



United Nations Development Programme  
Project Document template for projects  
financed by the various GEF Trust Funds

<b>Project title:</b> Restoring and Enhancing the Value of Degraded Lands and Forest Ecosystems for Enhanced Climate Resilience in Benin (PIRVaTEFoD-Benin)		
<b>Country(ies):</b> Benin	<b>Implementing Partner (GEF Executing Entity):</b> General Directory of Environment and Climate (DGEC), under the Ministry of the Living Environment and Sustainable Development (MCVDD)	<b>Execution Modality:</b> FULL National Implementation (NIM)
<b>Contributing Outcome (UNDAF/CPD, RPD, GPD):</b> <i>Outcome 1:</i> By 2023, the populations, in particular the most vulnerable, will improve their resilience and quality of life through access to decent employment, food and nutritional security, clean energy, and the sustainable management of natural resources, adverse effects of climate change, crises and disasters		
<b>UNDP Social and Environmental Screening Category:</b> 1 <b>UNDP Gender Marker:</b> 2		
<b>Atlas Award ID:</b> 00140000	<b>Atlas Project/Output ID:</b> 00129365	
<b>UNDP-GEF PIMS ID number:</b> 6514	<b>GEF Project ID number:</b> 10688	
<b>LPAC meeting date:</b> 5 December 2022		
<b>Latest possible date to submit to GEF:</b> 31 January 2022		
<b>Latest possible CEO endorsement date:</b> 11 December 2022		
<b>Project duration in months:</b> 72 months		
<b>Planned start date:</b> 01 February 2023	<b>Planned end date:</b> 31 January 2029	

Expected date of Mid-Term Review: 31<sup>st</sup> January 2026

Expected date of Terminal evaluation: 31<sup>st</sup> October 2028

**Brief project description:**

In recent years, degradation and loss of land, forest and natural habitats—in a context increasingly marked by a changing climate—has begun to seriously undermine human development in Benin. Land degradation has impacted negatively on the productivity of ecosystems in Benin. It is estimated that about 2.2 million hectares of land, equal to 19% of the national territory, were degraded between 2000 and 2010. During this period, observed climate variability and change, such as changes in seasonal distribution and precipitation patterns, more intense rains, higher temperatures and stronger wind storms, have increased and are beginning to have an increasingly significant impact on ecosystem services and agricultural outcomes.

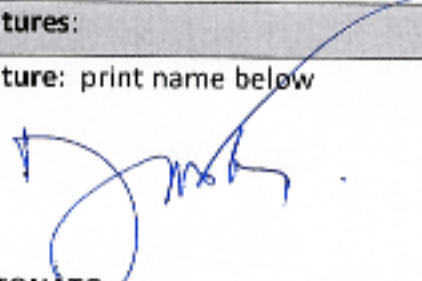



The project will:

- i) promote sustainable, climate resilient production systems in degraded lands and deforestation hotspots in Benin;
- ii) facilitate the development of green infrastructure, selected through integration of climate scenarios and resilience potential under current climatic stressors, to strengthen the Green Belt as a nature-based solution against desert advancement and support communities in climate change adaptation in the north of the country;
- iii) strengthen the protection and preservation of forest ecosystems located in large agricultural production basins;
- iv) identify and promote gender responsive, climate resilient value chains and increase productivity and competitiveness of the horticultural sectors, and;
- v) facilitate the mobilization of innovative financing and the involvement of private sector for the scaling up and sustainability of climate resilient agriculture, climate risk informed sustainable land and forest management, including facilitating market and credit access for producers involved in the resilient development of livelihoods.

The project will address a range of barriers and challenges and will be carried out at national, communal, and local site levels where degraded lands have been targeted for improved, climate risk-informed land management practices to support the achievement of Benin's LDN goals and to help meet national NDC objectives for climate change adaptation.

**Financing Plan**

GEF Trust Fund grant	4,566,667
Least Developed Countries Fund (LDCF)	4,466,210
UNDP TRAC resources (to be administered by UNDP)	480,000
UNDP (in-kind support)	800,000
<b>(1) Total Budget administered by UNDP</b>	<b>10,312,877</b>
<b>(2) Total confirmed co-financing to this project not administered by UNDP</b>	<b>46,992,615</b>
<b>(3) Grand-Total Project Financing (1) + (2) (USD)</b>	<b>57,305,492</b>

Signatures:		
<p><b>Signature:</b> print name below</p>  <p>José TONATO Minister of the Living Environment and Sustainable Development (MCVDD)</p>	<p>Agreed by Implementing Partner<sup>1</sup></p>	<p>14/02/2023</p> 
<p><b>Signature:</b></p>  <p>Aouale-MOHAMED ABCHIR UNDP Resident Representative</p>	<p>Agreed by UNDP<sup>2</sup></p>	<p>14/02/2023</p> 

<sup>1</sup> Not required when UNDP is the implementing partner (i.e. DIM implementation modality). If a UN Agency is the implementing partner, and has signed a SBEEA with UNDP, then the Government Development Coordination Authority, UNDP and UN Agency sign the project document. If an IGO is the implementing partner, and has signed a SBEEA with UNDP, then the Government Development Coordination Authority, UNDP and IGO sign the project document. If a CSO/NGO is the implementing partner, the Government Development Coordination Authority and UNDP sign the project document and attached it to the Project Cooperation Agreement to be signed by the CSO/NGO and UNDP.

<sup>2</sup> For NIM projects this is the Resident Representative. For DIM projects in a single country this is the Resident Representative. For global, regional DIM projects this is BPPS.

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## ACRONYMS AND ABBREVIATIONS

FSP	Full Sized Project
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
MSP	Medium Sized Project
PIF	Project Identification Form
PIR	GEF Project Implementation Report
POPP	Programme and Operations Policies and Procedures
PPG	Project Preparation Grant
STAP	GEF Scientific Technical Advisory Panel
BPPS NCE	Bureau for Policy and Programme Support, Nature, Climate and Energy

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## II. DEVELOPMENT CHALLENGE

The Republic of Benin is a low-income, food-deficit country with a predominantly rural population estimated at 11.2 million. A politically stable democracy since 1990, with a socio-political environment that is friendly and conducive to business, the country nevertheless ranked 158 of 189 countries on the 2020 Human Development Index. The national poverty rate stood at 40.1 percent in 2015.

Agriculture is the primary economic activity in Benin. In 2019, it accounted for 28% of gross domestic product (GDP) and employed 70% of the workforce, while also being highly exposed to climatic pressures. Agriculture in Benin is mainly practiced on smallholder farms, with over 70% of the population practicing subsistence agriculture for their livelihoods.

This section of the project document explores Benin's development and adaptation challenges as they relate to agriculture, land use and climate change. It consists of three brief sub-sections. First, it presents an analysis of problems and causes of land degradation in the context of a changing climate. Second, it identifies solutions and baseline activities aimed at encouraging their adoption. Third, it presents an analysis of barriers which are standing in the way of widespread adoption of available solutions, and, to some extent, to innovation and ingenuity needed to develop and disseminate new approaches in ways that take full account of climate change. Together, these sections lay a foundation for the project intervention, which is presented in Sections II and III below.

### PROBLEMS AND CAUSES

In recent years, degradation and loss of land, forest and natural habitats—in a context increasingly marked by a changing climate—has begun to seriously undermine human development in Benin. Land degradation neutrality (LDN) is defined by the UNCCD as “a state whereby the amount and quality of land resources, necessary to support ecosystems functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems”.<sup>3</sup> Land degradation has impacted negatively on the productivity of ecosystems in Benin, with reductions amounting to 19.1% for cultivated land, 18.7% for shrub savannah and 20.2% for forests<sup>4</sup>. It is estimated that about 2.2 million hectares of land, equal to 19% of the national territory, were degraded between 2000 and 2010.<sup>5</sup> During this period, observed climate variability and change, such as changes in seasonal distribution and precipitation patterns, more intense rains, higher temperatures and stronger wind storms, have increased and are beginning to have an increasingly significant impact on ecosystem services and agricultural outcomes.<sup>6</sup>

Benin is ranked 155 out of 181 in the ND-GAIN index of climate change vulnerability, indicating that it is highly vulnerable yet unready to adapt to climate change. In recent

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<sup>3</sup> See <https://www.unccd.int/actions/achieving-land-degradation-neutrality>

<sup>4</sup> Note Politique NDT 2017.

<sup>5</sup> CENATEL 2017

<sup>6</sup> <https://reliefweb.int/sites/reliefweb.int/files/resources/Benin.pdf>

decades, both droughts and rainfall intensity have intensified in the country, resulting in increased drought stress during the dry seasons (one long dry season per year in the north, one long and one short dry season in the south), as well as flooding and soil erosion. These effects have been particularly notable in the south but have also affected the north of the country where rainfall can be locally very intense.

According to projections, the combination of drought and flooding could reduce national food production by 6% by 2025 (estimates range from -3% to -18% for agricultural production by 2025, and one study projected a loss of 5 to 25% of maize production – a main staple – for the north of the country over the same time period), thereby negatively affecting food security. Increased flooding, which has cost around 50 human lives in addition to extensive material damage in 2010 alone, is exacerbated by the increasing destruction of gallery forests for charcoal production<sup>7</sup>. Herders, including ethnic Peulh in the north of Benin (PDA 1 and 2), have been particularly affected by drought due to the drying up of grasses and small water drains. This has jeopardized the sustenance of livestock (Donou et al., 2008) and forced herders to migrate from North Benin with their herds to the southern parts of the country in search of water and pasture. It has also led to increased pressure on natural resources, with rising levels of damage to crop fields and increased conflicts between farmers and herders. Finally, it has created tensions with government services in cases where herders are unable to pay fines imposed on them for not respecting passageways, entering protected areas with their herds, setting fires, etc.

Women are particularly affected by climate change in Benin because, according to the socio-cultural standards in force in the project intervention area, women cultivate their husbands' fields before cultivating their own fields and therefore are more likely to be directly affected by weather-related disturbance of the agricultural schedule (sowing, harvesting, weeding, fertilizer application (SAP Benin Project, 2014). Drought also leads to an increase in the time devoted to non-productive work for women, e.g., fetching wood and water from greater distance. In short, climate change has already become a significant contributing factor in a negative spiral of land use, degradation and depletion of natural capital, with significant impacts on livelihoods—both present and future.

In addition to degraded areas, other land and habitat, including 14.8% of remaining shrub savannah, and 21.3% of forest areas, were converted entirely between 2005 and 2020. In area terms, national forest coverage, estimated at 8.12 million hectares in 2007, fell to 7.9 million hectares in 2016, a loss of over 215,000 hectares.

In Benin, between 2005 and 2015, areas of natural forest types declined in favor of non-forest formations and plantations. Wooded savannah open forests were the biggest losers, with a decline in area of nearly 45% during this 10-year period. Meanwhile, dense forests lost 31% of their area and mangroves lost 25% of their area. The greatest expansions were made by dwellings, which increased by 73% of their initial area and by crops and fallows which increased by 55%. One exception was that of crops and fallows under oil palm, which

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<sup>7</sup> <https://reliefweb.int/sites/reliefweb.int/files/resources/Benin.pdf>

actually decreased by 48% in area. A 2.5% increase in water bodies corresponds to the creation of several dams and reservoirs and the effects of flooding of certain riparian areas during the period. Finally, reforestation and afforestation efforts resulted in a 73% increase in the area of fruit plantations and a 14% increase in forest plantations.<sup>8</sup>

As land has degraded, agricultural productivity has been affected, and poverty has increased. Thus, while land degradation in 2007 cost Benin's economy an estimated US\$ 490 million, or about 8% of GDP,<sup>9</sup> poor and vulnerable groups bore a large portion of this burden. Large areas of land are completely depleted and no longer suitable for cultivating the food crops commonly grown in Benin, such as cassava, yam, maize, cotton, rice, vegetable crops, pineapples, cashew nuts and oil palm trees. Land degradation has significant negative impacts on the resilience and adaptive capacity of local communities and amplifies the risks facing them, including those stemming from increasingly frequent climate events.

A somewhat tangled web of cause and effect, including climate change and a number of positive feedback effects, appears to underlie this cycle of poverty and degradation. This sub-section will look first at the problems / impacts, before attempting to describe and connect these to various levels of causes. The project's Theory of Change (see **Figure 1** below, p.37-38) identifies a number of significant environmental impacts / damages, including the following<sup>10</sup>:

- *Declining soil quality*: Factors associated with declining soil quality include leaching, acidification and compaction.
- *Soil erosion (loss)*: Water erosion threatens significant portions of the country's agricultural production and includes splash, runoff and gully erosion.<sup>11</sup>
- *Climate change trends and impacts*: Documented changes include: (i) late and heavy rains, contributing to increased flooding, landslides and stream bank erosion, especially in the south of the country, but also affecting the north (ii) periods of drought and drying up waterbodies, especially in the northern parts of Benin (iii) changes in the seasonal calendar, (iv) heavy winds, and (v) increased temperatures. For example, the annual number of wet days and annual total maximum 30-day rainfall declined from the 1960s to 2000,<sup>12</sup> while the short-term intensity of rainfall has increased, leading to more

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<sup>8</sup> Ahononga et al. 2021

<sup>9</sup> UNCCD 2018

<sup>10</sup> Causes are discussed below (see p.13-15).

<sup>11</sup> Moriaque, Akpfo Tobi et. al. 2019. "Factors influencing soil erosion control practices adoption in centre of the Republic of Benin: Use of multinomial logistic". *Journal of Agricultural Science*: Vol 11, No 17. Accessed at: <https://www.ccsenet.org/journal/index.php/jas/article/view/0/40804>

<sup>12</sup> <https://reliefweb.int/sites/reliefweb.int/files/resources/Benin.pdf>



flash floods and soil erosion. Heavy rains, riverine floods, burst riverbanks and intense storms affected a total of 35,850 people in 2021<sup>14</sup>.

- *Trends in agricultural production:* As a result of the above-mentioned climate trends, maize yields may decrease by 5 to 25% in the north of the country by 2025. For example, under climate scenarios detailed in the Third National Communication of Benin (TCN 2019)<sup>14</sup>, the maize variety EVDT (90 days) could experience a yield reduction by 16.7% and 8.9%, respectively, by 2030 and 2050, compared to a 1981–2010 baseline, while yield reductions for the SYN variety (75 days) could reach 21.6% and 28.8%. For niébé (cowpea, *Vigna unguiculata*), yield declines of 26.7% and 26.1%, respectively, have been projected for the same time horizons. Maize and cowpea being the local staple crops in the center and north of the country, such impacts would directly and substantially affect the food security of the local population, as well as their opportunities to generate an income from the sale of surplus agricultural produce. Groundnuts and cotton would be less affected by climate change (or, in the case of groundnut, could even slightly benefit) according to these projections, with cotton yield declines of about 0.9 percent in 2030 and 6.3 percent in 2050. For cassava, which is a staple crop in the south of the country, yield increases have been projected as a consequence of increasing temperature and the crop's low sensitivity to climate variation and infertile soils; however, this would mainly benefit populations in the south of the country, since cassava is not a preferred crop in the north where maize, sorghum and millet predominate. For yams, the preferred staple in the central parts of the country, yield declines by up to a third have been projected by mid-century as a consequence of high temperature extremes combined with drought, exacerbated by declining soil fertility—to which this crop is highly vulnerable<sup>15</sup>.
- *Increased pest incursions and diseases:* Fruit fly invasions (*Bactrocera dorsalis*) have decimated mango production and caused significant losses in mango orchards.<sup>16</sup> The impact of climate change on crop and livestock pests and diseases, while generally considered a key factor, is not well understood and difficult to predict. Potential impacts include an increase in pests and diseases affecting small ruminants and cattle, leading to higher mortality. Temperature increases might also cause mortality in fish tanks which are an important alternative source of protein and income for many rural communities.
- *Pollution and silting up of waterbodies:* This problem is linked to a combination of factors such as agrochemical use, loss of stream bank vegetation and increasing frequency and intensity of heavy rainfall events, as well as longer dry spells and droughts.<sup>17</sup> Together, these factors lead to increased runoff and resulting water pollution, as well as reduced streamflow, decreased soil water infiltration, drying up of water points and overall reduction of water supply. Such changes affect some

<sup>14</sup> EM-DAT The International Disaster Database. Hydrological disasters in Benin. Accessed December 1, 2021. <https://www.emdat.be/database>

<sup>14</sup> [https://unfccc.int/sites/default/files/resource/BENIN\\_TCN\\_2019.pdf](https://unfccc.int/sites/default/files/resource/BENIN_TCN_2019.pdf)

<sup>15</sup> <https://reliefweb.int/sites/reliefweb.int/files/resources/Benin.pdf>

<sup>16</sup> See <http://www.fao.org/3/CA1323EN/ca1323en.pdf>

<sup>17</sup> See [https://reliefweb.int/sites/reliefweb.int/files/resources/West\\_Africa\\_CRP\\_Final.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/West_Africa_CRP_Final.pdf)

watersheds more than others, and may lead to modifications of plant and animal habitats with consequent impacts to livelihoods, e.g., fisheries, livestock breeding and small-scale farming.

- *Reductions in quantity and quality of vegetative cover:* This broad category of environmental change includes forest loss, as well as replacement of beneficial plant species with invasive, 'weedy' ones. Changes in temperatures, seasonality of rainfall, floods and/or more intense droughts also negatively impact certain plant species and habitats.
- *Loss of biodiversity and habitat in adjacent protected areas and forest reserves*<sup>18</sup>: Pendjari National Park and W Regional Park (shared by Benin, Burkina Faso and Niger), located in Atacora and Alibori Departments respectively, are two of the most protected and biodiverse semiarid grassland ecosystems in West Africa. They comprise part of the UNESCO World Heritage W-Arly-Pendjari Complex,<sup>19</sup> a refugium for the region's largest remaining population of elephants and West African lions.<sup>20</sup> Both Pendjari and W Parks are managed by the National Centre for Management of Wildlife Reserves (*Centre National de Gestion des Réserves de Faune, CENAGREF*) under the Ministry of the Living Environment and Sustainable Development. They are both co-managed by African Parks through a management agreement with the Government of Benin.<sup>21</sup>

The above environmental changes and impacts may be seen in environmental economic terms as constituting a significant loss of natural capital, i.e. a reduction in natural capital stocks. For the people of Benin, a range of economic and social impacts is associated with the declining flow of ecosystem services from this reduced natural capital stock. Among the most noteworthy socio-economic impacts are the following:

- *Impacts on agricultural productivity, including sudden crop losses associated with extremes of weather:* **Table 1** below gives an indication of the evolution of crop yields in recent years, while **Table 2** shows the recent evolution of total crop areas in the target PDAs. While annual production has increased, and most crops have shown increases in per ha. yields associated with agro-chemical use, these gains have been tempered by losses of natural capital associated with conversion and, in particular, land degradation and climate variability and change. The food system is impacted by both climate and non-climate (population and income growth, demand for animal-sourced products) related stressors. For instance, drought results in, among other things, increasingly long dry spells, scarcity of grazing and intensification of transhumance, and increased soil degradation, with a consequent drop in crop productivity. In part due to farmers' responsiveness to increased demand and population, many farmers use excessive synthetic fertilizers and pesticides. This increased pressure on farmers starts a cycle

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18 Benin's classified forests are detailed on the Protected Planet portal: <https://www.protectedplanet.net/country/BEN>

19 UNESCO reference at <https://whc.unesco.org/en/list/749/>

20 African Parks: <https://www.africanparks.org/the-parks/pendjari>

21 Further information on African Parks's conservation and development efforts in Benin can be found at: <https://www.africanparks.org/benin-government-commits-long-term-protection-w-national-park>

where excessive pesticides and fertilizers are used, rendering the soil less profitable and more degraded. There are additional effects, such as water contamination, smaller yields, less variety, etc.<sup>22</sup>

**Table 1: National synthesis of the achievements of the agricultural campaigns, 2015-2016 and 2019-2020**

Crops	CAMPAIGN 2015-2016			CAMPAIGN 2019-2020		
	AREA (Ha)	YIELD (Kg/Ha)	PRODUCTION (T)	AREA (Ha)	YIELD (Kg/Ha)	PROD (T)
MAIZE	1 003 715	1 281	1 286 060	1 470 250	1 075	1 580 750
RICE	65 305	3 129	204 310	102 415	3 965	406 083
SORGHUM	131 553	986	129 674	151 065	1 059	160 000
MILLET	26 670	811	21 640	29 135	901	26 250
FOONIO	2 054	752	1 543	5 881	799	4 700
<b>TOTAL CEREALS</b>	<b>1 229 296</b>		<b>1 643 227</b>	<b>1 758 745</b>		<b>2 177 783</b>
YAM	202 605	13 082	2 650 498	235 331	14 301	3 365 500
CASSAVA	284 033	12 043	3 420 665	319 299	14 173	4 525 450
SWEET POTATOES	10 016	5 532	55 405	9 468	6 274	59 400
TARO	559	2 921	1 634	588	3 117	1 831
POTATOES	6,18	13 866	86	307	11 522	3 534
<b>TOTAL TUBERS</b>	<b>497 220</b>		<b>6 128 288</b>	<b>564 992</b>		<b>7 955 715</b>

