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May 10, 2019

**Closing Date: Thursday, May 30, 2019
at 6:00 p.m.**

FROM: Vice President and Corporate Secretary

Benin - Gazetted Forests Management Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed grant to Benin for a Gazetted Forests Management Project (IDA/R2019-0139/1), which is being processed on an absence-of-objection basis.

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Report No: PAD3250

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT

IN THE AMOUNT OF SDR 51.4 MILLION
(US\$75 MILLION EQUIVALENT)

TO THE

REPUBLIC OF BENIN

FOR A

GAZETTED FORESTS MANAGEMENT PROJECT

May 8, 2019

Environment & Natural Resources Global Practice
Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective March 31, 2019)

Currency Unit = XOF

584 XOF = US\$1

US\$1 = SDR .720

FISCAL YEAR

January 1 - December 31

Regional Vice President: Hafez Ghanem

Country Director: Pierre Laporte

Senior Global Practice Director: Karin Kemper

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Task Team Leader(s): Salimata D. Follea

ABBREVIATIONS AND ACRONYMS

ABE	Benin Environmental Protection Agency (<i>Agence Béninoise de l'Environnement</i>)
AfDB	African Development Bank
AGRHYMET	Agro-Hydro-Meteorological
BAU	Business as Usual
BCEAO	Central Bank of West African States (<i>Banque Centrale des Etats de l'Afrique de l'Ouest</i>)
CAA	Autonomous Amortization Fund (<i>Caisse Autonome d'Amortissement</i>)
CED	Classified Estate Domain
CENAGREF	National Center for the Management of Wildlife (<i>Centre National de Gestion des Réserves de Faune</i>)
CENATEL	National Center for Remote Sensing and Ecological Monitoring (<i>Centre National de Télédétection et de suivi écologique</i>)
CPF	Country Partnership Framework
CSO	Civil Society Organization
CTAF	Technical Forestry Management Unit (<i>Cellule Technique d'Aménagement Forestier</i>)
DA	Designated Accounts
DGEFC	Directorate General of Water, Forests and Hunting (<i>Direction Générale des Eaux et Forêts et Chasse</i>)
DFIL	Disbursement and Financial Information Letter
ECOWAS	Economic Community of West African States
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FALMP	Forest and Adjacent Land Management Project
FM	Financial Management
FSOA	West Africa Savannah Foundation (<i>Fondation des Savanes Ouest-Africaines</i>)
FY	Fiscal Year
GBV	Gender-Based Violence
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Fund
GF	Gazetted Forest
GFMP	Gazetted Forests Management Project
GHG	Greenhouse Gas
GIS	Geographic Information System
GIZ	German Corporation for International Cooperation (<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i>)
GoB	Government of Benin
GPN	General Procurement Notice
GRM	Grievance Redress Mechanism
ha	Hectare
HCV	High Conservation Value
HDI	Human Development Index
IBM	Iterative Beneficiaries Monitoring

ICRAF	International Centre for Research in Agroforestry
IDA	International Development Association
IFAC	International Federation of Accountants
IFR	Interim Financial Report
IGA	Income Generating Activity
INDC	Intended Nationally Determined Contribution
INRAB	Benin National Agricultural Research Institute (<i>Institut National de Recherche Agricole du Benin</i>)
IPF	Investment Project Financing
IPMU	Integrated Project Management Unit
IS	Implementation Support
MCVDD	Ministry of Environment and Sustainable Development (<i>Ministère du Cadre de Vie et du Développement Durable</i>)
M&E	Monitoring and Evaluation
MOU	Memorandum of Understanding
MRB	Rural Wood Markets (<i>Marchés Ruraux de Bois</i>)
MtCO ₂	Metric Ton of Carbon Dioxide
MtCO ₂ e	Metric Ton of Carbon Dioxide Equivalent
NCB	National Competitive Bidding
NDC	Nationally Determined Contribution
NFF	National Forest Fund
NGO	Non-Governmental Organization
NRM	Natural Resources Management
NTFP	Non-Timber Forest Product
OHS	Occupational, Health and Safety
ONAB	National Office for Wood (<i>Office National du Bois</i>)
PAD	Project Appraisal Document
PDO	Project Development Objective
PED	Protected Estate Domain
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PPSD	Project Procurement Strategy for Development
ProSOL	Soil Protection and Rehabilitation to Improve Food Security Project (<i>Protection et Réhabilitation des Sols pour améliorer la sécurité alimentaire</i>)
REDD+	Reducing Emissions from Deforestation and Forest Degradation
REOI	Requests for Expressions of Interest
RF	Results Framework
SIDC	Secure Identification Credentials
SLCG	Local Co-Management Structures (<i>Structures Locales de Co-Gestion</i>)
SO	Strategic Objective
SP	Strategic Program
SPN	Specific Procurement Notices
STEP	Systematic Tracking of Exchanges in Procurement
tCO ₂ e	Tonne of Carbon Dioxide Equivalent
TTL	Task Team Leader
UNDB	United Nations Development Business

UNDP	United Nations Development Programme
VfM	Value for Money
WACA	West Africa Coastal Areas
WB	World Bank

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Benin	Gazetted Forests Management Project	
Project ID	Financing Instrument	Environmental Assessment Category
P167678	Investment Project Financing	B-Partial Assessment

Financing & Implementation Modalities

☐ Multiphase Programmatic Approach (MPA)	☐ Contingent Emergency Response Component (CERC)
☐ Series of Projects (SOP)	☐ Fragile State(s)
☐ Disbursement-linked Indicators (DLIs)	☐ Small State(s)
☐ Financial Intermediaries (FI)	☐ Fragile within a non-fragile Country
☐ Project-Based Guarantee	☐ Conflict
☐ Deferred Drawdown	☐ Responding to Natural or Man-made Disaster
☐ Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
30-May-2019	30-Nov-2026

Bank/IFC Collaboration

No

Proposed Development Objective(s)

To improve the integrated management of targeted Gazetted Forests, to increase access of the main consumption cities to fuelwood produced sustainably, and to strengthen selected non-timber forest product value chains for forest-dependent communities

**Components**

Component Name	Cost (US\$, millions)
Support to Forests Governance	9.77
Integrated Management of Gazetted Forests	57.20
Development of Selected NTFP Value Chains	4.10
Project Management	3.90

Organizations

Borrower:	Ministry of Economy of the Republic of Benin
Implementing Agency:	Ministry of Environment and Sustainable Development

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

Total Project Cost	75.00
Total Financing	75.00
of which IBRD/IDA	75.00
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Development Association (IDA)	75.00
IDA Grant	75.00

IDA Resources (in US\$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
National PBA	0.00	75.00	0.00	75.00
Total	0.00	75.00	0.00	75.00



Expected Disbursements (in US\$, Millions)

WB Fiscal Year	2019	2020	2021	2022	2023	2024	2025	2026	2027
Annual	0.00	5.48	7.94	9.53	10.72	14.90	15.76	7.45	3.21
Cumulative	0.00	5.48	13.42	22.95	33.68	48.57	64.33	71.79	75.00

INSTITUTIONAL DATA

Practice Area (Lead)

Environment & Natural Resources

Contributing Practice Areas

Agriculture

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Substantial
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Substantial
4. Technical Design of Project or Program	● Substantial
5. Institutional Capacity for Implementation and Sustainability	● Substantial
6. Fiduciary	● Substantial



7. Environment and Social	● Moderate
8. Stakeholders	● Substantial
9. Other	
10. Overall	● Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

☐ Yes ☒ No

Does the project require any waivers of Bank policies?

☐ Yes ☒ No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36	✓	
Pest Management OP 4.09	✓	
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10		✓
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Schedule 2, Section I A 1: The Recipient shall establish no later than one (1) month after the Effective Date or at any later date agreed with the Association, and, throughout Project implementation, maintain the Project Steering Committee ("PSC") as the entity responsible for, inter alia, the overall strategic guidance and oversight of the



Project implementation. To this end, the Recipient shall ensure that PSC operates under terms of reference and with qualified and experienced staff in adequate numbers and other resources, all satisfactory to the Association.

Sections and Description

Schedule 2, Section I A 4: The Recipient shall ensure: (i) the configuration of the accounting software with specifications satisfactory to the Association no later than three (3) months after the Effective Date or at any later date agreed with the Association; (ii) the nomination of a representative in charge of procurement within the Ministry of Environment and Sustainable Development, satisfactory to the Association no later than three (3) months after the Effective Date or at any later date agreed with the Association; and (iii) the recruitment for the Project of: (A) a procurement specialist, with qualifications and terms of reference satisfactory to the Association no later than one (1) month after the Effective Date or at any later date agreed with the Association; (B) a financial management specialist, with qualifications and terms of reference satisfactory to the Association no later than three (3) months after the Effective Date or at any later date agreed with the Association; and (C) an external auditor no later than six (6) months after the Effective Date or at any later date agreed with the Association.

Sections and Description

Schedule 2, Section I B 1: The Recipient shall adopt, no later than one (1) month after the Effective Date or at any later date agreed with the Association, the Project Implementation Manual in form and substance satisfactory to the Association and in accordance with the provisions of this Section.

Sections and Description

Schedule 2, Section I B 4: Notwithstanding and further to paragraphs 1. and 2 of the Financing Agreement, the Recipient shall adopt an NTFP Manual, satisfactory to the Association, no later than one (1) month after the Effective Date or at any later date agreed with the Association, and carry out Part 3 of the Project in accordance with the NTFP Manual, which shall contain arrangements covering inter alia: (i) implementation arrangements; (ii) monitoring, evaluation and reporting modalities; and (iii) other relevant financial and administrative data as shall be required for Part 3 of the Project.

Conditions

Type	Description
Disbursement	Schedule 2, Section III B 1: Notwithstanding the provisions of Part A, no withdrawal shall be made: (a) for payments made prior to the Signature Date, except that withdrawals up to an aggregate amount not to exceed three million six hundred thousand Special Drawing Rights (SDR 3,600,000) be made for payments made prior to this date but on or after October 1, 2018, for Eligible Expenditures; (b) under Category (2), until and unless the Recipient has: (i) adopted a Subgrant Manual pursuant to Section I.B.3. of Schedule 2 to this Agreement; and (ii) recruited a Payment Agency satisfactory to the Association.



I. STRATEGIC CONTEXT

A. Country Context

1. Benin is a coastal State in West Africa located in the tropical zone with a total surface area of 114,763 km². It is bordered by Togo (West), Nigeria (East), Burkina Faso and Niger (North), and the Atlantic Ocean (South). In a politically stable and democratic regime for nearly 30 years, the Government of Benin (GoB) maintains a decentralized territorial administration comprising 77 municipalities (elected) in 12 departments. The population was estimated at 11.2 million in 2017, of which 51 percent are women, 52 percent are 18 or younger, and 55 percent live in rural areas¹. If the current growth rate of 3.2 percent per year is maintained, the population may reach 17.6 million by 2030.

2. With GDP per capita of US\$862 (constant 2010 US\$) in 2017, Benin is among the poorest countries in the world. The share of the population living below the national poverty rate was estimated at 40 percent in 2015, of which 63.5 percent earn less than a dollar/day (EMICoV², 2015). The poverty rate is higher in rural areas (42 percent) than in urban areas (32 percent). In 2014, the youth (15-29 years old) unemployment rate was at 14.3 percent and the percentage of youth in the informal sector was 89.6 percent (ETVA³ 2014). The country ranks 163 out of 189 on the 2017 UNDP Human Development Index (HDI).

3. In addition to transit trade with neighboring countries, especially Nigeria, Benin's economy relies heavily on agriculture, and on cotton, in particular. The agriculture sector is the second largest contributor to GDP (25 percent) and employs around 70 percent of the labor force (15-64 years old)⁴. Benin's agriculture—primarily extensive, slash-and-burn—is one of the major drivers of deforestation and forest degradation.

B. Sectoral and Institutional Context

4. Benin's forest areas are divided into two categories:

- a) the Classified Estate Domain (CED), a national heritage belonging to the Central State, is managed by the Directorate General of Water, Forests and Hunting (DGEFC: *Direction Générale des Eaux et Forêts et Chasse*), the National Office for Wood (ONAB: *Office National du Bois*), and the National Center for the Management of Wildlife (CENAGREF); all three entities are under the authority of the Ministry of Environment and Sustainable Development (MCVDD: *Ministère du Cadre de Vie et du Développement Durable*). The CED includes: (i) 46 Gazetted Forests (GFs), of which 39 (and an additional seven Reforestation Perimeters) are managed by the DGEFC and seven managed by ONAB, mainly for timber production for export; and (ii) two National Parks (Pendjari and W) and three hunting zones managed by CENAGREF.
- b) the Protected Estate Domain (PED), which comprises the remaining forested areas in the Rural Domain. The PED forests, authorized for multiple usages, including agriculture, are under the territorial jurisdiction of the municipalities and are managed by municipal mayors under the supervision of the DGEFC.

¹ RGPH4: *Le quatrième Recensement Général de la Population et de l'Habitation*, or Fourth National Census in English

² EMICoV : *Enquête Modulaire Intégrée sur les Conditions de Vie des Ménages*, or Integrated Modular Survey on Households' Living Conditions in English

³ ETVA: *Enquête sur la Transition des Jeunes de l'Ecole vers la Vie Active*, or Study on the Transition of Youths from School to Professional Life in English

⁴ The informal economy represents 65 percent of GDP, engaging 90 percent of the labor force and more than 95 percent of the female labor force. Services and agriculture, accounting for approximately 50 and 25 percent respectively of total value added, are both dominated by the informal sector. The large share of services reflects Benin's role as a transit and trade hub for landlocked countries in the north, primarily Niger and Burkina Faso, but also the large amount of informal re-export trade and commerce with Nigeria, which amounts to some 20 percent of GDP and 25 percent of government revenue (Source: Benin CPF 2018).



5. The forest policy (Law 93-009 of July 1993) that governs the forest regime in the Republic of Benin was revised in 2012. It is currently being updated with funding from the European Union to incorporate new guidelines for sustainable forest management and is expected to be submitted to Parliament for approval by end 2019. A number of policy and strategy documents have also been produced to improve the management of forest and natural resources, including the: (i) National Program for Sustainable Management of Natural Resources (2008); (ii) National Strategy for Rural Wood Markets (2008); (iii) National Strategy and Action Plan on Biodiversity (2011-2020); and (iv) Low Carbon and Climate Resilience Strategy (2016-2025). In addition, Benin has ratified several international conventions relating to the management and conservation of forest resources.

6. Despite a robust institutional context for management of the forestry sector, the decrease of Benin's forest cover, particularly over the decade from 2007-2016, is concerning: national forest cover, estimated at 8.12 million hectares (ha) in 2007 (70.4 percent of the national territory), fell to 7.9 million ha in 2016 (68.5 percent of the territory), a loss of over 215,000 ha. If the current deforestation rate continues, the per capita forest area, which more than halved from 1.63 ha in 1980 to 0.87 ha in 1995, will fall even further, to 0.29 ha by 2025 (MEHU/DGFRN⁵, 2012).

7. The direct drivers of deforestation and forest degradation in Benin's GFs are: (i) extensive and shifting slash and burn agriculture; (ii) uncontrolled production of firewood and charcoal (upon which more than 85 percent of the population depends for cooking, especially in the urban areas in the South of the country); (iii) seasonal transhumance of local and foreign herds in search of pasture and water. These causes are exacerbated by weak capacity and understaffing in the Forestry Administration and the inability of existing Non-Timber Forest Product (NTFP) value chains to provide alternative revenue sources for forest-dependent communities, both of which contribute to increasing human pressure on forest resources.

8. Indirect causes of deforestation include increasing demographic pressure and climate change, the latter is slowing down the forest cover regeneration process and reducing biomass through faster drying up and silting of streams, more frequent flooding, and increased soil erosion.

9. To address each of the identified direct drivers, the project has designed targeted activities, i.e., a combination of incentive-based agroforestry schemes—including use of the taungya method—agricultural intensification, bush fire control, establishment of fuelwood plantations on degraded GF lands (to increase fuelwood production and meet the energy needs of high-consumption urban hubs), efficient production of charcoal, transhumance management, and NTFP value chain development. Plantations will be comprised of native species, adapted to the area. Increasing tree cover in the project areas is expected to support the hydrological cycle and soil stability, among other factors, bolstering ecological health in these areas and improving overall conditions in Benin's GFs.

10. The capacity of the Forestry Administration will also be enhanced to deliver its mission in a more effective manner. This includes the identification of a financing instrument that will allow for long-term management of GF after project closure, specifically by helping to address the issue of recurrent costs.

