a healthy and productive life. In addition, the February 2016 analysis of vulnerability and food and nutrition security in Benin conducted by CT-SAGSA[14] showed that even in a year of good agricultural production, some people sell off their products as soon as they are harvested; because, they do not have the means to preserve the crops until the time when prices would be more remunerative. In particular, during the June-September period, 23 communes are classified as being under pressure. This situation is essentially linked to the start of the lean season in the northern part of the country. The communes concerned are Boukombé, Cobly, Matéri, Tanguiéta, Toucountouna (Atacora), Copargo, Ouaké (Donga) Banikoara, Karimama, Malanville (Alibori), and Toffo (Atlantic), Bembéréké (Borgou) Djakotomey, Lalo, Toviklin (Couffo), Athiémé, Bopa (Mono), Aguégués, Avrankou, Bonou (Ouémé), Savè (Collines), Agbagnizoun and Zakpota (Zou). As proof, the communes of Boukombé and Bopa unfortunately occupy the top positions with 43 and 40% of food insecurity rates in Benin, respectively (Aguèmon, 2016; MAEP, 2017)[15].

According to the Multiple Indicator Cluster Survey (MICS 2014), the prevalence of global acute malnutrition in children aged 6-59 months during the survey period was 4.3%. It is important to note that this type of malnutrition affects both urban (3.7%) and rural (4.9%) children. As for chronic malnutrition, at the national level, 31.8% of children aged 6 to 59 months suffer from stunted growth, 11.0% of which is severe. In all departments (except Littoral and Collines) more than 30% of children aged 6 to 59

[13]ELABORATION OF AN ENVIRONMENTAL RISK REPERTOIRE, Report, MGE, Brice TENTE, October 2014

[14]Harmonized Framework for the Identification of Risk Areas and Vulnerable Populations in the Sahel and West Africa (CH2)

[15]PDC 3, Bopa

months suffer from chronic malnutrition. This represents a serious nutritional situation according to the thresholds established by the WHO. It should be noted that chronic malnutrition affects rural areas (37.5%) more than urban areas (26.1%). This situation is due to low agricultural productivity in cereals and legumes, insufficient planted areas, significant post-harvest losses (poorly performing domestic and collective storage/conservation systems), and inadequate food practices in terms of breastfeeding and child feeding. It should be noted that food insecure households generally live in precarious sanitary and housing conditions. Moreover, it should be noted that this food insecurity increases the nutritional burden among pregnant women and nursing mothers. According to the Maternal and Child Health Directorate in 2012[16], women with poor nutritional status at the time of conception are at greater risk of illness and death.

To improve the food and nutrition insecurity situation in the targeted localities, the project plans to undertake actions aimed at strengthening the livelihood strategies of poor households with a focus on supporting the improvement of animal and crop production. Indeed, it is established that food security, the fight against hunger and human development, depend largely on agriculture which determines the availability of food (UNDP, 2015). The development of a nutrition education program, food safety, economic and community resilience to climate hazards is also necessary because strengthening food security relies on resilient communities and more empowered households.

2. Project Objectives

General Objective: This project aims to contribute to the improvement of food security, the resilience of vulnerable communities and their agricultural production systems to the effects of climate change in the communes of Boukombé and Bopa.

Specific objectives

Specifically, the project will aim to:

1. Strengthen the capacities of vulnerable communities on locally proven resilient practices and technologies to increase yields of targeted agricultural crops (plants, animals and fisheries)
2. Strengthen the resilience of vulnerable households through economic empowerment through the development of Income Generating Activities (IGA)
3. To sustainably improve the nutritional status of children under 5 years of age, pregnant women and nannies in vulnerable households through the promotion of new food consumption patterns based on local products in the communes of Boukombé and Bopa.

3. Project components and funding

The project is organized around three technical components.

1. Component 1: Strengthening the resilience of local agricultural production systems to the effects of climate change
2. Component 2: Economic empowerment and improved nutrition of vulnerable households
3. Component 3: Capitalization, dissemination of good practices and lessons learned and sustainability

These closely related components are presented in Table 13 below:

[16]Analysis of the quality of nutrition services offered to pregnant and postpartum women, MS/UNFPA, 2012

Table 11: Components of the project

N°	Componets of the project	Actual expected output	Expected results	Activities	Cost components	Project cost (US dollars)
	Component 1 : Strengthening the resilience of local agricultural production systems to the effects of climate change (maize, cowpeas, soybeans, cassava, market gardening, etc.)	Increase in yields of the main agricultural crops by 20% to 30%	Farmers adopt restoration and sustainable land management practices	Support for the inventory and dissemination and application of restoration and sustainable land management practices	Information and awareness-raising workshop for stakeholders; Village animation sessions; Design, translation and publishing of brochures and posters on climate change; Small tools and products (shovels, wheelbarrows, hoes, organic fertilizers and sprayers, seeders)	**1374500**
				Training and support for the application of adapted technical itineraries	Training workshop for trainers; implementation of school fields on sustainable land management methods and restoration techniques Kits for producers	
			The populations have easy access to materials/equipment and certified seeds	Support in kits of small materials/equipment and resilient seeds	kits of small materials/equipment: hoes, cutters, rakes, pots etc. ; Provision of resilient seeds (traditional seeds, seeds proposed by INRAB)	
		Installation of climate change resilient infrastructures for the promotion of agriculture and livestock	Resilient water mobilization, storage and distribution structures are built	Construction of 2 solar energy boreholes with market gardening for the benefit of vulnerable women in Bopa	2 photovoltaic boreholes with market gardening facilities	
				Rehabilitation of a water reservoir with market gardening in Boukombé	1 water reservoir with market gardening	

N°	Componets of the project	Actual expected output	Expected results	Activities	Cost components	Project cost (US dollars)
	Component 2 : Economic empowerment and improved nutrition of vulnerable households	Increased income of vulnerable agricultural households	Producers have easy access to the market and reduce the sale of products at harvest time	Establishment of a warrantage process with CECI groups (Communauté d'Epargne et de Crédit Internes)	Construction of 4 resilient food storage stores Support for the establishment and formalization of 15 CECI groups of 25 people (training of 375 members, CECI kits: boxes, tables and benches, registers, calculators, bill checkers, padlocks, pens, etc.) Training of members of CECI groups and local elected officials on the warrantage process. Organization of one warrantage per year	**787000**
			Producers engage in other income-generating activities (IGAs) that strengthen their resilience	Support for the development of innovative IGAs that are resilient to climate change (sustainable beekeeping in Boukombé, fish farming integrated with market gardening in Bopa)	Training of beneficiaries on resilient production techniques; Provision to CECI groups of 15 installation kits (beekeeping, fish farming, market gardening) ; Support and advice to CECI groups in the implementation of IGAs	
		Improvement of the nutritional status of children under 5 years of age, pregnant women and nannies in vulnerable households	The population adopts good food practices based on local products with high nutritional values	Behavior Change Communication (BCC) on good food practices	Design, translation and publication of image boxes, posters and leaflets on local foods and good food practices: Training of community relays on good food practices; Training of the population on good food practices to improve the food security situation	
				Support for the formulation of balanced food rations based on local products	Support for the organization of cooking demonstrations	

N°	Componets of the project	Actual expected output	Expected results	Activities	Cost components	Project cost (US dollars)
				Support for the production and valorization of local species with high nutritional value	Support for communities in the promotion of home gardens	
	Component 3 : Capitalization, dissemination of good practices and lessons learned and sustainability	Sustainability of achievements	Climate change adaptation measures are taken into account in the activities of the deconcentrated structures	Capacity building of local elected officials and executives of the deconcentrated structures and those in charge of the sectors for the integration of climate change adaptation in the Annual Investment Plans (AIP)	**Workshops**	**408827.6**
				Strengthening institutions, research structures and local actors for a better management of the effects of climate change at the local level	Workshops	
		Capitalization and dissemination of good practices	The good practices promoted are documented and disseminated	Capitalization and dissemination of good practices	Capitalization workshops Accountability workshops Community animation sessions for the dissemination of good practices	
			The community early warning system is functional	Strengthening of community monitoring and early warning mechanisms (SAP Benin, MON, others)	Support to local authorities in revitalizing the community warning system and disseminating the warning	
Project **implementation cost**						**2 570 327.60**
Total cost of the project						**3 110 096.40**
Projet **implementation cost** (9.5% of implementation cost)						**244 181.12**
FNEC management cost (8.5% implementation cost)						**218 477.85**
Amount of funding requested						**3 110 096.40**

4. Projected timeline for project implementation

The project is planned to be implemented over a period of forty-eight (48) months.

Table 12: Project implementation schedule

Steps	Planned dates
Start of project implementation January	January 2023
Mid-term review (if planned)	January 2025
Project closure	January 2027
Final evaluation	March 2027

PART II: PROJECT OR PROGRAM RATIONALE

A. *Describe the components of the project/program, with particular emphasis on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. In the case of a program, show how the combination of different projects will contribute to the overall increase in resilience.*

Component 1 : Strengthening the resilience of local agricultural production systems to the effects of climate change (maize, cowpea, soybean, cassava, and vegetable crops, etc.).

The main adaptation activities of this component are presented by expected result as follows:
Expected resultats 1.1 : Farmers adopt restoration and sustainable land management practices.

- **Support to the dissemination and application of restoration and sustainable land management practices**

This activity takes into account several aspects, including (i) informing different stakeholders about climate change, its manifestations, and means of response, depending on their level of involvement in the project, and (ii) sustainable land management methods and restoration techniques.

- **Training and support for the application of adapted technical itineraries**

This component supports two aspects: (i) training in production processes integrating adaptation to climate change, and, (ii) technical support for the application of technical itineraries adapted to the climate change context. It should be noted that the autonomous adjustments traditionally practiced by the populations, which allowed them to ensure some subsistence production, are no longer adapted to the current climate context. It will therefore be necessary to train the populations on new production methods that take into account the constraints of climate change. In the same way, the populations will benefit from support in the application of these methods, so that they can themselves ensure the production according to the resilient technical itineraries.

Expected results 1.2 : The populations have easy access to materials/equipment and certified seeds.

- **Support in small material/equipment kits and resilient seeds**

The training needs are not the only needs of the populations. The optimization of the effects of training and support requires the availability of appropriate tools and materials necessary for production. Thus, this component takes into account:

  - Support in small material/equipment kits: hoes, cutters, rakes, cooking pots, etc;
  - The provision of resilient seeds: it is no longer a question of using large quantities of traditional seeds and not harvesting the fruit of these efforts because of the effects of climate change, but to achieve the desired production with just enough seeds and plants adapted to climate change.

- **Construction of 2 solar energy boreholes with market gardening in Bopa and rehabilitation of a water reservoir equipped with a water treatment system in Boukombé**

Water is the element at the heart of all needs in the context of climate change. A population, for whatever reason, needs water (for production, consumption and domestic uses). The provision of two (2) solar-powered boreholes and one (1) water reservoir in certain villages of Bopa and Boukombé for access to water will improve the availability of water resources for

rice production and market gardening and food security.

Component 2 : Economic empowerment and improved nutrition of vulnerable households

Expected results 2.1 : Producers have easy access to the market and reduce the sale of products at harvest time.

- **Implementation of a warrantage process with CECI groups (Communauté d'Epargne et de Crédit Internes).**

CECI groups are groups whose main purpose is to save money for future use. This is therefore a matter of good financial management, to which the warrantage system will be coupled. This is a system that aims to store products from the harvest in exchange for monetary compensation for individual use. This will allow a better autonomy of the agricultural households.

Expected results 2.2 : Producers engage in other income-generating activities (IGAs) that strengthen their resilience.

- **Support for the development of innovative and climate change resilient IGAs (sustainable beekeeping in Boukombé, fish farming integrated with market gardening in Bopa).**

Faced with the constraints related to climate change, it is important to change the mode of production and consumption. Thus, the new climatic conditions require adapted production methods. For this component, it will be necessary to train the populations on resilient production techniques.

Expected results 2.3 : The populations adopt good food practices based on local products with high nutritional values

- **Behavior Change Communication (BCC) on good food practices;**

Food insecurity at the population level reflects the uncertainty or limitations on the availability of safe and nutritious food or the ability of individuals to have the minimum required to meet their food and nutritional needs through socially acceptable means. Climate change generally has a negative effect on food production, quality, availability, and consumer access. This activity of Component 2 aims at training the population on good habits to adopt in terms of food practices, in order to improve the food security situation.