Source: Agricultural statistics direction, MAEP, 2021

**Table 2: Changes in agricultural area within PDAs, 2015 - 2020**

Areas	PDA 1 (Karimama)	PDA 2 (Gogounou, Sègabana et Kouandé)	PDA 5 (Covè, Zagnanado, Aplahoué et Klouékammè)
Agricultural area (2015)	5,862,009 ha	50,892,807 ha	16,732,473 ha
Agricultural area (2020)	5,758,135 ha	48,475,679 ha	15,477,372 ha

<sup>22</sup> See <https://www.iacc.ch/srccf/chapter/chapter-5/>; see also <https://www.cabdirect.org/cabdirect/abstract/20036792676>

Change (2015-2020) %	-11.01	4.99	8.11
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- *Reduced flows of ecosystem services:* These include a range of provisioning (food, fibre, fresh water), regulating (climate, pollination, pests, soil quality), supporting (soil formation, nutrient cycling, primary production) and cultural (recreation, tourism, spiritual experience) services.<sup>23</sup>
- *Income losses, increased food insecurity and heightened vulnerability to famine:* Changes in precipitation patterns are resulting in fluctuating or declining yields in staple crops, fruits, and cash crops. Current vulnerability and future scenarios indicate declines in crop productivity, impacts on livestock and herders, and on natural habitats (as discussed above)<sup>24</sup>. Changes in the seasonal calendar, to which the rain-fed agricultural production systems have adapted over millennia, are resulting in damages to crops, shortened growing period and increased instances of pests, all leading to declining yields and food shortages. Lower and/or less predictable rainfall impacts vulnerable smallholder farmers and small-scale livestock herders most severely; many are also directly dependent upon the declining forest and savannah ecosystems for safety nets during times of climatic or economic shocks. Climate-linked impacts on farmers are most clearly seen in reports of damage to crops from water stress, high temperatures and stronger winds, disease and pests. Significant negative impacts also result from unpredictability of rainfall and changes in the onset and length of the wet and dry seasons, which challenge the seasonal calendar and lead to a decline in staple food crop yields, losses due to increased pests and diseases affecting both livestock and agricultural production, as discussed above.
- *Increased levels of conflict among groups:* This includes conflict between agriculturalists and herders, exacerbated by a context of resource scarcity, climate-driven migration and environmental degradation. Herders and agriculturalists livelihoods are intertwined, with herders often seeking the produce of agriculturalists, and agriculturalists requiring the dairy and meat from herders. Although they are interdependent, the relationship is fraught, as each group has competing priorities with environmental consequences; herders operate over wide geographic areas, seeking grazing land and water for their flocks, while agriculturalists need undisturbed land, fertile soil, and protected water. In the case of migration, fueled in increasingly large part by climate change, movements are in some cases fueled by the search for fertile land for farming and/or grazing cattle. Environmental conflict ensues when there is overuse of resources (on either side), pollution of a resource, or threat to either living. Herders may seek cultivated land for grazing as communal grazing land is viewed as degraded. Farmers may over-fertilize soil or clear land by burning, coming in conflict with herders.<sup>25</sup>

<sup>23</sup> See <https://www.sciencedirect.com/science/article/abs/pii/S0048969721014820?via%3Dihub>

<sup>24</sup> See Third National Communication to the UNFCCC. [https://unfccc.int/sites/default/files/resource/BENIN\\_TCN\\_2019.pdf](https://unfccc.int/sites/default/files/resource/BENIN_TCN_2019.pdf)

<sup>25</sup> <https://ecre.ac.uk/download/pdf/36771572.pdf>, <https://www.mdpi.com/2073-445X/10/4/425>

- *Reduced resilience to climate changes and other shocks:* There is a compounding effect of the multiple environmental changes taking place, which have a tendency, in the absence of concerted effort to the contrary, to reduce resilience to further climate-change related shocks and disturbances. This raises significantly the risks facing vulnerable populations. Some of these risks for vulnerable population include: rapid urbanization with poor infrastructure and sanitation development has put stress on vulnerable populations displaced by coastal erosion; droughts threaten an already dire food security situation and the agricultural livelihoods of ~70% of the population; increased flooding and standing water will result in the spread of insects that spread infectious disease, such as malaria.<sup>25</sup>

The above factors of course do not operate in isolation from one another but rather have typically synergistic effects. For example, climate change interacts with and compounds the problems caused by deteriorating ecosystem services, landscape degradation, soil erosion and biodiversity loss, exacerbating livelihood risks and leading to displacement, emigration and/or food insecurity for many of the affected communities. Northwestern Benin (Atacora) has seen both in-migration from neighboring countries to the areas around Pendjari Biosphere Reserve and out migration/emigration due to food shortages, soil degradation, poverty and declining livelihoods.<sup>27</sup> In the southern plateau area, maize production during the short rainy season is no longer viable for many farmers because the area is flooded due to excessive rains and/or river floods.<sup>28</sup>

As noted, the above-described environmental and socio-economic impacts can be traced to a multi-level set of causes. These include:

(i) Root causes: These are defined as causes that are largely or entirely beyond the scope of the project to address, either due to their scale, their being determined exogenously, or both. They include:

- Demographic pressures caused by high population growth rates<sup>29</sup>
- Global climate change
- Economic drivers, including: (i) increasing demand for natural resources and agricultural products, (ii) poverty and economic inequality<sup>30</sup>.

<sup>25</sup> See <https://www.ifad.org/en/web/operations/w/country/benin>; [https://climateknowledgeportal.worldbank.org/country/benin/vulnerability?select\\_variable2=](https://climateknowledgeportal.worldbank.org/country/benin/vulnerability?select_variable2=)

<sup>27</sup> Sow, P. S. Adaawen and J. Scheffran, 2014. Migration, Social Demands and Environmental Changes Amongst the Frafra of Northern Ghana and Biali in Northern Benin. *Sustainability*, 6 (1): 375-398. *Sustainability*, 6, 375-398.

<sup>28</sup> Baudoin et. al. 2014. Small scale farmers' vulnerability to climatic changes in southern Benin: the importance of farmers' perceptions of existing institutions. *Mtg.Adapt.Glob.Change*.

<sup>29</sup> Increasing population may also have countervailing benefits, e.g. to innovation.

<sup>30</sup> (In rural areas, the incidence of poverty is higher (42%) than in urban areas (32%). The population spending less than a dollar a day is 63.5%. Poverty appears much more as a rural phenomenon in Benin, in an economic context mainly characterized by the preponderance of the agricultural sector [EMICoV, 2015].;

(ii) Underlying causes: These operate at an intermediate level of causality. They are determined in part by root causes and they, in turn, help to drive direct or proximate causes (see below). They include:

- Market failures which are causing natural capital and resources to be inadequately valued and economic activities to be inadequately diversified,
- National and local land management systems, including land tenure systems that incentivize short-term profit over long-term investment, overlap and lack of congruence between traditional and modern land management systems and failure to resolve land use conflicts (e.g. between farmers and herdsman),
- Conflicting, and / or environmentally damaging, policies, regulations, decisions and plans linked to sector-specific outlooks and politicization of natural resource decision making,
- Human resources, especially women and youth, who, due to a variety of factors, are not able to achieve their potential as sources and disseminators of innovation and adaptation in the face of changing environmental circumstances.
- Primary and secondary baseline data about traditional and modern land use systems collected during the PPG and analysis of complementary data, highlight that the land use system on the project sites remains marked by a dualism of modern and customary rights. This legal dualism generates conflicts and does not facilitate the promotion of investments in sustainable agriculture or sustainable management of forest ecosystems. The traditional principles and practices of use remain carriers of symbolism and identity references<sup>21</sup>. This dualism can be identified also as dualism of formal and informal land use systems, that can coexist when the role of each is assessed and agreed by all the stakeholders involved.

(iii) Direct / proximate causes: Direct, or proximate causes are actions taken by individuals, usually at local level, that are directly causes or enabling land degradation associated environmental damages. They include:

- *Inappropriate agricultural cultivation practices*: These include slash and burn, shortened fallow, poor rotation / diversification practices. Together, they contribute to increased degradation, reduced agricultural yields and incentives for extensification onto new lands.
- *Expansion of agricultural area*: Depending on the category of land, this may consist of encroachment into protected areas and classified forests and conversion of existing forest and/or cultivation of other fragile, less productive lands. In the former case, important ecosystem services and natural capital—including biodiversity—is lost, while

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<sup>21</sup> Avchouémè, B., and Mongbo, R., 2019

in the latter case impacts include declining labour productivity, as more effort is required to reach the same level of yield.

- *Overgrazing, uncontrolled foraging and damage to fields by livestock associated with transhumant communities:* Conflicts between pastoralists practicing transhumance and agriculturalists occur when livestock enter field prior to harvest or damage crops, and when land is cleared of grass growth and tree cover through overgrazing or uncontrolled burning. Without grasses and native trees to protect the soil, erosion can become a major issue for agriculturalists. It should be mentioned that the controlled entry of livestock into agricultural fields during the fallow season is a traditional practice and can contribute to soil fertility regeneration through manure, and is therefore not in itself a source of conflict, whereas excess livestock densities combined with uncontrolled burning to stimulate grass regrowth as well as excessive lopping of trees for fodder lead to the degradation of soil and vegetation. Therefore, the objective is not to exclude cattle herders from agricultural lands but rather to reach (or re-instate) agreements that are beneficial for both sides
- *Uncontrolled burning (bush fires) by herders, farmers and hunters to stimulate grass regrowth:* It is common that herders may burn grasslands to generate new growth; while controlled burns can be useful for both farmers and herders, uncontrolled burns can destroy quality fields or planted fields threatening crops and clearing out native plants and tree cover. On the other hand, farmers may clear out grazing lands for crops, reducing grasslands for herders. Uncontrolled burns lead to erosion issues, water pollution, destruction of trees, and social conflicts between groups.<sup>22</sup>
- *Inappropriate and illegal use of certain fertilizers and pesticides:* Although Benin has legislation on the management and use of chemicals and chemical waste, these laws are often ignored and the national institutions that should monitor and enforce these laws are weak. Banned, expired, or simply dangerous pesticides are often used without the proper protective equipment, leading to many deaths and illnesses per year.<sup>23</sup>

#### CLIMATE RISK

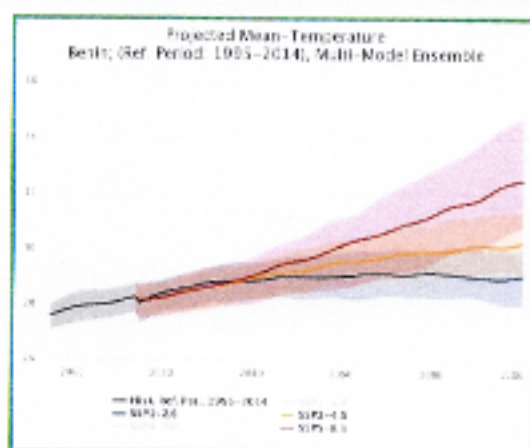
Benin's position in West Africa, between the Atlantic Ocean in the south and the Sahara in the north, and the seasonal movement of the Inner-tropical convergence zone (ITCZ) determine the country's climate, with decreasing rainfall from the south to the north and a pronounced seasonal contrast in rainfall between the wet and dry seasons. The country's northern regions in particular are its driest and hottest ones, characterized by a single rainy season and are among the most vulnerable to climate variability and change. Benin's ND-GAIN index was 159 out of 181 in 2019, characterizing the country as having high vulnerability to, and low readiness

<sup>22</sup> See [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwJL90tUJfzAhXRmFwKHR\\_QDWAQFnoECAMQAAQ&url=https%3A%2F%2Fwww.mdpi.com%2F2073-445X%2F10%2F4%2F425%2Fpdf&usq=AOvVaw0SsqJxnHT7Be1pFkOI2Q-vd](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwJL90tUJfzAhXRmFwKHR_QDWAQFnoECAMQAAQ&url=https%3A%2F%2Fwww.mdpi.com%2F2073-445X%2F10%2F4%2F425%2Fpdf&usq=AOvVaw0SsqJxnHT7Be1pFkOI2Q-vd)

<sup>23</sup> See <https://www.unep.org/news-and-stories/story/waste-no-more-benin-confronts-long-history-chemical-waste-mismanagement>

for, climate change.<sup>34</sup> The dependence of the country on agriculture and livestock increases its vulnerability to climate shocks (droughts, flooding), especially in its northern provinces with its long dry season and very intensive rainfalls during the rainy season. Climate models project an increase in temperature for the entire country, with increasing temperatures and reduced precipitation affecting both subsistence and cash crops, such as cotton<sup>35</sup>.

The project design considers a range of current and projected climate risks and impacts. The climate projections used to inform this project design for Benin are based on multi-model ensembles for three emissions scenarios (RCP 2.6, 4.5 and 8.5), for projections up until 2050 for planning purposes. Under a more optimistic emissions scenario (RCP 2.6), northern Benin is projected to experience a median temperature increase of 0.8 °C by 2050 and 1.1 °C for 2080 compared to reference levels by 2100. With RCP 4.5, projected median temperature increase in 2050 is almost 0.85 °C and 1.75 °C in 2080. Under a worst-case scenario, the median temperature increase is 1.4 °C in 2050, and 3.28 °C in 2080. This pattern holds true for the whole of Benin (see Figure 1 for projected temperature increases under those scenarios). As is evident from the figure, there is substantial overlap in the ranges of temperature anomaly up until mid-century for the three different emissions scenarios.



**Figure 1: Projected mean temperature for whole of Benin based on ensemble models of three scenarios (RCP 2.6, 4.5 and 8.5)**

Given the above, the project is designed to address not only impacts that are already observed but also to respond to the above range of anticipated temperature change, together with a corresponding range of potential impacts on the agricultural sector, on ecosystems, and on water resources through the planning horizon of 2050. Further description of a range of climate projections for Benin is available in the following embedded document (RCP 2.6, 7.0, 8.5) for the north (PDA 1 and 2) and the south (PDA 5):

<sup>34</sup> GAIN index summarizes a country's vulnerability to climate change and other global challenges in combination with readiness to improve resilience. Benin profile: <https://gain.nd.edu/our-work/country-index/rankings/>  
Methodology: [https://gain.nd.edu/assets/254377/nd\\_gain\\_technical\\_document\\_2015.pdf](https://gain.nd.edu/assets/254377/nd_gain_technical_document_2015.pdf)

<sup>35</sup> <https://climateknowledgeportal.worldbank.org/country/benin/climate-data-projections>





In the Niger Valley (PDA 1), desertification is a serious threat, with lower rainfall, changes in seasonality, stronger windstorms and droughts, while in the south (PDA5), rainfall variability and floods caused by intensive rainfall are becoming more frequent. Lower and/or less predictable rainfall impacts vulnerable smallholder farmers and small-scale livestock herders most severely, many of whom are also directly dependent upon the declining forest and savannah ecosystems for safety nets during times of climatic or economic shocks. For example, in northern Benin, delays and more erratic rainfall led to a decrease in cereal production by 5% in 2014 compared to yield in the previous year.<sup>86</sup> Climate impacts on farmers are most clearly seen in reports of damage to crops from water stress, high temperatures and stronger winds, disease and pests; unpredictability of rainfall and changes in the onset and length of the wet and dry seasons challenging the seasonal calendar and leading to a decline in staple food crop yields, increased pest and diseases affecting both livestock and agricultural production. As reviewed above, significant negative impacts of climate change on livestock herders and crop farmers have already been observed in Benin, including leading to increased conflicts among transhumant herders and local farmers, and major impacts on food security due to yield reductions for the main staple crops of the country (maize, cowpea, yam, etc) have been projected for the coming decades.

Average temperatures in the country have increased by 1.1°C since the 1960s, with strongest increases in the north of the country. The average number of “hot” days increased by 39 in between 1960-2003 and “hot” nights by 73.<sup>87</sup> Heat waves have become common. The annual number of wet days and annual total maximum 30-day rainfall declined from the 1960s to 2000,<sup>88</sup> while intensity of rainfall has increased leading to more flash floods and soil erosion.

Projections for precipitation are variable and it is not clear whether average rainfall will increase or decrease; moreover, there has been a pronounced fluctuation of rainfall over the last decades, with high average rainfalls in the 1960, low rainfalls in the 1970s and 1980s, followed by increasing rainfalls in recent years. This fluctuation makes it difficult to distinguish climate change trends or to make projections for future climates, as is generally the case in West Africa due to its geographic position between the ocean and the desert. There is however an expectation that the percentage of rain that falls in high-intensity events is likely to increase.

Taken together, the above climate trends make Benin highly vulnerable to droughts, floods and wildfires. While rainfall trends are uncertain, the increasing temperatures especially in the north of the country will make drought events and dry season fires more likely, and rising rainfall intensities are likely further to increase the already prevalent risk of flooding throughout the country, especially if seen in combination with the wide-spread degradation of

<sup>86</sup> [Men and women farmers in Benin are responding differently to climate change \(theconversation.com\)](https://theconversation.com/men-and-women-farmers-in-benin-are-responding-differently-to-climate-change)

<sup>87</sup> <https://reliefweb.int/sites/reliefweb.int/files/resources/Benin.pdf>

<sup>88</sup> <https://reliefweb.int/sites/reliefweb.int/files/resources/Benin.pdf>

the vegetation cover due to the expansion of agriculture. Climate change is likely to negatively affect agriculture and livestock production through recurrent droughts, wildfires and flooding. It could also affect the quality and reliability of water resources (e.g., seasonal drying up of wells especially in the north and contamination of water courses through flash floods), and could lead to increase in certain human and livestock diseases. Climate change interacts with and compounds the problems caused by deteriorating ecosystem services, landscape degradation, soil erosion and biodiversity loss, exacerbating livelihood risks and leading to displacement, emigration and food insecurity for many affected communities. Northwestern Benin (Atacora) has seen both in-migration from neighboring countries to the areas around Pendjari Biosphere Reserve and out migration/emigration due to food shortages, soil degradation, poverty and declining livelihoods.<sup>39</sup> In the southern plateau area, maize production during the short rainy season is no longer viable for many farmers because the soil is flooded due to excessive rains or river floods.<sup>40</sup> Based on climate projections recent studies have shown that current agricultural calendar could result in a reduction in yields of up to 20-50% by 2050 (Sarr, 2012).

The uncertainty of future climate change scenarios, particularly with respect to changes in precipitation, seasonality and intensity, which is typical for large parts of West Africa, suggests that land use interventions need to focus on increasing the resilience of populations and ecosystems to a range of climate change scenarios, including both drier and wetter future conditions. This general strategy also needs to take into account the interaction of climate with trends in land use and vegetation cover, such as increased risk of flooding due to the degradation of hill slopes and the occupation of lowlands by permanent agriculture. Moreover, it needs to consider the uncertainty even of current climate data, which in part results from the pronounced local variability of rainfall that is characteristic of the West African savanna regions.

Climate change is exacerbating the degradation of productive forest and agricultural lands in the target project PDAs in a number of ways. These effects have been documented in various reports and have been reported to the project development team in the course of multiple stakeholder consultation sessions that took place during their field visits.

For several decades, forest resources have been heavily degraded due to various anthropic pressures—anarchic/ lawless extension of agricultural and pastoral areas with occupancy of the beds of the rivers and other water bodies, impoverishment of soils and change of land use, etc. As far as major climate-related hazards having the greatest impacts on forest ecosystems and riparian communities, these are floods, heavy rains and drought. Livelihoods most affected by these factors include those of smallholder foresters and farmers.

Beyond these livelihoods, those of urban and rural wood craftsmen, transporters, hunters, traders in fuelwood and lumber and traders in non-timber forest products have also become

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<sup>39</sup> Sow, P. S. Adaawen and J. Scheffran. 2014. Migration, Social Demands and Environmental Changes Amongst the Frafra of Northern Ghana and Biali in Northern Benin. *Sustainability*, 6 (1): 375-398. *Sustainability*, 6: 375-398.

<sup>40</sup> Baudoin et. al. 2014. Small scale farmers' vulnerability to climatic changes in southern Benin: the importance of farmers' perceptions of existing institutions. *Mitg.Adapt.Glob.Change*.

more vulnerable due to dwindling access to basic resources. Likewise, nurserymen (pépiniéristes) have faced increased vulnerability due to scarcity of seedlings.

Climate change is affecting the agriculture, livestock, fishing and aquaculture sectors within the project areas as follows:

- Increasingly long dry spells causing scarcity of grazing, increasingly pronounced soil degradation and corresponding declines in crop productivity;
- Violent rains which lead to a delay in the sowing periods of the main crops;
- Excessive heat and lengthening of the dry season responsible for the early and prolonged drying up of water resources needed for agricultural and transhumance activities;
- Disruption of the agricultural calendar, decline in agricultural yields, the disruption of fishing and aquaculture activities, the high mortality of livestock, etc. attributable to these climatic risks, with significant economic repercussions on the affected populations lives (poverty, food insecurity, low income, migration of the population, socio-professional group and ethnic conflicts, etc.).

**Table 1** below presents details of the above impacts, disaggregated according to the three target PDAs.

Among the impacts of the above on the forest ecosystems of Benin are the decline of gallery forests, physiological and ecological dysfunction of certain forest ecosystems, the loss of biodiversity, regression of the populations of characteristic ligneous species (*Dialium guineenses*, *Sclerocarya birrea*, *Azelia africana*, *Diospyros mespiliformis*, *Daniellia oliveri*, etc.), the reduction in the size of fauna populations and modified population structures of certain plant and animal species.