C. Relevance to Higher Level Objectives

11. The proposed project contributes to the Benin Country Partnership Framework (CPF) FY19-23 (Report No. 123031-BJ⁶) through its: (i) Focus Area 1 "Structural Transformation via Competitiveness and Productivity", Objective 3 "Improving Governance Capacity for Effectiveness and Accountability"; and (ii) Focus Area 3 "Increasing Resilience and Opportunity, and Reducing Climate-Related Vulnerability", Objective 8 "Addressing

⁵ MEHU: *Ministère de l'Environnement de l'Habitat et de l'Urbanisme*, or Ministry of Environment, Habitat, and Urbanization; DGFRN: *Direction Générale des Forêts et des Ressources Naturelles*, or General Directorate for Forests and Natural Resources

⁶ World Bank. 2018. *Benin - Country partnership framework for the period of FY19-FY23 (English)*. Washington, D.C. : World Bank Group.



climate-related threats and vulnerabilities". The project supports these objectives by addressing as a priority the weak operational capacity of the DGEFC and the National Center for Remote Sensing and Ecological Monitoring (CENATEL: *Centre National de Télédétection et de Suivi Écologique*) by establishing a more robust operational forest governance framework to ensure effective GF management. This will be paired with implementation of agricultural intensification techniques, agroforestry methods promoting climate-resilient agriculture, and sustainable natural resource management. The project will also enhance protection of areas of high conservation value in GFs and support high-scale fuelwood plantations to contribute to the energy needs of Benin's main consumption cities (Cotonou, Abomey-Calavi, and Porto-Novo).

12. Given the range of forest and forest-smart activities, the project is closely aligned with the World Bank's Forest Action Plan (2016-2020). The Results Framework (RF) includes indicators matching the definition of the Predictive Proxy Indicators (PPI) concept to evaluate the effectiveness of forest related interventions, as suggested in the Forest Action Plan. While the project does not pursue the complete formation of specific PPI clusters, its indicators directly relate to the Poverty, Biodiversity, and Climate change themes in such clusters as Sustainable Income, Positive Environmental Impacts related to biodiversity and to climate change, as well as Increased Carbon Stocks. Please look at PDO Indicator 1: 'Gazetted Forest areas under sustainable management based on defined criteria'; PDO Indicator 3: 'Standing volume of wood energy plantations'; PDO Indicator 4: 'Communities adjacent to targeted GFs with increased access to income sources through NTFP value chains; Intermediate' Indicator 6: 'Surface areas brought under enhanced biodiversity conservation'.

13. Benin's Nationally Determined Contribution (NDC) highlighted the forestry sector as vulnerable, while also stating that sustainable management of forest resources was a viable climate resilience measure. Benin targets a 21.4 percent reduction in its emissions, committing to an unconditional reduction of 3.5 percent. Land use change is a major cause of emissions in the country and Benin targets reduction of emissions by 110 MtCO₂e compared to the Business as Usual (BAU) scenario. The project will support this NDC target through the promotion of large-scale plantations, regeneration of degraded lands, protection of conservation areas, and sustainable extraction of forest resources in project target areas.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

14. The PDO is to improve the integrated management of targeted GFs, to increase access of the main consumption cities to fuelwood produced sustainably, and to strengthen selected NTFP value chains for forest-dependent communities.

PDO Level Indicators

- (i) Gazetted Forest areas under sustainable management based on defined criteria ⁷(ha);
- (ii) Net greenhouse gas emissions (metric tons);
- (iii) Standing volume of wood energy plantations supported by the project (cubic meter (m³));
- (iv) Communities adjacent to targeted GFs with increased access to income sources through NTFP value chains (number).
- (v) Satisfaction of beneficiaries (level of engagement, by gender and age) (percentage).

⁷ The criteria include adoption and implementation of agroforestry schemes, taungya methods and agricultural intensification techniques defined in the project M&E manual



B. Project Components

15. Selected Gazetted Forests: 11 forest reserves have been targeted for project interventions on the basis of their conservation, production, and NTFP development potentials. Four are in the south (Dan, Dogo-Kétou, Logozohè and Toffo-Lama Sud), three in the center (Agoua, Ouémé-Boukou, and Tchaourou-Toui-Kilibo), and four in the north (Ouémé-Supérieur-Ndali, Alibori Supérieur, Trois Rivières, and Ouénou-Bénou). The total combined surface area of these GFs is 917,951 hectares representing 63 percent of the total surface area (1,457,247 ha) of the country's 46 GFs. The list of project targeted GFs and their respective surface areas is attached in Annex 4.

Component 1: Support to Forests Governance (SDR 7.05 million, US\$9.77 million equivalent)

16. The component aims to enhance the capacity of the Forestry Administration⁸ for improved management of the sector and establish a sustainable instrument for long term financing of the recurrent costs of managing the country's Gazetted Forests.

Sub-component 1.1: Capacity enhancement of the Forestry Administration (SDR 6.2 million, US\$8.59 million equivalent)

17. The objective of this sub-component is to improve the capacity of the Forestry Administration to effectively execute its mandate, including establishing, managing and monitoring implementation of management plans and detecting and responding to threats to project targeted GFs.

18. The sub-component will finance: (i) technical assistance to (a) take stock of the current degradation state of targeted GFs in order to elaborate forest cover maps; (b) conduct a socio-economic study of forest-dependent communities in target zones; and (c) develop GF management plans; (ii) GF management plan consultation and validation workshops with key stakeholders; (iii) acquisition of patrolling equipment, including vehicles and motorcycles, to enhance the capacity of the decentralized technical forestry management unit staff (CTAF: *Cellules Techniques d'Aménagement Forestier*) to effectively implement project activities in selected GFs; and (iv) rehabilitation works for CTAF offices and living quarters, including provision of electricity, water, and internet connection (to enhance communication with other project zone CTAFs and with the central administration in Cotonou for timely coordination of interventions in GFs).

19. The sub-component will also enhance the capacity of CENATEL through the establishment of a dedicated forest threat early warning and monitoring system. Support to CENATEL will allow it to provide updated high-resolution satellite imagery on forest cover and forest cover change, land use change, transhumance routes and traffic, and fire outbreaks. Furthermore, the sub-component will improve interagency and inter-ministerial coordination. In the former case, it will accomplish this by strengthening communication mechanisms that leverage CENATEL's real-time surveillance data and analysis to inform CTAF on-the-ground activities, including the deployment of forest rangers to rapidly respond to emerging threats to GFs. In the latter case, CENATEL's production of detailed maps of GFs and their buffer zones will help to promote better land use planning at the national level.

20. To achieve the above, the sub-component will finance: (i) acquisition of modern and efficient surveillance equipment (geospatial and image processing software, drones, cameras); (ii) technical and human capacity building to render CENATEL capable of quickly obtaining, analyzing, and communicating geospatial data for decision-making; (iii) planning and execution of targeted forest patrols; (iv) quality control measures that use GPS tracking to ensure forest rangers have comprehensively patrolled their assigned zones, of which the SMART⁹

⁸ For the purposes of this document Forestry Administration refers to DGEFC and CENATEL.

⁹ SMART: Spatial Monitoring and Reporting Tool



system, currently used for surveillance of Pendjari National Park in the North of the country, is the most salient example.

21. The sub-component will also finance South-South exchanges between Benin and: i) Côte d'Ivoire, where the World Bank financed the establishment of a satellite forest monitoring, reporting and verification unit at the Reducing Emissions from Deforestation and Forest Degradation (REDD+) Permanent Secretariat; ii) Senegal, home to the Ecological Monitoring Center¹⁰, which furnishes high-quality ecosystem monitoring information, e.g. bush fire outbreak and climate change adaptation data; iii) Niger, which hosts the AGRHYMET (Agro-Hydro-Meteorological) Regional Centre¹¹—the Permanent Interstate Committee for Drought Control in the Sahel—whose mission focuses on generating knowledge products and trainings on Sahelian food security, desertification control, and water management. The geographic information system (GIS) specialists of these institutions will be called upon to support installation of similar, high-performing systems at CENATEL if needed, as well as subsequent training to operationalize the system.

22. To ensure a collective and concerted management of forest resources, an intersectoral consultation and participation framework of key stakeholders including but not limited to Ministries of Environment, Agriculture, Energy, Land, and Infrastructure, as well as municipalities and traditional authorities, will be put in place for decision making and participatory planning and sustainable management of forest resources.

23. The project will also work with the Government through its Public Investment Program to: (i) renew the aging Forestry Administration workforce and undertake recruitments to enhance the Administration's human resources capacity for regular forest monitoring; and (ii) provide additional payments to CTAFs involved in project implementation.

Sub-component 1.2: Strategies and instruments for sustainable management of Gazetted Forests (SDR 0.85 million, US\$1.18 million equivalent)

24. The objective of this sub-component is to identify ways of managing the country's GFs in a more effective, efficient and sustainable manner, after project closure.

25. The sub-component will finance technical assistance to: (i) identify key opportunities and challenges of current organizational arrangements for GF management; (ii) investigate methods of GF management at the regional and international levels to identify best practices; and, (iii) make recommendations on strategies aimed at attaining transformational, sustainable impacts in Benin GF management.

26. Furthermore, given that the project will finance establishment of production forests (sub-component 2.4) that will yield, in the long run, revenues from the sale of wood products, an additional aim is to secure the use of these funds to finance the recurrent costs of managing the country's GFs, including long-term maintenance costs in the production forests themselves. The study will look into the various extant funds for protected areas management established in Benin, including the Conservation Trust Fund (CTF) created under the IDA and GEF-funded Support to Protected Areas Management Project (P122419/P115963), and named the West Africa Savannah Foundation (FSOA: *Fondation des Savanes Ouest-Africaines*). The aim is to look into the possibility of opening a window within FSOA solely dedicated to GFs and, if granted by the FSOA Board of Directors, to finance technical assistance to review the FSOA operating articles with an eye to establishing an endowment capital the interest of which will finance the recurrent costs of managing the country's GFs.

¹⁰ Centre de Suivi Ecologique

¹¹ Centre régional d'Agro-Hydro-Météorologie



27. The GFs window would receive the revenues from the sales of wood generated from the 22,000 hectares of production forests (15,000 ha acacia and 7,000 ha teak) established by the project. For acacia fuelwood this amount is estimated at US\$55.4 million based on total production of 120 m³/ha (1.8 million m³)¹². For the 7,000 ha of teak, the revenues are estimated at US\$79.1 million over a period of 23 years based on total production of 42 m³/ha (294,000 m³) and sold at US\$269/m³. ONAB will contribute a percentage¹³ of teak revenues to the GFs account window. Based on a conservative annual interest rate of 4 percent, the CTF would generate revenues estimated at US\$2.5 million per year to defray recurrent costs of managing Benin's GFs.

28. The project will also finance technical assistance to look into the functioning of the National Forest Fund (NFF) and examine options of opening a special window there to receive the fuelwood and timber revenues. The NFF is a financing instrument that was established by the Government of Benin on January 30, 2016 (Decree n°2016-014) and managed by the DGEFC. The NFF receives revenues from the sale of fuelwood produced in the rural domain and (produced legally) in GFs, as well as from fines levied on illegal activities in GFs, e.g. illegal charcoal production, agricultural activities, removal of natural forests for timber or fuelwood from GFs.

29. Other innovative long-term GF maintenance financing options will be looked into under this sub-component. It is expected that by the project's mid-term review, the most suitable sustainability instrument will have been identified and validated at the National level, and it will be operational before project closure.

Component 2: Integrated Management of Gazetted Forests (SDR 41.28 million, US\$57.2 million equivalent)

30. The objective of this component is to support management of selected GFs in the south (Dan, Dogo-Kétou, Logozohè, Toffo-Lama Sud) and in the center of the country (Agoua, Ouémé-Boukou, and Tchaourou-Toui-Kilibo) in an integrated manner through the following four sub-components.

Sub-component 2.1: Promotion of agricultural intensification and agroforestry methods (SDR 3.03 million, US\$4.2 million equivalent)

31. The sub-component aims to promote agricultural intensification and agroforestry methods in project targeted GFs in the center and south of the country with the goals of containing and/or reversing the trends of deforestation and forest degradation due to extensive agriculture.

32. The sub-component will finance technical assistance to take stock of existing farmers in GFs and work with them to adopt intensification and agroforestry methods in dedicated zones in GFs. The sub-component will finance: (i) technical assistance in outlining and mapping the zones for authorized agroforestry in GFs, parceling the agroforestry plots that will be given to farmers; (ii) participatory and inclusive stakeholder consultation workshops to ensure agreement on the siting of the dedicated agroforestry areas; (iii) provision of demarcation materials (posts, pillars, signs, panels, planting alignments) and their participatory installation with farmers to ensure ownership over the new zones.

33. The project will support adoption of agricultural intensification and agroforestry methods through a stocktaking of existing successful national and regionally employed agroforestry methods and agricultural intensification techniques to recommend those practices most suitable to the project's zones of intervention. In parallel, the project will pilot agroforestry and intensification methods currently supported in the North of Benin by a German Corporation for International Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit*: GIZ)-financed project, Soil Protection and Rehabilitation to Improve Food Security Project.¹⁴

¹² As explained below in the economic analysis, acacia fuelwood will be converted into energy efficient charcoal. One hectare of acacia plantation provides 300 (60kg) bags of charcoal. These bags are sold in Benin's main consumption urban cities at the equivalent of US\$12.30/bag.

¹³ Based on preliminary discussions this percentage will be around 10 percent of teak revenues; the amount will be confirmed in a convention signed with ONAB.

¹⁴ *Protection et Réhabilitation des Sols pour améliorer la sécurité alimentaire* (ProSOL).



The system consists of using local fertilizing plants (mucuna and Angolan nuts) proven to effectively increase farm productivity. The GIZ project has developed training modules which are disseminated by local NGOs who train farmers in the use of these techniques. The project will provide farmers with mucuna and Angolan nuts seeds as well as tree seeds adapted to the project agro-ecological zones, including those of acacia and teak, for introduction onto farms.

34. Furthermore, the project will: (i) establish agreements/MOUs with the Agriculture Department, research institutions (e.g. the National Agricultural Research Institute of Benin (INRAB: *Institut National de Recherche Agricole du Benin*)) for the production of improved seeds (maize, peanuts, soya, etc.) and the provision of technical assistance to farmers for the adoption of agricultural intensification techniques; (ii) farmer trainings and awareness raising in the implementation of agricultural intensification techniques; and (iii) awareness raising against agricultural bushfires and on fire prevention measures.

35. Services of seasoned intensification and agroforestry NGOs, which will provide assistance to the farmers to ensure successful implementation of the system, will be financed.

Sub-component 2.2: Sustainable management of transhumance (SDR 0.59 million, US\$812,000 equivalent)

36. Seasonal transhumance of local and foreign herds in search of pasture and water is a significant contributor to GFs deforestation and degradation. This mainly occurs through the grazing of livestock on herbaceous pastures, as well as livestock's pruning of and rumination on the low branches of trees ("aerial fodder") during the dry season, which compromises the trees' natural regeneration. These practices are widespread due to the importance of livestock farming¹⁵. Pastoral-related degradation of GFs has been exacerbated by: (i) rent-seeking behavior of traditional authorities, in collaboration with previously settled herders, who facilitate the settlement of newcomers in the GFs; and (ii) the lack of physically demarcated transhumance corridors and of managed and secured grazing areas and agro-pastoral infrastructure, leading to (a) agricultural encroachment into transhumance corridors; and (b) conflicts between transhumant herders and farmers.

37. As seasonal transhumance is a regional concern, and the Government and Economic Community of West African States (ECOWAS) plan to undertake actions to reduce its impacts, project interventions will mostly focus on increased surveillance around transhumance hotspots in project target zones through: (i) establishment of control posts (high viewing platforms) and increased aimed at securing plantations, agroforestry plants, and conservation areas; (ii) vegetation/reforestation to regenerate degraded corridors, and physical and visual delimitation of the transhumance corridors (e.g. using panels and signs); (iii) continuous awareness raising about corridor limits and borders at the local level through use of local radio spots and traditional methods of communication; and (iv) controlled early fire setting to encourage grazing pasture regeneration and planting/seeding of fodder trees to enhance pasture quality in transhumance corridors.