- **Support for the formulation of balanced food rations based on local products;**

The populations that do not have permanent access to local agricultural products, due to the effects of climate change, have difficulties to compose balanced and/or rich food rations. This activity will focus on training the population on the formulation of balanced food rations based on the main local agricultural products with high nutritional values, in order to improve the food security situation in the Communes of Bopa and Boukombé.

- **Support for the production and development of local species with high nutritional value;**

In the context of climate change coupled with food insecurity, it is important to develop new initiatives in the various food practices. In the context of climate change coupled with food insecurity, it is important to develop new initiatives in the various food practices. These initiatives could be based, among others, on the production of local food plants with high nutritional values and resilient to climate change. This is the intention behind this activity.

Component 3 : Capitalization, dissemination of good practices and lessons learned and sustainability

Expected results 3.1 : Climate change adaptation measures are taken into account in the activities of the deconcentrated structures

- **Capacity building of local elected officials, executives of deconcentrated structures and sector managers for the integration of adaptation to climate change in the Annual Investment Plans (AIP)**

Climate change is a global issue whose impact is observed in all economic and geographic sectors and at the level of all actors without any particular distinction. Each institutional or community actor has its share of responsibility in the measures to be taken to address it. Thus, for a sustainable improvement in the living and working conditions of the population, each actor must play his part, particularly at the level of local, communal and national decision-making bodies. The aim is to provide the managers concerned with the knowledge and know-how needed to take into account adaptation to climate change in development strategies and annual implementation plans.

- **Strengthening institutions, research structures and local actors for a better management of the effects of climate change at the local level ;**

To the global character of climate change, the vulnerability of natural and human systems and the adaptive measures or options oppose their local dimensions. This is why this activity of component 3 aims at strengthening institutions, research structures and local actors to promote a better management of the effects of climate change in the localities and to ensure the effective involvement of all stakeholders, guarantors of the sustainability of the achievements.

Expected results 3.2 : The good practices promoted are documented and disseminated.

- **Capitalization and dissemination of good practices;**

The elements of success that this project will have established in the face of the harmful effects of climate change in certain pilot sites in the Communes of Bopa and Boukombé are sources of inspiration that can be shared with the stakeholders of other sites in the same communes or communes belonging to the same agro-ecological zones. This activity aims to build databases and/or knowledge related to the project's achievements, and to disseminate good practices through appropriate channels: site visits by local development professionals, hosting of pupils and students on field trips or for end-of-study internships, local radio and television broadcasts, public lectures, etc.

Expected results 3.3 : The community early warning system is functional

- **Strengthening of community surveillance and early warning mechanisms (SAP Benin, MON, others);**

This project activity aims to strengthen the various systems for the prevention and management of environmental disaster risks of climatic origin in the Communes of Bopa and Boukombé. These mechanisms are not sufficiently functional in these communes.

B. New and innovative solutions and approaches provided by the project

The openness of this adaptation project to food and nutritional security, water resource availability, maternal and child health, and economic empowerment of women and rural households gives it an integrated dimension or approach. The main innovative solutions that the project will bring to the beneficiary communities will be:

- the promotion of seeds adapted to climatic stresses and climate-resilient technical itineraries ;
- the sustainable management of fragile lands overexploited by vulnerable populations;
- the application of solar energy to water security and income-generating activities for rural women
- the promotion of Savings and Internal Credit Communities (CECI) and the warrantage system.

The Savings and Internal Lending Communities (SILC) are a type of Community ‘‘*Savings and Loan Association’’*, a kind of "improved tontine" incorporating a number of adaptations and innovations specific to Caritas-Benin. They have been implemented by CARITAS-Benin since 2008 with the technical and financial support of CRS Benin in order to support vulnerable rural communities in initiatives aimed at their empowerment. This is the approach chosen by CARITAS Benin for the empowerment of poor households and the protection of vulnerable children and adults.

CECIs, like other tontines, are self-selecting associations of individuals (by affinity) that form a common fund from which members can borrow. Saving and borrowing activities are carried out on a predetermined cycle (usually 12 months) at the end of which the funds are shared among the members in proportion to the total savings of each. The CECIs also have a secondary fund intended to help members in case of emergency: a kind of micro-insurance called the Social or Solidarity Fund.

The savings, insurance and credit services offered by the CECIs enable members to meet financial needs created by variations in household cash flow or for income-generating activities, for social obligations and for emergencies, without having to resort to a moneylender, or take out a large loan from a supplier, or depend on their relatives. They improve the social security of members, capitalize on community knowledge and experience with tontines, and contribute to the creation of sustainable groups for adapted services.

The integration of the CECI approach strengthens the economic resilience of vulnerable people, particularly women, and their leadership, and confers many social benefits through the strengthening of social cohesion. The practice by CECIs of warrantage, or the process of storing harvested products in exchange for monetary compensation for individual use, will allow for greater empowerment of agricultural households. The use of CECIs and warrantage to mitigate the social effects of climate risks on rural communities is an innovation that will also allow for the expansion of the scope of application of these organizational systems in the communes of Bopa and Boukombé.
The introduction of non-timber forest products to diversify the sources of income of vulnerable people, particularly through the practice of beekeeping, is also an innovative approach that will help increase and stabilize the income of communities.

Finally, the use of endogenous knowledge in the development of adaptation strategies is a rewarding approach that will facilitate the adoption of these strategies by the beneficiaries.

C. Economic, Social and Environmental Benefits of the Project

The implementation of this project will have definite benefits that can be grouped around each of its main dimensions (social, economic, food and nutrition security, environmental, community and/or institutional, gender sensitive).

At the social level, the general interest of the community is at the heart of the actions planned. Equal access to resources and gender equity will strengthen human capital. Taking into account the specific needs of vulnerable groups, taking into account the culture of the area, guarantees a quality intervention. The project will generate jobs for the population, especially for young people and women. These jobs will be direct or indirect, seasonal or annual, and will be created in agricultural product processing units, market gardening operations and other high value-added agricultural sectors. In addition, thanks to the project, better intra-community solidarity and cohesion between members of the groups will be developed, which will increase their resilience to climate change.

L’application The application and generalization of the CECI (Community Savings and Internal Credit) approach to mitigate the social effects of climate risks on rural communities in the communes of Bopa and Boukombé will not only strengthen the solidarity and cohesion of poor households, particularly those headed by women, but also create conditions for the development of their managerial capacity and their social security.

In addition, the dissemination of new knowledge, capacity building through the provision of basic equipment and technical support, the rehabilitation or creation of water reservoirs, etc. will facilitate and encourage the facilitation of specific initiatives within and between social groups (farmers, herders, women, youth, etc.). This will help to satisfy social aspirations, particularly in terms of leadership development and the enjoyment of moments of relaxation for some women, as these are the rare moments when they can meet to discuss and exchange with each other. The training components of the activities will allow for the sharing and acquisition of new knowledge and the sustainability of the acquired knowledge.

On the economic level the new practices acquired, coupled with capacity building, will allow the populations to face the negative effects of climate change and, through this, to improve productivity and production for a better economic profitability. In the same way, the economic conditions of the producers, when they are improved, will allow through the process of payment of taxes and or royalties (especially by the market), an improvement of the economic status of the Commune. The adoption and development of new crops and animal breeds that are resilient to climate change will allow producers to make their farming systems more profitable. The expansion of initiatives of this nature will promote economic flows that are potentially beneficial to the Commune.

Furthermore, the implementation of resilience measures aimed at diversifying the sources of income of vulnerable households, increasing the storage capacity of agricultural products (warrantage), improving the marketing circuit, developing small ruminant breeding, etc. are all activities that will have a positive impact on the purchasing power and economy of households. In addition, the strengthening of women's economic power through the CECI approach will generate additional income for beneficiary households and facilitate the assumption of expenses related to food, health, education, security, etc. Households will thus be able to participate more fully in the development of their economy. Households will thus be able to better participate in the development of their village and, in turn, in the improvement of the local economy.

In terms of food and nutritional security, the various techniques learned by the beneficiary populations, as well as the support they will receive, will enable them to be sufficiently equipped to deal with the effects of climate change. They would have developed appropriate reaction capacities in the face of specific critical situations, including the reception of early warning messages, to limit the negative impacts on food production. From the smallest producer, to the institutional bodies, measures will be taken to fight against the reduction of the food insecurity rate in the area.

At the institutional and communal level, the dissemination of knowledge will enable the population and the various stakeholders to have basic knowledge of climate change, its manifestations and the strategies to adopt to reduce its effects. The attention of national and sub-national decision making bodies will be drawn to the strengthening or the implementation of proactive strategies and application modalities in the form of guidelines to be followed in case of announced manifestations of extreme weather and climate phenomena. It will be necessary to strengthen the institutionalization of early warning systems in the sense of decentralization with increased accountability of departmental and communal authorities, including the inclusion of operating and intervention costs in the Annual Investment Plans of the Communes. The main advantage is to bring the decision-making centers closer to the intervention centers for greater efficiency. To this end, it will be necessary to resize the National Platform for Disaster Risk Reduction and Adaptation to Climate Change and the National Civil Protection Agency (ANPC) in order to strengthen preventive measures and improve the involvement of local actors and technical expertise.

On the environmental level, the project will contribute to the conservation of biodiversity and the fight against erosion through the introduction of endangered forest species useful to local communities. Environmental and social impact studies will be carried out before the

implementation of climate change resilient infrastructures in order to identify measures to avoid or minimize negative impacts. The various measures that will be taken will allow the reduction of recurrent extreme events such as floods. Similarly, the application of climate-resilient production techniques and sustainable management techniques for land, water and other natural resources will considerably improve the living conditions of populations and the development of green spaces in human settlements and highly anthropized ecosystems.

D Project/Program Cost-Effectiveness Analysis

The analysis of the profitability of this project refers to the solid experience of the promoter CARITAS Benin reflected in the aspects taken into account in the different components.

Through Component 1 on strengthening the climatic resilience of local agricultural production systems, and affecting the direct beneficiaries who are the most vulnerable populations, the project will contribute directly to strengthening the capacities of the target populations.

A substantial part of the resources is allocated to the realization of concrete investments such as the rehabilitation of water reservoirs, the provision of production equipment/kits, the realization of drilling, the dissemination of knowledge, etc. These investments will help the populations to reduce their vulnerability to the effects of climate change and to increase and secure their income from production activities. The income generated will allow the populations to ensure the maintenance and sustainability of the project's achievements. Thanks to the project, its investments and the profitability mechanism developed, the sharing of good practices will be a reality that will ensure the sustainability of the project's effects.

Component 2 on economic empowerment and improved nutrition of vulnerable households aims to strengthen the economic capacity of poor farming households, encourage the adoption of more resilient crops and provide training on the methodology for designing and developing rich and nutritious food rations based on local products. These actions directly affect vulnerable populations, so as to bring about a change in their behavior that will help correct the effects of food insecurity, the effectiveness of the interventions and the profitability of the project for the beneficiaries. In addition, the establishment of CECI groups will facilitate initiative-taking by members and their economic empowerment.

As for component 3, on capitalization, dissemination of good practices, lessons learned and sustainability, it will allow the beneficiary populations to add their share of contribution to the fight against the harmful effects of climate change and to the strengthening of the efficiency of local and national interventions. The capacity building of institutional actors will allow for a rigorous monitoring to ensure the sustainability of the project's effects and therefore its effectiveness and profitability.
The concentration of the project's adaptive actions in the various localities selected for this purpose constitutes a very good opportunity for the communities concerned, and is a significant source of profitability.

In sum, all of the planned activities (capacity building, water reservoir development, equipment supply, economic security, etc.), coupled with the knowledge dissemination strategy, constitute an innovation and an added value that will allow the populations to perpetuate the potential benefits of the project, with a better understanding of climate change, its manifestations and the means to reduce vulnerability to these effects.

E. Compliance with national or international sustainable development strategies

The elaboration of the present project referred at the national and international level to the following plan, strategy and policy documents:

- The Regional Program for Agricultural Investment, Food Security and Nutrition (PRIASAN), set up by the Economic Community of West African States (ECOWAS), which has the overall objective of contributing in a sustainable manner to the satisfaction of the food and nutritional needs of the population, economic and social development and poverty reduction in member states, as well as the reduction of inequalities between territories, zones and countries. At the specific level, the objective is to (i) contribute to increasing productivity and agro-sylvo-pastoral and fisheries production through diversified and sustainable production systems, and to reduce post-production losses, (ii) promote contractual and inclusive agricultural and agro-food value chains geared towards regional and international demand, (ii) promote contractual and inclusive agricultural and agri-food value chains oriented towards regional and international demand, with a view to regional market integration, (iii) improve access to food, nutrition and resilience of vulnerable rural populations, and (iv) improve the business environment, governance and financing mechanisms of the agricultural and agri-food sector.