**Table 3: Ongoing impacts of climate change, by PDA**

	PDA1: Niger Valley	PDA2: Alibori Sud- Borgou Nord-2KP	PDA3: Zou-Gouffo
Climate risk	Description	Description	Description
Floods	<p>Overflow of rivers, mainly the Niger River, the Alibori, the Mekrou in the communes in August – September, due to the concentration of rainwater over a short period of the year (July-August)</p>	<p>Mainly due to the overflow of rivers</p>	<p>Overflow of rivers</p>
	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>- Flooding of rice fields and developed perimeters</li> <li>- Flooding of the lowlands of the municipality</li> <li>- Decline in yield due to the rotting of the roots of the plants and their yellowing</li> <li>- Loss of agricultural production (mainly rice)</li> <li>- Proliferation of water borne diseases</li> <li>- Loss of agricultural and fishing equipment, etc</li> <li>- Loss of livestock</li> <li>- Contribution of humus</li> </ul>	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>- Decline in yield due to rotting of the roots of the plants and their yellowing</li> <li>- Loss of agricultural production</li> </ul>	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>- Impacts on maize, yam, cowpea, groundnut</li> <li>- Slow growth, yellowing of leaves and loss of crops</li> <li>- Food insecurity</li> <li>- Destruction of road infrastructure (eg bridges)</li> <li>- Disruption of human mobility and transport of agricultural products</li> <li>- Multiplication of mosquitoes</li> <li>- Desertion of certain dwellings</li> <li>- Development of waterborne diseases</li> <li>- Damage to fish farmers</li> </ul>
Drought and pockets of drought	<p>Lengthening of the dry season; severe in May - June and September - October</p> <p>Pocket of drought in the middle of the rainy season (15 to 30 days) at the municipal level</p>	<p>Lengthening of the dry season</p> <p>Pocket of drought in the middle of the rainy season (15 to 30 days)</p> <p>scale communal</p>	<p>Includes late rains and sudden stoppages of rains</p>
	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>- Withering of plants and loss of crops</li> <li>- Scarcity of water points and pastures for animals</li> <li>- Increase in vegetation fires</li> <li>- Lots of rodents</li> <li>- Withering of plants and loss of crops</li> <li>- Scarcity of water points and pastures for animals</li> <li>- High mortality of plants (especially young ones)</li> </ul>	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>- Withering of plants and loss of crops</li> <li>- Difficulty for animals to drink</li> <li>- Mortality raised young plants</li> <li>- Increase in bush fires</li> </ul>	<ul style="list-style-type: none"> <li>- Impacts on corn, rice, yam, cowpea, cashew, groundnut, groundwater and wells, animals and plantations</li> <li>- Impoverishment of agricultural land, decline in yield and impoverishment of producers</li> <li>- Disruption of the agricultural calendar</li> <li>- Drop in groundwater level and drying up of wells</li> <li>- Scarcity of fodder</li> <li>- Drying up of watercourses</li> <li>- Food insecurity</li> </ul>
Late and violent rains	<p>1 to 2 months behind the expected date of the first rains, delay that can go as far as June or even July</p>	<p>1 to 2 months behind the probable date of the first rains (delay that can go as far as June or even July)</p>	<p>1 to 2 months behind the probable date of the first rains (delay that can go as far as June or even July)</p>
	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>- Late sowing dates</li> <li>- Reduced germination rates</li> <li>- Lower yields</li> <li>- Disruption of agricultural activities</li> <li>- Destruction of infrastructure</li> <li>- Turns over crops</li> </ul>	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>- Late sowing dates</li> <li>- Reduced germination rates</li> <li>- Lower yields</li> <li>- Disruption of agricultural business</li> </ul>	<ul style="list-style-type: none"> <li>- Late sowing dates</li> <li>- Reduced germination rates</li> <li>- Lower yields</li> <li>- Disruption of agricultural business</li> </ul>

	PDA1: Niger Valley		PDA2: Alibori Sud Borgou Nord-2KP		PDA3: Zou-Couffo	
Climate risk	Description	Impacts	Description	Impacts	Description	Impacts
<b>Strong winds</b>	Blow very often during the rainy period; periodic sandstorms	<ul style="list-style-type: none"> <li>- Turns over crops</li> <li>- Destruction of infrastructure</li> <li>- Falling trees</li> <li>- Causes fires</li> </ul>	<p>Blow very often during the rainy period throughout the town, sometimes accompanied by whistling</p> <p>These types of wind occur 2 to 3 times a year</p>	<ul style="list-style-type: none"> <li>- Four crops</li> <li>- Destruction of infrastructure</li> <li>- Falling trees</li> <li>- Diversion of animals from their route</li> <li>- Causes fires</li> </ul>	<p>Dry season and end of rainy season, thousands</p>	<ul style="list-style-type: none"> <li>- Impacts on people, fauna, flora, land, habitat</li> <li>- Destruction of barns, forests and crops</li> <li>- Lodging (?) of certain crops and windfalls in forests</li> </ul>
<b>Excessive heat</b>	Rise in temperature compared to the ordinary throughout the municipality High heat during the dry season (heat wave)	<ul style="list-style-type: none"> <li>- Drying out of crops</li> <li>- Drying up of watercourses</li> <li>- Low productivity of livestock and fishing</li> <li>- Negative impacts on humans</li> </ul>	<p>Rise in temperature compared to the ordinary throughout the municipality</p> <p>High heat throughout the dry season</p>	<ul style="list-style-type: none"> <li>- Drying up of crops and drying up of waterways</li> <li>- Weak livestock productivity</li> <li>- Negative impacts on humans</li> </ul>	<p>January - February</p>	<ul style="list-style-type: none"> <li>- Impacts on human and animal health;</li> <li>- Cashew and citrus plantations falling water table and dehydration;</li> <li>- Decline in soil moisture and crop productivity;</li> <li>- Development of diseases (anocytosis);</li> <li>- Burning of plantations and crops</li> <li>- Decline in yield;</li> <li>- Producer debt</li> </ul>

Among the impacts of the above on the forest ecosystems of Benin are the decline of gallery forests, physiological and ecological dysfunction of certain forest ecosystems, the loss of biodiversity, regression of the populations of characteristic ligneous species (*Dialium guineenses*, *Sclerocarya birrea*, *Azelia africana*, *Diospyros mespiliformis*, *Daniellia oliveri*, etc.), the reduction in the size of fauna populations and modified population structures of certain plant and animal species.

Local stakeholder consultations in Benin and neighboring Togo (which has a very similar climate) during two parallel GEF PPG phases have also shown that local people in several areas have begun to observe an increase in rainfall intensity and resulting flood risks during the rainy season, while drought remains a major threat to agricultural livelihoods during the dry season. This is compounded by shifts in rainfall seasonality, higher temperatures and variability in rainfall amounts. This project will therefore prioritize interventions that increase the resilience of natural and agricultural ecosystems to a range of climate hazards, and that are identified in consultation with the local population. This will include an emphasis on the restoration of tree cover (including of useful species such as néré, karité (shea), baobab, as well as fuelwood species) especially on hill slopes and erosion-sensitive sites; the management of pasture areas and corridors (for seasonal migration) to conserve a sufficient vegetation cover and increase water infiltration, e.g. by reducing the use of fire; and the management of agricultural fields for increased water infiltration and storage, e.g. by maintaining soil cover, increasing soil organic matter content and improving soil structure through multiple cropping, the avoidance of fire and the strategic use of trees (agroforestry).

#### SOLUTIONS AND BASELINE ACTIVITIES

A variety of actions have been identified to cope with the above set of challenges. These solutions have emerged at community, regional, national and international levels and range from policies and plans—themselves embracing specific detailed approaches and solutions—to specific techniques developed by communities.

An important source in identifying actions and solutions was a series of consultations that took place in May 2021 between local stakeholders and the national team involved in the Project design. The consultations were part of the stakeholder engagement process that has ensured a participatory approach since the earliest stages of project design.

These solutions and specific baseline actions taken in support of their implementation, are reviewed below.

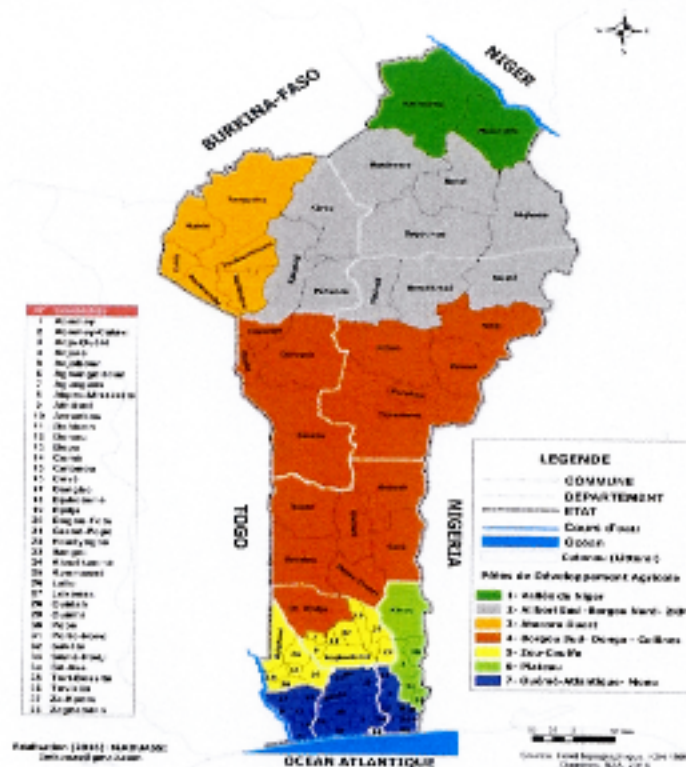
#### *(i) National policies and strategies for addressing land degradation and climate change adaptation*

Strategic Plan for the Development of the Agricultural Sector (PSDSA 2025)

A national agriculture development plan, titled the “Strategic Plan for Development of the Agricultural Sector”, known as ‘PSDSA 2025’, was approved in May 2017. The plan’s main objective is to encourage investment in agricultural productivity in order to ‘produce more, produce better’. The Plan aims to provide not only for national food security, but to position Benin as a competitive producer within the region. Agricultural crop and value chain diversification is an important strategy identified in Benin’s Nationally Determined Contribution<sup>41</sup> to help the country withstand projected climate impacts. Integrating consideration of climate risks into agricultural development and strengthening climate change adaptation for water resources, biodiversity and human settlements were identified as key actions in the National Action Plan for Adaptation (2008).

In order to implement the PSDSA, seven Agricultural Development Areas (*Pôles de développement agricole*) or PDAs, each with its own associated Territorial Agency for Agricultural Development (ATDA),<sup>42</sup> along with twelve Decentralised Departments for Agriculture, Livestock and Fisheries (DDAEP), have been established. Map 1 below presents the seven PDAs, while Table 3 identifies agricultural crops that have been prioritized for each area.

**Map 1: The seven Agricultural Development Areas (*Pôles de développement agricole*)**



**Table 4: Main crops in Benin’s PDAs**

<sup>41</sup> NDC, 2017

<sup>42</sup> The creation, roles and responsibilities of the Territorial Agencies for Agricultural Development are governed by Decree No. 2017-101 of 27 February 2017.

PDA number and name	Main crops
PDA N°1 « Vallée du Niger »	Rice and market gardening (tomato, onion, pepper, potato), cattle, sheep, goat and poultry farming
PDA N°2 « Alibori-Sud, Borgou-Nord et 2KP	Cotton, maize and sorghum, intensive breeding of cattle, sheep, goats and poultry
PDA N°3 « Atacora-Ouest »	Cotton and rice, maize, legumes (cowpeas and peanuts) and mango, intensive breeding of cattle, sheep, goats and poultry
PDA N°4 « Borgou-Sud, Donga et Collines »	Cashew and cotton, maize, rice, roots and tubers (cassava and yam), legumes (cowpeas, soybeans and peanuts), and mango, intensive breeding of cattle, sheep, goats and poultry
PDA N°5 « Zou et Couffo »	Citrus fruits, mangoes, oil palm, rice, Maize, cowpeas, peanuts (Agonlin oil) and small livestock
PDA N°6 « Plateau »	Oil palm, maize, cassava and rice are also grown there
PDA N°7 « Ouémé, Atlantique et Mono »	Aquaculture, rice growing and market gardening, pineapple, maize, cassava and small livestock

### Setting of Land Degradation Neutrality (LDN) targets

Benin has established national land degradation neutrality (LDN) targets and aims to achieve LDN by 2030.<sup>43</sup> This objective is to be achieved through a combination of restoration of 1.25 million hectares of degraded land and increased efforts to reduce and avoid degradation.

To achieve LDN by 2030, Benin has set the following targets:

- i) Restore at least 50% (1.2 million ha) of degraded land;
- ii) Limit the loss of non-degraded land to 5% (398,200 ha); and
- iii) Attain 12% (1,364,603 ha) net improvement in vegetation cover<sup>44</sup>.

The **measures** and efforts needed to attain the LDN targets include:

- reduce forest and savannah conversion from 21% to 5% (1,484,900 ha to 353,547 ha);
- increase forest cover by 5% (154,895 ha);
- increase agricultural land productivity on 2,431,400 ha; include LDN in national and local political priorities;
- reinforce political and institutional framework on management of forests;
- actively include local stakeholders and promote alternative livelihoods;
- promote climate-smart and resilient agriculture; develop fruit tree arboriculture; and
- restore degraded natural forests, degraded, bare and abandoned lands.

### Nationally Determined Contribution (NDC) under UNFCCC

<sup>43</sup> [https://www.unccd.int/sites/default/files/inline-files/Benin\\_3.pdf](https://www.unccd.int/sites/default/files/inline-files/Benin_3.pdf)

<sup>44</sup> Benin Country Profile: Global Mechanism



Benin has also developed land-based mitigation plans as part of its Nationally Determined Contribution<sup>45</sup> (NDC) under UNFCCC. These include: a 5.7% reduction in emissions between 2021-2030 by reducing the annual rate of deforestation by 41.7%; a 20.6% reduction in methane emissions by 2030; strengthening reforestation and planting efforts through sustainable development of forests; promoting organic fertilisers for sustainable soil management; and promoting access to fuel-efficient stoves to reduce wood energy consumption. Climate risk informed ecosystem restoration and sustainable land management efforts implemented to help achieve land degradation neutrality will also support climate change adaptation by reducing soil erosion, regulating the microclimate, and improving water quality and quantity. Furthermore, sustainable land management and restoration interventions (including natural regeneration and agroforestry) will provide direct benefits through enhanced food production, diversified income sources and more resilient value chains.

Benin's NDC articulates the following priorities for adapting to, and strengthening resilience to, climate impacts across the agriculture and forestry sectors by 2030:

reduce the vulnerability of communities arising from degradation of forest ecosystems and land degradation;

ensure diversification and promotion of high value-added, climate-resilient, agricultural value chains, as well as modernizing and enhancing the resilience of farm infrastructure;

promote suitable systems of agricultural production that is resilient and adapted to climate change for food and nutritional security (climate-smart agriculture); and

define new agricultural calendars adapted to a changing climate and specific to each of the major agro-climatic zones.

In addition to the adaptation options articulated in the NDCs, adaptation strategies employed by farmers include mulching, diversifying crops grown, adopting crop rotation, abandoning certain crop types that require the application of high rates of pesticides and fertilizers, and adopting the use of faster growing varieties for crops like maize. Agroforestry with fruit trees is an important diversification strategy used by some farmers in building resilience to climate change.<sup>46</sup> Agroforestry also plays an important role in reducing and reversing land degradation, and is thus an important aspect of climate change adaptation in Benin's agricultural sector.

#### Other strategies

Benin has also adopted a series of strategic documents that include the 2008 National Adaptation Programme of Action and the 2016-2025 Low-Emission Climate-Resilient Development Strategy. In addition, the Government has recognised the threat posed by climate change in its 2016-2021 Government Action Plan (Plan d'Action Gouvernemental -

45 Benin's NDC. October 2017. <https://www4.unfccc.int/sites/NDCStaging/Pages/Party.aspx?party=BEN>

46 Fadina, R. and D. Barjolle. 2018. Farmers' adaptation strategies to climate change and their implications in the Zou Department of South Benin. *Environments*. doi:10.3390/environments5010015

PAG), which outlines Benin's vision for sustainable economic and social development. The PAG integrates consideration of the SDG 2030 and the Paris Climate Agreement at its heart.

Benin's NDC is anchored in the SDGs in relation to the priority targets for national development and the Government Action Plan (PAG 2016-2023) specifies six areas of adaptation priority, including resilience in agricultural production and water resources. Adaptation objectives for the agricultural sector in the NDC include: i) ensuring diversification and promotion of high value-added agricultural value chains, as well as modernizing the resilient farm infrastructures in climate change context; ii) promoting suitable systems of agricultural production resilient and adapted to climate change for food and nutritional security, and; iii) defining new agricultural calendars adapted to a changing climate. Various implementation actions have been undertaken at the regulatory, institutional and political levels. These actions include the development of laws and normative measures, the definition of policies and strategies, the formalization of the institutional framework through the establishment of bodies and structures (political, technical and financial), etc. These include:

- (i) establishment of the implementation committee of the Benin NDCs;
- (ii) internalization of the document at regional, national, and local levels;
- (iii) ongoing implementation of the Reporting and Verification Measures (MRV) system with support from GEF and FAO;
- (iv) the ongoing evaluation of technology needs;
- (v) the implementation of certain projects in various sectors of the country (agriculture, energy, water resources, coastal erosion);
- (vi) the ongoing updating of the NDC document with the support of UNEP;
- (vii) Benin's accession to the Nationally Determined Contributions (NDC) Partnership;
- (viii) the passage of the Law on Climate Change; and
- (ix) the transformation of the National Determined Contribution into a Climate Business Plan to better encourage investors.

A comprehensive process for developing the country's National Adaptation Plan (NAP) will likely yield the NAP in 2021. The NAP process is being supported by the joint UNDP/UN Environment's National Adaptation Plan Global Support Programme (NAP-GSP), GIZ, AfDB and the preparatory program to the Green Climate Fund (GCF). Achieving climate risk informed and resilient agricultural livelihoods will contribute to Benin's objective for SDG 1, 2, 3, 5, 8, 10, 13, and 15.

#### UNCCD 2030 Strategic Framework and the Sustainable Development Goals

The 2030 Agenda for Sustainable Development places heavy emphasis on an integrated approach to achieving SDGs that can harness synergies and minimize potential trade-offs. Land plays an important part in accelerating the achievement of many SDGs. Benin has prepared a road map that sets out a number of participatory and inclusive activities bringing together government agencies, municipal authorities, locally-elected officials, parliamentarians, civil society and the media, and members of the private sector to support achievement of the SDGs. Maintaining and restoring land resources in Benin will play a vital role in tackling climate change, securing biodiversity and maintaining crucial ecosystem services, while ensuring shared prosperity and well-being. Healthy and productive land can play an unparalleled role as an engine of economic growth and a source of livelihoods for billions worldwide, including the most vulnerable populations. Achieving climate risk informed and resilient land degradation neutrality (LDN) will help Benin to achieve multiple SDGs, including SDGs 1, 2, 3, 5, 6, 7, 8, 11, 12, 13 and 17.

(ii) *Institutional developments*

Creation of multi-sectoral forums

In order to support implementation of the PSDSA, a number of multi-sectoral forums, such as Producer Unions, Interprofessional Associations and Thematic Committees, have been created at national, district and local levels. These forums are designed to support implementation of the national agricultural reforms and provide guidance for improved agricultural production and human development.

Territorial Agency for Agricultural Development (ATDA)

The role of the Territorial Agency for Agricultural Development (ATDA)—which is under the Ministry of Agriculture, Livestock and Fisheries—is to facilitate improved coordination between value chains across the territories and to ensure that relevant tools and procedures are applied, particularly with regard to:

- the selection of priority sectors and value chains for each PDA;
- making inputs and strengthening the various links in promising value chains;
- strengthening relations between the different ‘players’ in the value chains;
- establishing strategic partnerships for targeted responses to problems faced by producers, processors, financial services, traders (in agricultural products and their derivatives), and consumers, and;
- promoting the development of hydro-agricultural and agricultural mechanization, as well as infrastructure, within the PDA.

Associations and extension services

In recent years, a number of civil society organizations have emerged which group together, and provide extension and other support services to, the agricultural and related sectors. These represent an important element of the project's institutional baseline. They include:

- FUPRO-BENIN: Fédération des Unions de Producteurs du Bénin
- GEA-BENIN: Groupement des Exploitants Agricoles du Bénin
- ONPB: Organisation Nationale des Paysans du Bénin
- ANEP: Association Nationale des Eleveurs de Porcs
- UNAPEMAB: Union Nationale des Pêcheurs Marins et Assimilés du Bénin
- ANAB: Association Nationale des Aviculteurs du Bénin
- FNPPH: Fédération Nationale des Producteurs du Palmier à Huile
- ANOPER: Association Nationale des Organisations Professionnelles des Eleveurs de Ruminants
- SYNPA: Synergie Paysanne
- COLLEGE DES FEMMES des OP du Bénin
- FENAPAB: Fédération Nationale des Producteurs d'Anacarde du Bénin
- Conseil de Concertation des Riziculteurs du Bénin (CCR-B)
- Association nationale des professionnels transformateurs d'agrumes (AProTAB)
- Fédération nationale des organisations de maraîchers du Bénin

(iii) *Projects*

Building on the actions described above, a number of projects are in progress / planned to address the above-described development challenge. These projects, and their intersection with the present GEF project, are shown in **Table 5** below.