Sub-component 2.3: Sustainable management of conservation forests (SDR 1.8 million, US\$2.5 million equivalent)

38. Over time, a convergence of drivers has led to forest degradation and the destruction of natural habitats. One of the most significant is uncontrolled charcoal production, which has been concentrated for decades on a few rare natural forest species with high conservation value, jeopardizing their ability to provide ecosystem services such as carbon storage and sequestration. Many of these rare species are experiencing critical regeneration slowdown, as they are exceedingly difficult to reproduce naturally and require assistance for their

¹⁵ With a herd estimated at around 2 million heads of cattle, sheep and goats, extensive and transhumant livestock farming, based on the exploitation of natural pastoral resources, is the second most important socio-economic activity of the rural population.



preservation. Another major contributing factor is unregulated hunting/poaching, which has contributed to increased pressure on fauna and forest destruction, specifically through the use of uncontrolled bushfires for hunting.

39. The objective of this sub-component is to put up to 40 percent of GFs under conservation to ensure natural or assisted regeneration of tree species and concomitantly restore habitats conducive to increased biodiversity. The sub-component will finance the following activities:

40. Establishment and sustainable management of conservation zones in GFs through: (i) demarcation of conservation zones and delimiting borders, including through vegetative firebreaks (planting of multiple rows of fruiting trees, like mango or cashew, that prevents the growth of underbrush and limits/forestalls the spread of fire), placement of stone pillars, and hanging of signage; (ii) agreements with local forest co-management committees to complement the work of CTAFs through the conduct of regular ground patrols and lending of support for bushfire suppression—these agreements will include the acquisition of material sufficient to effectively carry out community patrols, including motorcycles (with provisions for gas and maintenance), boots and waterproof jackets, and other light equipment.

41. Biodiversity monitoring through: (i) technical assistance to conduct a detailed inventory of biodiversity in GFs (flora and fauna) and to establish a baseline reference level for ecological monitoring; (ii) establishment of conservation and restoration measures for the 10 most endangered timber species (see Annex 5); and (iii) creation and implementation of a biodiversity monitoring system consisting of: (a) a well-designed geospatial database within the National Environmental Monitoring database (currently being established at the Benin Environmental Protection Agency (ABE: *Agence Beninoise pour l'Environnement*)) under the West Africa Coastal Areas (WACA) Resilience Investment Project (P162337), (b) partnerships with universities and/or research centers to collect and analyze data and perform continuous monitoring on the status of targeted (e.g. threatened) flora and fauna species; and (c) reporting and publication of case studies and successful actions in biodiversity restoration.

42. Improving charcoal production efficiency from natural forests - traditional furnaces, which have less than 20 percent efficiency, thus leading to large losses of wood energy, will be improved through: (a) technical assistance to identify and develop efficient, affordable, and scalable technologies for charcoal production; (b) sensitization and training of local communities and charcoal producers in improved carbonization techniques and the use of higher performance furnaces; and (c) construction of improved charcoal furnaces at the outer limits of GFs to incentivize charcoal producers to do transformation outside of the boundaries of natural forests, hence reducing bushfires and forest degradation linked to charcoal production.

Sub-component 2.4: Establishment and management of production forests (SDR 35.86 million, US\$49.7 million equivalent)

43. Although more than 85 percent of the population depends on fuelwood to meet household needs, inefficient technologies are used in fuelwood combustion. As a result, natural forests are critically degraded and deforested and their potential to satisfy the increasing demand for fuelwood is low. To reverse the deforestation and degradation trends related to fuelwood collection from GFs, the sub-component will finance the establishment of sustainably managed fuelwood production forests, with the objective of contributing to alleviate the demand from Benin's major wood energy consumption cities--Cotonou, Abomey-Calavi and Porto-Novo.

44. The project will develop a total of 15,000 hectares of *Acacia auriculiformis* plantations, a fuelwood tree species used in Benin and known not only for its rapid growth, but also for its soil fertility restoration qualities. These soil fertility qualities will enable successful application of the taungya system—a method of intercropping where agricultural crops such as maize, peanut and soya are interspersed among acacia trees. Farmers settled in GFs will therefore be authorized to implement the taungya method and will be incentivized through a



performance-based contract with the project to participate in plantation works from nursery establishment to planting and maintenance of the acacia plantations. Pastoralists will be equally involved in this incentive mechanism, as the project will call on draft animals both during plantation preparation (to transport seedlings) and harvest time (to transport fuelwood loads to points of sale, i.e. rural wood markets (MRB: *Marchés Ruraux de Bois*). This integrated and participative "win-win" situation for local communities will not only provide alternative income streams, but it will also make them key players in sustainable gazetted forest management. It will also contribute to addressing transhumance in GFs as pastoralists become key actors in forest management.

45. The incentive mechanism will be governed by a performance-based contract between the Integrated Project Management Unit (IPMU) and the farmers. Payments will be triggered by: (i) the number of seedlings developed in the nursery by the farmers; (ii) the number of trees planted and the percentage of success; (iii) the effective maintenance of trees planted, etc. For the pastoralists, the performance will be measured by: (i) the number of seedlings transported to plantation sites and effectively distributed to farmers for planting; (ii) ensuring non-destruction of plantations by pastoralists; (iii) the number of loads transported to points of sale after harvests, etc. Verification of the performance will be ensured by the CTAFs as well as independent NGOs and will be reported to the IPMU. Payments will be made in installments in the form of subgrants based on this dual verification protocol; a payment agency will be recruited prior to disbursement of subgrants to the beneficiaries.

46. The establishment of the plantations will be supported by the following preparatory activities: (i) an analytical study to: (a) ascertain soil quality in potential plantation areas in selected GFs, (b) identify, survey, and map potential plantation sites and parcels for selected species; and (ii) establishment of community-led nurseries for the production of the selected species.

47. Given that *Acacia auriculiformis* is particularly sensitive to fire and can burn even when fresh, which is a risk to the success of this sub-component, the project will finance establishment of fire breaks (manual and/or vegetative) around plantations and ensure close monitoring during their first three years of development, when they are most sensitive to bush fire. Viewing platforms near plantations, water trucks and fire extinguishers will also be provided for quick intervention.

48. Technical specification sheets to guide the implementation and management of fuelwood production forests will be developed by the DGEFC before the establishment of plantations—which is planned for the second year of the project—while field preparation is scheduled for the first year of the project.

49. The sub-component will also support strengthening and scaling-up of rural wood markets—the sale points for wood harvested from the plantations—through: (i) a stocktaking of existing MRBs, which will report successes, best practices, challenges, and potential failures of the system; (ii) capacity building of GF co-management committees responsible for managing the MRBs in best practices and business management principles and simplified accounting methods; and (iii) acquisition of equipment for the establishment and furnishing of offices in new MRBs, including office supplies such as registers, receipts, notebooks, and other materials necessary for proper recordkeeping.

50. The sub-component will also finance the establishment of 7,000 hectares of teak plantation in two GFs (Toffo-Lama Sud and Dogo) given the high economic value of this tree species compared to acacia. These plantations will be done by ONAB based on their experience and track record in timber production and management. Revenues generated from teak will contribute to the management and maintenance costs of the acacia plantations after project closure. It has been agreed that a percentage of profits generated from the sale of timber will be earmarked for this purpose and transferred to the sustainability instrument (e.g. GF window within FSOA or NFF) that will be selected by mid-term review. The remaining profits will cover renewal of the plantations and related maintenance and overhead costs.



Component 3: Development of Selected Non-Timber Forest Product (NTFP) Value Chains (SDR 2.96 million, US\$4.1 million equivalent)

51. Traditionally, forest-dependent communities have harvested NTFP for household uses, including inter alia, nutrition, medicine, and beauty purposes. Their potential value is not fully understood and is often underestimated. Therefore, value chains are not well-developed and value addition is low. As a result, women, men, and youth, three population segments heavily involved in NTFP collection and processing—e.g. shea nut (women), apiculture (men and youth)—are not optimizing their earning potentials from these activities and heavily rely on wood products resources from GFs for their livelihoods, thereby increasing human pressure on GFs.

52. However, shea trees, which are among the main species populating GFs in the North, are aging and becoming less productive. This could lead in the long run to a shortage of the commodity, impoverishing women who depend on shea nut collection and processing for their livelihoods. Given that traditional processing of shea nut to shea butter contributes to deforestation¹⁶, the project will work with women shea nut collectors and processors to identify energy-efficient technologies for shea nut processing so as to reduce pressure on natural resources.

53. For honey, given that the project will be developing acacia plantations (Sub-component 2.4) and acacia honey is of high value and consumed worldwide, the project will aim at developing a value chain of acacia (organically certified acacia honey of Benin GFs) for the benefit of the men and youth involved in this activity.

54. The component is subdivided into the following two sub-components:

Sub-component 3.1: Development of shea value chain (SDR 2.09 million, US\$2.9 million equivalent)

55. The objective of this sub-component is to develop the shea value chain while promoting energy-efficient processing methods as well as establishing new plantations to replace the aging and less productive trees to sustain this NTFP.

56. The subcomponent will finance technical assistance to: (i) assess the stock of shea nut trees in and around the largest gazetted forests in the North (Alibori Supérieur, Ouémé-Supérieur-Ndali, Trois Rivières and Ouénou-Bénou); (ii) develop a production and management plan of the shea plantations with the aim of establishing 1,500 hectares to respond to market demand in the long-term and avoid supply shortages given the aging of shea trees; (iii) technical assistance including research on improvement of collection, conservation, and processing techniques; (iv) training of shea nuts collectors on those techniques; and (v) a marketing study looking at sources of demand, packaging, labeling and certification options and providing recommendations to implement the best options which the project will finance.

57. The project will also finance: shea nut processing units for the benefit of women organized in cooperatives; certification process of shea butter for export; support for women's participation in national, regional, and international fairs (thereby connecting them with potential buyers).

58. Given that transformation of shea nut to butter necessitates high consumption of energy, the project will look into integrating energy-efficient technologies, i.e. solar energy to operate the processing units and provide improved energy-efficient stoves to women groups specializing in nut collection and transformation. The project will also finance the services of local NGOs, research institutions and universities to support implementation of the sub-component.

¹⁶ 1 kg of shea butter requires an average of 7 kg of wood for transformation from the nuts (Source: CIRAD Burkina).



59. Details on the implementation of the sub-component will be elaborated in the project NTFP manual, which will include a specific development and implementation plan for the shea value chain. The manual will be developed within a month after project effectiveness.

Sub-component 3.2: Development of honey value chain (SDR 0.87 million, US\$1.2 million equivalent)

60. This sub-component aims at promoting the development of the acacia honey value chain from the 15,000 hectares acacia plantations to be established by the project, for the benefit of forest-dependent communities, especially the youths living in those communities.

61. The sub-component will finance: (i) provision of hives and capacity building of beneficiary farmers to make honey on acacia plantations; (ii) a marketing study looking at sources of demand, packaging, labeling and certification options and provide recommendations to implement the best options which the project will finance to support forest-dependent communities; and (iii) small honey processing units for beneficiaries organized in cooperatives with support from the project.

62. The sub-component will also finance the process of honey certification to facilitate its export regionally and internationally as well as the participation of producers in national, regional and international fairs to showcase their products to build demand.

63. Implementation of the sub-component will be supported by an NGO to be selected competitively.

64. Further details on the implementation of this sub-component will be elaborated in the NTFP manual which will include a specific development and implementation plan for the acacia honey value chain to be developed within a month after project effectiveness.

Component 4: Project Management (SDR 2.81 million, US\$3.9 million equivalent)

65. This component will support the overall daily administration of the project, to ensure that regular monitoring and evaluation is carried out, and the results are fed back into decision making on project implementation.

66. The project will competitively recruit an IPMU General Project Coordinator, an international, seasoned technical assistant (with a strong background in forestry), a dedicated technical project focal point for the project, as well as procurement, financial management, safeguards, communication, M&E specialists, and administrative support for implementation of activities. Once the recruitment is effective the team can organize and participate in the project launch workshop and own their respective roles and responsibilities in project implementation.

67. Four vehicles, office equipment, office supplies, offices rental and related utilities as well as project supervision and operating costs will be supported by the component. In addition to routine administration activities, i.e. budgeting and planning, procurement and financial management, the costs for annual audits, annual and quarterly progress reports, development of mid-term and completion reports and overall M&E, including implementation of safeguards instruments will be included under project management. Costs of project launch, MTR and completion workshops, as well as project team participation in World Bank trainings on its operational policies and procedures and other technical knowledge acquisition trainings, will also be financed by this component.

C. Project Beneficiaries

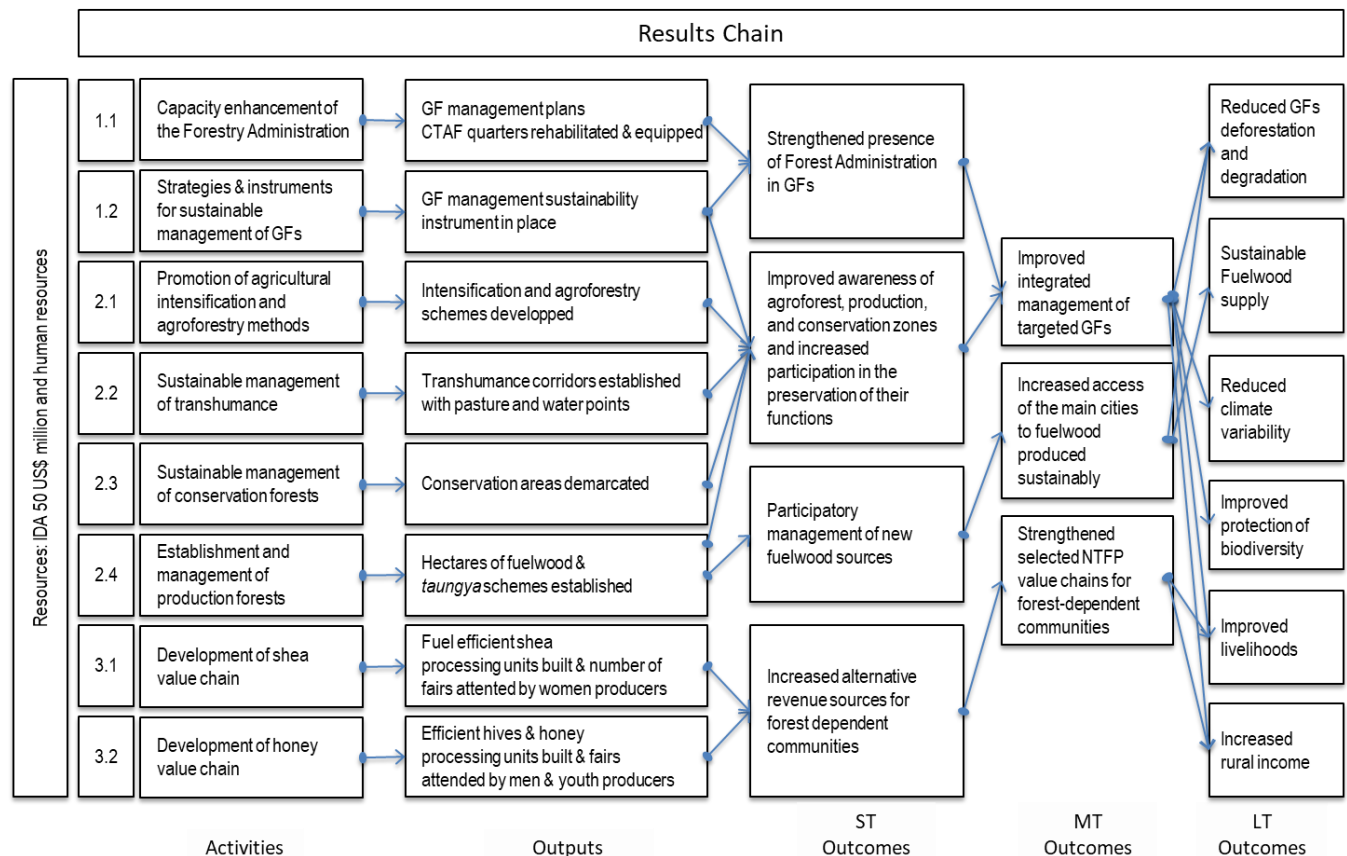
68. The project's direct beneficiaries are: (i) forest dependent communities in the project's target GFs, a population of about 536,368 inhabitants (68,954 households) of which 267,626 men and 268,204 women¹⁷ who

¹⁷ Source: DGEFC



will benefit from revenues generated from the performance-based agroforestry and agricultural intensification, as well as from the implementation of the taungya system, and NTPF value chain development; and (ii) the Forestry Administration, whose capacity will be enhanced for improved forest governance. Indirect beneficiaries are segments of the populations of Cotonou, Abomey-Calavi, and Porto-Novo, whose fuelwood needs will partially be fulfilled thanks to the project's support to fuelwood production.