- The Government's Action Program based on the United Nations 2030 Agenda for Sustainable Development (SDGs) and the conclusions and recommendations of the Paris Agreement (COP21), notably:
- in its Pillar 2: Engage in the structural transformation of the economy (Strategic Axis No4: Improving economic growth), and
- Pillar 3: Improving the living conditions of the population (Strategic Axis No 6: Strengthening basic social services and social protection and Strategic Axis No 7: Balanced and sustainable development of the national territory)
- the National Agricultural Investment and Food and Nutritional Security Plan (PNIASAN, 2017 - 2021), a second-generation agricultural investment plan that is a strategic planning and coordination framework for the sustainable agriculture and food and nutritional security sector. The value chains of key food production sectors are slated to benefit from massive investments.

- The Nationally Determined Contribution (NDC) in which the objectives of adaptation measures in Benin's agricultural sector are, among others, the diversification and promotion of high value-added agricultural sectors, as well as the modernization of resilient agricultural infrastructures in the context of climate change for food and nutritional security

- The National Action Program for Adaptation to Climate Change (PANA) which aims to promote the development of a framework for coordination and implementation of climate change adaptation activities in the country, capacity building and synergy of different programs in the field of environment through a participatory, community and multidisciplinary approach. Within the framework of agriculture, the program provides for the strengthening of food production systems.

- The National Climate Change Adaptation Plan (PNA), whose objective is to integrate climate change adaptation into policies, development planning strategies, development programs and budgeting processes in all sectors of activity, both at the national and local levels. Sectors covered by the NAP include agriculture, water resources, health, coastal zones, forestry, energy, tourism, and infrastructure and urban development. This programmatic approach to climate change adaptation in the eight national development priority sectors leads to increased empowerment of local communities in

integrating adaptation and climate resilience building into local development planning. This project follows the same logic for the areas of food security in the Communes of Bopa and Boukombé.

- The National Strategy and Action Plan for the Conservation of Biological Diversity, which aims to take effective and urgent measures to halt the depletion of biological diversity, strengthen the resilience of ecosystems and their capacity to provide essential services, and thus contribute to human well-being and poverty eradication.

- The National Forestry Policy, whose overall objective is the conservation and rational, integrated and sustainable management of forests, wildlife and other natural resources in order to contribute to the reduction of poverty among Beninese populations.

Because of the strong involvement of local communities in the implementation of the project and the sustainability of its results, the Communal Development Plans specifying the local strategic orientations are also taken into account. These are

- the Bopa Communal Development Plan 2018-2022, whose strategic orientations are (i) improving the productivity of agricultural land and the production of plant, animal and fishery products in priority agricultural sectors, (ii) strengthening and developing basic infrastructure (iii) improvement and strengthening of the quality of local governance, mobilization of own resources and human capital, (iv) equitable and sustainable development of the communal area, and (v) strengthening and development of decentralized cooperation, inter-communality and the gender approach.
- The 3rd generation Communal Development Plan (PDC) of the Commune of Boukombé (2018-2022), based on the following strategic orientations (i) promotion of local economic development and youth employment, (ii) provision of quality basic social services, (iii) management of natural resources and adaptation to the effects of climate change, (iv) promotion of local governance and women's leadership, and (v) promotion of food and nutritional security.

F. Alignment with national technical standards

The project is consistent with the Adaptation Fund's environmental and social policy and Benin's environmental and social regulations. Limited negative environmental impacts may result from some activities under Component 1 that will exploit sustainable land management and restoration technologies and resilient water mobilization and storage, distribution, and use structures. However, all relevant agricultural and agri-food processing, water and soil resource management, and environmental and social standards in the country will be met. The main relevant national laws and regulations are as follows:

- Law No. 98-030 of February 12, 1999 on the framework law on the environment in the Republic of Benin ;
- Law n°2018 - 18 of 06 August 2018 on climate change in the Republic of Benin;
- Law No. 2018-20 of 23 April 2019 on the pastoral code in the Republic of Benin;
- Framework Law No. 2014-19 of August 7, 2014 on fishing and aquaculture in the Republic of Benin ;
- Law No. 84-009 of March 15, 1984 on food control;;
- Law n°2013-01 of January 14, 2013 on the Land and Domain Code in the Republic of Benin, amended by Law n°2017-15 of May 26, 2017 ;
- Law n° 87-015 of September 21, 1987 on the Public Health Code ;
- Law n° 2010-44 of October 21, 2010 on water management in the Republic of Benin;
- Law n° 2002-016 of October 18, 2004 on the wildlife regime in the Republic of Benin
- Law No. 87-015 of September 21, 1987 on the Public Health Code ;

- Law No. 97-029 of January 15, 1999 on the organization of Communes in the Republic of Benin ;
- Law n° 2011-26 of January 9, 2012 on the prevention and repression of violence against women ;
- Law n° 98-004 of January 27, 1998 on the Labor Code in the Republic of Benin ;
- Decree No. 2001-235 of July 12, 2001 on the organization of the environmental impact assessment procedure ;
- Decree No. 2015-014 of January 29, 2015 on the conditions and modalities for the development of rural land ;
- Decree No. 114 of April 9, 2003 on quality assurance of fishery products in the Republic of Benin ;
- Decree No. 2011-573 of August 31, 2011 on the establishment of the master plan for water development and management ;
- Decree No. 2011-834 of December 30, 2011 on the creation, composition, powers and operation of the National Platform for Disaster Risk Reduction and Adaptation to Climate Change in the Republic of Benin

G. Project duplication (funding from other funders)

The "Integrated Program to Strengthen Food Security and Community Resilience to Climate Change in the Communes of Boukombé and Bopa" is a unique initiative in its spirit, approach and territorial location.

The Commune of Bopa The Commune of Bopa has benefited from a large number of development projects of national scope, focused on the issue of nutrition and without any formal link to climate variability and change. These include initiatives such as the Community Nutrition Project (PNC: 2011-2015), the Multisectoral Food, Health and Nutrition Project (PMASN: 2014-2019), as well as the Nutrition-Sensitive Agriculture and Small Producers Support Project (PADA-Nutrition) and the Early Childhood Nutrition and Development Project (PNDPE), which are still in progress.

The Commune has also benefited from several climate change adaptation projects such as the Integrated Adaptation Program to combat the adverse effects of climate change on agricultural production and food security in Benin (PANA 1). The objective of this project implemented between 2011 and 2016 was to "strengthen the capacities of agricultural demonstration communities in selected Communes to adapt to extreme events and impacts of climate change in the four vulnerable agro-ecological zones of Benin. This project, implemented in the Commune of Malanville (Agro-ecological Zone 1), and in the Communes of Ouaké and Matéri (Agro-ecological Zone 4), Savalou and Aplahoué (Agro-ecological Zone 5) and Bopa, Adjohoun, Ouinhi and So-Ava (Agro-ecological Zone 8), aimed to contribute to the reduction of the impacts of climate change, to intensive agriculture and to food security in Benin The project's achievements were expected to have a positive impact on human health (as a result of improved dietary status), household purchasing power, and the living conditions of youth and women in the country's most vulnerable rural areas, but none of the project's activities targeted these outcomes.

The first group of projects set out, through relevant activities, to improve the basic socio-economic conditions of poor communities in the Commune of Bopa without taking the precaution of integrating climatic hazards whose impact is likely to limit the sustainability of results. The second group of projects, open to the fight against the negative effects of climate

variability, targeted positive impacts on vulnerable communities without specific activities to stimulate these impacts.
By intervening in the Commune of Bopa, this project will build on the good practices of these two groups of initiatives while correcting shortcomings.

As far as **the Commune of Boukombé** is concerned, the prioritization of the targets of the Sustainable Development Goals (SDGs) in Benin in 2017, the domestication of the SDG indicators and the spatialization of the priority targets, have made it possible to assign to this Commune, among others, the generic target of SDG 13 relating to the fight against climate change. This is specifically target 13.1 aimed at "building resilience and adaptive capacity to climate-related hazards and natural disasters in all countries". The priority action and the related domesticated indicator are respectively the improvement of the resilience of populations to climate change and the implementation of national and local strategies for disaster risk reduction (MPD, 2017, 2018a, 2018b)

Local populations and communal authorities had a good understanding of the climatic constraints of their immediate environment, but development initiatives had not always well integrated the issue of adaptation to climate change. Thus, in the multisectoral projects implemented in the Commune, such as the HELVETAS Project for training and capacity building in poultry production, the Local IWRM Support Project (PROTOS PAGIREL, 2006-2011), and the Local Water Governance Project in 5 communes of northern Benin (GLEauBe, 2009-2014), the relationship to climate change was not explicit. The Multisectoral Support Program for Food and Nutritional Security in the Atacora (AMSANA, 2015-2020), whose design did take into account the issue of adaptation to climate change, experienced implementation problems related to the weakness of technical capacity building activities in terms of efficient management and monitoring of resilient infrastructure and equipment chains. The appropriation of technologies by the beneficiaries, the quality and sustainability of the achievements have been.

On the other hand, climate resilience building activities clearly included in the water resources sector projects have been implemented to the satisfaction of stakeholders. This is notably the case for the project to improve water quality in Benin (QualiEau 2011-2015), and the Programme d'Appui aux Communes dans la Gestion de l'Eau et de l'Assainissement au Bénin (PACEA 2011-2016). These two projects were implemented, respectively, to "secure the quality of water for the selected communities and strengthen the capacities of the various actors in the management of drinking water, hygiene and sanitation" and to "strengthen and support all public and private actors involved in the management of drinking water in their effective roles for an equitable and sustainable management of AEPHA services."

As in the Commune of Bopa, this project is at the multi-sectoral level in Boukombé and will implement activities to adapt to climate change and strengthen the resilience of rural communities and their livelihoods.

The project is not submitted to any other funders.

H. Modalities of technology ownership by the populations and dissemination of the project's achievements

Effective communication, knowledge management and learning are essential to the success of this project. This is why it has been taken into account in the design of the project and integrated into the different components.

Component 1, related to strengthening the resilience of local agricultural production systems to the effects of climate change and taking into account the dissemination of information on

sustainable land management, technical support on production itineraries, etc. takes into account the production and sharing of information that will be transmitted through different channels (training sessions, social networks, websites). Technical support alone constitutes a form of communication and regular sharing of information and/or knowledge, providing information on how to adapt to the risks that the beneficiaries will have to face. The first factor that will allow the populations to become familiar with the technology is andragogical: the working language will play an important role. All community trainings will be conducted in the local languages spoken in the project's implementation area. The documents prepared and translated into languages, the image boxes, the audiovisual aids, the role plays and the simulations will be the factors of ownership of the communities.

Similarly, Component 2, with the establishment of CECI groups, will allow for the production and sharing of information on good income management, savings and intervention strategies. Communication activities on good practices and support activities are means of producing, sharing and assimilating knowledge. Also, technical support for the formulation of nutritious food rations, perhaps even rations that will be constituted using newly discovered local species, is an excellent means of knowledge acquisition.

Finally, Component 3, which is broader and takes into account the decision-making bodies and institutions in charge, also ensures the production, sharing and assimilation of the knowledge necessary to strengthen their level of involvement.

I. Consultative process and presentation of the list of stakeholders consulted during project preparation

The process of identifying adaptation measures and activities, and the drafting of the Concept Note followed a participatory approach that took into account stakeholders (farm households, local and communal authorities, decentralized state structures, etc.) who were regularly consulted. Similarly, the consultants were asked to provide information on the project intervention areas. This information had to be oriented in the same way as the national and communal strategies planned for this purpose. In sum, all stakeholders concerned with the theme of climate change and food security were consulted

The stakeholder consultation phase required several steps :

(i) Documentary research;

(ii) Consultation of resource persons involved in different administrative structures, ministries, organizations whose themes are related to climate change, sustainable agriculture, water needs, food, nutrition, health, etc. in the concerned localities ;

(iii) Field survey mission in the arrondissements of Badazouin and Yegodoè in the commune of Bopa, and the districts of Manta and Natta in the commune of Boukombé ;

(iv) Elaboration of the preliminary draft of the Concept Note;

(v) Validation of the Concept Note, in a workshop or meeting gathering the different stakeholders, the promoters, the implementing entities, the beneficiaries and organizations concerned by the theme. This validation session allowed for the collection of critical information needed to improve the document.