Table 5: Ongoing and planned baseline projects with which the GEF project will partner<sup>47</sup>

Project and Donor	Sector and location	Main anticipated results	Project period	Implementing Partner	Links to outputs ...
Project APAD I-WAP (UE-UEM OA)	Transfrontier project (Benin, Burkina Faso, Niger) on integration of adaptation and mitigation measures to climate change in management of the WAP <sup>48</sup> cross-border parks complex. The project aims to strengthen the resilience of ecosystems and improve the living conditions of populations in the WAP complex in the face of climate change through the establishment of a multi-risk early warning system relating to droughts, floods and fires, and the implementation of adaptation measures to manage these emergencies	<ul style="list-style-type: none"> <li>- Integration of climate change aspects and the emergency plan (MREWS) in the management of the WAP Complex</li> <li>- Design and implementation of a multi-risk early warning system (drought, floods and fires)</li> <li>- Improving ecosystem resilience and human livelihoods through implementation of adaptation actions</li> <li>- Awareness, communication and capacity building for concerted, integrated and sustainable management of the WAP Complex</li> </ul>	2019-2023	Sahara et Sahel Observatory (OSS)	1.2; 1.3; 1.4; 1.5; 2.1; 2.2; 2.5.
Project to support the development of the cashew sector and agricultural entrepreneurship in Benin (PADEFA-ENA) <sup>49</sup> (FAD)	Project Site overlap: <b>Karimama, Gogounou, and Kouandé</b> The Project aims to reduce poverty and improve food and nutrition security in Benin. It also aims to develop the cashew sector and to promote agroforestry  No project site overlap but complementary activities and collaboration and sharing of lessons learned	<ul style="list-style-type: none"> <li>- Reshaping of rural roads</li> <li>- Construction of warehouses</li> <li>- Rehabilitation of old plantations</li> <li>- Creation of modern orchards</li> <li>- Creation of processing units</li> <li>- Jobs for youth</li> </ul>	2019-2024	MNEP/ATDA 4	2.1; 2.2; 2.3; 2.4; 2.5; 3.2; 3.3; 3.4; 3.5.
Support program for the sustainable management of communal forests in Benin (Phase II) FFCM	Sustainable management of communal forests in Benin  No project site overlap but there are parallel project objectives	<ul style="list-style-type: none"> <li>- Promoting private communal forests</li> <li>- Sustainable supply of energy wood and charcoal</li> <li>- Promotion of alternative measures for sustainable management of classified forests</li> </ul>	2018-2023	COFORMO	2.1; 2.2; 2.3; 2.4; 2.5; 3.2; 3.3.

<sup>47</sup> The present project has been developing partnerships with all of these projects, a portion of whose budgets are included in project cofinancing (see below, Partnerships).

<sup>48</sup> The WAP Complex (W-Arly-Pendjari Complex) is a Transboundary Natural UNESCO World Heritage Site in Benin, Burkina Faso and Niger

<sup>49</sup> PADEFA-ENA - Programme d'Appui au Développement de la Filière Anacarde et de l'Entreprenariat Agricole au Bénin

Project and Donor	Sector and location	Main anticipated results	Project period	Implementing Partner	Links to outputs ...
Integrated Program for Development and Adaptation to Climate Change in the Niger Basin (PIDAC) <sup>50</sup> (BOAD <sup>51</sup> BM)	The project aims to improve the resilience of Niger River ecosystems and populations through sustainable management of natural resources  Project site overlap: <b>Karimama</b>	<ul style="list-style-type: none"> <li>- Water resource management and construction of water reservoir</li> <li>- Restoration of African fan palm</li> <li>- Rehabilitation of two hydroelectric dams</li> <li>- Dam construction for the promotion of rice growing</li> </ul>	2019-2024	DGEau/MEM <sup>52</sup>  DQJFF <sup>53</sup> /MAEP	2.2; 2.4; 2.5; 3.2;
Project to improve the climate resilience of rural communities in central and northern Benin (Green Climate Fund)	Management of forest and agricultural landscapes  No project site overlap but important for coordination and collaboration on mechanisms and activities of mutual value	<p>The project aims to protect communities from the harmful effects of climate change through adapting agricultural livelihoods and productivity, and investing in land management</p> <p>Climate resilient agricultural interventions will be implemented in seven central municipalities and in the north of Benin in the municipalities of: Dassa, Tchaourou, Djougou, Ouaké, Coby, Boukoubé and Banikoara</p>	2022	DGEFC	2.2; 2.3; 2.4; 7.5; 3.2; 3.3.
Intensive Reforestation Project (BN)	The project aims to strengthen the country's forestry through intensive reforestation of land and forests in all of Benin's municipalities in order to make wood energy more available and to fight climate change  Project site overlap: <b>Gogounou, Ségbana, Kouandé, Karimama, Cové, Za-Kpota, Kouékanmè and Aplahoué</b>	<ul style="list-style-type: none"> <li>- Develop industrial plantations for the sustainable supply of wood needs</li> <li>- Strengthen the sustainability of urban, peri-urban and rural areas to the harmful effects of climate change</li> <li>- Support the dissemination of sustainable land management practices to improve the resilience of populations to the harmful effects of climate change</li> </ul>	2017-2026	DGFCC	1.2; 1.3; 1.4; 1.5; 2.1; 2.2; 2.5.

<sup>50</sup> PIDAC : *Projet Intégré de Développement et d'adaptation au Changement Climatique dans la Vallée du Niger*

<sup>51</sup> BOAD - *Banque Ouest Africaine de Développement*

<sup>52</sup> MEM : *Ministère de l'Eau et des Mines*

<sup>53</sup> DQJFF - *Direction de la Qualité de l'Innovation de la Formation Professionnelle et de l'Entrepreneuriat*

Project and Donor	Sector and location	Main anticipated results	Project period	Implementing Partner	Links to outputs ...
Project to support the development of market gardens (PADMAR)	PADMAR will be limited to the southern regions of Benin and will intervene in 7 of the 12 departments of the country, namely Atlantic, Couffo, Littoral, Mono, Ouémé, Plateau and Zou. In these departments, the Project will intervene in 27 communes out of a total of 44 communes	- Strengthen the institutional, technical and organizational capacities of the various actors Focused on the development of market gardens.	2017-2023	FIDA	2.2; 2.3; 2.4; 2.5; 3.2; 3.3.
Pro Agri3: Programme de Promotion de l'Agriculture (ProAgri)	Project site overlap: <b>Za-Kpota, Cové</b> Atacora : Tanguiéta, Kérou, Kouandé, Péhunco Donga : Boukoubé, Copango, Djougou, Ouaké Borgou : Nikki, N'Dali, Pérère, Tchaoourou Collines : Ouessè, Glazoué, Savè, Dassa-Zoumè	Focused on agricultural support for cashewnut, rice, soybean and shea butter value chains.	2017 - 2020	BMZ/GIZ	2.1; 2.2; 2.3; 2.4; 2.5; 3.2; 3.3; 3.4; 3.5.
Integrated Program for Development and Adaptation to Climate Change in the Niger Basin (Pidacc-Bn) Benin Component	Resilience To Climate Change Banikoara, Bembereke, Gogounou, Kalale, Kandi, Karimama, Kerou, Kouandé, Malanville, Nikki, Pehunco, Segbana, Sinendé	Sustainable agriculture lowland development restoration of degraded lands reforestation	2019-2025	FAD DCF UE BENIN	2.2; 2.3; 2.4; 2.5; 3.2; 3.4; 3.5.
ALDIPE -ONG	PDA 5 Zakpota, Cové	Sustainable agriculture, lowland development, restoration of degraded lands, reforestation	permanent	UE ; GIZ ; BM	2.1; 2.2; 2.4; 3.1; 3.2; 3.3; 3.4; 4.2; 4.3; 4.4.
CAPIES	Aplahoué, Klouékammè	Sustainable agriculture, lowland development, restoration of degraded lands, reforestation	permanent	CRDI ; ITA/AFRICA RICE	2.1; 2.2; 2.4; 3.1; 3.2; 3.3; 3.4; 4.2; 4.3; 4.4.

Project and Donor	Sector and location	Main anticipated results	Project period	Implementing Partner	Links to outputs ...
API Service Monde	Kouandé, Ségbana, Gogounou	Sustainable agriculture, lowland development, restoration of degraded lands, reforestation	permanent	UE, AFD	2.1; 2.2; 2.4; 3.1; 3.2; 3.3; 3.4; 4.2; 4.3; 4.4.
DEDRAS	Karimama Ségbana, Gogounou	Sustainable agriculture, lowland development, restoration of degraded lands, reforestation	permanent	GIZ, WOORD D'AVAD Pays-Bas	2.1; 2.2; 2.4; 3.1; 3.2; 3.3; 3.4; 4.2; 4.3; 4.4.
APIC	Karimama Ségbana, Gogounou	Sustainable agriculture, lowland development, restoration of degraded lands, reforestation	permanent	BAD ; GIZ ; IFAD	2.1; 2.2; 2.4; 3.1; 3.2; 3.3; 3.4; 4.2; 4.3; 4.4.



## BARRIERS

In spite of the above baseline efforts, a number of barriers are continuing to limit success in achieving solutions to the inter-connected challenges of land degradation and climate change adaptation in the agriculture and land management sectors. These have been grouped into four areas and are outlined below.

### *Barrier type 1: Political, financial, institutional and regulatory barriers to operationalizing Land Degradation Neutrality and climate change adaptation*

Specific barriers include:

- Limited data management and analysis capacities related to LDN, climate risk and vulnerability assessments for specific crops, livestock and sub-regions, for adaptation planning and other management purposes;
- Policy and institutional barriers; Although land degradation and climate change vulnerability are recognized and are receiving political attention at highest government levels in Benin, including through the creation of an inter-ministerial committee on climate change, a key policy and institutional barrier remains the limited ability of developing, budgeting for and implementing integrated activities and work plans in the areas of land degradation and climate change. The discrepancy between policy goals and plans on the one hand, and the lack of actual implementation on the ground is recognized by the Government of Benin. It is in part caused by the difficulty of allocating operational budgets for inter-institutional and inter-ministerial tasks and also to gaps in capacities and responsibilities for inter-disciplinary tasks especially at local level. The result is that often plans (on LDN, CCA and their integration with agricultural policies) remain on paper and have limited impact on the ground.
- Limited institutional and human capacities for: (i) agricultural and agro-forestry extension and monitoring, or for inter-ministerial coordination and (ii) implementation of national and international policies, plans and commitments, e.g., PSDSA, LDN targets, CCA, NDC, etc

### *Barrier type 2: Site-level barriers to land and forest conservation & restoration under climate change*

Specific barriers include:

- Overlapping, contradictory and non-strategic land use objectives and plans
- Few well managed, well studied examples of integrated management and restoration as part of ecosystem-based approaches to adaptation incorporating direct and indirect climate change risks into spatial planning and prioritization.
- Lack of inter-sectoral coordination at landscape level, e.g. to align agricultural development plans with forest protection objectives integrating a range of relevant climate change scenarios

- Limited human skills and capacities for taking action in support of CCA and LDN, e.g. by adopting innovative practices, stimulating uptake and accessing new markets

*Barrier type 3 - Barriers to sustainable, nature-based livelihoods*

Specific barriers include:

- Limited understanding of how various agricultural value chains could be transformed to be climate resilient, support LDN, conservation and sustainable income generation
- Limited knowledge of climate resilient agriculture value chains
- Income-generating support programs are failing to capitalize on partnership opportunities
- Climate-resilient, zero-degradation products lack adequate marketing opportunities

*Barrier type 4 - Barriers to gender equality and diffusion of innovations and knowledge*

Specific barriers include:

- Women face multiple barriers and challenges to their effective participation and benefitting from sustainable and climate resilient development efforts. During stakeholder consultations women expressed concerns about their lack of participation in decision-making processes. The Gender Analysis conducted during PPG identified the following key challenges, as disparities in terms of gender:
  - Participation of women in **decision-making bodies** at national and local levels is very low.
  - The influence of women in decision-making remains limited and female **participation in political life** is declining. For example, the proportion of women in the National Assembly from the fifth to the eighth term is around 7.62 percent, or six women in the fifth, six women in the seventh and seven women in the eighth.
  - Access to land remains out of reach for the majority of women in Benin. The phenomenon is particularly notable in rural areas, where gender equality is still far from being achieved and women-headed households are more vulnerable to climate change impacts.
  - Women's **lack of access to quality public primary and secondary education** hinders abilities to understand, assimilate and adopt changes needed to adapt to climate change.
  - Limited economic resources, social benefits and political power of women diminish their **ability to react in risk situations**. Other aggravating circumstances include the poor dissemination of emergency information among women and the fact that many women and girls cannot read or write (UNDP, 2009).

- Lessons of LDN & CC adaptation interventions & innovations are inadequately captured, learned and diffused within and beyond target landscapes

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### III. STRATEGY

In addressing drivers of land degradation, the project will take a systemic approach to build climate resilience in vulnerable agricultural and degraded forest-mosaic landscapes, thereby mainstreaming climate adaptation needs and options in Benin. The project proposes actions that acknowledge the intrinsic links between reversing land degradation, supporting climate change adaptation for vulnerable communities, and reducing further pressures on existing natural ecosystems. It will support Benin in achieving its landscape restoration targets in a manner that integrates climate change risks in identifying and selecting types of restoration interventions, and climate resilience as an objective, as well as integrate systematic adaptation planning and action within agricultural communities and institutions. The project will specifically work with smallholders and local communities who depend on farming and small-scale cattle herding for their livelihoods to restore agro-ecosystems, adopt climate resilient agricultural practices and diversify value chains in the productive landscape. The project's approach will address barriers and their underlying root causes, which are currently hindering effective integrated landscape management, addressing the physical, climatic, biological and socio-economic aspects affecting the agro-ecosystems and forestry management.

As noted above, Benin has joined the land degradation neutrality (LDN) process and has committed to achieving the goal of zero net land loss by 2030 in order to preserve terrestrial and aquatic ecosystems. Benin's NDC clearly indicates its awareness of, and commitment to, addressing the needs for adapting the agricultural sector to climate change impacts. Furthermore, climate change adaptation and reversing land degradation are interconnected, with many climate-resilient agricultural practices contributing to improving soil fertility, reducing soil erosion and restoring ecosystem services through restoration and regeneration of ecosystems.

The present project has been designed as an integrated LDN and climate change adaptation project that aims to reverse current trends in land and ecosystem degradation in Benin, build adaptive capacity to enhance climate change resilience of communities, and implement land restoration, and improved livelihoods for communities in the target areas.

As noted above, the Government of Benin carried out a number of reforms to implement the PSDSA, in particular the creation of seven Agricultural Development Areas (PDAs), each with its own Territorial Agricultural Development Agency (ATDA),<sup>54</sup> deployed across 12 Decentralised Departments for Agriculture, Livestock and Fisheries (DDAEP)<sup>55</sup>. The principal

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<sup>54</sup> Roles and responsibilities for the ATDAs were defined in Decree No. 2017-101 (27 February 2017) and Decree No. 2017- 582 (13 December 2017)

<sup>55</sup> The creation and roles and responsibilities of the DDAEP are noted in Order No 2016-581 of 07 November 2016

project partners will be the ATDA structures at the target sites. The project will assist these Agencies—along with selected multi-sectoral, multi-party forums that have been created at national, district and local levels—to implement the reforms that are underway. The project will further provide technical guidance for improved climate resilient agricultural production and sustainable human development that is aligned with Benin’s LDN targets.

The project will focus on three of the country’s seven PDAs. Profiles of these PDAs are presented in **Annex 14**.

In addition to building capacity at PDA level, the project has identified eight target communes, together covering approximately 22,400 km<sup>2</sup>, where on-the ground restoration and prevention actions will take place. **Table 6** below provides basic information on the selected districts, including data on net degradation and deforestation between 2005 and 2015.

**Table 6: Basic data on project target districts, land degradation and deforestation**

PDA	Department	Commune	Area (km <sup>2</sup> )	Population (2013)	Annual pop. growth, 2002-2013 (%)	Net degradation (ha) (2005-2015)	Net deforestation (ha) (2005-2015)
1	Alibori	Karimama	5,041	66,675	4.72%	208	276
2	Atacora	Kouandé	4,500	111,540	2.99%	3,545	838
	Alibori	Ségbana	4,700	89,081	4.79%	4,205	20,378
	Alibori	Gogounou	4,910	117,523	3.48%	3,804	689
5	Coffou	Klouékanmé	394	128,597	2.87%	61	258
	Coffou	Aplahoué	915	171,109	3.37%	17	4,211
	Zou	Cové	525	51,247	3.40%	15	4,687
	Zou	Zakpota	409	132,818	3.78%	12	517

Sources: Deforestation and degradation calculations by project team

Pilot activities within the above communes will demonstrate climate-resilient agricultural development, restoration techniques, income diversification strategies, etc. Restoration and other efforts will include community farmers as well as private forest concessions and plantations (such as teak, eucalyptus and acacia tree species). In addition, the project sites include, or are in close proximity to, classified, community, and sacred forests, as well as protected areas. For example, in the Niger Valley, Karimama,<sup>56</sup> is in close proximity to the

<sup>56</sup> Karimama is a town, commune and arrondissement in Alibori Department and covers 6,102 sq kilometres (610,200 ha). It is located in the north-east of Benin at 12°4'N; 3°11'E

Parc W, whilst Kouandé<sup>57</sup> is close to Pendjari National Park; Gogounou<sup>58</sup> and Ségbana<sup>59</sup> (both in PDA 2, i.e. Alibori Sud-Borgou Nord-2KP), and Aplahoué (Zou-Couffo, PDA 5) include sacred forests. The commune of Aplahoué<sup>60</sup> is associated with a group of sacred forests within Agoua Classified Forest (Terminal Evaluation Report of UNDP SGP project, GEF Project ID 3770).<sup>61</sup> These areas are large and cover an area exceeding 1.2 million hectares. The project's active measures to encourage learning, diffusion, uptake and replication will help to ensure that adoption of improved practices will extend well beyond the 30,000 hectares noted in the project's core indicators.

#### Alignment with GEF focal area and/or Impact Program strategies

The project aligns with two GEFTF funding areas under Land Degradation, namely LD-1.3: Food systems, land use and restoration and LD-2.5: Creating an enabling environment to support voluntary LDN target implementation.

With respect to climate change adaptation, the project responds to two of the three LDCF programming objectives. In addition to supporting "CCA-1: Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation," it is also providing significant support related to "CCA-2: "Mainstream climate change adaptation and resilience for systemic impact." This is particularly evident in light of the project's Joint Programming approach, in which GEFTF funds and objectives for land degradation are being combined in a single project with LDCF funds and programming objectives.

The project's multi-focal area alignment is perhaps best described in the LDCF Programming Strategy document, under LDCF Objective 2: 'Mainstream Climate Change Adaptation and Resilience for Systemic Impact,' which states:

Under this objective, countries may strategically jointly program LDCF grants alongside GEF Trust Fund resources to develop robust projects or programs that generate GEBs as well as adaptation benefits. Such support will capitalize on the GEF's unique mandate to serve multiple MEAs, draw upon its wide-ranging technical strengths, and respond to recent COP guidance to promote synergies across focal areas. This approach towards synergistic programming of adaptation and GEF Trust Fund resources can deliver multiple benefits in terms of sustainability, cost-effectiveness, delivery of holistic solutions, enhanced impacts, and an expanded array of beneficiaries.

Alignment of joint programming will depend on national adaptation priorities as well as priorities for generating GEBs, and will be country-driven...given the high level of alignment of LDC NAPA

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57 Kouandé is a town, commune and arrondissement in Alibori Department with an area of 4,500 sq kilometers (450,000 ha). It is in the north-west of Benin at 10°19'54"N; 1°41'29"E

58 Gogounou is a town, commune and arrondissement in Alibori Department with an area of 4,910 sq kilometers (491,000 ha). It is in the north-east of Benin at 10°50'19"N; 2°50'10"E

59 Ségbana is a town, arrondissement and commune located in Alibori Department with an area of 4,471 sq kilometers (447,100 ha). It is in the north-east of Benin at 10°55'40"N 3°41'40"E

60 Aplahoué is a commune and a city in Couffo Department (it is the Capital of Couffo) and has an area of 572 sq kilometers (57,200 ha). It is in the south-west of Benin at 5°56'N 1°41'E

61 See MTR of GEF-funded UNDP SGP: Intégration des Forêts Sacrées dans le système des Aires Protégées du Bénin - PIFSAP

implementation projects to date in themes/areas of agriculture, land-based actions, sustainable rural livelihoods...<sup>22</sup>

The LDCF Programming Directions go on to describe the potential for integrated benefits, two of which are well captured in the present project. These are:

Climate-resilient smallholder food systems that generate climate mitigation, sustainable land management and biodiversity benefits while addressing the root causes of degradation and vulnerability;

Land-based solutions, such as the Green Wall Initiative, that address cross-cutting themes of adaptation, mitigation, land degradation, and sustainable development...