D. Results Chain



69. Forests in Benin have been declining steadily and recent studies have shown GFs to be the most under threat. The main drivers of degradation and deforestation in GFs are weak forest governance, agricultural expansion, unmanaged extraction of forest resources, and unmet energy demands. The project has devised targeted activities to address each of the identified drivers. A combination of incentive-based agroforestry, including taungya method, agricultural intensification, transhumance management, and NTFP support, is expected to increase farm productivity and income generation for farmers and reduce the likelihood of further encroachment into forests.

70. New plantations will be established on degraded lands to increase fuelwood production to meet urban wood and energy demands. To attenuate ever-increasing fuel energy demand, the project will invest in efficient charcoal production. Improving management for conservation, in areas that hold higher biodiversity, and sustainable extraction of forest resources, for increased income and easier consumption, will contribute to the maintenance of the country's existing forests. Foundational capacity of forest governance will be improved by



boosting the performance of decentralized forest management units, providing forest monitoring equipment, and supporting an intersectoral consultative body for decision-making related to the use of forest resources.

71. The project is designed to address multiple drivers of deforestation and to build capacity of the forest governance structure within Benin. All activities will be supported through technical assistance, so that the species and technologies adopted are appropriate to the Beninese context. In this way the project will ensure that its measures attenuate climate change-related vulnerabilities, specifically flooding-induced erosion and forest fires. All measures are designed using inclusive stakeholder participation and selected incentives so that the activities remain sustainable after the project period. These forest management-focused activities will, in the long-term, build-up the resilience of communities and reduce emissions from deforestation and forest degradation.

E. Rationale for Bank Involvement and Role of Partners

72. The rationale for Bank involvement is multidimensional: The World Bank brings valuable support through technical expertise on forestry, landscape, and climate issues. In Africa, the World Bank environment and natural resources portfolio focuses on promoting sustainable and resilient management of natural resources and helping countries with adaptation, as well as mitigation, of climate change impacts. The World Bank conducts technical analysis, provides advice and designs projects to address countries' critical adaptation and mitigation needs, including sustainable land management, forest and land use, climate smart agriculture, as well as building resilience into infrastructure investments. The World Bank can provide expertise to Benin based on a large staff of technical and sectoral experts in key fields. To support countries' initiatives toward reduced emissions from deforestation and forest degradation, the World Bank hosts a range of carbon and climate finance mechanisms¹⁸, which provide technical and financial support for transformational changes in land use and forestry.

73. The World Bank also has a legacy of assistance to Benin in the protection of the country's forest resources. The Bank has considerable experience working with Benin particularly in regard to operational support to the Government on projects concerning protected areas, specifically the Forests and Adjacent Lands Management Project (P069896) and Support to Protected Areas Management (P115963). Consequently, the project is well-positioned for a scaling up of activities previously undertaken and continue the work on participatory forest management plans and other co-management activities with local communities, including the rural wood markets.

74. Additionally, the World Bank's mandate allows it to act as a convening power for all governmental actors, other development partners, the private sector and NGOs involved in environment and natural resource use reforms, namely, in the case of the Benin, the Ministry of Environment and Sustainable Development, Ministry of Agriculture, Livestock Department, Ministry of Economy and Finance, municipal government, community governance institutions and traditional authorities.

F. Lessons Learned and Reflected in the Project Design

75. The project takes lessons from previous forestry projects in Benin. The Benin Forest and Adjacent Lands Management Project (FALMP) (P069896) was implemented in the country in two phases over 12 years. This project targets the gaps that remained at the end of the FALMP. One such gap is the CTAF's limited capacity to govern. Based on FALMP experience, the proposed project has placed a focus on providing CTAFs with sufficient resources, training, and incentives to conduct an appropriate number of surveillance missions, to enhance monitoring capacity and ensure patrols. This project also will employ a more inclusive approach towards forest management, including participatory boundary demarcation and execution for fuelwood plantations. Instead of

¹⁸ This list includes the Carbon Partnership Facility, Forest Carbon Partnership Facility, Partnership for Market Readiness, Carbon Initiative for Development, BioCarbon Fund Tranche 3: Initiative for Sustainable Forest Landscapes, and Pilot Auction Facility, among others.



lending support to all of Benin's Gazetted Forests, the project will select an important subset so that resources are well-targeted and positive impacts are sufficiently supported and measurable.

76. The results in the earlier project highlighted the importance of continuing investments towards improving livelihoods in communities that border Gazetted Forests. In line with these recommendations, IGAs will be specifically tailored to communities targeting value of selected NTFPs, i.e. shea and honey.

77. The project also takes lessons from the first phase of the AfDB's "Communal Forest Management Support Project," which closed in 2011. The proposed project adds to the inventory and demarcation of sacred forests undertaken during the AfDB project, insofar as it will demarcate, inventory, and monitor the selected GFs. Also, it will encourage planting and conservation of local species.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

78. An Integrated Projects Management Unit (IPMU) will be responsible for the implementation of all World Bank-financed environment, forestry and NRM projects, under the responsibility of the Ministry of Environment, and Sustainable Development, including WACA Resilience Investment Project (P162337) and Gazetted Forests Management Project (GFMP).

79. The current WACA Resilience Investment Project (P162337) Project Implementation Unit (PIU) will be upgraded to an IPMU. It will be composed of the following shared units by all projects under its responsibility: (i) Financial Management, (ii) Procurement, (iii) Safeguards, (iv) Monitoring & Evaluation, (v) Communication and (vi) Administrative Support, as well as a shared Steering Committee chaired by the Minister of Environment and Sustainable Development. The shared Steering Committee will be in place one (1) month after the Effective Date or at any later date agreed with the Association. These units will be strengthened as needed with fiduciary, safeguards, M&E and communication staff to support the GFMP implementation.

80. The WACA implementation manual (administrative, financial management and accounting procedures) is being updated to cover the project.

81. A General Project Coordinator of the IPMU, an International Technical Assistant and a dedicated GFMP focal point will also be recruited. The procurement process is underway, and the selected candidates will sign their contract one (1) month after the Effective Date.

82. The Director General of DGEFC in his role as National Coordinator of the Government Forestry Program and a permanent member of the Steering Committee will ensure synergies between the project and that Program. The decentralized Technical Forests Management Units (CTAF) in the field will ensure technical execution of the project's activities. Headcounts of CTAF employees will be increased by the Government to include personnel fully dedicated to project implementation, especially for the timely establishment and management of fuelwood production forests activities.

B. Results Monitoring and Evaluation Arrangements

83. Project monitoring and evaluation will serve to: (i) monitor and report on implementation progress as agreed in budgeted annual workplans; (ii) proactively identify gaps during implementation progress and take immediate corrective actions; and (iii) assess and report on the achievement of planned outputs, outcomes and impacts as per the project's results framework.

84. The M&E system will be based on the results matrix and will focus on tracking project results and providing gender-disaggregated data whenever possible based on baselines established in May 2019 during project preparation.



85. Overall monitoring and evaluation will be ensured by the IPMU. The dedicated GFMP focal point at the IPMU, will be responsible for data collection and upstream reporting, and monitoring information and overall progress toward achieving results.

86. The M&E system will rely on the project M&E system established at the IPMU and the M&E Specialist for reporting. Furthermore, CTAFs will actively contribute to data collection. Cost of data collection and monitoring is embedded in the project management component.

87. Specific elements of the M&E system will include: (i) technical, procurement and financial management audits; and (ii) analysis of intermediate project effects and the strength of the participatory GF management, agro-forestry and agricultural intensification methods, performance-based payment sub-grants. The carbon impact will be monitored using proxies defined during project preparation.

88. The M&E system will feed the project annual report which includes GHG emission reductions/enhancement of carbon stocks and other relevant co-benefit themes as they apply to the project (such as biodiversity and additional environmental services, governance and capacity development).

89. Benin's environmental M&E system currently faces several constraints that the current project hopes to surmount before its conclusion. First, the decentralized nature of Benin's Gazetted Forest Management structure—the presence of dozens of CTAFs in the field who are far from Cotonou and who currently lack stable access to communication, i.e. internet—is a significant constraint to the smooth functioning of the M&E system. Second, there is a need for human capacity building in terms of M&E, as many Forestry Administration agents in the field, i.e., CTAF may not have familiarity with the rigor inherent to managing robust M&E systems. Third, with discrete agencies and units generating or needing data, information is often scattered, rendering some data collection efforts duplicative or underutilizing data which has been collected at the costs of time and effort. This in turn makes it difficult to turn key evidence into actionable policies.

90. The project addresses the first constraint through reinforcement of forest governance infrastructure at the Gazetted Forest levels. For example, the project will modernize rangers' field offices, which, through the provision of stable electricity and internet connection, will facilitate better communication between the field and the central Administration (DGEFC), as well as the IPMU.

91. The project addresses the second constraint, of human capacity, through the propagation of technical materials—notably the M&E manual—and the installation of a core, experienced team (through implementation of the WACA program) that can impart knowledge to government counterparts and help to create a sustainable structure past the project's end date. As the IPMU team has specialists dedicated to M&E, implementation of sophisticated tools, such as surveys, will be led and carried out in a methodologically rigorous and defensible manner. Their participation will also serve to expose and transfer knowledge and best practices in M&E to forestry officials who may have little prior experience with such processes.

92. The overarching aim of this M&E work is to foster an environment of communication and data-sharing that enables optimal use of Benin's forest resources. To those ends, the project addresses the third constraint, the lack of coherent data aggregating and processing apparatus, via multiple avenues. One avenue is through inclusiveness of the multiple stakeholders involved in sustainable forest and natural resources management. By integrating research institutions, universities, NGOs, communities, and the government in the execution of the project, it is hoped that the M&E system will be bolstered through the generation of critical data, the identification of blockages to the fluid transmission of this data among parties, and solutions that permit the establishment of data repositories enabling free access to information on Gazetted Forest management. By way of example, this project will finance a Gazetted Forests window within the ABE database, which will allow Forestry Administration



and other Government officials to upload, update, and query statistics and analysis impacting Benin's Gazetted Forests.

93. The second avenue is to promote the use of this information at the highest levels of state. The project's support to the establishment of an intersectoral consultative body on the use of forest resources will help to ensure that collection of data is continuous and precise, since this body will act as a high-visibility client to the M&E system. Because it is comprised of high-ranking members of government, this body will demand robust data that permits informed decision-making. In this way, the body will serve as a feedback loop between the M&E system and policymakers.

C. Sustainability

94. The Project will establish 22,000 ha of production forests, of which 15,000 ha will be *Acacia auriculiformis*, a fast-growing fuelwood species with soil fertilizing qualities and 7,000 ha will be timber (teak and gmelina). After harvesting, the wood-energy plantations will regenerate themselves with little need to reseed. The Forestry Department along with GF local co-management committees will continue to ensure long term maintenance of the plantations including silvicultural operations to support their continued natural regeneration and complement with new seedlings as needed. Timber production forests are harvested on a long-term basis (20 to 40 years) and with their higher economic value, the plantations renewal will self-finance itself.

95. Given that the Government has already established a Conservation Trust Fund, the FSOA, whose main objective is to finance the recurrent costs of the country's national parks (Pendjari and W Parks), the project aims to partner with the FSOA to open a GF account within the FSOA. The account will host revenues generated from the sale of wood from the plantations as an endowment capital. Interest generated from the capital will be used to finance the recurrent costs of managing the country's GFs in a sustainable manner after project closure. Alternatively, the National Forest Fund could be restructured in a manner satisfactory to the World Bank to host the revenues from wood sales to support sustainable management of the GFs. By project mid-term review, a financial sustainability instrument (FSOA or National Forest Fund) will be selected and operationalized in the second half of project implementation.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

(i) Technical

96. The project will bring technical knowledge from the World Bank and international experts in agroforestry from International Centre for Research in Agroforestry (ICRAF), intensification, production and conservation forests management as well as climate change specialists for mitigation and adaptation. The project will also benefit from technical support from a seasoned international expert who will be recruited to support implementation and also to transfer technical knowledge to the Forestry Administration to enhance their technical knowledge in both production and conservation forest management.

(ii) Economic and Financial Analysis

97. A cost-benefit-analysis was applied to assess the economic efficiency of this project as detailed in Annex 2 attached. A sensitivity analysis was conducted for the main parameters including discount rate. For the discount rate, alternative rates of 5 percent, 12 percent, and 20 percent were applied. To test the robustness of the initial results, the economic benefits were reduced by 50 percent and lower:

- a) for fuelwood plantation 15,000 ha, the assumption was made that the first benefits will arrive in year six of the project, The Mean Annual Increment (MAI) - average volume of wood growing on one hectare of



forest plantation during one year – was taken into account to calculate benefits associated with fuelwood production

- b) for crop production using taungya system – the assumption was made that the maize will be harvested on 5,000 ha of acacia plantation during first three years after fuelwood harvest,
- c) for production of honey, the assumption was made that the first harvest will be made in year six of the project, assuming that capacity building and management plans will be developed during the first years of project implementation, and considering the growth period of the Acacia trees on the new plantation;
- d) for shea the assumption was made that the first harvest will be made in year 13 of the project life, taking into account the growth characteristics of shea trees, and development of the value chain.

98. A carbon price was applied in the subsequent analysis. All sensitivity analyses were run for all discount rate scenarios. The results of the quantitative results will be complemented with qualitative benefits to conclude overall project feasibility.

99. An assessment of climate benefits considered incremental sequestered carbon and storage as a result of direct interventions during the project life of 20 years, without accounting for the additional benefits resulting from the improved forestry management. In addition, carbon benefits delivered by the agroforestry interventions were not accounted for due to the on-demand nature of this subcomponent.

100. The project duration is seven years. The “with-project”, with carbon benefits and “without-project” situations were compared over the project life, estimated at 20 years. In total, the project will generate net emissions reductions of 12.6 million tCO₂e over a period of 20 years.

101. The shadow price of carbon was calculated based on the World Bank guidance document¹⁹ (2017). As recommended in the guidance document, the scenarios considered in the economic analysis were done both with and without the shadow price of carbon, to reflect the local and global impacts of the project. In line with the High-Level Commission on Carbon Prices²⁰, this guidance note recommends that project’s economic analysis use a low and high estimate of the carbon price starting at US\$40 and US\$80, respectively, in 2020 and increasing to US\$50 and US\$100 by 2030. Beyond 2030, the guidance note recommends that the low and high values on carbon prices are extrapolated from 2030 to 2050 using the same growth rate of 2.25 percent per year that is implicit between the 2020 and 2030, leading to values of US\$78 and US\$156 by 2050.

102. Results of the economic analysis show positive outcomes for the project. A summary of economic simulations are summarized in the table below. The table shows the NPV, benefic cost ratio and IRR (selected interventions) for various discount rates, carbon prices scenario and variations of benefits, including for simulations without carbon benefits.

	All Benefits with low carbon price			All Benefits with high carbon price			All Benefits without carbon			50 percent Benefits and low carbon benefits		
Discount rate, percent	5	12	20	5	12	20	5	12	20	5	12	20
NPV, US\$ m	529.6	270.2	148.4	907.3	487	284.7	151	52.6	11.5	423	219.4	123.3
B/C ratio	9.3	6.3	4.6	15.4	10.7	8.1	3.2	1.8	1.1	7.7	5.4	4.1

¹⁹ 2017. World Bank. Guidance note on shadow price of carbon in economic analysis. Washington DC

²⁰ https://static1.squarespace.com/static/54ff9c5ce4b0a53deccfb4c/t/59244eed17bffc0ac256cf16/1495551740633/CarbonPricing_Final_May29.pdf



103. This analysis was limited to the benefits and values that can be attributed to the project and can be measured at the time of the assessment. Thus, benefits from widely adopting agroforestry methods, including improved climate resilience, sales of the high-quality teak and gmelina (which will be harvested at the appropriate maturity level), or revenue of the shea butter under an export scenario with significantly higher prices are not accounted for. If additional and downstream benefits are accounted for, the analysis would demonstrate even higher returns. It should be noted that the fuelwood subcomponent demonstrated overall efficiency only in the case of charcoal production, compared to the returns generated as a result of fuelwood sale.