The consultations were organized in Bopa on March 22 and 23, 2021 at the town hall and in the districts of Badazouin and Yègodoé and in Boukombé on March 24 and 25 in the conference room of the town hall and in the districts of Manta and Natta.

The lists of the different meetings and actors met are annexed to this report (annexes 1 to 6).

Photo 1 : Picture of the participants after the work session at the Bopa Town Hall (02/03/2021)


Photo 2 : Work session in the arrondissement of Badazouin/Bopa (02/03/2021)


Photo 3 : Work session in the Borough of Yégodoé/Bopa (03/03/2021)


Photo 4 : Work session at the Town Hall of Boukombé (04/03/2121)


Photo 5 : Work session in the arrondissement of Manta/Boukombé (04/03/2021)


Photo 6 : Work session in the arrondissement of Natta/Boukombé (05/02/2021)

It is important to note that the activities of the primary sector are the main activities of the area. Agriculture being a part of this sector, it occupies an important place in the daily life of the commune and in its capacity to create economic flows. Unfortunately, this sector is experiencing enormous difficulties because agriculture in the area is essentially rain-fed and therefore dependent on climatic conditions which, with their current variability, cause serious problems for farming households.

Faced with all these difficulties, it is urgent to take new measures, measures that take into account the production, sharing and assimilation of good knowledge and or practices through the implementation of concrete improvement actions, all this, in the dynamics of the objectives of the Adaptation Fund.

J. Justification of the request for funding (Justification of the funding requested, with emphasis on the total cost of the recommended adaptation measures)

The objectives of the project are fully in line with the food security thematic area of the Adaptation Fund. The measures, mechanisms, actions and capacity building and public-

private partnership activities that will be promoted in the Communes of Bopa and Boukombé will help improve the living conditions of the populations and contribute to food and nutritional security.

Component 1 : Strengthening the resilience of local agricultural production systems to the effects of climate change (US$ 137,500)

In the communes targeted by the project, agricultural production levels are in continuous decline. The causes identified are the degradation of land, water and biological resource management systems, exacerbated by climate variability and change. Conflicts between farmers and herders over natural resources are increasing. The lack of knowledge of the new rainy cycles limits the forecasting guidelines of the public services in charge of supervising agricultural production.

The activities planned in this component will enable the development and dissemination of new knowledge on climate variations, the dates of rainy events and solutions to cope with them in the agricultural and food production sector. The populations in charge of production, agro-food processing and marketing will be informed and accompanied: they will inscribe their actions in the sense of economic and social profitability and sustainability. This component takes into account in particular:

- training on sustainable land management ;
- the provision of equipment and resilient seeds;
- the rehabilitation of water reservoirs ;
- the construction of boreholes.

Component 2 : Economic empowerment and improved nutrition of vulnerable households ($787,000)

For this component, the non-implementation of the project would mean the continuation of the mismanagement of rural households' income, the sustained lowering of their standard of living and their impoverishment, and would lead to the intensification of their vulnerability to the adverse effects of climate change. The lack of knowledge of good adaptive practices regarding the composition of balanced diets would particularly limit the nutritional development of families, mothers and children.

The implementation of this component will allow:

- The training of populations on good practices to adopt in case of climate change events ;
- the establishment of village savings and internal credit community (CECI) nuclei committed to learning and practicing the management of domestic funds and thus promoting financial autonomy, particularly with the establishment of the warrantage system ;
- Capacity building on the design of rich and nutritious diets based on local products for families.

Component 3 : Capitalization, dissemination of good practices and lessons learned and sustainability (US$ 40,827.6)

The non-implementation of this component would leave the various local, communal and institutional actors with a lack of capacity to face the various challenges facing their localities. This would lead to problems of involvement in the monitoring of activities, which would considerably limit the quality and sustainability of the project's achievements.

This component, once completed, would allow, among other things:

- A better involvement of the different actors concerned by the different themes (climate change, food security, risk management);
- The development and availability of strategic risk management documents;
- a good sustainability of the project's achievements ;
- A thorough understanding of the different environmental and climatic phenomena that will occur in the localities.

With this funding request, the project proposal will help to strengthen the resilience of rural populations, the various stakeholders involved and the production activities of goods and services.

K Sustainability of project results

Sustainability of outcomes has greatly guided the project design and the approach to implementing activities. As an initiative to improve the food security and resilience of vulnerable communities and their agricultural production systems to the adverse effects of climate change in two communes, the project is designed to integrate climate change adaptation into local development strategies, stakeholder knowledge and capacity, communal partnerships and budgetary commitments, and the development and implementation of best adaptation practices. Gradually during the implementation of the project and definitively at the end of the programmed activities, adaptation to climate change will have to be anchored in the multiple areas of sustainability.

Environmental sustainability : The implementation of resilient technologies in the areas of agricultural production and processing, food rationing, land, water and production systems management, and household economy management will lead to increased crop and livestock productivity, purchasing power of stakeholders and adaptive capacity of households and the entire rural community. Despite the projected trend of global warming and its consequences in terms of disruptions to hydrological cycles, agricultural season cycles and crop vegetative cycles, farms benefiting from resilient technologies will show a good level of resilience and resist impacts. Despite extreme weather events, farmers will ensure good food production, which is essential for achieving food security and enhancing the sustainability of community livelihoods. The use of resilient seeds will result in water savings in vegetable and field crops. Substitution of agrochemicals with organic fertilizer will help protect the environment and water from chemical pollution and limit adverse effects on human and animal health and the health of micro fauna and wildlife.

Social and economic sustainability : Ensuring good crop yields and production levels in the context of climate change will have a substantial impact on livelihoods, and enable communities to develop economic opportunities in their rural communities. The project will focus on creating new opportunities for producers of **maize, cowpeas, soybeans, cassava, vegetable crops, sorghum, fonio, rice, etc.** and link them to other economic opportunities along agricultural value chains. Public-private partnerships can be initiated or strengthened at the commune level so that farmers - especially women and youth - can engage in and benefit from high value-added activities, such as product processing, that provide direct, indirect, temporary employment, etc.

Institutional, political and financial sustainability: The project will be implemented through national and communal producer organizations, non-governmental organizations (NGOs), and local development associations. These organizations already exist in the sectors, themes and crops covered by the project. They will be encouraged through participatory and consultative processes to assume leadership and ownership of the issues involved. The project will focus on strengthening the institutional capacities of communal and departmental branches of national and regional research centers (INRAB, IITA, Universities), regional and national implementing entities and extension institutions (DDAEP, ATDA, DDS, DDCVDD), local NGOs and development associations, and producer groups. The capacities necessary for the extension and intensification of the themes promoted by the project will thus be developed and

will guarantee the continuation of the processes after the end of the project.

La Awareness raising and information sharing on climate adaptation strategies and measures pursued by the project will involve all stakeholder groups, including political and decision-making institutions. Successful project results will be widely shared. A project database will be developed and hosted by CARITAS-Benin, the technical services of the Communes of Bopa and Boukombé, and the ministries in charge of agriculture and the environment, in order to ensure the availability and free accessibility of data and information related to good adaptation practices after the project ends.

L. Environmental and Social Impacts and Risks

This project was developed in accordance with the 15 environmental and social principles of the Adaptation Fund's Environmental and Social Policy.

Some of the activities under Component 1, which will exploit technologies for restoration and sustainable land management and resilient water mobilization and storage, distribution, and use, may have limited environmental impacts that could result in a Category B rating for the project, as suggested by the results of the preliminary screening and the various analyses conducted during data collection.

A full Environmental and Social Assessment will be carried out at the time of preparation of the full project document, to demonstrate the level of compliance with the environmental and social principles of the AF. In accordance with the provisions of Decree No. 2017-332 of July 06, 2017, on the organization of environmental assessment procedures in the Republic of Benin, this project will be subject to an environmental impact assessment prior to its execution.

The potential environmental and social risks identified during the initial screening phase made it possible to document the table of environmental and social principles of the Adaptation Fund's Environmental and Social Policy as follows (Table 14). .

Table 13: Environmental and social risks

Environmental and Social Principles Checklist	No additional assessment required for compliance	Potential impacts and risks, additional assessment and management required for compliance
Compliance with the law	The proposed project has been developed in accordance with the provisions of the Multilateral Environmental Agreements and the laws in force at the national level, including the Framework Law on the	

Environmental and Social Principles Checklist	No additional assessment required for compliance	Potential impacts and risks, additional assessment and management required for compliance
	Environment, the Law on Climate Change, the Laws and regulations relating to food safety, health, soil management, water, biological diversity, etc. With respect to environmental and social assessment, a detailed assessment will be conducted during the development of the full project proposal.	
Access and equity	The project provides equitable access to all targeted vulnerable groups in the beneficiary communes. To ensure that no one is left out, depending on the composition of the communities, selection criteria will be developed and agreed upon during the full proposal development phase in a consultative manner.	However, certain categories of people (orphans, refugees, disabled, displaced persons, people affected by HIV/AIDS or Corana Virus, etc.) may be excluded because of their status.
Marginalized and vulnerable groups	The project gives priority to the most vulnerable people among the targeted communities, i.e., small-scale farmers, herders, fishermen, market gardeners, emerging farmers, pregnant women and nannies from vulnerable households.	However, some of the target populations who are illetrate may not benefits from the outcomes such as the implementation guide for climte change adaptation for people living near classified forests. To overcome this difficulty, an illustrated version of the guide in local language will be produced. Similarly, populations without radios and cell phones may not benefit from climate information. This risk will be overcome by using traditional means of communication (griots, etc.)
Human rights	The project guarantees respect for the rights of direct beneficiaries, i.e., men, women, youth and children, depending on their involvement in the implementation. The consultation of stakeholders prior to the drafting of this CN was part of this logic. Adaptation to CC, seen as everyone's business, will contribute to this.	-
Gender equality and women's empowerment	In its design, this project fundamentally takes into account gender equality and women's empowerment. Activities such as the development of shea butter CVAs and the inclusion of gender in the CC adaptation guide are planned to this end.	However, since the communities of Bassila are predominantly patriarchal, there may be risks of inequality.
Fundamental labor rights		unequal pay between men and women and child labor are risks that could have an impact on the proper execution of activities. The project will remain vigilant to ensure compliance with the Labor Code in force in the Republic of Benin. Attention will be paid to the elimination of child labor.
Indigenous Peoples	The Project's beneficiary communes do not have indigenous peoples as defined by the United Nations, but the project will ensure that all vulnerable groups benefit	-

Environmental and Social Principles Checklist	No additional assessment required for compliance	Potential impacts and risks, additional assessment and management required for compliance
	fully from the actions to be implemented	
Involuntary resettlement	Project activities will be implemented with communities in their own localities and on their own land. No resettlement of populations in new localities is planned.	-
Protection of natural habitats		The project implementation strategy envisages the safeguarding of endangered plant species through reforestation, beekeeping, etc. In addition, productivity gains resulting from the adoption of resilient technologies could lead some actors to convert natural areas into agricultural land. For this reason, the project will identify protected areas in the intervention zones during the environmental and social impact assessment and will raise awareness among the populations on the importance of safeguarding and protecting these areas.
Conservation of Biodiversity		Despite the many environmental benefits of the project, including improved soil health, water conservation, and reduced use of chemical fertilizers and pesticides, the conversion of land for food crop production may affect biological diversity. Consultations will be needed in developing the environmental and social impact framework to identify appropriate measures and develop training modules that incorporate this concern.
Climate Change	No further assessment is required. The activities initiated in this project aim to strengthen the resilience of beneficiary communities and support them in sustainably adapting their livelihoods and ecosystems to climate change	
Pollution prevention and resource efficiency		The project will contribute to sustainable land management, water use efficiency and water pollution prevention. However, soil fertility restoration and crop processing activities can cause pollution. The environmental and social impact assessment will identify avoidance measures
Public health	The various climate adaptation interventions planned for the project should make it possible to improve the health of the beneficiary populations (reduction in the risk of disease and financial capacity to meet health care costs).	-
Tangible and intangible heritage	None of the project's activities will have an impact on the physical and cultural heritage of humanity. On the contrary, the project aims to improve the traditional knowledge and know-how of the communities and to accompany them to live in harmony with nature and the	

Environmental and Social Principles Checklist	No additional assessment required for compliance	Potential impacts and risks, additional assessment and management required for compliance
	variations of its components	
Land and soil conservation	The project is not expected to cause any damage to land and soil. On the contrary, the sustainable land management techniques and adaptive food production and processing technologies promoted by the project should contribute to strengthening the resilience of land and soil resources	

PART III: IMPLEMENTATION ARRANGEMENT

A. Institutional arrangement for project implementation

The implementation of the project will take into account the three international, national and local scales.