In recognition of the importance and relative novelty of this Joint Programming approach, careful attention has been paid to ensuring full integration and benefits associated with the mainstreaming approach. Special attention has been paid to ensuring alignment with LDCF guidance, details of which are presented in **Table 7** below.

**Table 7: Project alignment with LDCF objectives and outputs**

LDCF Objective & outcome	LDCF Output (as per CCA results framework)	Corresponding project outputs or activities
<b>OBJECTIVE 1:</b> Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation  <i>Outcome 1.1: Technologies and innovative solutions piloted or deployed to reduce climate-related risks and/or enhance resilience</i>	<b>Output 1.1.1:</b> Physical and natural assets made more resilient to climate variability and change	<b>Output 2.2:</b> Degraded lands amounting to at least 15,000 hectares, and at least 15,000 hectares of forest are under climate risk informed and resilient restoration and functional and sustainable management regimes
	<b>Output 1.1.2:</b> Livelihoods and sources of income of vulnerable populations diversified and strengthened	<b>Output 3.1:</b> Five agricultural value chains are identified and assessed according to their potential to be climate resilient and deliver multiple local, national and global benefits, including income generation, LDN benefit and enhanced adaptive capacity within project PDAs
		<b>Output 3.2:</b> Selected climate resilient and sustainable agricultural and agroforestry practices and market channels are strengthened through investments and extension support for climate resilient agricultural practices, leading to triple-bottom-line benefits, strengthened adaptive capacity of vulnerable communities, job and SMME creation

<sup>22</sup> LDCF-CCA Result Framework.

LDCF Objective & outcome	LDCF Output (as per CCA results framework)	Corresponding project outputs or activities
		<u>Output 3.3:</u> Local, national and regional partnerships established to support and promote 'forest-friendly' and climate resilient income-generating opportunities
	<u>Output 1.1.3:</u> New /improved climate information systems deployed to reduce vulnerability to climatic hazards/variability	<u>Output 1.1:</u> National LDN and restoration database established within the DGEC under MCVDD, bringing together national data sources including related data on climate impacts, vulnerability, and adaptation needs, and linking to global systems for monitoring restoration and LDN
	<u>Output 1.1.4:</u> Vulnerable natural ecosystems strengthened in response to climate change impacts	<u>Output 2.5:</u> Green Belt infrastructure against the advance of the desert in the north of Benin strengthened through development of manuals for climate change resilient restoration and forest regeneration, community managed nurseries for drought resilient tree species of local preference, communal fire control measures, protection of watercourses, integration of tree fodder production to accommodate seasonal passage of pastoralists, and locally managed monitoring for landscape and forest restoration.
<b>OBJECTIVE 2:</b> Mainstream climate change adaptation and resilience for systemic impact <i>Outcome 2.1: Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience</i>	<u>Output 2.1.1:</u> Cross-sectoral policies and plans incorporate adaptation considerations	<u>Output 2.1:</u> Integrated climate risk, land use, landscape restoration, and forest management plans, which incorporate climate scenario-based hazards and likely impacts, are developed, with climate change scenarios informing risks and selection of adaptation options, and developed and operationalised at target sites, with capacity to implement
	<u>Output 2.1.2:</u> Cross-sectoral institutional partnerships established or expanded	<u>Output 3.4:</u> Strengthened cooperatives and farmer organizations and negotiated partnerships with traders and processors for farmers and communities practicing climate resilient, zero degradation agriculture and agroforestry
	<u>Output 2.1.3:</u> Systems and frameworks established for continuous monitoring, reporting and review of adaptation	<u>Output 1.2:</u> National monitoring and reporting systems for tracking climate change vulnerability in the agricultural sector along with changes in adaptive capacity, land cover, land degradation, restoration, forest ecosystems and ecosystem services
	<u>Output 2.1.4:</u> Climate risk and vulnerability assessments conducted	<u>Output 2.1:</u> Integrated climate risk, land use, landscape restoration, and forest management plans are developed, with climate change scenarios

LDCF Objective & outcome	LDCF Output (as per CCA results framework)	Corresponding project outputs or activities
		informing risks and selection of adaptation options, and operationalised at target sites Output 4.2: Participatory M&E and quantification of LDN implementation—including restoration, SFM and SLM actions—as a contribution to national reporting under the UNFCCC and other international commitments
Outcome 2.3: Institutional and human capacities strengthened to identify and implement adaptation measures	Output 2.3.1: Number of people trained regarding climate change impacts and appropriate adaptation responses	Output 2.3: Awareness raising and training of 1,000 national and local government and administration officials (including ATDAs, DGEC under MCVDD and DGEFC1), parliamentarians and representatives of private sector in climate resilient and degradation neutral planning and policies, with focus on agriculture, animal husbandry and forestry,1 targeting the mainstreaming of CCA and LDN in all policies and administrative decisions Output 2.4: Extension services in climate resilient and degradation neutral agriculture, animal husbandry and agroforestry provided to 24,000 farmers and community leaders (50% women), including on climate resilient and degradation neutral cotton production.

Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF and co-financing

Table 8 below summarizes the project’s incremental cost reasoning.

**Table 8: Incremental cost reasoning**

Baseline practices	Alternatives to be put in place	Global Environmental Benefits (GEBs) and Project impacts
National plans and programs are in place but lack of coordination and defined responsibilities between government actors hinders effective implementation of the LDN priorities/targets and SLM Framework which in turn affects agriculture and agroforestry (impacted by lack of appropriate SLM of the	Cross-sectoral Ministerial or Agency regulations (Decrees/Orders/Bills) for the LDN targets and the climate risk integrated SLM and SFM Framework will be developed where lacking, necessary, and appropriate, and signed into effect, ensuring effective coordination between the different sector entities within government, integration and mainstreaming of climate adaptation needs in efforts to achieve land degradation neutrality, as well as providing needed direction for effective implementation towards meeting underlying targets. New	Climate risk informed and resilient SFM, SLM and sustainable agricultural production approaches are adopted and implemented on <b>30,000 ha in three PDAs</b> , as follows:  - 15,000 ha of forest ecosystem brought under restoration integrating consideration of climate change scenarios/risks and resilience criteria (e.g. using seed varieties and/or species resilient to current and future



Baseline practices	Alternatives to be put in place	Global Environmental Benefits (GEBs) and Project impacts
<p>crop and forest lands at target sites).</p> <p>National funding through the government systems will continue to be available, but this does not meet the funding gap at local level where funding for additional, climate risk informed SLM, restoration, and forest conservation efforts are needed.</p> <p>Smallholder farmers will continue focusing on traditional cash-crops and remain unaware and untrained on alternative, climate resilient value chains, agricultural practices and SLM, agroforestry possibilities that are financially viable.</p> <p>The economic returns from traditional farming systems and local varieties/traditional crops will continue to decline in the local farming communities.</p>	<p>or revised policies will in turn influence how forestry and other land management and land-use plans in target areas will be coordinated and implemented.</p> <p>Guidelines on how to access the LDN Fund and other funding sources will be elaborated, to enable project development in support of climate resilient and risk informed SLM and forest conservation at local level.</p> <p>The training in land degradation and neutrality target achievements through development of management tools and climate change risk integrated, land-use options will build the technical expertise of agencies, project staff, and producers in management of landscapes in the target areas.</p> <p>Specific vulnerability of smallholder farmers and small-scale cattle herders will be assessed through the use of tools such as SHARP.<sup>63</sup> Together with analysis of climate resilient value chains<sup>64</sup> and adaptation options, these assessments will provide a comprehensive understanding of varying vulnerability to climate change, existing adaptive capacity, and farmer preferences for adopting more climate resilient value chains and climate resilient agricultural practices.</p> <p>Training in effective climate resilient agriculture, SLM and sustainable, climate risk informed and resilient agroforestry will enable farmers to implement methods that will increase land productivity, including increasing soil fertility, identify climate resilient value chains for diversifying income and livelihood sources, improve ability for on-farm water savings and micro-irrigation to increase water efficiency in order to face droughts, variability in rainfall</p>	<p>climate change) restored and under improved management (Core Indicator 3 - Area of land restored);</p> <p>CCA Core Indicator 2 – area of land managed for climate resilience)</p> <p>- 15,000 ha of degraded land brought under restoration and under improved management (Core Indicator 4 and CCA Core Indicator 2 - Area of landscapes under improved practices (excluding protected areas))</p> <p>- The co-benefits of the project in terms of GHG emissions avoided have been estimated to be 4,471,732 t CO<sub>2</sub>eq.</p> <p>- 24,000 producers in 18 communities are provided with training and extension support for climate resilient, sustainable (climate-smart) agricultural and agroforestry production. (CCA core indicator 1 – total number of direct beneficiaries, with indirect beneficiaries estimated at an additional 344,000 individuals in the three development poles)</p> <p>The capacity for developing climate risk informed and resilient forest and agricultural landscape and land-use plans is built through the provision of training and extension services to national DGEC under MCVDD and MAEP staff, national agency staff involved in land use, land management, climate change adaptation and forest conservation at the targeted project sites</p>

<sup>63</sup> Self evaluation and holistic assessment of climate resilience of farmers and pastoralists (SHARP). Accessed at : [http://knowledgecentre.resilientfoodsystems.co/kt/resource\\_library](http://knowledgecentre.resilientfoodsystems.co/kt/resource_library)

<sup>64</sup> Toolkit for value chain analysis and market development integrating climate change resilience and gender responsiveness: <https://www.fao.org/publications/card/en/c/CB0699EN/>

Baseline practices	Alternatives to be put in place	Global Environmental Benefits (GEBs) and Project impacts
	<p>and extremes, protecting local biodiversity, and carbon sequestration.</p> <p>A designated knowledge and learning exchange system will facilitate sharing of knowledge and information on improved, climate resilient SLM practices between project implementors and all stakeholders.</p>	<p>Investment for SLM, climate resilient agriculture and climate resilient value chains and sustainable agroforestry projects will increase as a result of the strengthened mechanism for funding through the National Forestry and National Agricultural Development Funds (this will be designed to provide compensation to farmers adopting climate resilient SLM technologies that lead to long term productivity, use of high-value sustainably grown, climate resilient and forest-friendly crops, and improved land and soil health as a result of reduced dependence on chemicals and fertilizers)</p>

#### Global environmental benefits (GEFTF) and adaptation benefits (LDCF/SCCF)

The environmental benefits generated by the adoption of climate resilient agricultural practices, climate risk informed and resilient SLM and SFM under the project will contribute to land and ecosystem health, strengthen **climate** resilience of beneficiaries, and support community adaptation to the impacts of climate change. Through project activities, climate resilient value chains will be identified and promoted, agricultural practices and production at target sites will improve, integrating climate risk reduction strategies, with associated increases in revenue, and ecosystem integrity will be conserved. The project will carry out activities that will ensure reduced threats from unsustainable land and forest use practices, and, at the same time, limit land degradation and soil erosion, contributing to increased ecosystem services, build resilience in hydrological flows under climate change and strengthening adaptive capacity of the households in target sites. Through the project, Sustainable Land Management, and climate resilient agricultural practices will be applied as an effective tool to limit soil and vegetation degradation and enhance water resource management. The project will additionally improve resilience to climate change through implementation of climate change risk informed Sustainable Forest Management practices that will conserve natural resources and reduce their unsustainable exploitation. Initiating and mainstreaming climate-smart agroforestry and carrying out training and agricultural extension services at ground level, including on adapting to climate change, will contribute to the uptake of SLM approaches and techniques that will increase community resilience to climatic hazards, restore degraded ecosystems, and increase agricultural supplies for subsistence and income generating purposes.

**The project will reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation. This will occur through transfer of**

technologies and innovative solutions that will be piloted or deployed to reduce climate-related risks and/or enhance resilience. More specifically:

- Technologies and innovative solutions will be piloted or deployed to reduce climate-related risks and/or enhance resilience, affecting production practices on 15,000 of agricultural land;
- Livelihoods and sources of income of vulnerable populations (est. 24,000 beneficiaries) will be diversified and strengthened in the areas of agriculture, agro-processing, dairy and enhanced access to markets, through the strengthening of climate resilient value chains;
- Improved climate information systems will reduce vulnerability to climatic hazards/variability, through improved collection and dissemination of climate-related information, benefitting an estimated 5,000;
- Vulnerable natural ecosystems, including grasslands and forests, will be strengthened in response to climate change impacts, resulting in hydrological flows and enhanced provisioning services due to reduced conversion of natural forests and savannahs into other forms of land use, as well as through increased reforestation.

In addition to the above, **climate change adaptation and resilience will be mainstreamed** for systemic impacts, including through:

Strengthened cross-sectoral mechanisms (one each for three PDAs), covering the agricultural and water sectors, will mainstream climate adaptation and resilience, while enhancing inter-sectoral coordination of policies and planning, and water resource management;

Institutional and human capacities (est. 1,000 trainees) to identify and implement adaptation measures will be strengthened;

Local people will be made aware of climate change impacts and appropriate adaptation responses.

Quantitative indicators of global environmental benefits and adaptation benefits are listed in the last column of **Table 7** above. The following provides additional information on how these targets were determined:

- **Forest restoration targets:** Based on the forest map of Benin and the degradation areas around protected forests (sacred, community, classified and wildlife reserves), the national SFM indicator has been defined. The NDC has set itself the ambitious target of restoring 150,000 hectares of degraded forests. The project has committed to contributing 10% of the CDN's target and has initiated a process of identifying the most suitable sites in the project's intervention area, based on the prevalence of degraded forest in the zone.

- **Target of land under sustainable management:** We have estimated the proportion of degraded arable land in the project's sites from land use maps, and have applied the land degradation neutrality indicator which is "10% of degraded land restored" according to the National SLM Action Plan (PAN/GDT). This resulted in a target of 15,000 ha of land to be brought under climate risk informed sustainable management.
- **Calculation of carbon gains:** The co-benefits of the project in terms of GHG emissions avoided have been estimated to be **4,471,732 t CO<sub>2</sub>eq**. Of these, 2,887,338 t CO<sub>2</sub>eq of emissions reductions would result from the restoration of 15,000 ha of degraded areas into natural forest cover, focusing on sensitive areas such as slopes, riparian forests and wildlife corridors; and the remainder would result from the rehabilitation of 15,000 ha of degraded areas into a mix of agroforestry, productive crop and pasture land with interspersed tree cover. The details are provided in the included Ex-Act file. The difference to GHG emissions reductions estimated at PIF stage (1,006,450 t CO<sub>2</sub>eq) are due to a change in the methodology of calculation (for the PIF, the Winrock carbon calculator was used) and related assumptions (especially consideration of a 20-year time horizon in the Ex-Act tool as compared to a 6-year horizon in the Winrock tool) as well as minor adjustments in project design (i.e. the current design assumes that 15,000 ha of degraded lands would be rehabilitated into a mix of agroforestry, productive pasture and crop lands with interspersed trees rather than all into agroforestry as was the assumption in the PIF calculation).
- **Number of beneficiaries:** The project aims to directly benefit a total of 24,000 individuals, of which 7,000 adult men, 7,000 adult women and 10,000 youth, with indirect beneficiaries estimated at an additional 344,000 individuals in the three development poles. Estimations of population size are based on village populations and the proportion of active farmers in each village. At least 50% of direct beneficiaries, and approximately 50% of indirect beneficiaries, will be women.

### Safeguards

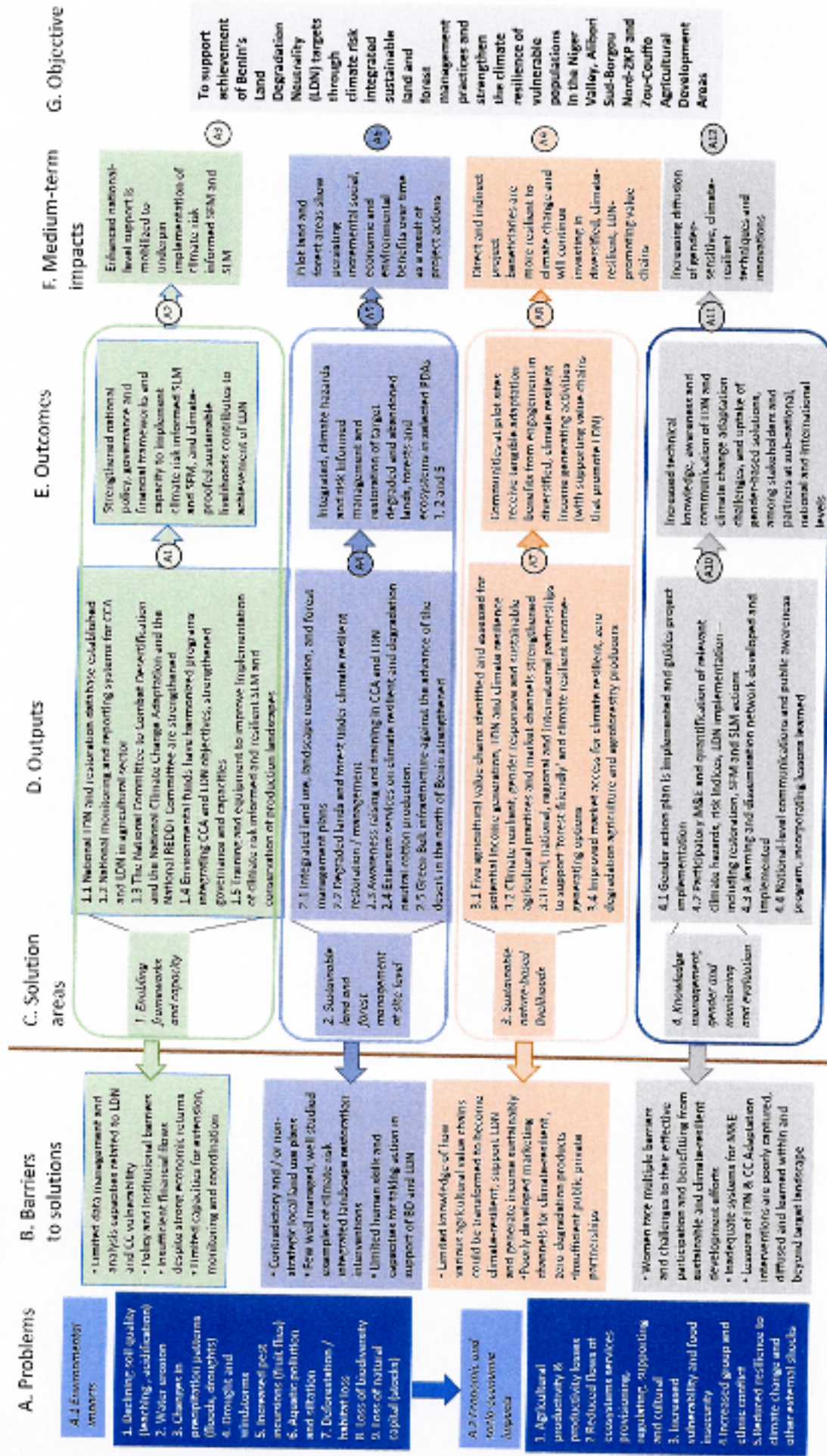
UNDP's safeguards approach is an integral part of the project strategy and ensures that the project has been designed and will be implemented in compliance with UNDP social and environmental safeguards. In particular, UNDP's Environmental and Social Management Framework (ESMF) (see **Annex 9**) will be followed to ensure that environmental and social risks and impacts are fully assessed and management measures are in place prior to and during the implementation of relevant project activities. The ESMF forms the basis on which the project will develop an Environmental and Social Management Plan (ESMP) for each PDA to ensure that significant adverse environmental and social impacts mitigation and management measures are implemented and monitored as required. The ESMF identifies the steps required for preparing a detailed assessment of the project's potential social and environmental risks, and for preparing and approving the required management plan for avoiding, and where avoidance is not possible reducing, mitigating and managing, the identified adverse impacts of this project.

### Theory of change

Figure 1 below presents the project's theory of change, which may be summarized as follows:

- The project's theory of change incorporates a brief summary of problems and barriers (Columns A and B respectively), which is essential to understanding the intervention logic.
- An interlinked set of environmental problems faces Benin as a whole and the target PDAs ) in particular (see ToC diagram, A.1), constituting a loss of natural capital. These problems are due to a set of *direct and proximate causes*, which themselves are resulting from *root / underlying causes* (neither shown in diagram; see discussion in UNDP project document).
- The above environmental problems are having a set of environmental and socio-economic impacts on local populations (see ToC diagram, A.2), associate with reduced flows of various environmental services.