B. Fiduciary

(i) Financial Management

104. A Financial Management (FM) assessment was conducted on the FM arrangements for the Gazetted Forests Management Project. This new project will be implemented by the PIU established at the end of 2018 for the implementation of WACA (PIU-WACA). This PIU will be reinforced to become an IPMU under the oversight of the Ministry of Environment and Sustainable Development. The IPMU will be responsible for coordinating the day-to-day implementation of the Gazetted Forests Management Project, including financial management, organizational aspects and monitoring and evaluation. The PIU-WACA is staffed with a Financial Management Specialist and an Accountant who are experienced in the implementation of World Bank-financed projects. One additional Financial Management Specialist will be recruited to reinforce the FM team taking into account the workload which the new project will generate. Based on the assessment carried out in November 2018 in accordance with the FM Manual for World Bank Investment Project Financing Operations that became effective on March 1, 2010 and re-issued on February 10, 2017, it was established that the PIU-WACA has acceptable financial management capacity to implement the project.

105. Going forward and in order to mitigate the fiduciary risk to the extent possible, the following actions will need to be implemented: (i) the recruitment of an experienced and qualified Financial Management Specialist to reinforce the FM team in light of the workload which the new project will generate, (ii) the update of the WACA's project implementation manual and manual of administrative, financial and accounting procedures to include the new project specificities; (iii) the revisiting of the project software parameters to take into consideration the specificity of the new Project, and (iv) the recruitment of an independent external auditor based on acceptable terms of reference.

106. The overall FM risk for the Gazetted Forests Management Project is rated Substantial taking into account the country context, the multiplicity of actors and beneficiaries who are located in remote and dispersed areas around the country combined with the nature of activities supported by the project and the World Bank's minimum requirements under Bank Policy and Directive – IPF which describes the overall FM World Bank policies and procedures. The proposed risk mitigation measures will strengthen the internal control environment and maintain the continuous timely and reliability of information produced by the IPMU and an adequate segregation of duties. These mitigation measures have been incorporated into the design of the project FM arrangements. It is considered that the financial management will satisfy the World Bank's minimum requirements under World Bank Policy and Directive – IPF once the proposed mitigation measures are met. The proposed financial management arrangements including the mitigation measures for this project are considered adequate to meet the World Bank's minimum financial management requirements under Bank Policy and Directive – IPF. Detailed FM arrangements are provided in Annex 1.



(ii) Financial Management

107. Procurement activities will be carried out in accordance with the World Bank's "Procurement Regulations for IPF Borrowers" dated July 2016 and revised in November 2017 and August 2018 under the "New Procurement Framework", and the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated July 1, 2016, and other provisions stipulated in the Financing Agreements. The Ministry of Environment Sustainable Development has prepared the Project Procurement Strategy for Development ("PPSD") which describes how procurement activities will support project operations for the achievement of the PDO and deliver Value for Money (VfM). It was finalized on April 28, 2019. The procurement strategy considers institutional arrangements for procurement, roles and responsibilities, thresholds, procurement methods, and prior review, and the requirements for carrying out procurement. It also includes a detailed assessment and description of state government capacity for carrying out procurement and managing contract implementation, within an acceptable governance structure and accountability framework. Other issues considered include the behaviors, trends and capabilities of the market (i.e. Market Analysis) to respond to the procurement plan. The World Bank's Systematic Tracking of Exchanges in Procurement ("STEP") planning and tracking system, shall be implemented. Further details are provided in Annex 1.

108. All procuring entities as well as bidders, and service providers, i.e. suppliers, contractors and consultants shall observe the highest standard of ethics during the procurement and execution of contracts financed under the project in accordance with paragraph 3.32 and Annex IV of the Procurement Regulations.

C. Safeguards

(i) Environmental Safeguards

109. From the environmental benefits perspective, the Gazetted Forests Management Project will be associated with several positive impacts as it aims at protecting and preserving gazetted forests reducing potential GHG emissions linked to deforestation and forest degradation while ensuring that livelihood and food security are safeguarded. The operation will help restore soils and forest landscapes, support physical and visual delimitation of the transhumance corridors which will also contribute to reducing conflicts between farmers and herders.

110. The Project is rated as a category "B" operation, meaning that no significant negative environmental and social impacts are expected. However, the project triggers the following safeguards: (i) OP/BP 4.01 "Environmental assessment" (triggered due to physical demarcation of conservation areas, development of timber production, fuelwood production, as well as NTFP value chains, which may have potentially negative, though moderate, impacts on the environment); OP/BP 4.04 "Natural Habitats" (triggered due to possible negative impacts of physical demarcation on natural habitats if not well-managed); OP/BP 4.36 "Forests" (triggered to enhance natural forest resource protection due to activities such as agroforestry and physical demarcation, which could impact natural forests); OP 4.09 Pest Management" (triggered to guide any potential use of chemical products under the agricultural intensification and agroforestry schemes promoted by the project); OP/BP 4.11 "Physical Cultural Resources" (triggered to anticipate and to be sure that all the precautions were taken to protect and safeguard physical cultural assets within the project area). While the exact locations of the planned investments are not yet known, the proper safeguards instrument to be prepared is an Environmental and Social Management Framework (ESMF). This ESMF was reviewed, consulted upon and disclosed both in Benin and on the World Bank website on March 12, 2019.



(ii) Social Safeguards

111. The project will: (i) develop approximately 15,000 ha of fuelwood plantations in the selected GFs, in order to contribute to the supply of main urban centers; (ii) support forest-dependent communities for the development of NTFP value chains. All these activities are associated with social positive impacts.

112. However, the implementation of some activities of the project might have potential social adverse impacts. For example, the implementation of sub-component 2.1 needs to put selected areas of GFs under conservation to ensure natural or assisted regeneration of tree species and concomitantly restore habitats conducive to increased biodiversity. In addition, the project will finance works, equipment, and technical assistance necessary for the establishment and sustainable management of conservation zones in GFs through physical demarcation of borders and landmarking of conservation zones. This could lead to potential restriction of access. The anticipated adverse impacts are inter alia: loss of access to assets, loss of income sources or means of livelihood or the restriction of access to legally designated parks and protected areas. Such activities are most of the time associated with moderate potential social risk and impacts that are easily manageable.

113. The project triggers OP 4.12 on Involuntary Resettlement. In anticipation of the negative social impacts, mainly the restriction of access to legally designated parks and protected areas, a Process Framework was prepared by the Client, reviewed, consulted upon, and publicly disclosed within Benin and on the World Bank website on March 12, 2019. During implementation, an assessment will be carried out for each sub-activity to determine specific measure to be taken into account. In addition, the project will support citizen engagement through public consultation on the information related to the implementation of the project activities.

D. Gender

114. An exploratory gender analysis was undertaken, based on seven participatory meetings/discussions with women and men in forest communities, as well as local forest officials and forest management committees in or similar to the project's targeted forest areas (across southern, central, and north-central Benin). The goal was to better understand who will benefit from the proposed activities, and how. Discussions centered upon what forest-related activities (timber, fuelwood, charcoal, NTFP, agroforestry) men and women are currently doing, what constraints they are facing, and what their future aspirations are.

115. Gender gaps. There are numerous gender gaps that will be critical to enhance the likelihood of success of this new forest project. These include:

- Security issues, including illegal logging and conflicts with external community members seeking firewood and grazing/fodder for their livestock. This is also a serious issue for men, but women are particularly vulnerable in these remote forested areas. This is both a safety and livelihoods issue, as well as a great threat to reduced deforestation, restoration and reforestation efforts.
- Soil fertility constraints, as women are typically given plots that are degraded or of poor soil quality. This results in lower agricultural productivity for women, contributing to household food insecurity.
- Weak forest and agroforestry-related women's groups with low marketing capacity. While there exist many groups, including women producer groups, they lack information and knowledge, particularly relating to markets (e.g. for NTFP and agroforestry products). They are very poorly linked to markets outside of their own communities.
- Women's access to technical information (e.g. different agroforestry species and management techniques), agricultural storage and processing technologies is weaker than men's.



116. Project activities aimed at addressing these gender gaps include:

- Technical forest management and agroforestry support and trainings aimed at institutional strengthening (and making even more inclusive) of existing forest management groups/committees;
- Ensuring that new NTPF value chain activities are focused on both women, men and youth, including facilitating linkages to markets;
- 30 percent of the budget for NTFP IGA initiatives is earmarked for initiatives led by women, women's groups, or groups with male and female members that focus on activities aimed primarily at generating income controlled by women. A preference for projects aimed at developing renewable energy sources for women/youth or women's/youth's groups (e.g. solar, biogas) is also recommended;
- The national agricultural research system on agroforestry and ICRAF if necessary, will be key project partners, with a dedicated budget from the project to strengthening the forest-agriculture/agroforestry collaboration (this could also include a budget line in support of agroforestry initiatives led by women);
- A budget line item is included for regional workshops or 'fairs' that link local forest product producers and groups to national and international buyers/markets, with at least 30 percent of supported participants female;
- the performance-based contracts for planting and protecting trees on farms, as well as inside GFs, must be signed not only by men (or with a requirement that the signatory is a landowner), but by both spouses, or women alone in the case of female-headed households.

E. Citizen Engagement

117. The project has been designed in a participatory and inclusive manner with all stakeholders at the national and local level. All activities have been designed with inputs from key stakeholders, including small holder farmers, women producers of charcoal and shea butter, men and youth producers of honey, local GF co-management committees and CTAFs. These stakeholders will continue to be fully engaged and consulted during project implementation.

118. For Components 2 and 3 a light gender-disaggregated survey (SWIFT type) will be undertaken at the beginning of the project in order to assess poverty levels in the target areas. Furthermore, an Iterative Beneficiaries Monitoring (IBM) system will be set up with a specific emphasis on gender issues that will contribute to measuring results, improving operations, and ensuring inclusiveness. The project will also work on providing training to women's associations on technical themes related to the project activities they participate in, as well as, on individual/SME business management and literacy, and simple accounting and financial management systems.

119. Sub-component 2.4 incentive-based mechanism will further enhance citizen engagement in project implementation as local communities, including farmers and pastoralists will be involved in integrated GF management and receive incomes based on their performance. Furthermore, citizen engagement dimensions will also be monitored and measured through PDO level indicator "Satisfaction of beneficiaries (level of engagement, by gender and age by target area).

120. The three following approaches will be used to further strengthen citizen engagement and participation in overall project implementation: (i) Collaboration: Representatives of civil society organizations (CSOs) will be members of the Project Steering Committee where they echo voices of the beneficiaries and participate in the decision making related to the implementation of project activities; (ii) Collecting, recording and reporting on inputs from citizens: Beneficiary feedback on project implementation (effectiveness, inclusiveness, quality, delivery, and targeting) will be collected during implementation support and supervision missions and during evaluation of project achievements using focus group discussions and satisfaction surveys. Innovative approaches



will also be used in the development of an Internet-based citizen engagement platform/portal. Disruptive technologies will be employed by creating an Android application that the members of the platform can use to share information related to distribution of forestry seedlings for agroforestry, local fertilizing plants (mucuna and Angolan nuts) for agricultural intensification, number of trainings, market prices for crops, farming techniques, income generation, and project achievements. NGOs will be identified to monitor and collect data on achievements and write reports to disseminate case studies and results of the project. The information gathered would then be used to improve project implementation and to address issues raised by the beneficiaries for better results; and (iii) Citizen-led monitoring: CSOs and communities will be involved in World Bank implementation support and supervision mission as well as in joint evaluation of project results upon completion of the project.

Grievance Redress Mechanism

121. Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

V. KEY RISKS

122. The project is broadly considered to have Substantial risk. The following is an explanation of the most important risks and their mitigation measures:

123. **Political and governance - Substantial:** The Government's commitment to the project is strong as shown by the upcoming increase of CTAF personnel to support project implementation, in addition to the Government's commitment to allocate US\$7 million through the National Investment Program. The purpose of this budget is to provide additional payments to CTAF involved with project implementation as well as renew the aging workforce of the DGEFC (cf, Sub-component 1.1). However, there is risk that the full amount might not be disbursed possibly due to conflicting priorities that might arise during the project implementation period. To mitigate this risk, the project team will actively take part in the annual budget allocation sessions to ensure that funds committed to the project are disbursed as planned. Furthermore, during implementation support and supervision missions, counterpart funding release will be closely monitored at the highest level of Government, including with the involvement of the CMU through mission debriefings to Government.

124. **Sector Strategies and Policies - Substantial:** There are risks of: (i) insufficient intersectoral coordination (between, for example, the Ministries and agencies involved in policy formulation and execution related to environment, agriculture, decentralization, energy, tourism etc.); and (ii) a lack of coherence between the different existing sectoral policies. Substantial efforts have been made in recent years to reduce illegal or overexploitation of logging practices and promote ecotourism in national parks. To ensure the success of the actions envisaged by the current project, an intersectoral coordination mechanism between relevant ministries to ensure coherence among the various sectoral policies will be put in place.



125. **Technical Design of Project – Substantial:** The main risk that could impede the success of the core of this project (Development of fuelwood plantations) is bushfire. The species used (*Acacia auriculiformis*) is particularly sensitive to fire during its first three years of establishment. To mitigate this risk, the project will finance establishment of fire breaks (manual and/or vegetative) around plantations, viewing plate forms for surveillance near plantations, and provision of water trucks and fire extinguishers to curtail potential fires that could be set by transhumance herders or hunters. The project will also work with farmers through transfer of agricultural intensification techniques as an alternative to prevent slash and burn agriculture in GFs. Operational capacity of the Forestry Administration will also be improved in terms of surveillance vehicles, rehabilitated CTAF quarters to enhance their presence in the GFs and ensure bushfire control in a timely manner.

126. **Institutional Capacity for Implementation and Sustainability – Substantial:** Although Forestry Administration has acceptable technical capacity to execute project activities in the field, the number of CTAF employers per GF is low, and there is a high turnover of personnel, i.e. CTAF assignment duration is about two years in each GF. To mitigate this risk, the Forestry Administration has committed to maintain CTAF personnel in project targeted GFs in their positions during the project life to ensure continuity in execution of field activities. Furthermore, the number of CTAF personnel will be increased for plantations activities at the ratio of four staff per 2,000 ha.

127. High turnover of the Director General of Forests is also a risk of institutional memory loss and continuity in implementing project activities. To address this risk, the project will be managed by the General Coordinator of the IPMU with a dedicated project focal point. An experienced internationally recruited Technical Assistant with strong background in agroforestry and the core units of the IPMU, i.e. Procurement, Financial Management, Safeguards, Communication, and M&E will also support project implementation.

128. To ensure that funds generated from the sales of the production forests established by the project contribute to sustaining GF management after project closure, Component 1 will look into mechanisms that can finance the recurrent costs in the country's GFs, including long-term maintenance costs of the newly-created production forests. The project will finance technical assistance to look into the FSOA, a Conservation Trust Fund created with support from the IDA and GEF-funded Support to Protected Areas Management Project (P122419/P115963), and the National Forest Fund (NFF), as well as other innovative long-term GF financing options, to explore the opening of a special window within those Funds that can receive fuelwood and timber revenues for sustainable financing of the recurrent costs of GF management. By project mid-term review the most suitable sustainability instrument will be identified and validated.

129. **Fiduciary – Substantial:** Fiduciary risks related to project funds are substantial taking into account the country context, the multiplicity of actors and beneficiaries who are located in remote and dispersed areas around the country combined with the nature of activities supported by the project. This risk will be mitigated through close implementation support and supervision of the World Bank Financial Management and Procurement Specialists based in the field. Furthermore, an international seasoned technical assistant will be recruited to not only support project implementation, but also oversee execution of funds in line with the financing agreement signed between the Government and the World Bank.

130. **Stakeholders - Substantial:** There are potential risks associated with the performance-based incentive scheme that encourages farmers in the GFs to remain there—subject to their adopting agroforestry, intensification, in particular possible creation of new clandestine farms by farmers entering GFs to take advantage of the incentives. To mitigate this potential risk, the establishment of a database of farmers will make it possible to monitor and evaluate the situation, and avoid new farms being included in the mechanism. Furthermore, GF surveillance will be enhanced thanks to the improved patrolling capacity of the CTAFs, thereby controlling further illegal intrusions in GF.