The implementing entity at the national level is the National Fund for Environment and Climate (FNEC), which is responsible for overseeing and coordinating project activities in the two beneficiary municipalities, in close collaboration with CARITAS-Benin. FNEC is responsible for managing the financial resources allocated by the Adaptation Fund, as well as for the quality of the results before the Adaptation Fund Board. It shall produce periodic implementation reports for the Adaptation Fund.

The physical and financial implementation of the project will be carried out at the national level by a project management team. A Project Monitoring Committee (PMC) will ensure the follow-up of the management and the orientation to be given according to the evolution of the implementation activities with a view to achieving the objectives.

At the local level and in each of the intervention Communes, monitoring will be ensured by a local committee placed under the supervision of the Communal Authority in order to facilitate the capitalization of the achievements at the end of the project and the possibility of extension or duplication on other sites.

The Project Monitoring Committee (PMC), chaired by tFNEC, will play the role of the Steering Committee and has the following mission: (i) to define the reorientation of project activities, (ii) to ensure the execution of the entire project, (ii) to validate the annual work plans and budgets as well as the quarterly plans and budgets, (iii), and (iv) to formulate recommendations for the next steps of implementation. This committee will meet once a year to evaluate and adopt the activities of the previous budget year and to review and approve the Work Plan and Budget for the following year. The PMC is composed as follows: a representative of FNEC; representatives of multisectoral stakeholders including the ministries in charge of agriculture, water, health, living environment and sustainable development, local governance, the designated national authority, national environmental authorities/agencies, and a representative of civil society. The committee may call on resource persons as needed.

The project team will be composed as follows: a Project Manager who is the Father Director of CARITAS BENIN, a person in charge of the sustainability of the achievements, a Secretary-Accountant and a person in charge of monitoring and evaluation and the Community Facilitators.

- The project manager : the project manager is responsible for the organization and structuring of all programmatic activities, data collection and the preparation of periodic reports. He/she assists the other team members. He/she collaborates with FNEC, local authorities and any other institution and external collaborators to achieve results.

-The Monitoring and Evaluation Officer : The Monitoring and Evaluation Officer monitors the day-to-day activities of the community facilitators, ensures the planning of activities, the implementation and monitoring of work plans agreed upon with the Coordinator. He/she supports the team in the planning (annual, quarterly, monthly, weekly) of activities. He/she also ensures the production and documentation of program performance indicators.

-The Sustainability Manager : The Sustainability Manager is responsible for capitalizing on, supporting and monitoring studies and action research to ensure the sustainability of actions at the end of the project. He/she develops a sustainability plan through knowledge management and the improvement of rich exchanges and sharing with the communities.

He/she documents good practices and lessons learned. He/she also contributes to communication.

-The Secretary-Accountant : The Secretary-Accountant is responsible for supporting the management team in the preparation of budgets and work plans, producing financial reports and analyzing requests for funds from all stakeholders. He/she reviews monthly and quarterly accounts, ensuring timely submission and payment to all stakeholders. He/she contributes effectively to the administrative management of the project according to the donor's procedures and those put in place by CARITAS.

At local level, the Local Project Committee (LPC) chaired by the Communal Authority or its representative, plays a role of facilitation and monitoring at the local level and will ensure the capitalization of all the project's achievements.

- 2 Communuty Facilitators in charge of implementing and monitoring field activities in order to collect and feed back information.

- **Support staff**

The National Directorate, the Program Directorate, and the Administrative and Financial Directorate of CARITAS will work part-time on the project, ensuring supervision, quality control, and compliance with contractual and partnership principles, but also, and above all, the achievement of objectives and performance indicators.
FNEC will be the eye of the external monitoring and evaluation on a daily basis for cross-referencing data and information from the internal monitoring team. Joint FNEC/CARITAS missions will facilitate the proper execution of activities.
Focal points per commune will be the facilitators' relays. They will be endogenous animators, whether or not they are integrated into the groups, and they will be the vectors and guarantors of sustainability under the umbrella of the groups' decision-making bodies.

B. Financial and project/program risk management measures

An analysis of the financial and risk management framework will be fully developed during the drafting phase of the full project document. This framework will be drafted in accordance with the procedures and operations manuals, to ensure that the various stakeholders are taken into account.

In order to manage potential risks, a framework will be established to specify the budgetary and fiduciary management modalities that govern the relationships and operations of the entities involved in the project implementation. The financial management policies of the Adaptation Fund will be taken into account in the realization of this framework.

Table 14: Financial risks

Name or definition of risk	Cause of risk	Consequence	Mitigation/eradication measure
CONFLICT OF INTEREST	Non-compliance with standards, procedures manual, procurement procedures	Mismanagement, sloppiness in management, unfairness, frustration, non-demand	Information on procedures manual and management standards/good governance
CONFLICT OF ATTRIBUTION	Poor understanding of the work plan	Poorly executed work, failure to achieve results, difficulty in collaborating	Clear work plan validated by all,
MISAPPROPRIATION OF FUNDS	Moral and spiritual poverty, inappropriate ambition, professional unawareness	Loss of funding, loss of job, loss of visibility and notoriety of the organization, legal proceedings	Formal signature of the code of good conduct for personnel
FAILURE TO ACHIEVE PROGRAM RESULTS PROGRAMMES/DELAY	Poor planning, poor identification of stakeholders	Loss of organizational credibility, Termination of contract	Objective planning, daily monitoring

C. Describe the environmental and social risk management measures, in relation to the Adaptation Fund's Environmental and Social Policy and Gender Policy

An environmental and social study will be conducted at the full project proposal writing phase. An environmental and social management plan will be produced and implemented during the project implementation phase.

An assessment will identify environmental and social risks in the targeted communes. Procedures will then be put in place to effectively manage these risks. These procedures, which will be linked to the environmental and social policy in Benin, will be in line with the gender policy of the Adaptation Fund.

D. Monitoring and Evaluation Modalities and Budgeted M&E Plan, in accordance with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund

A project monitoring and evaluation mechanism will be implemented to assess the progress made in achieving the project's objectives and results. This will allow the identification of strengths and weaknesses in the implementation of the project with the intention of carrying out corrective actions in time. Internal monitoring will be conducted by the CGSN. The CGSN will conduct annual monitoring missions to assess the compliance of the implementation of activities, in close collaboration with the CICC. A monitoring mission will make recommendations to the CCP. A monitoring and evaluation plan for the project will be developed, and a monitoring and evaluation expert will be assigned to ensure that the expected results are in line with the guidelines of the AF and the project indicators.

During the implementation of the project, technical support will be provided to technical services and producer organizations for the development of monitoring and evaluation tools.

Monitoringand Evaluation will be carried out through :

- Evaluation and planning of meetings with the various stakeholders ;
- Periodic reports and annual review by the project team ;
- Field missions

Annual evaluation: An annual evaluation conducted by the CGSN, in collaboration with the CICC will be submitted to the CCP. This evaluation will take into account progress towards objectives, knowledge gained, and risk management. This evaluation will cover technical and financial aspects.

Mid-term evaluation : This will consider the assessment of the effectiveness, efficiency and relevance of the project activities in the context of the project. The report produced will shed light on issues requiring decisions and actions, as well as initial lessons learned from the formulation, implementation and management of the project. This evaluation would lead to the reorientation of certain activities if necessary.

Final evaluation : The recommendations of this evaluation, which will be carried out at the end of the project, may suggest additional measures to strengthen the sustainability of the project.

E. Projet resuts Framework

This section could be developed in the final drafting phase of the project document.

Table 15: Projet logistic framework

N°	Project Components	Implementation Indicators	Expected Results	Activities	Project Cost (US dollars)
1.	**Component 1 : Component 1: Strengthening the resilience of local agricultural production systems to the effects of climate change (maize, cowpea, soybean, cassava and market gardening, etc.)**	Increase in yields of the main agricultural crops by 20% to 30%	Farmers adopt restoration and sustainable land management practices	Support to the dissemination and application of land restoration and sustainable management practices	**1374500**
				Training and support for the application of adapted technical itineraries	
			The populations have easy access to materials/equipment and certified seeds	Support in small material/equipment kits and resilient seeds	
		Installation of climate change resilient infrastructures for the promotion of agriculture and livestock	Resilient water mobilization, storage and distribution structures are built	Construction of solar energy boreholes with market gardening in Bopa and Boukombé	
2.	**Component 2 : Economic empowerment and improved nutrition of vulnerable households**	Increased income of vulnerable agricultural households	Farmers have easy access to the market and reduce the sale of products at harvest time	Establishment of a warrantage process with the CECI groups (Savings and Internal Credit Community)	**787,000**
			Farmes engage in other IGAs which strengthen their resilience	Support for the development of innovative IGAs that are resilient to climate change (sustainable beekeeping in Boukombé, fish farming integrated with market gardening in Bopa)	
		Improvement of the nutritional status of	The population adopts good food practices based on local products	Behavior Change Communication (BCC) on good food practices	

N°	Project Components	Implementation Indicators	Expected Results	Activities	Project Cost (US dollars)
		children under 5 years of age, pregnant women and nannies in vulnerable households	with high nutritional values	Support for the formulation of balanced food rations based on local products	
				Appui à la production et la valorisation des espèces locales à hautes valeurs nutritives	
3.	**Component 3 : Capitalization, dissemination of good practices and lessons learned and sustainability**	Sustainability of achievements	Climate change adaptation measures are taken into account in the activities of the deconcentrated structures	Capacity building of local elected officials and executives of the deconcentrated structures and those in charge of the sectors for the integration of climate change adaptation in the Annual Investment Plans (AIP)	**408827.6**
				Strengthening of local institutions and actors for a better management of the effects of climate change at the local level	
		Capitalization and dissemination of good practices	The good practices promoted are documented and disseminated	Capitalization and dissemination of good practices	
			The community early warning system is functional	Strengthening of community monitoring and early warning mechanisms (SAP Benin, MON, others)	
4.	**TOTAL COMPONENTS**				**US $2,570, 327.60**
5.	**PROGRAM MANAGEMENT**				**US $244, 181.12**
6.	**EMO MANAGEMENT FEES**				**US $218, 47.85**
7.	**MONITORING EVALUATION**				**77, 109.83 US $**
8.	**TOTAL**				**US $3,110, 096.40**

F. Alignment of project objectives with the Adaptation Fund Results Framework

This section may be expanded upon during the development of the full project document.

G. Detailed budgets

This section will be developed during the drafting phase of the full project proposal

H. Disbursement schedule

This section will be developed during the full project document writing phase

PART IV: GOVERNMENT APPROAL AND CERTIFICATION BY THE IMPLEMENTING ENTITY

ADAPTATION FUND

Republic of Benin, Cotonou, January 7, 2022

N° 022 /DGEC/MCVDD/SD

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

Subject: Endorsement for project to strengthen food security and community resilience to climate change in the communes of Boukombe and Bopa.

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

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by National Fund for Environment and climate and executed by national executing entity.

Sincerely,

Prof Martin Pépin AINA
General Director of Environment and Climate.

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A N N E X ES : Attendance lists for stakeholder consultation meetings

Annex 1 : Attendance list Bopa Town Hall.

Annex : Attendance list Badazouin arrondissement/Bopa commune.

Annex 3 : Attendance list Borough of Bègodoé Arrondissement

Annex 4 : Attendance list Boukombé Town Hall.

Annex 5 : Attendance list Manta arrondissement /Boukombé Commune.

Annex 6 : Attendance list Natta arrondissement /Boukombé commune.