Figure 1: Theory of change



### Theory of change assumptions A1 - A12

- A1: Policy and institutional tools and plans are effectively integrated to result in improved climate sensitive and risk informed landscape planning and decision-making for climate adaptation and LDN
- A2: Climate resilient and degradation neutral landscape planning and decision-making methodologies are effectively absorbed into government at various levels and implemented beyond the duration of the project
- A3: Climate resilient and degradation neutral landscape planning and governance remain mainstreamed into government practice over the long term in the target provinces
- A4: The restoration of agricultural and forest ecosystems with appropriate methods, informed by climate risk assessments, and in strategic locations are integrated into management decisions and result in improved resilience of ecosystems in the target areas
- A5: Scusibly improved ecosystem services delivery result in larger-scale adoption of ecosystem restoration across the region beyond the lifetime of the project
- A6: Enhanced ecosystem integrity and LDN contribute to persistent and large-scale climate-resilient sustainable development in the target provinces
- A7: Degradation-neutral and climate-resilient value chains and land use practices are successfully adopted by a significant percentage of the local population
- A8: The adoption of nature-based and climate-resilient value chains and land use practices results is perceived as beneficial and maintained beyond the project end by local communities and businesses
- A9: Degradation-neutral and climate-resilient value chains and land use practices are sufficiently profitable to be adopted at significant scale and mainstreamed into the local economies in the target provinces
- A10: Learning, knowledge-sharing and gender sensitive approaches are effectively mainstreamed throughout the project
- A11: Knowledge-sharing and gender sensitive development are adopted at a large scale and mainstreamed into government and non-government organizations across the region
- A12: A learning and knowledge-sharing culture and gender mainstreaming contribute to long-term, degradation-neutral and climate-resilient sustainable development in the region

- A project intervention designed to address this situation requires four interlinked solution areas, a.k.a. components. These are summarized in column C and represent the anchors for four solution pathways that together will deliver the project objective. These solution areas work synergistically to address environmental and socio-economic impacts in highly complex ways which cannot be captured in the simplified ToC diagram
- Successful implementation of the solution areas requires addressing a number of barriers associated with each solution area. These barriers may be thought of as standing in the way of solutions. They are grouped by solution area and presented in column B of the diagram. Arrows pointing left from solution areas to barriers denote barrier removal processes.
- Column D presents the set of project outputs which together are designed directly to address / remove barriers associated with each solution area.
- Column E describes the outcomes that are expected to result from the implementation of the project outputs, under the conditions that related project assumptions (see box underneath the ToC figure) are met.
- Column F presents medium-term impacts beyond the lifetime of the project expected to result from achievement of the four project outcomes
- Taken together, columns C-F represent the project's four solution pathways—each enclosed by rounded rectangles and tempered by corresponding assumptions.
- Achieving the four project outcomes will, subject to additional assumptions, deliver the project objective, or long-term development impact beyond the life of the project.

In substantive terms, the project will improve the information base for government decision making (LDN database), will strengthen multi-stakeholder processes such as the Committees to combat desertification and climate change for greater coordination of programs and actions, will strengthen institutions including their access to funding tasked with the promotion of land uses that conserve or rehabilitate the fertility and ecosystem services of the land with special focus on forestry, agroforestry and sustainable, climate resilient agriculture practices, will strengthen extension services, will pilot forest rehabilitation and sustainable land management models, will strengthen value chains for climate resilient agriculture, promote learning, and empower women in decision making and as market actors. This set of outputs at institutional and field level will establish and reinforce capabilities within stakeholders that currently are weak, thereby reducing barriers to change. Specifically, government will be better able to analyse climate and land degradation risks and plan their interventions accordingly; the capabilities of government and non-government stakeholders to implement climate risk informed ecosystem restoration and climate resilient land use programs will be increased, and public and private actors will have increased capabilities to promote value chains that encourage sustainable production and land management. These increased capabilities of key actors and institutions, in turn, will lead to the short-term outcomes of strengthened policies and increased funding for climate resilient and sustainable land use planning; better informed programs for ecosystem restoration and conservation; and tangible benefits for



communities from increased climate resilience, reduced soil degradation, and income streams from sustainable value chains.

Over the longer term, agriculture and land use generally in Benin (and beyond) will become more sustainable and climate resilient, land degradation will decrease and ecosystems will be restored. Building on the project experience, rural people will have greater ability to adapt to climate change impacts through increased and more reliable incomes. Women will play a stronger and more empowered role in rural societies. Learning from this project will be exchanged with stakeholders in Benin and beyond through knowledge transfer. These outcomes will together enable achievement of the project development objective.

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#### **IV. RESULTS AND PARTNERSHIPS**

##### Proposed alternative scenario with a brief description of expected outcomes and components of the project:

The long-term solution is to support achievement of Benin's Land Degradation Neutrality (LDN) targets through climate risk informed sustainable land and forest management practices, and strengthen the climate resilience of vulnerable populations, in the Niger Valley (PDA 1), Alibori Sud-Borgou Nord-2KP (PDA 2) and Zou-Couffo (PDA 5) Agricultural Development Areas. The project intends to:

- i) promote sustainable and climate resilient production systems in degraded lands and deforestation hotspots in Benin;
- ii) facilitate the development of green infrastructure, selected through integration of climate scenarios and resilience potential under current climatic stressors, to strengthen the Green Belt as a nature-based solution against desert advancement and support communities in climate change adaptation in the north of the country;
- iii) strengthen the protection and preservation of forest ecosystems located in large agricultural production basins;
- iv) identify and promote climate resilient value chains and increase productivity and competitiveness of the horticultural sectors, and;
- v) facilitate the mobilization of innovative financing and the involvement of private sector for the scaling up and sustainability of climate resilient agriculture, climate risk informed sustainable land and forest management.

The project will address the barriers and challenges outlined above and will be carried out at national, communal, and local site levels where degraded lands have been targeted for improved, climate risk-informed land management practices to support the achievement of Benin's LDN goals and to help meet national NDC objectives for climate change adaptation.

As noted in the climate risks section above, the project is designed to address not only

impacts that are already observed but also to respond to a range of anticipated temperature change, together with a corresponding range of potential impacts on the agricultural sector, on ecosystems, and on water resources through the planning horizon of 2050.

**At the national level**, the project will carry out activities to strengthen the capacity of the General Directory of Environment and Climate (DGEC), under the Ministry of the Living Environment and Sustainable Development (MCVDD) to meet the country's LDN and climate change adaptation commitments, and the Ministry of Agriculture, Livestock and Fisheries (MAEP) to attain its national agricultural production goals in line with its objectives for adapting agricultural practices to withstand climate change as articulated in its NDC.

The project will also facilitate the development of guidelines for potential funding mechanisms to enable the National Forest and National Agricultural Development Funds to function effectively and sustainably into the future; this will ensure continuity in supporting individual producers, farmer associations, and producer unions to implement technologies for climate resilient agriculture, and climate risk informed SLM and SFM.

**At the local level**, the project will provide support to generate land and forestry benefits, including critical ecosystem services, by improving the technical capacity of land planners and managers to integrate climate change into management plans, apply management plans, climate change vulnerability analysis and other tools for integrated landscape restoration and climate resilient agricultural planning. The project will create stakeholder awareness and build the capacity of agricultural land managers and national agency staff to support the scaling up of integrated, climate resilient and risk informed landscape management approaches in three targeted PDAs, and ensuring their alignment with national LDN targets, climate adaptation needs and objectives.

The project will raise awareness and strengthen capacities of beneficiary communities at the local level in the development of climate resilient value chains in non-timber forest products (NTFP) such as the African locust bean (*Néré*), *Parkia biglobosa*, the Shea tree (*Karité*) *Vitellaria paradoxa*, baobab (*Adansonia digitata*), fruit trees (citrus, mango, cashew), and food crops (maize, sorghum, rice, cassava, yam, sweet potatoes, groundnuts, cowpea etc). The local tree species *néré*, *karité* and baobab are widespread savanna trees that are well known for their resistance to drought and even light fire, and are in common use among the local population. All three species are used in local culinary needs and have important local markets, while especially *karité* butter is traded internationally for cosmetics and as a substitute for cocoa butter. The introduced, but very common, cashew trees are not only highly resistant to climate variability and change, but also particularly well adapted to infertile soils and have significant potential in export markets. For their part, improved varieties of mango and citrus are more demanding in terms of soil fertility and water needs and require careful assessment of site conditions prior to planting. The mentioned food crops are all staples of the region, with grains being more used in the north and tubers more in the south. With increased climate change impacts, there may be a

gradual shift from maize to sorghum in the north and from yam to cassava in the center and south of the country. However, crop choices are to a large extent determined by local customs and preferences, which may delay local responses to climate pressures.

Alternative, diversified, income-generating activities such as livestock production, organic cultivation, climate resilient agroforestry and agriculture, transformation/processing of agricultural and fruit products, and small-scale market gardening of high-value crops (e.g. tomatoes, okra, chili pepper) will be promoted. Efforts will also be made to reduce the use of fire as a tool in land management, with the objective of reducing burning frequency and avoiding uncontrolled burns that lead to the degradation of soil and vegetation.

The project will adopt an integrated approach based on local vulnerability assessments and instigating site-specific solutions that include:

- i) developing and applying sustainable community forest management tools, based on participatory planning approaches;
- ii) implementing climate risk informed Sustainable Land Management (SLM), climate resilient agricultural practices and soil fertility improvement techniques;
- iii) providing extension services and material resources for agroforestry with fruit and fodder trees as an alternative to annual crops, e.g., in Za-Kpota, Covè, Klouékanmè and Aplahoué; communes, and
- iv) initiating large-scale, ecosystem appropriate restoration that factors in climate projections and contributes to the Green Belt initiative to counter the advancement of the desert in Karimama, Kouandé, Ségbana and Gogounou in northern Benin.

Beekeeping will also be promoted to enhance restoration at site level and to aid the development of fruit tree plantations, while providing diversification of livelihoods. The alternative scenario is centered on community-inclusive, multi-stakeholder collaborations at national and local scales that integrate climate change impacts and adaptation needs with addressing and reversing land degradation and deforestation. The value chain for beekeeping is already under development in municipalities across Benin. Key links across NGOs, microenterprises and individuals are in place and an organization exists between producers and buyers with bottling and packaging efforts. Local skills and competencies exist in terms of manufacturing services, hive repair, harvesting, packaging, marketing. Expertise also exists to train and organize community-level actors. The above actors will be targeted in the municipalities of intervention and will be reinforced with support for the strengthening of production and marketing capacities. In this way, the project will employ existing local expertise for the further development of the value chain already under construction.

Within the three PDAs, site-level activities under components 2 and 3 will take place within eight communes, which together cover 1.2 million ha. Analysis of satellite imagery and ground-level consultations during the PPG have further identified key hotspot areas of degradation, as shown in a set of district-level maps presented in Annex 14.6.

## Social and environmental safeguards

As noted in the Strategy section above, the project will be implemented in compliance with all UNDP Social and Environmental principles and standards, as per UNDP's revised SES Policy (January 2021).

Based on the findings of the Social and Environmental Screening Procedure (SESP), the following assessments and plans will be implemented (for details, see ESMF, Annex 9):

- As the project is 'Substantial' risk with potential upstream impacts, a Strategic Environmental and Social Assessment (SESA) is required for the policy-level activities. The SESA report (and Action Matrix) will integrate the findings of the Environmental and Social Impact Assessment (ESIA) required for field-level activities.
- The SESA will be developed to ensure that the impacts of upstream activities—especially those included in project Component 1—are assessed and mitigation measures are identified. A SESA will be developed for each targeted policy (for details, see Annex 9, Environmental and Social Management Framework – ESMF)
- An ESIA will be developed for each PDA.
- A Stakeholder Engagement Plan will be implemented, beginning with the project inception phase.
- An Ethnic Groups Plan will be developed for each of the three target PDAs. The three plans will take into consideration the involvement of the ethnic groups present in the target areas, including any ethnic minority at field level and at institutional level.
- The Stakeholder Engagement Plan and the three Ethnic Groups Plans will precede, and strongly support, the implementation of activities planned under outputs 2.1, 2.2, 2.4, 3.1 and 3.2, thereby ensuring compliance with UNDP SES.
- A Gender Action Plan will be implemented in line with Component 4, ensuring compliance with UNDP SES.
- A Livelihood Action Plan may be developed, if and when needed, in line with the ESIA findings.
- A Pesticides and Herbicides Management Plan may be developed for relevant activities, in line with the ESIA findings. The plan will especially support the implementation of activities under outputs 3.1 and 3.2, thereby ensuring compliance with UNDP SES.
- An Environmental and Social Management Plan will be developed for each PDA and will include actions to mitigate all risks identified in the SESP.

No activities which could have adverse impacts on the rights, lands, resources and territories of marginalized Indigenous Peoples (such as ethnic minorities) will commence

until the ESIA/ESMP is completed (and its public disclosure period), impact management measures established, and broad community consent has been obtained.

Project components, results / outcomes, outputs and indicative activities are described below.

**Component 1: Political, financial, institutional, and regulatory frameworks to achieve climate risk informed Land Degradation Neutrality (LDN) and advance integration of vulnerability assessments and adaptation options within land use decisions.**

This component is focused at the national level on strengthening the enabling environment, including capacities of key agencies, for implementation of climate-risk informed LDN, including actions related to SLM, SFM and associated livelihood issues. Establishing and building capacities to monitor and report on land degradation, land cover change, ecosystem services, as well as climate risks, vulnerability and adaptation metrics, will be central to assessing both the changing conditions and the impact of actions being taken. Effective field-level implementation, including under component 2, will benefit from multi-sectoral consultations to review and harmonise relevant policies, sectoral strategies and programs in order to mainstream LDN targets, informed by climate change scenarios, and objectives. Engaging multiple government entities will be necessary, and activities will include development of tools and measures to facilitate the adoption and operationalization of the principle of no degraded, bare, or abandoned land due to agricultural practices. Support, advice and awareness-raising will be provided to representatives at all levels of decision-making to enable the revision of national strategies, plans and sectoral indicators in accordance with the recommendations inherent and contained within updated regulatory texts.

Work under this component is centered on achievement of the following outcome:

**OUTCOME 1.1: STRENGTHENED NATIONAL POLICY, GOVERNANCE AND FINANCIAL FRAMEWORKS AND CAPACITY TO IMPLEMENT CLIMATE RISK INFORMED SLM AND SFM, AND CLIMATE-PROOFED SUSTAINABLE LIVELIHOODS CONTRIBUTES TO ACHIEVEMENT OF LDN**

The above outcome will be delivered through a set of five inter-connected outputs, as follows:

- Output 1.1 will establish a national LDN and restoration database at DGEC under MCVDD to serve as the hub for national monitoring and national reporting on LDN.
- Output 1.2 will build national reporting and monitoring systems for tracking LDN and various aspects of climate change vulnerability and adaptation.
- Output 1.3 will strengthen the National Committee on Desertification as a key tool for national-level coordination.

- Output 1.4 will raise the profile of LDN within national environmental funding mechanisms.
- Output 1.5 will build capacities of key agencies for climate risk informed and resilient SLM, SFM and restoration.

The above-mentioned outputs are described in further detail below.

*Output 1.1: National LDN and restoration database established within the DGEC under MCVDD, bringing together national data sources including related data on climate impacts, vulnerability, and adaptation needs, and linking to global systems for monitoring restoration and LDN*

Under this output, a national LDN database and information system will be established at the General Directory of Environment and Climate (DGEC), under the Ministry of the Living Environment and Sustainable Development (MCVDD). Experts from different sectors—including forestry, agriculture, climate change and land use planning—and from academia will work together to develop and agree on data gathering and data sharing protocols. The system will thus pull together various sectoral sources of data, e.g., forest cover and forest permanent estate, agricultural activities (agro-industrial and small farming around villages), general land allocation, tenure rights, protected areas and hotspots of biodiversity, land dynamics (productivity, land cover, carbon stocks, soil erosion linked to changes in precipitation), observed meteorological data, downscaled climate change scenarios, and livestock corridors, resulting in a more comprehensive overview, while providing actionable data and projections of climatic variables (e.g. precipitation and temperature) for managers on the ground. It will also underpin reporting under international conventions (see Output 1.2) and associated commitments, e.g. by linking to the IUCN-managed BC Barometer for restoration progress. While the database will be national in scope, it is expected that initial data sources and coverage will be more extensive and accurate in the case of the three project-supported PDAs (see Component 2).

Indicative activities include:

1.1.1. Building on work done during PPG, complete detailed assessment of relevant equipment specifications, GIS and spatial analyses and capacity building requirements and provide targeted support to ensure effective participation in the process, particularly within DGEC under MCVDD

1.1.2 Support and strengthen existing national networks for inter-sectoral data sharing on LDN, climate impacts, vulnerability and adaptation, e.g., REDD+ national coordination mechanism, National Committee for Climate Change, Technical Group for Land Degradation, land-use planning ministry and other sectoral ministries

1.1.3 Assess and strengthen existing cartographic databases of land use, particularly agricultural uses, and associated land degradation and ecosystem services

1.1.4 Support the development of improved national baseline maps indicating land and forest status, soil type and soil fertility, as tools for monitoring LDN (see also Activity 2.2.1)

1.1.5 Build capacities for effective use of enhanced databases and maps

*Output 1.2: National monitoring and reporting systems for tracking climate change impacts on and vulnerability in the agricultural sector along with changes in adaptive capacity, land cover, land degradation, restoration, forest ecosystems and ecosystem services*

Building on the establishment of the national LDN database, a system for dynamic monitoring of land use status and change will be established. The system will focus on the agricultural sector in particular and will be designed to support monitoring and indicators at the level of PDAs, among other levels of aggregation. It will include indicators on land use change, climate hazards and vulnerability to climate change, and indicators of adaptive capacity. Relevant targets will also be agreed. Key national- and local level-stakeholders will be engaged, including both government and private sector representatives. The system will be pilot tested in the three project PDAs, where it will benefit from a pilot effort to establish a participatory M&E system (see Outputs 2.1 and 4.2 below), the latter also addressing issues such as governance, FPIC, etc. Finally, the system will be used to support production of a biannual national report on the impacts of climate change and production sectors on forest ecosystems and on the state of land degradation.

Indicative activities include:

1.2.1 Develop an observatory for monitoring agricultural dynamics, climate change impacts on agriculture and the vulnerability of forest ecosystems, including agreeing on indicators to be monitored

1.2.2 Pilot testing in three PDAs of an operational system for monitoring agricultural dynamics and the vulnerability of forest ecosystems, based on existing and upgraded cartographic information

1.2.3 Prepare two biennial national reports (2024 and 2026)

*Output 1.3: The National Committee to Combat Desertification, National Committee for Climate Change and the National REDD+ Committee are strengthened to improve the coordination, ownership and capacity of national authorities to address projected climate change risk and sensitivity scenarios.*

The National Committee to Combat Desertification was created in 2008 and the National REDD+ Committee was created in 2017, but has met only rarely since. Its secretariat is provided by the DGEC under MCVDD. In addition, the National Committee for Climate Change was decreed in 2002, with mandate for both adaptation and mitigation. However, there is little coordination among the three committees. The project will support the reactivation of these potentially important mechanisms as necessary tools to coordinate

data sharing and action related to LDN. It will also support an integration of LDN and climate change policies by promoting joint meetings of the three committees and an expansion of the former committee's mandates to include climate change adaptation, which is closely linked with both LDN and REDD+.

Indicative activities include the following:

- 1.3.1 Analyze the structure, capabilities, and operating rules of the committees and propose any recommended changes, especially an explicit mandate to address climate change vulnerability and adaptation assessments and policies and to integrate them with LDN and REDD+ mechanisms.
- 1.3.2 Support annual meetings of the two Committees, expanded as needed to cover CCA, at which a set of common objectives and a work plan for data sharing and other joint actions in support of integrated LDN, REDD+ and CCA policies and actions will be adopted.
- 1.3.3 Strengthen the technical capacity of ministries and other government agencies through the development of strategy documents (e.g., REDD+ strategy, climate vulnerability assessments and adaptation action plans, regular review of land degradation policies and activities) to contribute to the objectives adopted by the Committees.

*Output 1.4: National environmental funding mechanisms integrate CCA and LDN objectives, and have enhanced capacity to mobilize and manage relevant funding*

The project will facilitate the development of guidelines for existing funding mechanisms—including the National Environment and Climate Fund, National Agricultural Development Fund and potentially others—to encourage and guide these funding mechanisms in efforts to support individual producers, farmer associations, and producer unions to implement technologies for gender responsive, climate-resilient agriculture, and climate risk informed SLM and SFM.

Indicative activities include the following:

- 1.4.1. Develop guidelines for Federal and local Government financing of climate risk informed SLM, SFM and restoration efforts, and gender responsive climate resilient agriculture, including eligibility criteria for grant or loan financing
- 1.4.2 Develop a program of climate risk informed SLM and SFM actions at national level with harmonized financing procedures and integration of environmental, economic and social aspects
- 1.4.3 Insert an SLM budget line within the mechanism for transferring financial resources to municipalities



*Output 1.5: Training and equipment provided to key agencies (DGEC under MCVDD, National Geographic Institute, Directorate of Remote Sensing and Ecological Monitoring, National Institute of Agricultural Resources) to improve implementation of climate risk informed, gender responsive and resilient SLM technologies and conservation of production landscapes, with improved coordination and monitoring of climate change impacts, land degradation trends, restoration, and sustainable forest management*

Several government agencies have significant roles to play in supporting the project objective, including monitoring and coordination. This output will strengthen their capacity to do so, in line with existing policy mandates.