VI. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Benin

Gazetted Forests Management Project

Project Development Objectives(s)

To improve the integrated management of targeted Gazetted Forests, to increase access of the main consumption cities to fuelwood produced sustainably, and to strengthen selected non-timber forest product value chains for forest-dependent communities

Project Development Objective Indicators

Indicator Name	DLI	Baseline	End Target
Improve integrated mgmt of GFs; increase access to sust. fuelwood; strengthen NTFP value chains			
PDO Indicator 1: Gazetted Forest areas under sustainable management based on defined criteria (Hectare(Ha))		8,909.00	917,951.00
PDO Indicator 2: Net greenhouse gas emissions (Metric ton)		0.00	12,600,000.00
PDO Indicator 3: Standing volume of wood energy plantations (Cubic Meter(m3))		10,800.00	1,810,800.00
PDO Indicator 4: Communities adjacent to targeted GFs with increased access to income sources through NTFP value chains (Number)		0.00	1,000.00
PDO Indicator 5: Satisfaction of beneficiaries (level of engagement, by gender and age) (Percentage)		0.00	70.00



Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets							End Target
			1	2	3	4	5	6	7	
Component 1: Support to Forests Governance										
Intermediate Indicator 1: Forest area brought under management plans (Hectare(Ha))		0.00	0.00	124,981.00	384,951.00	897,451.00	917,951.00	917,951.00	917,951.00	917,951.00
Intermediate Indicator 2: Areas of GF patrolled by the forest rangers (Square kilometer(km2))		883.00	883.00	2,651.00	5,302.00	7,983.00	7,983.00	7,983.00	7,983.00	7,983.00
Intermediate Indicator 3: Improved organizational arrangements for GF submitted to the Government for adoption (Yes/No)		No	No	No	No	Yes	Yes	Yes	Yes	Yes
Intermediate Indicator 4: Financial instrument selected to finance recurrent costs of GF management in the long run (Yes/No)		No	No	No	No	Yes	Yes	Yes	Yes	Yes
Component 2: Integrated Management of Gazetted Forests										
Intermediate Indicator 5: Farmers adopting improved agricultural technology (Number)		0.00	0.00	0.00	600.00	1,000.00	1,500.00	2,000.00	2,000.00	2,000.00
Intermediate Indicator 6: Surface areas brought under enhanced biodiversity		88,377.00	88,377.00	88,377.00	150,000.00	200,000.00	250,000.00	367,180.00	367,180.00	367,180.00



Indicator Name	DLI	Baseline	Intermediate Targets							End Target
			1	2	3	4	5	6	7	
conservation (Hectare(Ha))										
Intermediate Indicator 7: Transhumance corridors created by the project (Number)	1.00	1.00	1.00	3.00	5.00	7.00	9.00	10.00	11.00	11.00
Intermediate Indicator 8: Producers adopting improved carbonization techniques (Number)	0.00	0.00	0.00	0.00	0.00	100.00	200.00	250.00	300.00	300.00
of which women (Number)	0.00	0.00	0.00	0.00	0.00	50.00	100.00	150.00	200.00	200.00
Intermediate Indicator 9: Plantations of wood energy established and managed (disaggregated by GF) (Hectare(Ha))	90.00	290.00	2,440.00	4,890.00	7,340.00	9,490.00	12,090.00	15,090.00	15,090.00	
Dan (Hectare(Ha))	35.00	235.00	535.00	835.00	1,035.00	1,235.00	1,235.00	1,235.00	1,235.00	1,235.00
Ketou (Hectare(Ha))	45.00	45.00	445.00	945.00	1,545.00	2,045.00	2,545.00	3,045.00	3,045.00	3,045.00
Logozohe (Hectare(Ha))	0.00	0.00	250.00	500.00	800.00	1,100.00	1,300.00	1,300.00	1,300.00	1,300.00
Oueme-Boukou (Hectare(Ha))	10.00	10.00	510.00	1,110.00	1,710.00	2,210.00	2,510.00	3,010.00	3,010.00	3,010.00
Tchaourou-Toui-Kilibo (Hectare(Ha))	0.00	0.00	500.00	1,100.00	1,700.00	2,400.00	2,900.00	3,500.00	3,500.00	3,500.00
Agoua (Hectare(Ha))	0.00	0.00	200.00	500.00	800.00	1,000.00	2,000.00	3,000.00	3,000.00	3,000.00
Intermediate Indicator 10: Surface areas granted to farmers to apply the taungya system (Hectare(Ha))	0.00	0.00	0.00	1,000.00	2,000.00	3,500.00	5,000.00	5,000.00	5,000.00	5,000.00



Indicator Name	DLI	Baseline	Intermediate Targets							End Target
			1	2	3	4	5	6	7	
of which women (Hectare(Ha))		0.00	0.00	0.00	500.00	1,000.00	1,500.00	2,500.00	2,500.00	2,500.00
Intermediate Indicator 11: Plantations of timber established and managed (disaggregated by GF) (Hectare(Ha))		805.00								7,805.00
Dogo (Hectare(Ha))		805.00	1,555.00	2,305.00	3,055.00	3,805.00	4,805.00	5,805.00	5,805.00	5,805.00
Toffo (Hectare(Ha))		0.00	0.00	300.00	600.00	900.00	1,200.00	1,600.00	2,000.00	2,000.00
Component 3: Development of Selected Non-Timber Forest Product Value Chains										
Intermediate Indicator 12: Shea trees established and managed in and around targeted GF in the north (disaggregated by GF) (Hectare(Ha))		0.00	0.00	0.00	200.00	550.00	950.00	1,150.00	1,500.00	1,500.00
Trois Rivières (Hectare(Ha))		0.00	0.00	0.00	50.00	150.00	250.00	300.00	400.00	400.00
Alibori Supérieur (Hectare(Ha))		0.00	0.00	0.00	50.00	150.00	250.00	300.00	400.00	400.00
Ouémé Supérieur Ndali (Hectare(Ha))		0.00	0.00	0.00	50.00	150.00	250.00	300.00	400.00	400.00
Ouenou-Benou (Hectare(Ha))		0.00	0.00	0.00	50.00	100.00	200.00	250.00	300.00	300.00
Intermediate Indicator 13: Women shea nut collectors organized and producing energy-efficient shea butter for national and regional		0.00	0.00	0.00	0.00	50.00	150.00	200.00	200.00	200.00



Indicator Name	DLI	Baseline	Intermediate Targets							End Target
			1	2	3	4	5	6	7	
sale (Number)										
Intermediate Indicator 14: Honey producers organized and producing honey for national and regional sale (Number)		0.00	0.00	0.00	0.00	50.00	150.00	200.00	200.00	200.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
PDO Indicator 1: Gazetted Forest areas under sustainable management based on defined criteria	This indicator measures the total areas of GF that will be managed based on the satisfaction of criteria pertaining to techniques in: 1) agroforestry, 2) taungya method, and 3) agricultural intensification.	Bi-annual	Agroforestry intensification technical manual	Surveys, mission M&E reports	IPMU and Forestry Administration
PDO Indicator 2: Net greenhouse gas emissions	This indicator measures climate mitigation potential through: (i) CO2 sequestered from direct investments in the field (components 2.3 and 3.1). GHG reductions and	Mid-term and project end	ABE database, Project M&E database	Forest cover change system supported by FAO (EXACT)	IPMU and Forestry Administration



	removals are measured using proxies for carbon sequestration.				
PDO Indicator 3: Standing volume of wood energy plantations	This indicator measures the total standing volume of fuelwood produced by plantations established by the project to supply the three major energy consumption hubs (Cotonou, Abomey-Calavi and Porto-Novo).	Mid-term and project end	Field Survey	Mission M&E reports	IPMU and Forestry Administration
PDO Indicator 4: Communities adjacent to targeted GFs with increased access to income sources through NTFP value chains	This indicator measures the extent to which communities adjacent to targeted GF have seen improvements of revenues as a result of project interventions. This may cover both monetary income and non-monetary benefits such as capacity building or improved access to markets.	Bi-annual	Surveys	Qualitative and quantitative data resulting from beneficiary surveys	IPMU and Forestry Administration
PDO Indicator 5: Satisfaction of beneficiaries (level of engagement, by gender and age)	Satisfaction with project interventions focuses on (i) GF co-management associations and farmers benefiting from agro-forestry and intensification techniques, as well as performance-based incentives payments and; (ii)	Bi-annual	Surveys	Qualitative and quantitative data resulting from beneficiary surveys	IPMU and Forestry Administration



	perception whether interventions are effective and meet the demand of project beneficiaries and will be solicited through a semi-structured questionnaire.				
Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Intermediate Indicator 1: Forest area brought under management plans	This indicator measures the capacity of the Forest Administration to develop GF management plans.	Annual	Management plans	Review of stage of implementation of targeted GF management plans	IPMU and Forestry Administration
Intermediate Indicator 2: Areas of GF patrolled by the forest rangers	This indicator measures the effectiveness of forest surveillance as measured by annual GF surveillance plan reports.	Annual	Annual GF surveillance plan reports	Field-level observations using an ecological monitoring systems provided by CENATEL (Centre National de Teledetection)	IPMU and Forestry Administration
Intermediate Indicator 3: Improved organizational arrangements for GF submitted to the Government for adoption	This indicator measures the organizational structure changes to be adopted by the Government for optimal management of the country's GFs	Mid-term	External independent consultancy reports	Mission of external consultants to identify key opportunities and challenges of current organizational arrangements for GFs management, investigate methods of	External consultants with support from the IPMU



				GF management at the regional and international levels to identify best practices,	
Intermediate Indicator 4: Financial instrument selected to finance recurrent costs of GF management in the long run	This indicator assesses the effectiveness of the GF financial sustainability instrument.	Mid-term	External consultants reports	External consultant missions to look into the functioning of the FSOA and the NFF and review of their mandates to determine options of establishing GF account for GF sustainable management.	External consultants with support from the IPMU
Intermediate Indicator 5: Farmers adopting improved agricultural technology	This indicator measures the effectiveness of agroforestry and intensification adoption by farmers in dedicated areas in GFs.	Annual	Field survey	Mission and M&E reports	Forestry Administration, Department of Agriculture, IPMU and Agroforestry and intensification NGOs
Intermediate Indicator 6: Surface areas brought under enhanced biodiversity conservation	This indicator is a WBG core indicator and will assess the level of encroachment of agriculture, transhumance and hunting in demarcated areas for enhanced conservation in GFs.	Mid-term	Management plans	Assessment of effectiveness of conservation measures through CENATEL and patrolling reports,	CTAF, CENATEL and IPMU
Intermediate Indicator 7: Transhumance corridors created by the project	This indicator assesses the establishment of sustainable transhumance corridors	Annual	Progress and activity reports	Verification field missions to assess stage of corridors	CTAF and IPMU



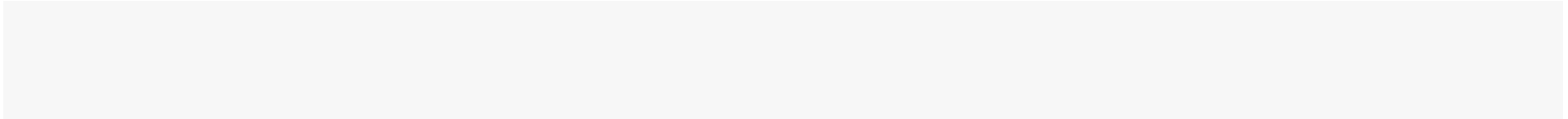
	traversing GFs.			development and usage by herders.	
Intermediate Indicator 8: Producers adopting improved carbonization techniques	This indicator will assess the number of charcoal producers using fuelwood energy-efficient techniques to carbonize wood for the purpose of transforming it into charcoal.	Annual	Field Survey	Mission and M&E reports	IPMU and Forestry Administration
of which women					
Intermediate Indicator 9: Plantations of wood energy established and managed (disaggregated by GF)	This indicator assesses the capacity of fuelwood production in 6 of the project's targeted forests.	Annual	Activity and progress reports	Direct observation on plantation sites on a regular basis to assess the stage of participatory plantations activities (involving farmers, pastoralists and CTAFs).	Forestry Administration and IPMU
Dan					
Ketou					
Logozohe					
Oueme-Boukou					
Tchaourou-Toui-Kilibo					
Agoua					
Intermediate Indicator 10: Surface areas granted to farmers to apply the taungya	This indicator measures the total areas that can be	Mid-term	Activity and progress	Direct field observation on a regular basis of	Forestry Administration



system	granted to farmers to apply the taungya methods in wood energy plantations. Based on the Beninese experience with the Taungya method, up to half total areas of wood energy plantations can be allocated to farmers to implement this method. Explanation: Given that most of the farmers are small holder farmers who have an average of 2 ha of farmland/person and it is estimated that 2,500 of farmers are currently cultivating in project targeted GF, hence the target of 5,000 ha.		report	effective implementation of the taungya system in line with technical itineraries provided by the Forestry Administration.	and IPMU
of which women					
Intermediate Indicator 11: Plantations of timber established and managed (disaggregated by GF)	This indicator assesses the capacity of timber production in two of the project's targeted forests.	Annual	Activities and progress report	Direct observation on a regular basis of stage of teak plantation activities	ONAB
Dogo					
Toffo					
Intermediate Indicator 12: Shea trees established and managed in and around targeted GF in the north (disaggregated	This indicator assesses the number of hectares of shea trees planted in four	Mid-term	Activity and progress reports	Field level observation to assess the stage of establishment of shea	Forestry Administration and IPMU



by GF)	targeted forests in the North of the country.			nuts nurseries and planting of seedlings in line with the technical itineraries provided by experts.	
Trois Rivières					
Alibori Supérieur					
Ouémé Supérieur Ndali					
Ouenou-Benou					
Intermediate Indicator 13: Women shea nut collectors organized and producing energy-efficient shea butter for national and regional sale	This indicator assesses the effectiveness of structuring the shea butter value chain. Based on surveys, initial estimates are approximately 500 women producers in the target areas. This number will be confirmed in the first year's data collection.	Mid-term	Activity and progress reports	Field missions of NGOs to supervise usage of efficient shea processing technology and assess the effectiveness of women producers organizational structure.	IPMU
Intermediate Indicator 14: Honey producers organized and producing honey for national and regional sale	This indicator assesses the effectiveness of structuring Acacia honey value chain.	Annual	Activity and progress reports	Field missions by NGOs to assess the effectiveness of organizational structure of honey producers and quality of honey produced.	NGOs