Annex 1 : Attendance List Bopa Town Hall

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REALISATION DE l'ENQUETE DE TERRAIN EN VUE DE L'ACTUALISATION DES NOTES CONCEPTUELLES POUR LE FOND D'ADAPTATION

Client : Fond National pour l'Environnement et le Climat : ONAB ☐ CARITAS ☒

Date : 22/03/2021 **Localité :** Mairie de Bopa

Liste des participants

N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
1.	HOUNKPE K. Samuel	Caritas Lokossa	94 19 65 81	[signature]
2.	BABADANKPODJI Blandine	Caritas Bénin/Djeffa	66 30 67 85	[signature]
3.	Toho M'kpinsè Coffi Jude Corentin	Caritas Bénin/Djeffa	94 76 76 61	[signature]
4.	KOUKPO [illegible]	CARITAS Bénin/Djeffa	95051906	[signature]
5.	GOUDOU Simplice	Caritas BENIN	97 13 24 74	[signature]
6.	GBEKAN Herman	Caritas BENIN	63 40 76 04	[signature]
7.	HOTCHI Agathe	Agent IMS Mairie - Bopa	97 13 85 10	[signature]
8.	VIKOU A. René	Agent IMS Mairie - BOPA	97719092	[signature]
9.	BAKO SEIDOU Nouratou	Plan Inter Bénin Bopa/Lomé	97 26 38 38	[signature]
10.	EZIN Cyprien	CLSA DE Mairie BOPA	97863483	[signature]

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N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
11.	AMADJEZO S. Bertin	ONG-MORIJA	61723882	[signature]
12.	GBESSO Désiré	DAM- BOPA	97068585	[signature]
13.	CHANOU D. Hack	SG - BOPA	97197517	[signature]
14.	KOUYE KOKOU	Point Focal Nutrition	97619026	[signature]
15.	DAN SOH Olivia Ayawa	Chargé de Programme caritas Lokossa	96099378	[signature]
16.	AFFO Antoine	CP ONG AVPN	96324722	[signature]
17.	OZOUE C. Célestin	PF-ANPC/BOPA	97187740	[signature]
18.	ALOHOUN Léopold	ATDA7/Bopa	96841823	[signature]
19.	TOGBE Ariane	CS Bopa	62-00-00-98	[signature]
20.	SOUNOU Nicodème	Responsable des Eaux et Forêts	65097809	[signature]
21.	BADOU Djigbo Félicien	Consultant	97967519/64138385	[signature]
22.	BAGAN Thomas	Expert Acc	95714529	[signature]
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Annex 2 : Attendance list Badazouin arrondissement/Commune of Bopa.

REALISATION DE l'ENQUETE DE TERRAIN EN VUE DE L'ACTUALISATION DES NOTES CONCEPTUELLES POUR LE FOND D'ADAPTATION

Client : Fond National pour l'Environnement et le Climat : ONAB ☐ CARITAS ☒

Date : 22/03/2021 **Localité :** Arrondissement/Badazouin/Commune BOPA

Liste des participants

N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
1.	BABADANKPODJI Blandine	Caritas Benin/ Djeffa	66 30 67 85	[illegible]
2.	KOUKPONOU Fidète	Caritas BENIN	95 05 19 06	[illegible]
3.	TOHO Jude	Caritas BENIN	94 76 76 01	[illegible]
4.	GBEKAN Herman	Caritas BENIN	60 60 39 08	[illegible]
5.	KOUKPONOU Camille	Caritas BENIN	60 60 99 16	[illegible]
6.	FIDEMANTIN Martine	// //	60 60 99 14	[illegible]
7.	ADIKPETO Adeline	// //	60 60 99 15	[illegible]
8.	ZOHAN Lucien	HOMBETE	97 15 09 25	[illegible]
9.	TCHEKESSI Justice	HOMBETE	96 32 16 48	[illegible]
10.	HOUNTOKANDE MAHISI	HOMBETE		
11.	BESSOU Malènou	HOMBETE	91 52 73 13	[illegible]
12.	Gousou Simplice	Caritas BENIN	97 13 24 74	[illegible]
13.	VAVO Victoire	HOMBETE	66 62 87 40	[illegible]
14.	AHI Basile	CV hombete	97 95 36 29	[illegible]
15.	DOGBOSSOU Séraphin	Hombete	66 07 37 98	[illegible]
16.	MERPONOU BANTCHA	HOMbete		[illegible]
17.	ANATO Severin	CV Badazouin	96 68 77 32	[illegible]
18.	AGBEKPESSI Ahanhou	Badazouin		[illegible]
19.	KINDEDOHOU Sèhenou	Badazouin		[illegible]
20.	LANTEFO Félicienne	Badazouin	97 71 33 66	[illegible]
21.	GUISSI Antoine	AKPLENOU		[illegible]
22.	DANMANDO Armand	AKPLENOU	61 20 33 93	[illegible]
23.	HOUNGUIA Albert	AKPLENOU CV	97 06 97 21	[illegible]
24.	HOUNASO HEGNONSI	AKPLENOU	96 63 82 20	[illegible]
25.	KAEI Yehessi	AKPLENOU	96 40 22 29	[illegible]
26.	TOTOGO Gossoun	Badazouin		[illegible]
27.	AHOANHOU Filomène	Badazouin		[illegible]

28.	DEGBOSSI Aman	AKPLENOU	66946946	
29.	KOUMENSSI Mensan	Badazouin		
30.	FANOU Véronique	AKPLENOU	66730842	
31.	GANVO Albert	AKPLENOU	66118793	
32.	BESSOU Bertine	AKPLENOU	97697924	
33.	ADJAA Houngnia	Badazouin	62470013	
34.	DAN SOH Olivia Ayawa	Caritas Diocésaine Lokossa	96099978	
35.	HOUNSOUNOUVI C. Toussaint	CA Badazouin	97031585	
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Annex 3 : Attendance list Yègodoé **a**rrondissement

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REALISATION DE l'ENQUETE DE TERRAIN EN VUE DE L'ACTUALISATION DES NOTES CONCEPTUELLES POUR LE FOND D'ADAPTATION

Client : Fond National pour l'Environnement et le Climat : ONAB ☐ CARITAS ☒

Date : 23/03/2021 **Localité :** Arrondissement Yegodoe

Liste des participants

N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
1.	KOUKPONOU Fidèle	CARITAS Benin	97251906	
2.	BABADANKPODJI Blandine	Caritas Bénin/ Djeffa	66 30 67 85	
3.	GOUDOU Simplice	CARITAS BENIN	97 13 24 74	
4.	GBEKAN Hermann	CARITAS BENIN	96 45 07 17	
5.	TOHO Jude	Caritas Bénin	94767661	
6.	HOUNKPE C. Romuald	CARITAS BENIN	96811550	
7.	ADIKPETO Adeline	CARITAS BENIN	61-15-94-81	
8.	FIDEMANTI Martine	CARITAS BENIN	67 19 37 29	
9.	KOUKPONOU Camille	CARITAS-BENIN	95615302	
10.	TONOUDJI Auréole	CARITAS-BENIN	94617495	

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N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
11.	KPOTO Joachim	LONFIN	97434569	
12.	KENOU Germain	LONFIN	97432184	
13.	TOSSOU Virginie	LONFIN	96 20 62 10	+
14.	SOGADJI Marthe	LONFIN	67386105	
15.	KPOTO Lucien S.	CV LONFIN	97434647 62186675	
16.	ADJAFIO Simon	LONFIN	97049945	
17.	GBEDE Antoine	DJEKIAN	Pas de contact	
18.	SIAVE Affi	DJEKIAN	Pas de contact	
19.	TEKOU Akpiti	DJEKIAN	67256636	
20.	GNANWI Norviho	DJEKIAN	Pas de contact	
21.	GOUDJA H. Richard	CV TOHOUETA	97930195	
22.	GOUDJA-CONON Samuel	TOHOUETA	66 24 15 19	
23.	GNANKOU Jean	TOHOUETA	97863561	
24.	DAGBO K. Antoine	TOHOUETA A.	66 89 59 62	
25.	KAKPO Govoh Marc	TOHOUETA-KPODJI	51 44 35 22	
26.	SOSSA Titi	TOHOUETA-KPODJI	60-69-35-84	
27.	DEGBOE Bernadette	TOHOUETA-AKLOH	66-12 88 19	

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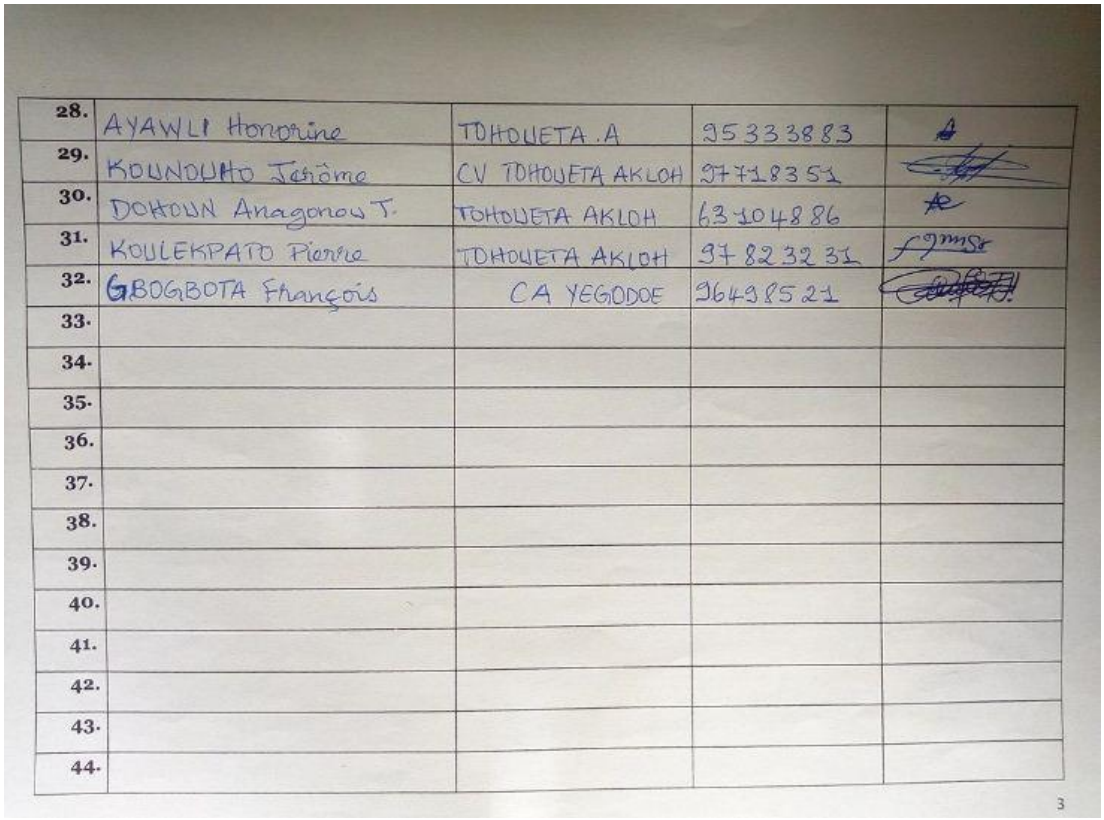

28.	AYAWLI Honorine	TDHOUETA .A	95333883	
29.	KOUNOUHO Jérôme	CV TDHOUETA AKLOH	97718351	
30.	DOHOUN Anagonou J.	TDHOUETA AKLOH	63104886	
31.	KOULEKPATO Pierre	TDHOUETA AKLOH	97823231	
32.	GBOGBOTA François	CA YEGODOE	96498521	
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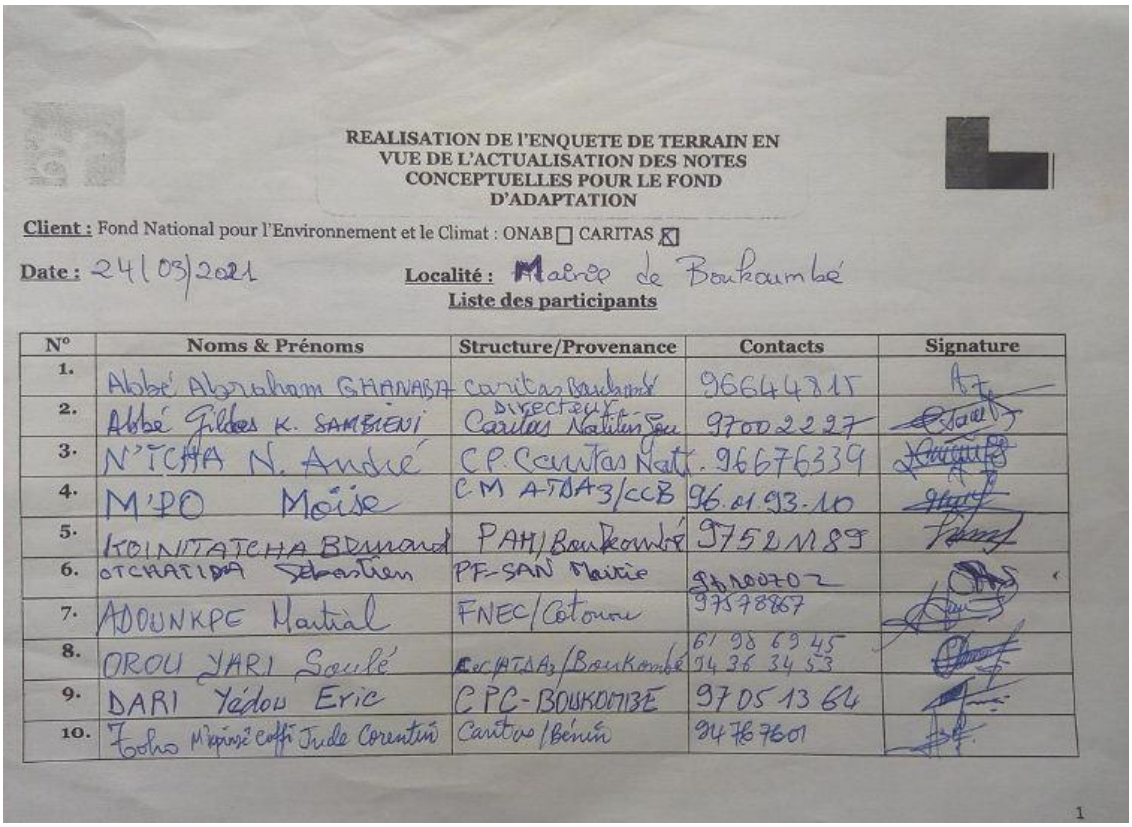
Annex 4 : Attendance list Boukombé Town Hall.