Indicative activities include the following:

- 1.5.1 Implement a training program for key organizations, including DGEC under MCVDD, Directorate of Remote Sensing and Ecological Monitoring, National Geographic Institute, National Institute of Agricultural Resources, etc.
- 1.5.2 Carry out multi-criteria climate change risk and SLM assessments, taking into account synergies and comparative advantages on the environment
- 1.5.3 Provide necessary equipment to the National Geographic Institute and the Directorate of Remote Sensing and Ecological Monitoring to support their forest cover monitoring functions
- 1.5.4 Provide capacity building support (equipment and training) to Ministries and research institutions to enable management of 'the databases'
- 1.5.5 Implement training programs to access, interpret and use climate scenarios and vulnerability assessments, and especially to adapt them to local conditions through downscaling and through locally collected data based on observations and interviews.

## **Component 2: Restoration of land and forest ecosystems for improved agricultural productivity, prevention of deforestation, and enhanced climate resilience of vulnerable communities**

Under this component, the project will assist the Government of Benin to build on the enabling environment being supported under Component 1 and implement concrete actions within eight target districts of the project PDAs (see **Table 9**).<sup>45</sup> The project will implement an integrated, collaborative approach to delivering climate change adaptation actions, including climate-resilient SLM, to restore degraded lands, and climate resilient agricultural practices on farms to reduce further land and soil degradation, and enhance adoption of gender responsive, climate resilient agricultural value chains (through Component 3, in particular), and thereby improve food security for smallholders and farmer communities. Efforts will be focused on carefully defined target sites, but with mechanisms in place to ensure wider impact (the latter through Component 4, in particular).

<sup>45</sup> Annex 14.6 presents additional information, including SFM and SLM potential in each district, along with more precise geographical details at the level of 'arrondissement' and village.

**Table 9: Project intervention zones within each PDA and indicative breakdown of GEF-supported SFM & SLM actions\***

PDA	Département	Commune	Area (ha)	SFM area (ha)	SLM area (ha)
1	Alibori	Karimama	604 100	500	500
2	Atacora	Kouandé	450 000	2 000	1 000
	Alibori	Ségbana	470 000	5 000	6 500
	Alibori	Gogounou	491 000	7 000	2 000
5	Couffo	Klouékanmè	39 400	50	100
	Couffo	Aplahoué	91 500	50	2 400
	Zou	Cové	52 500	-	2 500
	Zou	Zakpota	40 900	400	-
		<b>TOTAL</b>	<b>2 239 400</b>	<b>15 000</b>	<b>15 000</b>

*Note:* The above breakdowns of SLM and SFM actions are approximate, based on total potential identified within each commune during the PPG.

Work under this component is centered on achievement of the following outcome:

**OUTCOME 2: TARGET DEGRADED AND ABANDONED LANDS, FORESTS AND ECOSYSTEMS IN SELECTED PDAs 1, 2 AND 5 MANAGED AND RESTORED THROUGH CLIMATE RISK-INFORMED PLANNING AND ACTIONS**

The above outcome will be delivered through a set of five inter-connected outputs, as follows:

- Output 2.1 will support the development of restoration and SLM / SFM components which incorporate locally relevant climate hazard data and risk mapping within management plans at various levels within the three PDAs.
- Output 2.2 will support restoration and sustainable land management at target sites.
- Output 2.3 will strengthen capacities of government extension services to provide extension services to farmers to strengthen agricultural resilience to climate impacts
- Output 2.4 will provide training and awareness raising support within the communities at the target sites.
- Output 2.5 will involve creating green infrastructure<sup>66</sup> resilient to projected climate impacts in four of the target communes (Karimama, Kouandé, Ségbana and Gogounou) to strengthen Benin's Green Belt against desert encroachment from the north.

<sup>66</sup> Green infrastructure is a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation.

The above-mentioned outputs are described in further detail below.

*Output 2.1: Integrated climate risk, land use, landscape restoration, and forest management plans, which incorporate climate scenario-based hazards and likely impacts, are developed and operationalized at target sites*

Management plans currently exist for Parc W, the Pendjari Complex, and various classified forests in Benin. However, the capacity of responsible agencies to implement these management plans needs to be strengthened. In addition, few of the plans incorporate analyses of climate hazards and risks, well-developed strategies to restore lands and/or ensure SLM and SFM under climate change. Potential response of species used for restoration to future climate conditions is rarely considered in restoration or SFM plans but is an important consideration for long term resilience. Output 2.1 will firstly focus on the analyses of relevant range of climate change scenarios to identify hazards and potential risks at the landscape and farm scales for the two agro-climatological zones covered under this project, based in part on field-level data gathering within the eight target communes . This output will produce climate risks assessments for ecosystem based adaptation using established approaches<sup>67</sup>, and with participation of local representatives, as part of detailed spatially explicit planning to allow for an integrated approach to planning for LDN and CCA in the target communes. This work will be done in collaboration with national universities (see Annex 8, Stakeholder Plan for details).

Based on updated analysis of climate change scenarios and potential risks, land use /land cover mapping, and in close cooperation with representatives of participating communes, local management authorities and communities, spatially explicit, participatory, local management plans will be created. These zoning and action plans—which will be closely aligned with any existing SDAC and PDC plans—will guide site-level implementation of climate risk informed restoration/SFM/SLM actions—including actions for direct support via GEF project funds as well as areas for eventual uptake and replication. In parallel, existing management plans will be reviewed and, where necessary, updated so that they cover climate change vulnerability and adaptation strategies, including soil and water conservation, LDN and other SLM / SFM related issues. This will include the preparation of hazard maps and risk models based on at least two climate scenarios.

Indicative activities under this output include the following:

2.1.1 Build capacity for data collection on multiple climatic, biophysical and agro-ecological variables and participatory, scenario-based analysis to support local level planning for both climate change adaptation and land degradation neutrality.

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<sup>67</sup> Climate risk assessments to inform integration of climate change risks and impacts into planning for SLM, SFM and climate resilient agriculture will be developed using approaches such as the one produced by GIZ and UNU (2018): A guidebook for planners and practitioners. See [here](#).

2.1.2 Field-level, participatory, survey-based data collection within the eight target communes to support climate risk and LDN analyses

2.1.3 Work with the cartographic division of DGERC to integrate readily available, regional downscaled climate scenarios to create a spatially explicit dataset on climate hazards and map potential risks for land use and land cover change in the eight communes, where available use crop and plant habitat suitability models for common species, to inform SLM/SFM and land use planning, to inform the process for identifying climate resilient value chains with local participation (Component 3), and develop up to date and improved land use, land degradation, soil fertility, climate hazards and risks' informed zoning maps of the overall intervention area, i.e. eight target communes, together covering 2.2 million ha.

2.1.4 Conclude data sharing agreements amongst sectoral Ministries and national and local organisations

2.1.5 Develop LDN scenarios and LDN neutrality targets—based on a multi-criteria analysis of sustainable land management, restoration actions and climatic hazards and non-climate risk analyses—and mainstream into emerging PDA Master Plans, with additional details for the participating communes

2.1.6 Support the incorporation of LDN and climate change aspects eight commune-level integrated, spatially explicit planning documents—“Schéma directeur d'aménagement de la commune” (SDAC) and “plan de développement communal” (PDC)

2.1.7 Build validated multi-dimensional local plans that are aligned with existing SDACs and PDCs, and that can be easily integrated within the SDACs and PDCs, supported by recognized local governance structure

2.1.8 Mainstream climate change hazards, risks and adaptation options SLM and SFM into eight commune-level Land Management Plans (PIGUS), including capacity-building strategies

2.1.9 Conduct climate risk assessments for ecosystem based adaptation<sup>44</sup> using the climate hazards dataset (2.1.1), integrate relevant modeled outputs from GEF-CI SPARC and participatory input from communities to identify cost effective and locally relevant adaptation measures in order to update management plans for the classified forests of Sota, Mékrou and Kouandé, in line with commune-level plans, along with soil conservation and LDN plans for the classified forests of Alibori Superior and Trois Rivières

*Output 2.2: Degraded lands amounting to at least 15,000 hectares, and at least 15,000 hectares of forest, are under climate risk informed and resilient restoration and functional and sustainable management regimes.*

<sup>44</sup> Using, for example, the GIZ – UNU guidance to practitioners (2018).

A key element of the planning processes described under Output 2.1 above will be to identify and prioritize natural ecosystems for restoration<sup>69</sup>, including natural regeneration, based on criteria that include resilience to current climate change and future projections using downscaled climate scenarios and available climate suitability models, potential restoration of fallows in an ecosystem appropriate manner, development of community forests, and the promotion of private, communal and community restoration zones with valuable, climate resilient species for degraded lands and forests, informed through a multi-criteria analysis. This prioritization exercise will build on work completed during the PPG, which led to a series of commune-level degradation maps presented in Annex 3 below.

Improved land management at these sites will enable them to function as carbon sinks, and will include nature-based adaptation options to improve soil moisture, reduce soil erosion, regulate the microclimate, and provide a diversified source of NTFPs resilient to climate change (see Component 3 below). This will be achieved through the introduction of climate-smart agriculture and improved, climate resilient SLM and agricultural practices to reduce carbon release from soil, increase water infiltration, conserve topsoil, and thereby enhance water availability to crops.

Indicative activities include the following:

2.2.1 Identify exact locations for land and forest restoration and sustainable management, building on PPG site selection process and incorporating additional climate scenarios and risk mapping work undertaken under 2.1.1, and 2.1.8 as well as nature of restoration or SLM/SFM approach. Site selection will take into consideration climate risks (risk maps produced under 2.1.1) and opportunities to reduce them (e.g. by restoring erosion prone slopes and riparian forests), based on climate hazard maps and risk models.

2.2.2 Provide extension and material support (e.g., equipment, seedlings, compost, climate resilient agriculture (CRA) techniques and inputs) for conservation and improvement / restoration of cropland and conservation of soil fertility in identified priority locations (see 2.2.1) and in line with plans developed under activities 2.1.2 - 2.1.4 above

2.2.3 Provide extension and material support (e.g. equipment, seedlings and materials for the plant nurseries) for conservation and improvement / restoration of forest areas and conservation of soil fertility in identified priority locations (see 2.2.1) and in line with plans developed under activities 2.1.5 and 2.1.6 above, including enriching and developing protection series / green belt in the classified forests of Alibori Superior, Trois Rivers, Sota, Mékrou and Kouandé with versatile forest species with high tolerance to droughts and floods.

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<sup>69</sup> Through, for example, working with partners to integrate current climatic stress and projections into models such as those produced by IIS-Rio and applied in Brazil, countries in South America and the global scale. Also see: Strassburg, B. et al. 2020. Global priority areas for ecosystem restoration. *Nature*.

2.2.4 Protect the banks of the Ouémé, Zou and Couffo river basins against erosion through reforestation of 1,000 hectares of riparian forest using native species with high tolerance to drought and floods, in line with plans developed under Activities 2.1.5 and 2.1.6

2.2.5 Establish multi-purpose water reservoirs to facilitate access to clean water [particularly for select water-saving crops and value chains], by, and avoid conflict among, agricultural producers, livestock breeders and migrant and other vulnerable populations

*Output 2.3: Awareness raising and training of 1,000 national and local government and administration officials (including ATDAs, DGEC under MCVDD and DGEFC) and representatives of private sector in climate resilient, gender-responsive and degradation neutral planning and policies, with focus on agriculture, animal husbandry and forestry, targeting the mainstreaming of CCA and LDN in all policies and administrative decisions.*

This output will begin with the development of capacity building (training) materials in a range of key areas. These will be carefully designed to address specific issues faced by officials and technical personnel involved in issues related to LDN, climate adaptation for the agricultural sector, etc. within the three target PDAs. Particular emphasis will be on agricultural extension personnel. It will be to a large extent through these agents of change that the project will expect to reach far and wide to agriculturalists and other land users.

Indicative activities include the following:

2.3.1 Development of capacity building modules and materials, based on international experience, with specific adaptations for conditions in Benin as well as further specifications by PDA, covering: (i) integration of SFM, SLM in projects, business plans, laws and sector strategies; (ii) soil fertilization technologies; (iii) technologies for restoring degraded lands; (iv) approaches to maintaining soil fertility and respecting degradation neutrality standards; (v) Climate vulnerability and risk assessments through a combination of use of climate scenarios and local experiences and observations to inform the selection of locally relevant adaptation measures including selection of crop and tree species and varieties, planting dates, soil management practices to increase water availability to crops (e.g. mulching), irrigation practices, crop diversification, provision of climate resilient crop varieties, etc. (vi) methods of soil water conservation, (vii) safeguarding farms against risks (infestations, flooding, bush and vegetation fires, etc.); (viii) protection of forests against brush fires; (ix) cultivation technologies and fodder storage; (x) approaches and standards for forest management and the establishment of carbon sinks and protective belts; (xi) techniques for collecting and processing agricultural and forestry seeds; (xii) approaches and production methods of agricultural and forestry plants in a context of climate change, etc.

2.3.2 Delivery of training modules and materials to at least 1,000 national and local government and administration officials (including ATDAs, DGEC under MCVDD and DGEFC), parliamentarians and private sector representatives

2.3.3 Awareness raising seminars, workshops and information materials provided to decision-makers and other officials

**Output 2.4:** *Extension services in climate resilient, gender-responsive and degradation neutral agriculture, animal husbandry and agroforestry provided to 24,000 farmers and community leaders (50% women), including on climate resilient and degradation neutral cotton production.*

Extension services, training and related capacity building measures will be delivered to farmers and other land users within each of the eight target communes. These efforts will support direct actions under Output 2.2, as well as laying the groundwork for uptake and replication across the eight communes. This work will be led by ATDAs, DGEC under MCVDD and DGEFC and supported by NGOs.

Indicative activities include the following:

2.4.1. Through a participatory process including stakeholder mapping, the participatory mapping of climate hazards and risks, and land degradation vulnerability as perceived locally in combination with available data, identify local priorities and action plans for the promotion of climate resilient and degradation neutral agricultural, livestock and agroforestry practices and organize user groups (including women and youth groups) for each identified activity.

2.4.2. Implement intensive train within (2ing and extension programs in the pilot communities, led by local NGOs in partnership with community-based groups and under the guidance and supervision of government extension services. Considering the high number of illiterate people (especially women) in the rural population especially in the north of the country, extension methods will rely on face-to-face meetings rather than printed communication tools or social media.

2.4.3. Develop radio programs on a range of climate change and land degradation topics, identified by a local advisory committee, and emit them in the most common local languages.

2.4.4. Provide local groups with the essential tools and inputs for climate resilient agriculture and land restoration, such as farm tools, supplies for village nurseries, seedlings, etc.

**Output 2.5:** *Strengthened Green Belt infrastructure against the advance of the desert in the north of Benin*

Under this output, the project will support the creation of green infrastructure resilient to projected climate impacts in two of the project's target communes—Karimama and Kouandé—in order to strengthen Benin's Green Belt against further desert encroachment from the north. Activities will focus, *inter alia*, on improved soil management through active organic cultivation, development of tree nurseries for reforestation, improved manure techniques, and fire management. As a result, the project will contribute to improved, climate-smart agricultural management and forest protection practices for LDN and sustainability.

To fortify the Green Belt and provide guidance to climate-resilient agricultural development, targeted efforts will be required to develop nurseries for trees to replant in forest corridors where agricultural production occurs. Agriculturalists will receive training on sustainable land management techniques, climate risk informed landscape restoration and climate resilient agricultural techniques, including promotion of organic cultivation and increasing use of organic compost and integrated pest management techniques, reduced use of fire, controlled grazing of communal areas, diversification of cropping systems to reduce risk, and the integration of local, drought and fire resilient tree species such as néré, karité and baobab. Natural regeneration potential under likely climate projections, for example, through downscaled prioritization maps, will help to identify sites where natural regeneration and other restoration practices can be supported.<sup>70</sup>

Indicative activities include the following:

- 2.5.1. Disseminate existing technical guidance materials developed by other initiatives (e.g. PROSOL) relating to “Integrated management of soil fertility”, “soil and water conservation”, “conservation agriculture” and “agroforestry and individual forests”
- 2.5.2. Establish at least 200 ha of commercial plantations (150 ha of forest species and 50 ha of forage species)
- 2.5.3. Support local communities to establish at least 100 ha of communal and individual fruit plantations
- 2.5.4. Promote arboriculture as well as the vegetated delineation based on, for example, palm trees (rônier), néré and shea trees, which are all highly resilient to climate variability and drought and even support occasional fire, as a means of diversifying farming systems thereby reducing risks related to a largely unpredictable climate future.
- 2.5.5. Promote the use of soil improving plants, e.g. mucuna, pigeon pea (*cajanus cajan*); and *Vigna radiata* for the restoration of degraded agricultural sites (noting that pigeon pea has been used in the West African savanna for many years and is noteworthy for its positive influence on associated food crops (e.g. maize) as well as a producer of edible seeds and fodder (see also Outputs 3.1 and 3.2 re. final species selection).

### **Component 3: Building diversified income-generating activities and value chains to strengthen community resilience to climate change**

Under this component, the project will engage at community level within the three PDAs—in particular within the above-described target areas—to support the development of income-generating activities and agricultural value chains. These efforts are being specifically designed to complement and synergize with the integrated climate change adaptation and LDN actions under Component 2, and to deliver lessons for dissemination under component 4, while promoting long-term resilience to climate change.

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<sup>70</sup> See for example : Strassburg et al 2020. Global priority areas for ecosystem restoration. Nature



Work under this component is centered on achievement of the following outcome:

**OUTCOME 3.1: COMMUNITIES AT PILOT SITES RECEIVE TANGIBLE BENEFITS FROM ENGAGEMENT IN DIVERSIFIED, CLIMATE RESILIENT INCOME GENERATING ACTIVITIES (WITH SUPPORTING VALUE CHAINS THAT PROMOTE LDN)**

The above outcome will be delivered through a set of four inter-connected outputs, as follows:

- Output 3.1 will consist of in-depth analyses and selection of short-listed value chains from the perspective of their potential to generate income for local communities while delivering a variety of national and global environmental benefits, including enhanced climate change resilience for households and communities<sup>21</sup>.
- Output 3.2 will strengthen selected climate resilient and gender responsive value chains through investment and extension support.
- Output 3.3 will deliver financial support and partnerships to forest-friendly and climate resilient income generating activities including, *inter alia*, products being supported under Output 3.1.
- Output 3.4 will help to increase market access for farmers and communities practicing climate-resilient, zero-degradation agriculture and agro-forestry, including NTFPs.

The above-mentioned outputs are described in further detail below.

*Output 3.1: Five agricultural and agro-forestry value chains are identified and assessed according to their potential to be climate resilient and deliver multiple local, national and global benefits, including income generation, LDN benefit and enhanced adaptive capacity within project PDAs*

Initial activities under this output will involve the selection of five climate-resilient agricultural and agroforestry value chains, from the short list presented in **Table 10**, which was developed based on analysis and consultations during the PPG.

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<sup>21</sup> The selection process will utilize the following methodology: Toolkit for value chain analysis and market development integrating climate resilience and gender responsiveness - integrating agriculture in National Adaptation Plans (NAP-Ag) Programme. 2020. FAO and UNDP.

**Table 10: Short list of agricultural and agroforestry value chains for possible in-depth analysis and support**

Pôles de développement (PDA)	Chaines de valeurs agricoles	Chaines de valeurs agroforestières
PDA 1 : Valley Niger Karimama	Riz, cultures maraichères, volailles, petits ruminants	Parkia biglobosa (nééré), Vitellaria paradoxa (karité), Rônier
PDA 2 : Alibori Sud-Borgou Nord-ZKP : Ségbana, Gogounou, Kouandé,	Maïs, riz, igname, soja, cultures maraichères, caprin, volailles	Parkia biglobosa (nééré) Vitellaria paradoxa (karité), Adansonia digitata (baobab), manguiier, anacardier, colas (garcinia, nitida), apiculture
PDA 5 : Covè Zakpota-Aplahoué Klouékanmè	Riz, maïs, niébé, arachide, cultures maraichères, pois d'angole, volailles, petits ruminants	Agrumes, palmier à huile, baobab, nééré, colas (garcinia, nitida), Xylopia, Tetrapleura apiculture

The above list also reflects the list of priority agricultural products identified at the time the PDAs were first identified and thus remain in line with Government priorities.

Once the final list of five value chains has been agreed, a detailed analysis will be made of the entire value chain for each potential product. This analysis—which will be undertaken in close consultation with local communities and will build on discussions held during the PPG—will integrate climate change impacts and resilience as criteria, based on published toolkits<sup>72</sup>. It will include economic and financial analysis of climate-resilient value chains and adaptation options, including assessment of the vulnerability of smallholder farmers and small-scale cattle herders to climate change, based on application of analytical tools such as SHARP.<sup>73</sup> Farmer preferences for adopting more climate-resilient value chains and climate resilient agricultural practices will be carefully identified, in line with the project's stakeholder participation plan (see **Annex 8**). Finally, the value chain analysis will consider market demand at various levels, and the potential for investment and other partnerships (see Output 3.3 below). **The tool to be deployed for this analysis is the UNDP -FAO Climate Resilient and Gender Responsive Value Chains tool.**

Indicative activities, all of which will contribute to the final value chain assessment reports, will include the following:

### 3.1.1 Map the short-listed value chains

<sup>72</sup> The selection process will utilize the following methodology: *Toolkit for value chain analysis and market development integrating climate resilience and gender responsiveness - integrating agriculture in National Adaptation Plans (NAP-Ag) Programme*. 2020. FAO and UNDP.