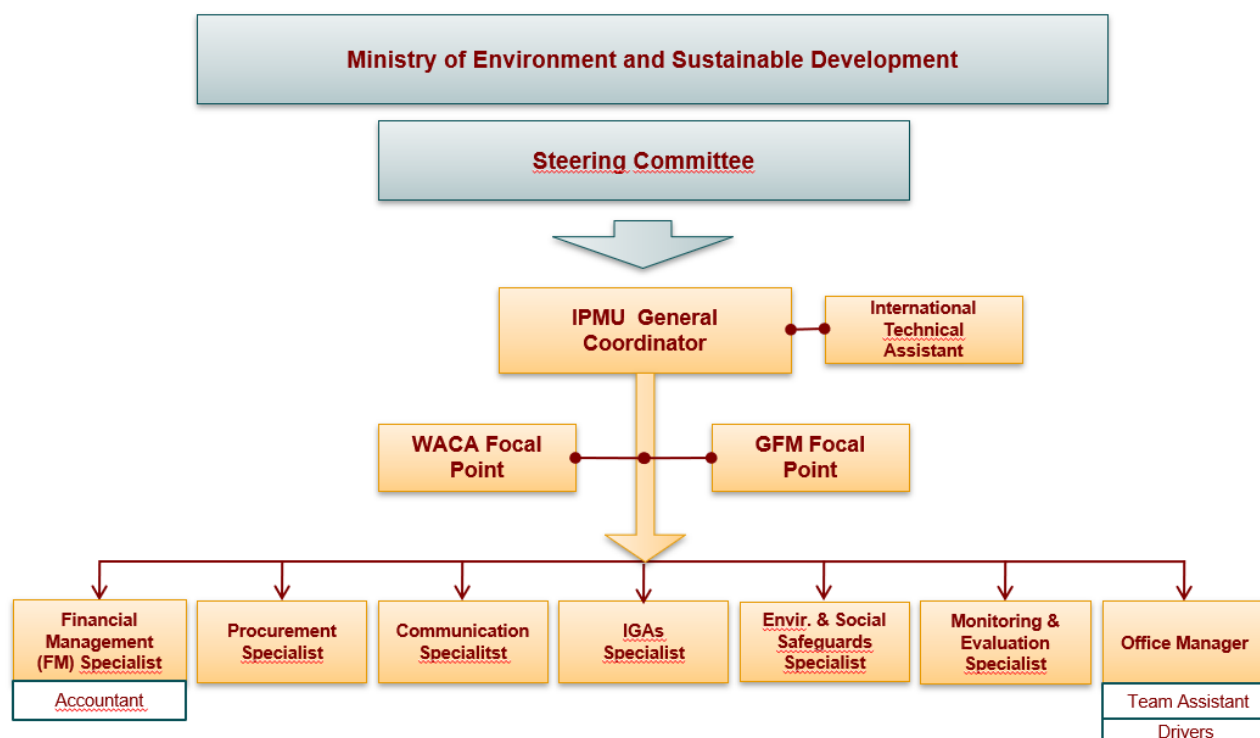




Annex 1: Implementation Arrangements and Support Plan

A) Implementation Arrangements

1. An Integrated Projects Management Unit (IPMU) will be responsible for the implementation of all World Bank-financed environment, forestry and NRM projects, under the responsibility of the Ministry of Environment, and Sustainable Development, including West Africa Coastal Areas (WACA) and the GFMP.
2. The current WACA PIU has been upgraded to an IPMU. It will be composed of the following shared units by all projects under its responsibility: (i) Financial Management, (ii) Procurement, (iii) Safeguards, (iv) Monitoring & Evaluation; (v) Communication; and (vi) Administrative Support, as well as a shared Steering Committee. These units will be strengthened as needed with fiduciary, safeguards, M&E and communication staff to support the GFMP implementation.
3. Each project under the IPMU will have a dedicated technical focal point under the responsibility of a General IPMU Coordinator supported by an international top-notch technical assistant in forestry.
4. The Director General of DGEFC in his role as National Coordinator of the Government Forestry Program and a permanent member of the Steering Committee will ensure synergies between the project and that Program.
5. The decentralized Technical Forests Management Units (CTAF) in the field will ensure technical execution of project activities. The headcount of CTAF employees will be increased by the Government to include personnel fully dedicated to project implementation, especially for timely implementation of production forests activities.
6. The IPMU projects Steering Committee (SC) will be chaired by the Minister of Environment and composed of key Sectoral Ministries involved with the projects, the Director General of Forests (DGEFC), the Director General and Environment and Climate, as well as elected local representatives and community representatives, Conservation NGOs and CSOs: The SC will be established within one month after project launch. Its mandate includes: (i) approving policy guidelines and providing overall supervision for project implementation; (ii) approving the annual work plans and budget; (iii) approving the annual procurement plan; and (iv) reviewing the annual implementation performance report to be prepared by the IPMU, and overseeing the implementation of corrective actions, when necessary. The Steering Committee will have two ordinary meetings: (i) to review and approve annual work plans and; (ii) undertake a mid-term review of the annual work plans. Extraordinary meetings will also be organized on specific issues needed the Steering Committee's guidance.
7. Below is the institutional arrangements diagram:



Financial Management

Summary of the Financial Management Assessment

8. **A Financial Management (FM) assessment was conducted on the FM arrangements for the Gazetted Forests Management Project.** This new project will be implemented by the PIU established in 2018 for the implementation of WACA (PIU-WACA). This PIU will be reinforced to become an Integrated Projects Management Unit (IPMU) under the oversight of the Ministry of Environment and Sustainable Development. The IPMU will be responsible for coordinating the day-to-day implementation of the Gazetted Forests Management Project, including financial management, organizational aspects and monitoring and evaluation. The financial management arrangements for this project will be based on the existing arrangements in place for the West Africa Coastal Areas Resilience Investment Program related to Benin. The PIU-WACA is staffed with a Financial Management Specialist, and an Accountant who are experienced in the implementation of Bank-financed projects. One additional Financial Management Specialist will be recruited to reinforce the FM team in the perspective of the workload which the new project will generate. Based on the assessment carried out in November 2018 in accordance with the FM Manual for World Bank Investment Project Financing Operations that became effective on March 1, 2010 and re-issued on February 10, 2017, it was established that the PIU-WACA has acceptable financial management capacity to implement the project.

9. The IPMU will be responsible for coordinating the day-to-day implementation of the Gazetted Forests Management Project, including financial management, organizational aspects and monitoring and evaluation. These include budgeting, disbursement, financial management, reporting, supervision, management of the Designated Account, and auditing.



Detail of financial management arrangements

10. **Budgeting Arrangements:** The manual of procedures the PIU-WACA is using for the West Africa Coastal Areas Resilience Investment Program related to Benin already includes detailed budgeting procedures, and the preparation of an annual work plan. It will be revised to incorporate the new project specifics. Annual workplans and budgets will be submitted to the World Bank for no-objection not later than November 30 of each year proceeding the year the work plan should be implemented. The budgeting system under the new project will build on lessons learned. The budgetary discussions will begin at least six months before the fiscal year of implementation and will consider the procurement plan as the starting point. Once the budget is approved, it will be integrated in the computerized accounting system to serve as a basis for a budget execution monthly follow-up, based on variance analysis.

11. **Accounting and Reporting Arrangements.** The manual of procedures the PIU-WACA is using for the West Africa Coastal Areas Resilience Investment Program related to Benin details the accounting systems, policies, and administrative and financial procedures which is acceptable to the World Bank. It will be updated to include specific procedures related to this operation. The IPMU should retain staffing resources that are adequate for the level of project operations and activities and are sufficient to maintain accounting records relating to project financed transactions, and to prepare the project's financial reports. The FM function will be carried out by a team composed of: (i) a qualified and experienced Financial Management Specialist (FMS) already in charge of the supervision of all project's FM activities; and another qualified and experienced FMS to be recruited to reinforce the FM team considering the workload which the new project will generate. This staff will be recruited through a competitive process in compliance with the World Bank's Procurement Regulations. The team will have the overall FM responsibility over budgeting, accounting, financial reporting, flow of funds, internal control, and auditing. The FM staff capacity will be reinforced over the project implementation period through the deployment of training on IDA disbursement procedures and financial reporting arrangements. The accounting software acquired under the West Africa Coastal Areas Resilience Investment Program related to Benin financing will be used for the new project. This accounting software has multi-projects, multi-sites and multi-donor features, and is customized to generate its financial reports. The IPMU will use SYSCOHADA accounting standards, which are commonly used among West African Francophone countries. Accounting procedures will be documented in the Project Implementation Manual (PIM).

12. **Internal Control and Internal Audit Arrangements.** The manual of procedures used under the West Africa Coastal Areas Resilience Investment Program related to Benin will be updated to include the specificities of the new project with specific sections on anti-corruption aspects and the existing internal control arrangements will be applied.

13. **Governance and Anti-Corruption Arrangements.** To enhance transparency and accountability, the IPMU will have to deal with fraud and anti-corruption. The World Bank Anti-Corruption Guidelines referred to in the Financing Agreement will apply, i.e. Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006 and revised in January 2011 and as of July 1, 2016.

Funds Flow Arrangements

14. **Designated Account.** The IPMU will open one (1) Designated Account (DA) at the Central Bank of West African States (BCEAO: *Banque Centrale des États de l'Afrique de l'Ouest*) for IDA funds. The funds will be released to one Operational Account to be opened in a reputable commercial bank. The Operational Account will be managed by the IPMU. Cash withdrawal transactions from the Operational Account will be authorized respectively



by the dedicated project Coordinator and the FM Specialist. The account is set up to fund eligible expenditures based on the approved annual budgeted work plans. The DA ceiling will be determined.

Disbursement Arrangements

15. Disbursements will be made in accordance with the Disbursement Guidelines for Investment Project Financing dated February 2017. The Autonomous Amortization Fund (CAA: *Caisse Autonome d'Amortissement*) is the assigned representative of the Recipient for the mobilization of IDA funds. Withdrawal application requests will be prepared by the Project's FM Specialist signed by a designated signatory or signatories (the signature authorization letter is signed by the Minister of Finance) and sent to the Bank for processing. This procedure applies to all Bank-financed projects in Benin. The Project will submit applications using the electronic delivery tool, "e-Disbursements", available at the World Bank's Client Connection website/web-based portal. The Authorized Signatory Letter signed by the GoB will include authorization for the designated signatories to receive Secure Identification Credentials (SIDC) from the World Bank for the purpose of delivering such applications by electronic means.

16. Disbursements under the Project will be transaction-based. In addition to making advances to the DA, other disbursement methods (reimbursement, direct payment and special commitment) will be available for use under the Project. Further instructions on the withdrawal of proceeds will be outlined in the Disbursement and Financial Information Letter (DFIL) and details on the operation of the DA will be provided in the Project Administrative, Accounting and Financial Manual of procedures (as part of the PIM).

17. **Financial Reporting Arrangements.** The IPMU will prepare quarterly unaudited IFRs satisfactory to the World Bank in form and content, which will be submitted to the World Bank within 45 days after the end of the reporting period. The formats and contents of the IFR have been agreed upon during negotiations. The quarterly IFR will include the following information: (i) Statement of Sources and Uses of Funds; (ii) statement of uses of funds by project activity/component; and (iii) DA activity statement and explanation notes to the IFR. The IPMU will prepare the project financial statements in accordance with SYSCOHADA accounting standards applicable in Benin.

18. **External Audit Arrangements.** An external independent and qualified private sector auditor will be recruited to carry out the audit of the project's financial statements under the supervision of the supreme audit institution. Therefore, the annual audits will be conducted based on Terms of Reference agreed with the supreme audit institution and that are satisfactory to the World Bank. The auditor will express an opinion on the Annual Financial Statements and perform his audit in compliance with International Standards on Auditing issued by the International Federation of Accountants (IFAC). The auditor will be required to prepare a Management Letter detailing observations and comments and providing recommendations for improvements in the accounting system and the internal control environment. The audit report on the annual project financial statements and activities of the DA will be submitted to IDA within six months after the end of each project fiscal year.



Table 1: Financial Management Action Plan

Issue	Remedial action recommended	Responsible entity	Completion	Effectiveness conditions
Staffing	Recruit a qualified and experienced Financial Management Specialist.	IPMU	Three months after effectiveness [DONE]	N
Information system accounting software	Revisit PIU-WACA's software parameters to take into consideration the specificity of the new Project	IPMU	Three months after effectiveness	N
Financial reporting: IFR	Format, content, and frequency of the IFR were discussed during project negotiation	IPMU	During the negotiation [DONE]	N
Administrative, Accounting and Financial Manual of procedures	Update the PIU-WACA's Administrative, Accounting and Financial Manual of procedures (as part of the PIM) that also includes detailed procedures describing the system to pay recurrent expenditure with specific sections on anti-corruption aspects.	IPMU	One month after project effectiveness	N
External financial auditing	Appoint an external auditor acceptable to IDA	IPMU	Six months after effectiveness	N

19. **Financial covenants.** Financial covenants related to standard FM requirements are covered under Section 5.09 of IDA General Conditions and specific FM aspects are included in the DFIL.

20. **Conclusion.** Overall, the residual financial management (FM) risk for the project is rated as **Substantial**.

Procurement

21. **A Procurement Plan setting out the selection methods to be followed has been prepared.** This covers procurement of goods, works, non-consulting and consulting services financed by the World Bank. The Procurement Plan represents the first 18 months of project implementation and would be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity, through STEP. The procuring entity as well as bidders, and service providers, i.e. suppliers, contractors and consultants shall observe the highest standard of ethics during the procurement and execution of contracts financed under the project in accordance with paragraph 3.32 and Annex IV of the Procurement Regulations.

22. **Procurement Plan and Manual.** IPMU has prepared a detailed 18-month Procurement Plan which was agreed with the World Bank during the negotiations. The Procurement Plan will be updated in agreement with the World Bank Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. Procurement arrangements, roles and responsibilities, methods and requirements for carrying out procurement shall be updated in detail in the Procurement Manual which may be a section of the PIM. The PIM shall be updated by the IPMU and agreed to with the Bank no later than one (1) month after the Effective Date.



23. **The IPMU will follow the World Bank guidelines for procurement.** The IPMU shall prepare and submit to the World Bank a General Procurement Notice (“GPN”) and the World Bank will arrange for publication of GPN in the United Nations Development Business (“UNDB”) online and on the World Bank’s external website. The IPMU may also publish it in at least one national newspaper. The IPMU shall publish the Specific Procurement Notices (“SPN”) for all goods, works, non-consulting services, and the Requests for Expressions of Interest (“REOI”) on their free-access websites, if available, and in at least one newspaper of national circulation in the Borrower’s country, and in the official gazette. For open international procurement selection of consultants using an international shortlist, the Borrower shall also publish the SPN in UNDB online and, if possible, in an international newspaper of wide circulation. The World Bank arranges for the simultaneous publication of the SPN on its external website.

24. **Procurement Methods.** The Borrower will use the procurement methods and market approach in accordance with the Procurement Regulations. The procurement procedure to be followed under the Project for the National Competitive Bidding (“NCB”) for Goods, Works, and Non-Consulting Services shall be Local Competitive Bidding as described in the new procurement Law and may be used to procure goods, works, or non-consultant services provided it meets the requirements of paragraphs 5.3 to 5.6 of the Procurement Regulations.

25. **Community-driven Development:** The plantation works (from nursery establishment, planting and maintenance of acacia plantations) will be done using the CDD approach according to the paragraphs 6.52 and 6.53 of the Procurement Regulations.

26. The Proposed arrangements and the project activities to be carried out by community participation are further elaborated in the relevant project implementation document (manual) to be approved by the World Bank and made publicly available by the Borrower.

27. **Procurement Institutional Arrangement:** An Integrated Projects Management Unit (IPMU) will be responsible for the implementation of all environmental, forestry and NRM projects, under the responsibility of the Ministry of Environment Sustainable Development. Given that a PIU was recently established for the implementation of WACA with a core team (Financial Management, Procurement, Monitoring and Evaluation, Safeguards and Administrative support), this team will be strengthened with an additional procurement specialist dedicated to the project.

28. The Ministry of Environment Sustainable Development should establish a Procurement Commission that will be chaired by the nominated person in charge of the Ministry’s procurement. The person in charge of procurement will also designate a secretary who will serve as a Secretary to the Commission. The documents (i.e. bidding documents, requests for proposals, bid evaluation reports) jointly elaborated by the Procurement Commission and the IPMU will be submitted for the decision of the procurement control commission of the Ministry of Environment Sustainable Development or for the decision of the National Procurement Control Directorate (*Direction Nationale de Contrôle des Marchés Publics*) under the Ministry of Finance depending of the competency of the procurement control threshold. The person in charge of procurement, the procurement commission, and the procurement control commission will be established in accordance with articles 10 to 17 of the new procurement code No 2017-04 dated October 19, 2017.

29. **Training, Workshops, Study Tours, and Conferences.** Training activities would comprise workshops and training, based on individual needs, as well as group requirements, on-the-job training, and hiring consultants for developing training materials and conducting training. Selection of consultants for training services follows the requirements for selection of consultants above. All training and workshop activities (other than consulting services) would be carried out on the basis of approved Annual Work Plans/Training Plans that would identify the general framework of training activities for the year, including: (i) the type of training or workshop; (ii) the personnel to be trained; (iii) the institutions which would conduct the training and reason for selection of this



particular institution; (iv) the justification for the training, how it would lead to effective performance and implementation of the project and or sector; (v) the duration of the proposed training; and (vi) the cost estimate of the training. A report by the trainee(s), including completion certificate/diploma upon completion of training, shall be provided to the Project Coordinator and will be kept as part of the records, and will be shared with the World Bank if required.

30. **Operational Costs.** Operational costs financed by the project would be incremental expenses, including office supplies, vehicles operation and maintenance costs, maintenance of equipment, communication costs, rental expenses, utilities expenses, consumables, transport and accommodation, per diem, supervision costs, and salaries of locally contracted support staff. Such services will be procured using the procurement procedures specified in the PIM accepted and approved by the World Bank.

31. **Filing and record keeping.** The Procurement Procedures Manual will set out detailed procedures for maintaining and providing readily available access to project procurement records, in compliance with the Financing Agreement. The IPMU will assign one person responsible for maintaining the records. The logbook of the contracts with a unique numbering system shall be maintained. The signed contracts as in the logbook shall be reflected in the commitment control system of the Borrower's accounting system or books of accounts as commitments whose payments should be updated with reference made to the payment voucher. This will put in place a complete record system whereby the contracts and related payments can be corroborated.

32. **Project Procurement Strategy for Development:** As part of the preparation of the project, the Borrower (with assistance from the World Bank) has prepared the Project Procurement Strategy for Development (PPSD) which describes how procurement activities will support project operations for the achievement of project development objectives and deliver Value for Money (VfM). The procurement strategy is linked to the project implementation strategy ensuring proper sequencing of the activities. It considers institutional arrangements for procurement; roles and responsibilities; thresholds, procurement methods, and prior review, and the requirements for carrying out procurement. It also includes a detailed assessment and description of state government capacity for carrying out procurement and managing contract implementation, within an acceptable governance structure and accountability framework. Other issues considered includes the behaviors, trends and capabilities of the market (i.e. Market Analysis) to respond to the procurement plan.