REALISATION DE L'ENQUETE DE TERRAIN EN VUE DE L'ACTUALISATION DES NOTES CONCEPTUELLES POUR LE FOND D'ADAPTATION

Client : Fond National pour l'Environnement et le Climat : ONAB ☐ CARITAS ☒

Date : 24/03/2021 **Localité :** Mairie de Boukoumbé

Liste des participants

N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
1.	Abbé Abraham GHANABA	Caritas Boukombé	96644315	
2.	Abbé Gilbes K. SAMBIENI	Directeur Caritas National	97002227	
3.	N'TCHA N. André	C.P. Caritas Natl.	96676339	
4.	M'PO Moise	C.M ATDA3/CCB	96.01.93.10	
5.	KOINTATCHA Bernard	PAH/Boukombé	97521189	
6.	OTCHATIDA Sébastien	PF-SAN Mairie	97100702	
7.	ADOUNKPE Martial	FNEC/Cotonou	97378867	
8.	OROU YARI Soulé	CCATDA3/Boukombé	61 98 63 45 / 94 36 34 53	
9.	DARI Yédou Eric	CPC-BOUKOMBE	97 05 13 64	
10.	Toho M'pinsé Coffi Jude Corentin	Caritas/Bénin	94767601	

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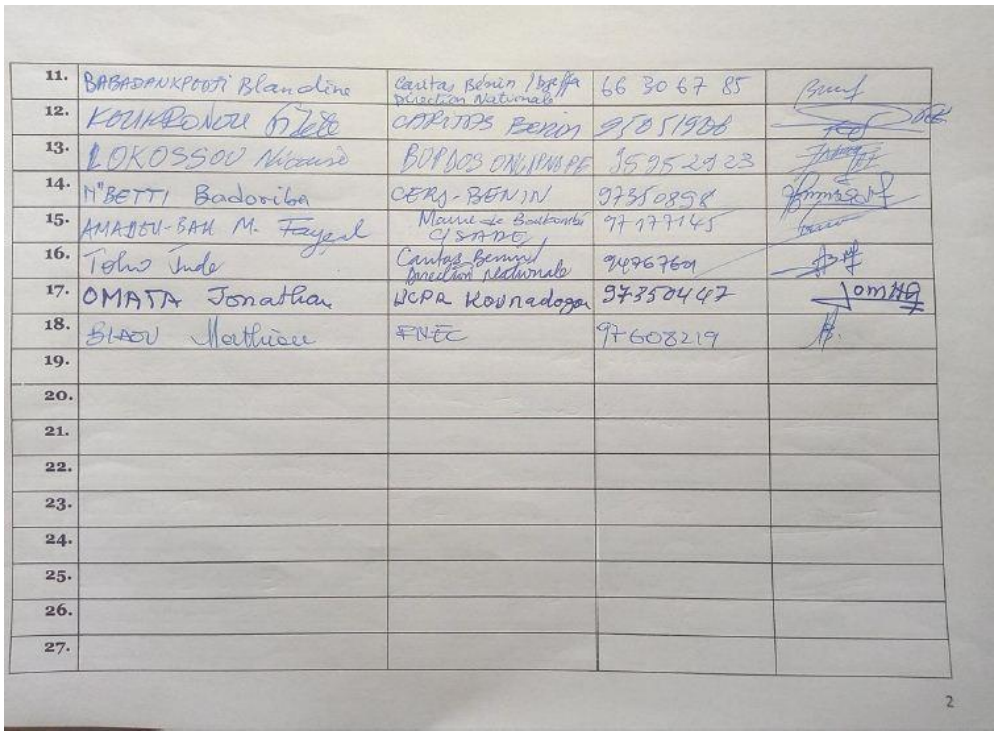

11.	BABADANKPODI Blandine	Caritas Bénin/Bureau Direction Nationale	66 30 67 85	
12.	KOUKPONOU Félix	CARITAS Bénin	97051926	
13.	LOKOSSOU Nicaise	BOPDOS ONG/MDPE	95952923	
14.	M'BETTI Badoriba	CERG-BENIN	97350858	
15.	AMADOU-BAH M. Fayçal	Mairie de Boukombé/STATE	97177145	
16.	Toho Jude	Caritas Bénin/Direction Nationale	94767601	
17.	OMATA Jonathan	UCPA Kouandaga	97350447	
18.	BIAOU Mathieu	FNEC	97608219	
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Annex 5 : Attendance list Manta arrondissement /Commune of Boukombé.

REALISATION DE L'ENQUETE DE TERRAIN EN VUE DE L'ACTUALISATION DES NOTES CONCEPTUELLES POUR LE FOND D'ADAPTATION

Client : Fond National pour l'Environnement et le Climat : ONAB ☐ CARITAS ☒

Date : 24/03/2021 **Localité :** Arrondissement Manta / Commune Boukombé

Liste des participants

N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
1.	NAMBOUA N'KOUYENA	Tatchadieta	66814464	
2.	NAMBOUA B. Raymond	Dikon-kein	52089703	
3.	M'BALLE Ibia	Dipokar 1		
4.	N'TANGOU Hélène	Dipokar 1		
5.	YANTIKOUA Hélène	Dipokar 1		
6.	SOUWEMGA Jérôme	Dipokar 1	64385464	
7.	N'TOUA Mouniamou	Dikon-kein	90126071	
8.	M'PO Delphine	Dikon-kein	95001972	
9.	MBOMA Téna	Dipokar 1		
10.	N'TCHANTI Témpa	Dipokar 1		

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11.	TOUHOUDAGOU B-Bienvenu	DIKON-HEIN	51-97-53-75	
12.	KAPARA Rousjema	Dipokar 1	96610596	
13.	GNIAMOU Nicolas	Dikon-kein	65056451	
14.	TCHANATI N'TONI	Dikon-kein		
15.	TATCHA N'TABOUTI	Dikon-kein		
16.	BASSARI Adiza	Dikon-kein		
17.	M'BETTI Moosa	Tatchadieta	64954909	
18.	NAMBI M. claude	Dikon HEIN	91366306	
19.	SOUWEGA Badona	~~96426828~~ Tatchadieta	96426828	
20.	SATIKOUA Fatchafa	Dipokar 1	96105935	
21.	N'TCHA Appolino	Tatchadieta		
22.	M'BETTI Wamoukoua	Dikon-kein	96341085	
23.	NAMBOUA Ibibia	Tatchadieta	64371974	
24.	N'DAH Joël	Tatchadieta		
25.	N'WE Emile	Dipokar 1	66839351	
26.	TAWE Nassi	Dikon-kein	97951762	
27.	TAYA Dieudonné	~~Dikon~~ Dipokar 1	68423301	

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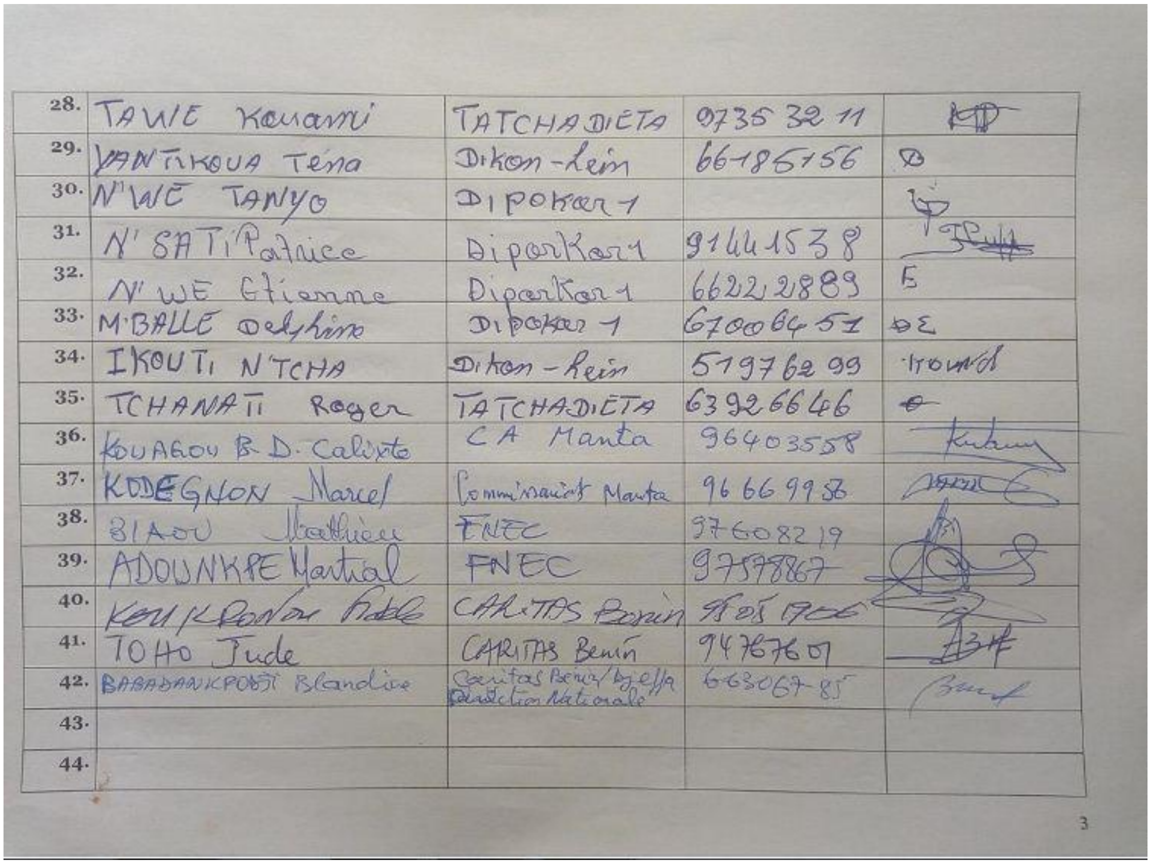