<sup>73</sup> Self evaluation and holistic assessment of climate resilience of farmers and pastoralists (SHARP). Accessed at : [http://knowledgecentre.resilientfoodsystems.co/icc/resource\\_library](http://knowledgecentre.resilientfoodsystems.co/icc/resource_library)

3.1.2 Undertake surveys within potential beneficiary communities to assess preferences among alternative value short-listed chains

3.1.3 Select five priority value chains, based on pre-determined selection criteria and with reference to PDAs

3.1.4 Prepare five value chain analyses, including priority measures needed to strengthen climate resilience. These should include, inter alia: (i) good practices and associated technologies for the storage / conservation and processing of various products (plants, animals, fisheries and forestry, etc.); (ii) the potential contribution of each product / value chain in terms of climate resilience, zero degradation or restorative production and gender-balanced income generation; (iii) specific barriers and opportunities associated with each value chain; (iv) climate change impact assessment across all priority value chains to identify the adaptation measures to reduce risks of climate related losses and damages

3.1.5 Develop an action plan for strengthening each value chain

*Output 3.2: Selected climate resilient and sustainable agricultural and agroforestry practices and market channels are strengthened through investments and extension support for climate resilient, **degradation neutral and gender responsive** agricultural practices, leading to triple-bottom-line benefits, strengthened adaptive capacity of vulnerable communities, job and SMME creation*

This output will support the implementation of value chain action plans developed under Output 3.1. These action plans will provide the specific details and locations of support, which will focus on removing key barriers and demonstrating short- and medium-term benefits and lessons. These will include a combination of training, technological and logistical support. Support to women and women's groups will be prioritized wherever possible.

Indicative activities include the following:

3.2.1 Deliver training to strengthen agricultural skills related to the selected products, including: (i) techniques for managing soil fertility and (ii) climate-resilient agricultural practices

3.2.2 Improve access to information and to appropriate post-harvest processing and storage equipment and infrastructure, at different levels of the marketing chain, to help processors better respond to quantitative and qualitative aspects of market demand

3.2.3 Contribute to the sustainable intensification of production in the selected sectors by supporting the adoption of improved technologies adapted to the needs of farmers, in particular women, and enabling them to better respond to market signals

3.2.4 Support efforts by cooperatives to strengthen crop processing and storage

*Output 3.3: Local, national, regional and international partnerships developed to support and promote 'forest-friendly', climate resilient and gender-responsive income-generating opportunities*

Support under this output will go beyond the five priority value chains (see Outputs 3.1 and 3.2 above) to encourage investment in a wider range of sustainable and climate-resilient income-generating opportunities within the target project areas. A key criterion for identifying the activities to be supported will be their potential to contribute to the aims and objectives of the integrated, climate-resilient land use, land restoration and forest management plans being developed under Output 2.1 above. For each of the above areas, and others identified in the plans, implementation partnerships will be sought, with the goal of leveraging additional funding into activities that will combine climate-resilient income generation with LDN, SLM and SFM co-benefits. The PPG has clearly shown that farmers and local traders face significant barriers to obtaining loans from commercial banks owing to their difficulty of providing collateral (land is not usually individually owned in rural parts of Benin), that agricultural production is perceived as risky, and that loans needed by individual farmers or families are mostly relatively small.

Indicative activities include the following:

3.3.1 Develop partnership with micro-financing institutions to increase the flow of financial services (campaign credit, equipment credit, etc.) to encourage adoption of SLM and SFM practices. The project will work with commercial credit institutes and government on the possibility of designing standardized loan packages for communities and cooperatives engaged in climate-resilient and degradation neutral activities such as certain agroforestry value chains, small livestock production, etc. that would be accompanied by extension services to reduce the risks of default.

3.3.2 Establish partnerships with local communities, NGOs, forest department directorates, and ATDAs to train farmers and ranchers (particularly women), in climate resilient agriculture. This activity would focus on the creation and strengthening of land user, processor and trader groups and cooperatives that would work under the supervision and with the support of the responsible government agencies (e.g. forestry) and civil society organizations, thereby increasing their access to credit, technical support and markets, and reducing risks for individuals and families engaged in agricultural and forestry production, processing and trade. This would also include the organization of savings groups within communities to cover smaller investment needs or complement external loans.

3.3.3 Initiate a national dialogue (Government, financial sector, NGOs) on de-risking mechanisms to provide loan guarantees for micro-projects for land degradation neutral (or regenerative) and climate resilient income-generating opportunities. This would build on climate risk assessments of value chains to identify relatively low-risk land use options and would engage with national and local governments, the private sector and civil society organizations active in the area on the possibility of creating partial guarantees for loans and investments in degradation-neutral and climate-resilient land

uses and value chains. This discussion is rather new in Benin and therefore the immediate objective of the project would be to create a discussion forum for de-risking needs and potential mechanisms and sensitize government and other actors for the issues involved.

*Output 3.4: Strengthened cooperatives and farmer organizations, and negotiated partnerships with traders and processors, for farmers and communities practicing climate-resilient, zero degradation agriculture and agroforestry*

Support for enhanced cooperatives, farmer organizations and negotiated partnerships will be aimed at improved market access for farmers and communities practicing climate resilient, zero degradation agriculture and agroforestry including NTFPs. This output will build on value chain analysis selection and support being undertaken under Outputs 3.1 and 3.2 in order to further strengthen the support mechanisms and marketing opportunities in key selected value chains.

Indicative activities include the following:

- 3.4.1 Develop market research and feasibility assessment for new products based on the "Market Analysis and Development (ADM)" approach and in consultation with potential beneficiaries
- 3.4.2 Organize initial meetings between buyers and sellers, and trade shows and exchange trips in the West and Central African sub region and / or support the participation of local producer groups (including cooperatives) in such meetings
- 3.4.3 Support improve packaging and delivery of new products to market
- 3.4.4 Support identification of new business partners for SMEs

#### **Component 4: Gender Empowerment, Knowledge Management, and M&E**

The project is expected to generate a wealth of experience and lessons from the activities being implemented in Components 1-3. While component 1 activities are national in scope, on-the-ground and other actions under components 2 and 3 will be more limited, and often local (e.g. village and commune level), in geographic scope, beginning with actions aimed at restoration, SLM and SFM of specific target areas within the PDAs. While such actions are critical in that they will support actual environmental change and restoration within 30,000 ha of degraded lands, the impact of such changes in terms of transforming broader areas and processes will depend on the *diffusion* and *replication* of the innovations and good practices being demonstrated. The extent and success of this process will depend in turn on a variety of behavioral and other factors. Component 4 offers an approach, based in part on learning and adaptation within defined replication areas (PDAs), designed to maximize the extent and impact of this transformational logic.

This component includes two sub-components: (i) gender empowerment and knowledge management and (ii) monitoring and evaluation.

**OUTCOME 4A: INCREASED TECHNICAL KNOWLEDGE AND DIFFUSION OF LDN AND CLIMATE CHANGE ADAPTATION STIMULATE UPTAKE OF EFFECTIVE, GENDER-BASED SOLUTIONS AT SUB-NATIONAL, NATIONAL AND INTERNATIONAL LEVELS**

The above outcome will be delivered through a set of four inter-connected outputs, as follows:

- Output 4.1 will establish the gender-based parameters and goals of the project, and in particular its learning and replication efforts, by coordinating and monitoring a gender action plan that was developed during the PPG (see **Annex 8**). The action plan will ensure that both on-the-ground actions under Components 1-3, as well as learning, dissemination and replication efforts under the remainder of Component 4, are designed to leverage women's strategic role in climate change adaptation and natural resource management in order to effect desired change, while simultaneously enhancing that role and ensuring that important project benefits accrue to women.
- Output 4.2 will focus on the important monitoring issues associated with delivering on climate change informed LDN commitments. It will do so based on a participatory approach which will also serve to verify achievement of the project's own targets. Success in this area will offer an important stimulus to further climate change and LDN investments in the country.
- Output 4.3 will underpin and expand the project's learning and replication ambitions by integrating LDN and climate change adaptation for agricultural resilience within overall PDA-level monitoring. As a result, changes both within and beyond the specific project target areas will be measured, and adaptive actions will be identified to enhance and quicken uptake across each of the three target PDAs.
- Finally, under Output 4.4, a national-level communications and awareness program will be developed and implemented. As a result, project results and lessons learned will continue to radiate outwards—from target areas (components 1 and 2) to demonstration PDAs (Output 4.3)—to remaining PDAs in Benin and to the wider region as a whole.

The above-mentioned outputs are described in further detail below.

***Output 4.1: Gender action plan is implemented and guides project implementation***

A gender analysis and action plan are presented in **Annex 8**. As noted in the gender analysis, research in rural Benin has shown that women have less access to land and lower levels of land tenure security than men. These factors reduce women's willingness and ability to make longer-term investments, e.g. in the planting of valuable fruit trees, application of fertilizer and other investments in soil fertility, at a significant cost to society as a whole. In addition, women end up farming marginal plots of land due to lack of alternatives. These issues also make women and women headed households more vulnerable to climate change impacts. Strengthening skills and land tenure security of women would therefore help to increase both the long-term

sustainability and productivity of land and the incomes of women and female-headed households<sup>74</sup> there by enhancing their adaptive capacity.

As outlined in the gender action plan, the project will aim to address specific disadvantages facing women in Benin's rural society and to empower them to play a role equal to that of men in the sustainable development of the target areas and PDAs. This will include the following types of activities under the individual components:

- Supporting the roles and rights of women in policy and institutional work (Component 1).
- Involving women's groups in all stages of forest restoration and reforestation activities and increasing women's access to land through gender-sensitive land use plans and climate risk assessment, including the demarcation by local committees of fertile lands for use by women and women groups (Component 2).
- Strengthening the organization of women in informal groups, associations and cooperatives to increase their market access, position in climate-resilient value chains and control over revenues from agriculture, agroforestry and trade (Component 3).

Guidance documents that have been, and will continue being, used to guide the project's gender work include the CGIAR-CCAFS program's "[Gender and Inclusion Toolbox: Participatory Research in Climate Change and Agriculture](#)"<sup>75</sup>, as well as the UNDP/FAO "Toolkit for value chain analysis and market development integrating climate resilience and gender responsiveness"<sup>76</sup>. These tools are essential for assessing the specific role and problems of women and for harmonizing proposed activities with specific local needs, both during the PPG and during the full project implementation. These efforts are also drawing on experiences from other projects such as the GEF Resilient Food Systems Impact Program<sup>77</sup>.

While most activities identified in the gender action plan have been distributed across the relevant components and outputs, indicative activities under Output 4.1 include the following:

- 4.1.1 Raise awareness among project stakeholders regarding the goals, activities and objectives of the gender action plan
- 4.1.2 Monitoring and adaptive management of implementation of the gender action plan to ensure that it is meeting its objectives

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74 Goldstein, Markus; Hounbedji, Kenneth; Kondylis, Florence; O'Sullivan, Michael; Selod, Harris. 2016. Securing Property Rights for Women and Men in Rural Benin. Gender Innovation Lab Policy Brief; No. 14. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/25453> License: CC BY 3.0 IGO.

75 <https://ccafs.cgiar.org/gender-and-inclusion-toolbox#X4g25N3KjW>

76 [https://reliefweb.int/sites/reliefweb.int/files/resources/nap-ag\\_toolkit\\_for\\_value\\_chain\\_analysis\\_.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/nap-ag_toolkit_for_value_chain_analysis_.pdf)

77 <http://www.resilientfoodsystems.co/news/for-women-in-benue-state-beekeeping-offers-an-avenue-for-income-and-independence>

*Output 4.2: Participatory M&E and quantification of LDN and CCA implementation—including restoration, SFM and SLM actions—as a contribution to national reporting under the UNFCCC and other international commitments*

Under Output 4.2, a participatory system will be tested in the three project PDAs for generating and managing data on climate hazards and impacts, restoration, SFM and SLM. In addition to contributing to UNCCD and UNFCCC reporting, this M&E data will also be useful for verifying that key quantitative project targets are being met. In parallel, changes in vulnerability and livelihood status will be monitored, thereby contributing to enhanced understanding of the relationship between degradation and livelihoods.

Indicative activities include the following:

- 4.2.1 Strengthen capacities, particularly among women and young people, to contribute to monitoring and evaluation of interventions for the sustainable and climate resilient management of land and forest ecosystems at the local, municipal and PDA levels (1, 2, and 5)
- 4.2.2 Pilot testing of a system of participatory monitoring, review and verification (MRV) of land and forest degradation, climate vulnerability and adaptation needs, potential risks and likely impacts.
- 4.2.3 Implement a system of monitoring changes in livelihood status and adaptive capacity for vulnerable people targeted
- 4.2.4 Obtain agreement between project stakeholders and sectoral decision makers at the national level on simple indicators, applicable to all sectors, linked to integrated, gender sensitive, sustainable responses to climate change
- 4.2.5 Produce reports estimating LDN implementation across the three PDAs, integrating data gathered by participatory and other means

*Output 4.3: A learning and dissemination network developed and implemented in each of the three PDAs*

On-the-ground actions and investments made by the project under Components 2 and 3 will be carefully monitored and periodically assessed from the point of impact, innovativeness, application of best practices and other factors in order to generate lessons that can be captured, learned and disseminated. An initial priority target for dissemination will be the remaining areas within the three project PDAs. PDA-level monitoring will assess the degree to which lessons / methods are being diffused and adopted throughout these wider landscapes. Awareness raising / training activities will be organized to disseminate technical aspects of the demonstrations. Behavioral and other barriers to diffusion of successful practices, and ways to overcome such barriers, will be identified as part of an iterative process aiming at stimulating broader PDA-wide transformations.

Indicative activities include the following:



- 4.3.1 Monitoring and assessment of project impacts and associated lessons emerging
- 4.3.2 Based on project results / demonstrations, develop and implement a training and dissemination plan aimed at women's groups and mixed farmers' organizations to support the further uptake of implementing technologies for the climate risk informed restoration of natural ecosystems, innovation in soil water conservation, etc.
- 4.3.3 Develop and disseminate technical guidance on adoption of climate resilient value chains integrating climate risks, to enhance productivity and climate resiliency of targeted value chains and agroforestry systems
- 4.3.4 Organize networking sessions to share experiences between the intervention municipalities on the one hand, and other municipalities within the three PDAs
- 4.3.5 Strengthen the capacities of women, young people and small producers in the management of digital tools (financial, digital education, e-commerce, etc.) for better climate resilience
- 4.3.6 Organize exchange trips / visits between PDAs and capacity building for the benefit of stakeholders on SLM/SFM

*Output 4.4: National-level communications and public awareness program, incorporating lessons learned by the project, including through participatory M&E and gender empowerment, is developed and implemented at national, regional and international levels*

Learning developed under output 4.3 will contribute to the development of a national-level communications and public awareness program. This effort will reach well beyond the direct circle of project beneficiaries and landscapes to encompass a broad swath of Benin society. It will also include a series of exchanges with a parallel UNDP-GEF project being implemented in neighbouring Togo.

Indicative activities include the following:

- 4.4.1 Develop a national information, education and communication (IEC) plan targeting all relevant actors, including, *inter alia*: (i) educational materials in order to increase knowledge and awareness among educators and to encourage teaching sessions in secondary schools and universities on Land Degradation Neutrality and climate change adaptation; (ii) an inclusive dialogue platform between scholars, customary and religious authorities, vulnerable groups and representatives of sectoral ministries around the inclusive management of natural ecosystems for climate resilience and LDN
- 4.4.2 Produce gender-sensitive communications and public awareness materials, e.g. leaflets, posters, flyers, brochures, summaries, videos, local radio spots, phone app, etc.)
- 4.4.3 Conduct briefings with target groups on project experience, as well as best practices and lessons learned, on topics such as gender and LDN, climate change resilience, etc.

4.4.4 Organize a series of physical and virtual exchanges—e.g. visits, workshops, knowledge products—with counterpart project team and stakeholders in neighboring Togo

#### OUTCOME 4B: PROJECT LEVEL MONITORING AND EVALUATION

The above outcome will be delivered through the following output:

##### *Output 4.5: Project monitoring and evaluation is ensured*

This output will ensure that project results are properly monitored throughout implementation through a performance framework, regular monitoring activities and evaluations.

Indicative activities include the following:

Activity 4.5.1. Project Inception Workshop

Activity 4.5.2. Implementation of Monitoring and Evaluation Framework for the Project

Activity 4.5.3. Mid-term review

Activity 4.5.4. Terminal evaluation

In the table below, in **bold**, are the activities that cannot start **until the ESIA/ESMP are in place**:

Component 1	Indicative activities
Output 1.1: To be started while developing SESA	1.1.1. Building on work done during PPG, complete detailed assessment of relevant equipment specifications, GIS and spatial analytic practices and capacity building requirements and provide targeted support to ensure effective participation in the process, particularly within DGEC under MCVDD
	1.1.2 Support and strengthen existing national networks for inter-sectoral data sharing on LDN, climate impacts, vulnerability and adaptation, e.g., REDD+ national coordination mechanism, National Committee for Climate Change, Technical Group for Land Degradation, land-use planning ministry and other sectoral ministries
	1.1.3 Assess and strengthen existing cartographic databases of land use, particularly agricultural uses, and associated land degradation and ecosystem services
	1.1.4 Support the development of improved national baseline maps indicating land and forest status, soil type and soil fertility, as tools for monitoring LDN (see also Activity 2.2.1)
	1.1.5 Build capacities for effective use of enhanced databases and maps
Output 1.2: To be started while developing SESA	1.2.1 Develop an observatory for monitoring agricultural dynamics, climate change impacts on agriculture and the vulnerability of forest ecosystems, including climate risks, including agreeing on indicators to be monitored
	1.2.2 Pilot testing in three PDAs of an operational system for monitoring agricultural dynamics and the vulnerability of forest ecosystems, based on existing and upgraded cartographic information
	1.2.3 Prepare two biennial national reports (2024 and 2026)
Output 1.3: To be started while	1.3.1 Analyze the structure, capacities and rules of operation of the two Committees and propose any recommended changes, especially an explicit mandate to address climate change vulnerability and adaptation assessments and policies and to integrate them with LDN and REDD+ mechanisms.

Component 1	Indicative activities
developing SESA	1.3.2 Support annual meetings of the two Committees, expanded as needed to cover CCA, at which a set of common objectives and a work plan for data sharing and other joint actions in support of integrated LDN, REDD+ and CCA policies and actions will be adopted.
	1.3.3 Strengthen the technical capacity of ministries and other government agencies through the development of strategy documents (e.g., REDD+ strategy, climate vulnerability assessments and adaptation action plans, regular review of land degradation policies and activities) to contribute to the objectives adopted by the Committees. <b>{Project will ensure findings of SESA on this activity are included in the Ethnic Groups Plan}</b>
Output 1.4: To be started while developing SESA	1.4.1. Develop guidelines for Federal and local Government financing of climate risk informed SLM, SFM and restoration efforts, and gender responsive climate resilient agriculture, including eligibility criteria for grant or loan financing
	1.4.2 Develop a program of climate risk informed SLM and SFM actions at national level with harmonized financing procedures and integration of environmental, economic and social aspects
	1.4.3 Insert an SLM budget line within the mechanism for transferring financial resources to municipalities
Output 1.5: To be started while developing SESA	1.5.1 Implement a training program for actors for key organizations, including DGEC under MCVDD, Directorate of Remote Sensing and Ecological Monitoring, National Geographic Institute, National Institute of Agricultural Resources, etc.
	1.5.2 Carry out multi-criteria climate change risk and SLM assessments, taking into account synergies and comparative advantages on the environment
	1.5.3 Provide necessary equipment to the National Geographic Institute and the Directorate of Remote Sensing and Ecological Monitoring to support their forest cover monitoring functions
	1.5.4 Provide capacity building support (equipment and training) to Ministries and research institutions to enable management of 'the databases'
	1.5.5 Implement training programs to access, interpret and use climate scenarios and vulnerability assessments, and especially to adapt them to local conditions through downscaling and through locally collected data based on observations and interviews

Component 2	Indicative activities
Output 2.1:	2.1.1 Build capacity for data collection on multiple climatic, biophysical and agro-ecological variables and participatory, scenario-based analysis to support local level planning for both climate change adaptation and land degradation neutrality. <b>{To be started while developing SESA}</b>
	2.1.2 Field-level, participatory, survey-based data collection within the eight target communes to support climate risk and LDN analyses <b>{To be started while developing SESA}</b>
	2.1.3 Work with the cartographic division of DGERC to integrate readily available, regional downscaled climate scenarios to create a spatially explicit dataset on climate hazards and map potential risks for land use and land cover change in the eight communes, where available use crop and plant habitat suitability models for common species, to inform SLM/SFM and land use planning, to inform the process for identifying climate resilient value chains with local participation (Component 3), and develop up to date and improved land use, land degradation, soil fertility, climate hazards and risks' informed zoning maps of the overall intervention area, i.e. eight target communes, together covering 2.2 million ha. <b>{To be started while developing SESA}</b>
	2.1.4 Conclude data sharing agreements amongst sectoral Ministries and national and local organisations <b>{To be started while developing SESA}</b>
	2.1.5 Develop LDN scenarios and LDN neutrality targets—based on a combination of sustainable land management and restoration actions and climatic hazards and non-climate risk analyses—and mainstream into