28.	TAWE Kouami	TATCHADIETA	97353211	
29.	YANTIKOUA Tena	Dikon-Lein	66185156	
30.	N'WE TANYO	DIPOKAR 1		
31.	N'SATI Patrice	DiporKar 1	91441538	
32.	N'WE Etienne	DiporKar 1	66222889	
33.	M'BALLE Delphine	DIPOKAR 1	67006451	
34.	IKOUTI N'TCHA	Dikon-Lein	51976299	
35.	TCHANATI Roger	TATCHADIETA	63926646	
36.	KOUAGOU B. D. Calixte	CA Manta	96403558	
37.	KODEGNON Marcel	Commissariat Manta	96669958	
38.	BIAOU Mathieu	FNEC	97608219	
39.	ADOUNKPE Martial	FNEC	97598867	
40.	KOUKPONOU Fidèle	CARITAS Benin	95051906	
41.	TOHO Jude	CARITAS Benin	94767607	
42.	BABADANKPODJI Blandine	Caritas Benin/Dijella Direction Nationale	66306785	
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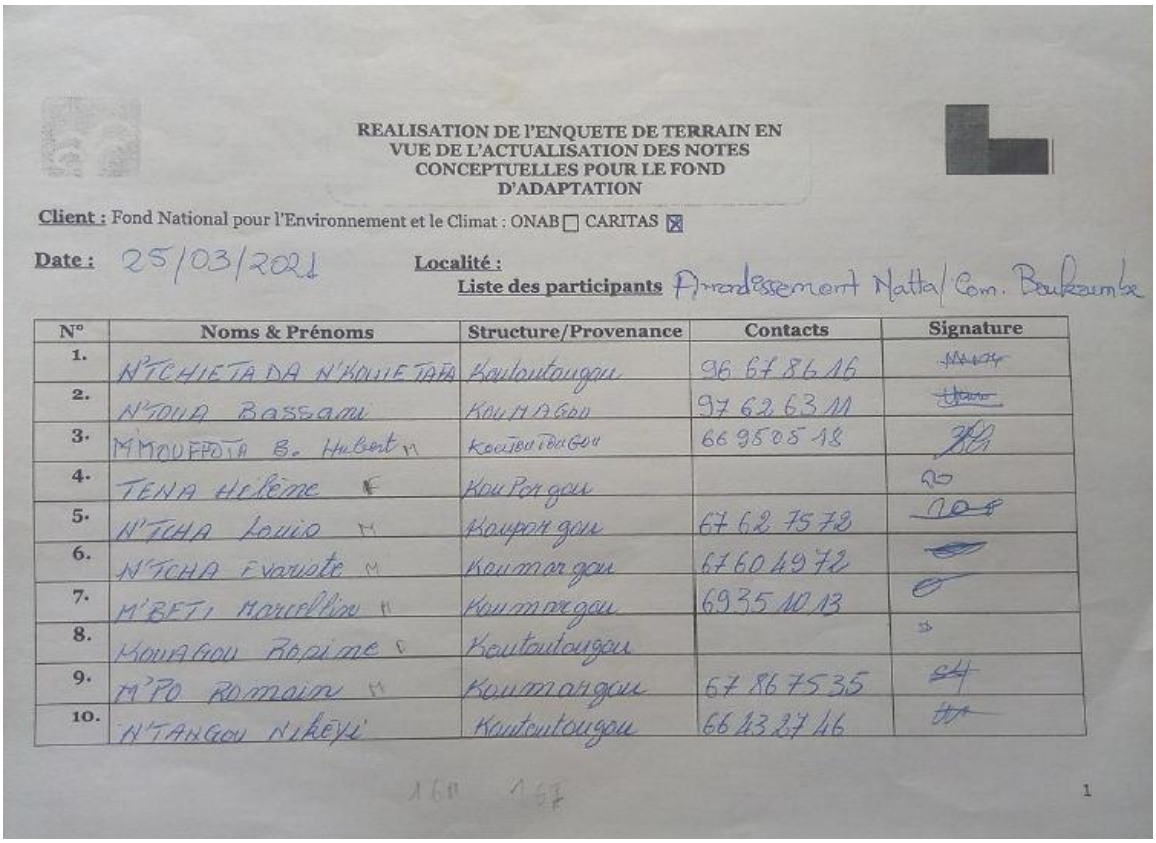
Annex 6 : Attendance list Natta arrondissement /Commune of Boukombé.



REALISATION DE l'ENQUETE DE TERRAIN EN VUE DE L'ACTUALISATION DES NOTES CONCEPTUELLES POUR LE FOND D'ADAPTATION

Client : Fond National pour l'Environnement et le Climat : ONAB ☐ CARITAS ☒

Date : 25/03/2021 **Localité :**

Liste des participants Arrondissement Natta/Com. Boukombe

N°	Noms & Prénoms	Structure/Provenance	Contacts	Signature
1.	N'TCHIETA DA N'KOUETATA	Kouloutougou	96 67 86 16	
2.	N'TOUA Bassabi	Koumagou	97 62 63 11	
3.	M'MOUFFOUA B. Hubert M	Koubetougou	66 95 05 18	
4.	TENA Hélène F	Koupongou		
5.	N'TCHA Louis M	Koupongou	67 62 75 73	
6.	N'TCHA Evariste M	Koumongou	67 60 49 72	
7.	M'BETI Marcellin M	Koumongou	69 35 10 13	
8.	KOUAGOU Rosine F	Kouloutougou		
9.	M'PO Romain M	Koumongou	67 86 75 35	
10.	N'TANGOU Nikeyi	Kouloutougou	66 43 27 46	

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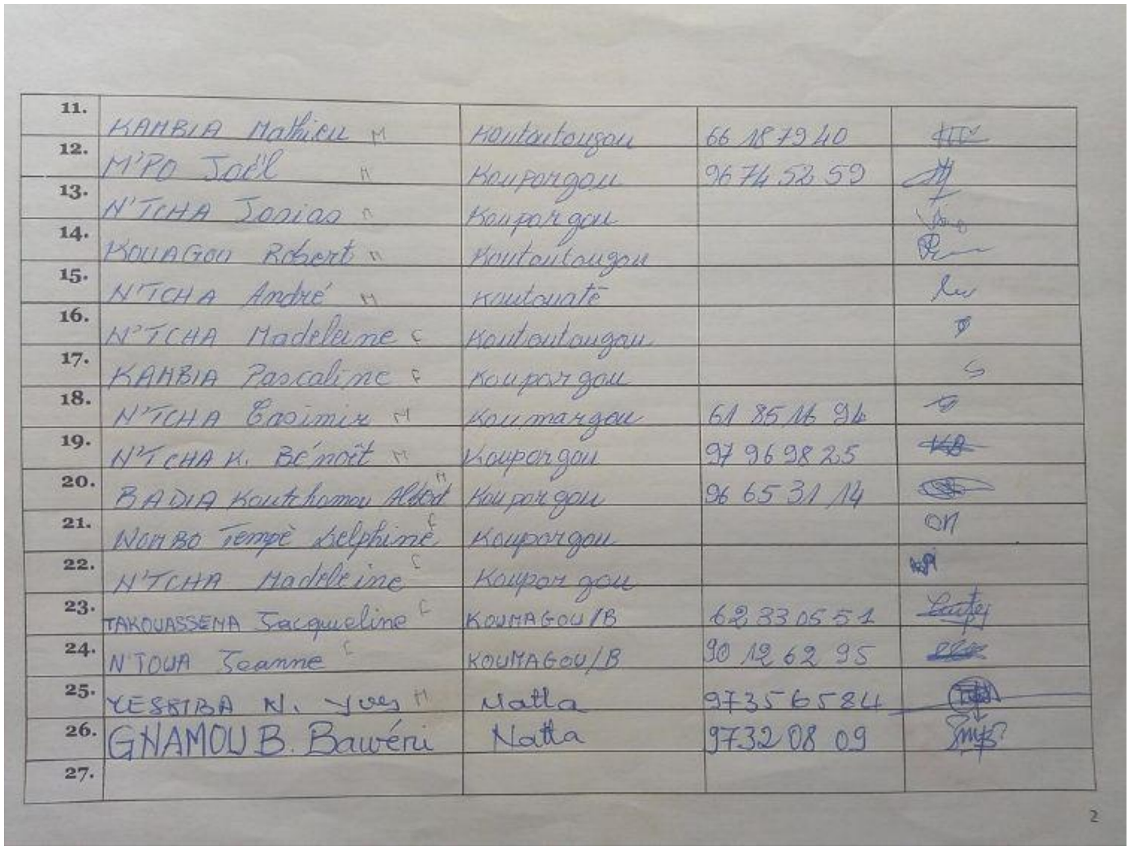

11.	KAMBIA Mathieu M	Koutoutougou	66 18 79 40	
12.	M'PO Joël M	Kouporgou	96 74 52 59	
13.	N'TCHA Josias M	Kouporgou		
14.	KOUAGOU Robert M	Koutoutougou		
15.	N'TCHA André M	Koutouaté		
16.	N'TCHA Madeleine F	Koutoutougou		
17.	KAMBIA Pascaline F	Kouporgou		
18.	N'TCHA Casimir M	Koumargou	61 85 16 96	
19.	N'TCHA K. Benoît M	Kouporgou	97 96 98 25	
20.	BADIA Koutchamou Aldod M	Kouporgou	96 65 31 14	
21.	NORBO Tempé Delphine F	Kouporgou		
22.	N'TCHA Madeleine F	Kouporgou		
23.	TAKOUASSENA Jacqueline F	KOUMAGOU/B	62330551	
24.	N'TOUA Jeanne F	KOUMAGOU/B	90 12 62 95	
25.	YESRIBA N. Yves M	Natta	97356584	
26.	GNAMOU B. Bawéni	Natta	97320809	
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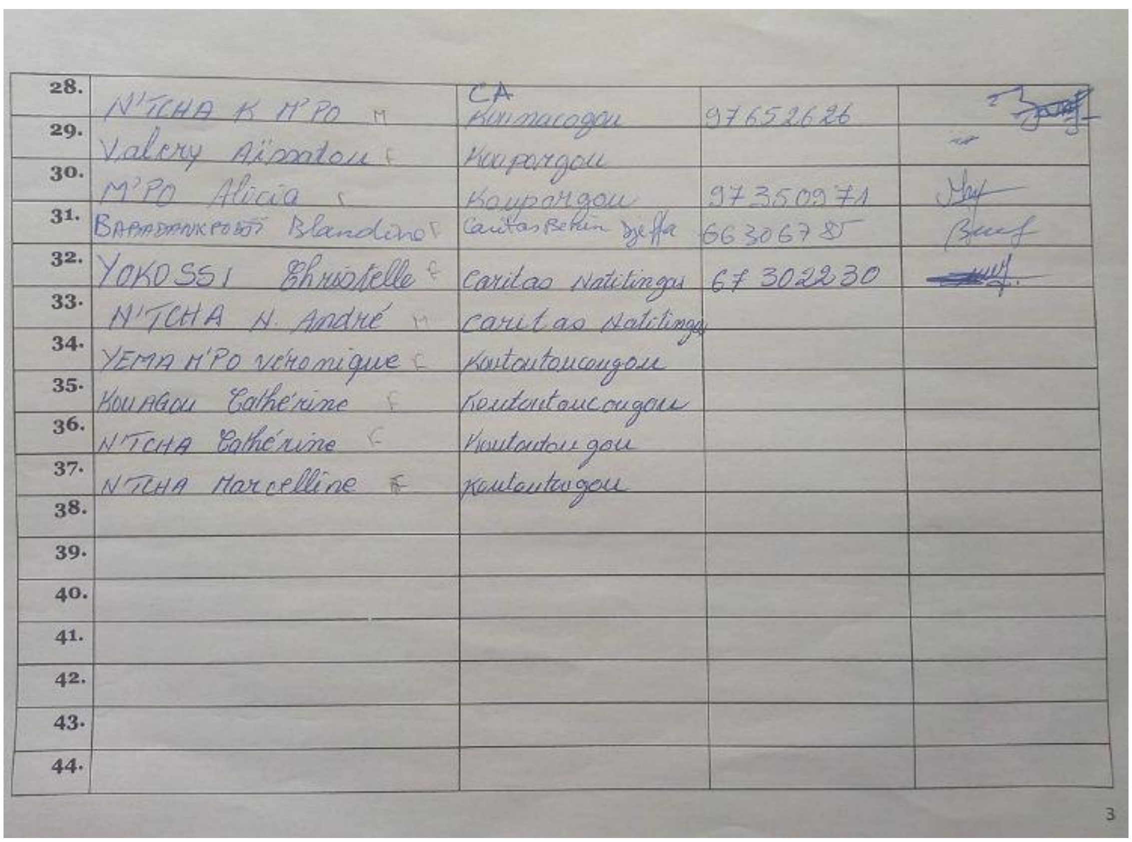

28.	N'TCHA K M'PO M	CA Koumarogou	97652626	
29.	Valery Aïssatou F	Kouporgou		
30.	M'PO Alicia F	Kouporgou	97350971	
31.	BABADANKPODJI Blandine F	Caritas Bénin Djeffa	66306785	
32.	YOKOSSI Christelle F	Caritas Natitingou	67 302230	
33.	N'TCHA N. André M	Caritas Natitingou		
34.	YEMA M'PO Véronique F	Koutoutoucougou		
35.	KOUAGOU Catherine F	Koutoutoucougou		
36.	N'TCHA Catherine F	Koutoutougou		
37.	N'TCHA Marcelline F	Koutoutougou		
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