33. The recruitment of civil servants as individual consultants or as part of the team of consulting firms will abide by the provisions of paragraph 3.23 (d) of the Procurement Regulations.

34. **Procurement Risk Rating:** The project procurement risk prior to the mitigation measures is Substantial. The risk can be reduced to a residual rating of Moderate upon successful implementation of the mitigation measures. The risks and mitigation measures are provided in the table below.



Procurement Risk	Mitigation measure	Responsibility and Deadline	Risk level Initial/residual
			Substantial/Moderate
IPMU			Substantial/Moderate ²¹
Workload in procurement activities	Recruit a procurement specialist to be dedicated to this project	IPMU – one month after effectiveness	
The procurement procedures of the current project will be reflected in the existing manual of PIU	Amend the existing manual in order to introduce procurement arrangements planned for this project	IPMU – one month after effectiveness one month after project effectiveness	
Non-designation of the person in charge of procurement and non-establishment of the procurement commission and the procurement control commission	(i) Nominate the person in charge of procurement and, (ii) establish the procurement commission and the procurement control commission in accordance with articles 10 to 17 of the new procurement code No 2017-04 dated October 19, 2017	Ministry of Environment Within three months after Effectiveness	
Weak Ministry capacity in NPF procedures	Capacity building will be provided by the World Bank on NPF procurement.	IPMU and WB During project implementation	

Safeguards

Environmental Safeguards

35. From the environmental benefits perspective, the Gazetted Forests Management Project will be associated with several positive impacts as it aims at protecting and preserving gazetted forests, reducing potential GHG emissions linked to deforestation and forest degradation while ensuring that livelihood and food security are safeguarded. The operation will help restore soils and forest landscapes, bring support to physical and visual delimitation of the transhumance corridors thereby reducing conflicts between farmers and herders.

36. The Project is rated as a category “B” operation as no significant negative environmental and social impacts are expected. However, the project triggers the following safeguards policies: (i) OP/BP 4.01 “Environmental assessment”; OP/BP 4.04 “Natural Habitats”; OP/BP 4.36 “Forests”; OP 4.09 Pest Management” and OP/BP 4.11 “Physical Cultural Resources”. While the exact locations of the planned investments are not yet known, the proper safeguard instrument to be prepared is an Environmental and Social Management Framework

²¹ See paragraph 34.



(ESMF). This ESMF was reviewed, consulted upon and disclosed both in Benin and on the World Bank website on March 12, 2019.

37. The ESMF lays out procedures for screening and mitigating impacts from activities associated with potential adverse impacts, and includes the following: (a) checklists of potential environmental and social impacts and their sources; (b) procedures for participatory screening of proposed sites and activities and the environmental and social considerations; (c) procedures for assessing potential environmental and social impacts of the planned project activities; (d) institutional arrangements for mitigating, preventing, and managing the identified impacts; (e) typical environmental management planning process for addressing negative externalities in the course of project implementation; (f) a system for monitoring the implementation of mitigation measures; and (g) recommended capacity building measures for environmental planning and monitoring of project activities.

38. The ESMF was prepared in compliance with OP 4.01 and addresses critical issues related to pest management through the development of a specific chapter focused on how to handle a good pest management in the wake of agricultural intensification and agroforestry methods in GFs.

39. It is not anticipated that the project will have negative impacts on any physical cultural resources. However, during the implementation phase, particular attention will be paid to ensuring that project activities do not affect sites deemed rich culturally.

40. None of the project activities are expected to promote exploitation of woods or to finance activities which will contribute to destroying the gazetted forests as well as natural habitats. The ESMF includes a section that aims to draw attention to forest resources and natural habitats preservation during project implementation.

41. A Grievance Redress Mechanism (GRM) was set up to allow stakeholders and interested parties to bring up any concern regarding the project to the IPMU with the aim of finding solutions.

42. Safeguards documents include guidelines on Occupational, Health and Safety (EHS/OHS) that clearly mention that the Environmental and Social Management Plan (Works-ESMP) must be approved by the IPMU and their partners prior to commencement of works. Moreover, the tender documents and the contracts for main contractors as well as the sub-contractors will also include sections related to EHS/OHS.

43. With respect to potential labor influx, during implementation the project will establish guidance and rules for contractors to enhance the ESMPs, and workers contracts will include measures for managing the potential impacts of such an outside workforce on the local community. Specific details will be prepared during the investment activities for contractors who will bring in workers and operators from outside the area, and these are likely to be housed in work camps during construction.

44. To ensure that the safeguard instruments prepared in line with policies triggered by the project are implemented properly, the IPMU will hire an environmental safeguards specialist and a social safeguards specialist. The environmental safeguards specialist must have additional experience in EHS/OHS, and the social safeguards specialist in Gender-Based Violence (GBV), social inclusion and any labor related risk. Both specialists will be fully in charge of all environmental and social safeguards aspects and will regularly monitor all safeguard requirements. More specifically, the two specialists, the whole IPMU, the executing agencies as well as the other stakeholders will ensure that children are not employed in civil works as part of the labor force.

45. World Bank implementation and supervision support missions will also include environmental and social safeguards specialists to ensure that all safeguards issues are addressed properly and, in a timely manner.



Social Safeguards

46. Overall project activities are associated with positive social impacts for forest-dependent communities. However, the implementation of some activities of the project could have potential social adverse impacts. For example, the implementation of sub-component 2.3 needs to put selected areas of GFs under conservation to ensure natural or assisted regeneration of tree species and concomitantly restore habitats conducive to increased biodiversity. In addition, the project will finance works, equipment, and technical assistance necessary for the establishment and sustainable management of conservation zones in GFs through physical demarcation of borders and landmarking of conservation zones. These activities could lead to restriction of access to protected areas. The anticipated adverse impacts are inter alia: loss of access to assets, loss of income sources or means of livelihood or the restriction of access to legally designated parks and protected areas. Such activities are most of the time associated with moderate potential social risk and impacts that are easily manageable.

47. The project therefore triggers OP 4.12 on Involuntary Resettlement. In anticipation of the negative social impacts, mainly the restriction of access to legally designated parks and protected areas, a Process Framework was prepared by the Client. The framework was reviewed, consulted upon, and publicly disclosed within Benin and on the World Bank website on March 12, 2019. During implementation, an assessment will be carried out for each sub-activity to determine specific measures to be taken into account. In addition, the project will support citizen engagement through public consultation on the information related to the implementation of the project activities.

48. The Recipient has already benefitted from other (past and ongoing) IDA projects which have provided/are providing relatively sufficient capacity to understand and apply safeguards policies. The client has recent experience in Natural Resources Management with the World Bank. Two projects (Forests and Adjacent Lands Management Project, and Support to Protected Areas Management Project) closed respectively on January 31, 2018 and December 31, 2017. Lessons learnt have served as basis for investments to be supported by the proposed project.

B) Implementation Support Plan.

49. The strategy for implementation support (IS) has been developed based on the nature of the project and its risk profile. It will aim at making implementation support to the client more flexible and efficient and will focus on implementation of the defined risk mitigation measures.

- **Procurement:** Supervision missions will be conducted twice a year and more frequently as needed. Implementation support will include: (i) providing training to IPMU and DGEFC staff as needed; (ii) reviewing procurement documents and providing timely feedback to the IPMU; (iii) providing detailed guidance on the World Bank's Procurement Guidelines to the IPMU; and (iv) monitoring procurement progress against the detailed Procurement Plan.
- **Financial Management:** Supervision missions will be conducted over the project's lifetime. The project will be supervised on a risk-based approach. Based on the outcome of the FM risk assessment, the following implementation support plan is proposed. The objective of the implementation support plan is to ensure the project maintains a satisfactory FM system throughout its life.



FM Activity	Frequency
Desk reviews	
IFR reviews	Quarterly
Audit report review of the program	Annually
Review of other relevant information such as interim internal control systems reports	Continuous, as they become available
On-site visits	
Review of overall operation of the FM system (Implementation Support Mission)	Every six months for Substantial risk
Monitoring of actions taken on issues highlighted in audit reports, auditors' Management Letters, internal audits, and other reports	As needed
Transaction reviews	As needed
Capacity-building support	
FM training sessions	At project launch and during implementation as needed

- Environmental and social safeguards. The World Bank safeguard specialists in the project task team will provide technical support for the implementation of the Environmental and Social Management Framework and the Process Framework and will provide guidance to the IPMU and DGEFC as needed. They will work closely with the safeguard specialists hired and participate in supervision missions as required. Formal implementation and supervision missions will be conducted twice a year.
- Anti-Corruption. The World Bank team will supervise the implementation of the agreed Governance and Accountability Framework and provide guidance in resolving any issues identified.

50. The World Bank core team is based in Cotonou: TTL, Procurement Specialist, Financial Management Specialist. The Social Safeguard Specialist is based in the Ouagadougou country office and the Environmental Specialist is in the Abidjan country office. The proximity of the task team to the client is an advantage in terms of timely, efficient, and effective implementation support to the client. Formal implementation support missions and field visits will be carried out semi-annually and punctual implementation support as needed. Detailed inputs from the World Bank team and partners are outlined below:

- Technical inputs. The team's Sr. Forestry Specialist will provide technical guidance to the team as needed. Furthermore, regular video-conferences will be organized as needed to provide technical guidance to the DGEFC team as needed to support development of production forests for fuelwood which is the core of the project.
- Fiduciary requirements and inputs. Training will be provided by the World Bank's financial management specialist and procurement specialist as needed to project staff. Both the financial management and the procurement specialist are based in the country office of Cotonou to provide timely support. Formal supervision of FM will be carried out semi-annually, while procurement supervision will be carried out on a timely basis as required by the client.
- Safeguards. Inputs from an environment specialist and a social specialist are required, though the project's social and environmental impacts are limited, and client capacity is generally adequate. Capacity building will be required on environment monitoring and reporting. On the social side, supervision will focus on the implementation of the Process Framework. Field visits are required on a semi-annual basis. The social and environmental specialists are based in the region (Burkina Faso and Côte d'Ivoire).



- **Operations.** The task team leader (TTL) based in Cotonou, will provide timely supervision of all operational aspects through regular meetings, as well as coordinating with the client and World Bank team members. The TTL will lead two formal field supervisions a year and, as needed, conduct punctual missions to resolve operational issues.

The main focus areas for implementation support are summarized in Table 1 below.

Table 1: Implementation Support Focus Areas

Time	Focus	Resource Estimate
First 12 months	Financial management (FM) training and supervision	FM specialist 4 SWs
	Procurement training and supervision	Procurement specialist 4 SWs
	Social safeguards, training and supervision	Social specialist 2 SWs
	Environmental training and supervision	Environmental specialist(s) 2 SWs
	Forestry and biodiversity	Task Team Leader (TTL)/Sr Natural Resource Management (NRM) Specialist (6 SWs) Sr. Forestry Specialist (6 SWs)
	Agricultural Intensification	Sr Agricultural Economists (4 SWs)
	Project implementation and monitoring and evaluation (M&E) support	Sr. M&E Specialist, NRM specialists (6 SWs)
12–60 months	Agricultural intensification	Sr Agricultural Economists (10 SWs)
	Environment and social monitoring and reporting	Environmental specialist(s) 16 SWs Social specialist 16 SWs
	FM disbursement and reporting	FM specialist 16 SWs
	Procurement supervision	Procurement specialist 16 SWs
	Forestry and biodiversity	TTL/Sr NRM specialist 16 SWs Sr. Forestry Specialist 16 SWs
	Project implementation support and M&E	Sr. M&E Specialist and NRM specialists (16 SWs)

- Note: SW = staff week.
- n.a. Not applicable.

51. The staff skill mix required is summarized in Table 2.

Table 2: Staff Skill Matrix

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Forestry:	2 SWs annually	Two annually	Paris- based
Procurement	4 SWs annually	Two annually	Country office based
Social	4 SWs annually	Two annually	Country office based
Environment	4 SWs annually	Two annually	Country office based



NRM	8 SWs annually	Two annually	Washington-based
Financial management	4 SWs annually	Two annually	Country office based
NRM and biodiversity	6 SWs annually	Two annually	Country office based
Agriculture	2 SWs annually	One	Lomé based
Operations and M&E	4 SWs annually	Two annually	Washington and country office based



Annex 2: Economic Analysis

1. Benin's economic activity expanded, and inflation stayed low in 2017-2018. Economic growth for 2017-2018 was estimated at 5.6 percent, buoyed by record cotton production and processing, and the recovery of the Nigerian economy²². However, Benin's GDP per capita remains among the lowest in the world. The real GDP growth was at 4 percent between 2010-2015, but average annual growth in GDP per capita was just over 1 percent, placing Benin among the lowest performers in the region. In addition, inclusive growth is hindered by a poverty rate of 40.1 percent in 2015, persistent unemployment, and a Human Development Index value of 0.485. Despite being one of the best business performers in 2015-2016, Benin's ranking remains low in the World Bank 2018 Doing Business report²³.

2. Agriculture accounts for a quarter of GDP and 51 percent of the country's employment with cotton as its primary export commodity. The informal sector, including subsistence agriculture, contributes up to almost 60 percent of GDP and engages over 80 percent of the labor force. Re-export to Nigeria contributes up to a quarter of the government's revenue. Due to its low productivity, growth was modest in agriculture, which employs almost half of the labor force²⁴.

3. The vast majority of the work force are self-employed (81 percent of jobs), with low average earnings. Currently, median earnings in agricultural activities and non-agricultural enterprises are 20,000 and 25,000 FCFA per month, respectively – less than half that of salaried workers (60,000 FCFA per month). Female worker earnings are substantially lower than that of males across the various types of employment and targeted policies and programmatic interventions are required to reduce this earnings gap. To reduce poverty, these two sectors of employment would need to provide more prosperous and sustainable livelihoods for their workers through higher returns to agriculture and greater access to good jobs in non-agricultural activities.

4. In many rural areas, farmers still struggle with subsistence agriculture and diversification is low. Diversifying into higher-value product chains can provide opportunities for these farmers to stabilize and increase their incomes, in part to hedge against the erratic price trends of basic commodities and in part to meet their basic food security needs. It is necessary to build competitive agricultural value chains for domestic, regional and international markets.

5. The World Bank's Systematic Country Diagnostic identified three pathways for accelerating progress in achieving twin goals. The first two are focused on creating jobs and livelihoods in Benin's areas of comparative advantage and building human capital, particularly among the poorest and among women and girls, so that they can increasingly benefit from a growing and transforming economy.

6. Pathway 3 would focus on strengthening natural resource management, both to ensure sustainability and to build on Benin's comparative economic advantages arising from its natural capital and geographic endowments. Key issues to be addressed in the short to medium term to ensure sustainable growth and development would include:

²² IMF Country Report No. 18/217. July 2018. <file:///C:/Users/wb231078/Downloads/cr18217.pdf>

²³ African Economic Outlook (AEO) 2018

²⁴ IMF Country Report No. 18/2. November 2017 [file:///C:/Users/wb231078/Downloads/cr1802%20\(1\).pdf](file:///C:/Users/wb231078/Downloads/cr1802%20(1).pdf)



- a. no-regret climate change adaptation investments and policy measures to protect Benin's natural endowments, to facilitate increased agricultural productivity, and to mitigate coastal erosion in affected areas and cities;
- b. improved water management measures to make better use of Benin's ample surface and groundwater resources, to reduce the impact of weather induced natural disasters, including floods and drought episodes, and to enhance agricultural production and productivity; and
- c. better manage and preserve Benin's forest resources as sustainable sources of livelihoods and as a complement to enhanced agricultural and primary product production and transformation.

7. The Project Development Objective is to improve the integrated management of targeted GFs, to increase access of the main consumption cities to fuelwood produced sustainably, and to strengthen selected NTFP value chains for forest-dependent communities.

8. Income derived from forest and wild products is important in reducing income inequality between households, especially in rural areas. A recent CIFOR's Poverty Environment Network (PEN) study²⁵ underscores the significant role played by the natural environment in the income and livelihoods of rural households in developing countries. According to the study's findings, natural and plantation forests represent 22 percent of total household income globally – in sample sites, and in Africa - 21.4 percent, providing an average annual household income in this region of US\$ 217.2. The households in the study sample use a wide variety of products, many of which are “non-timber forest products” (NTFPs) that are likely to help meet nutritional, medicinal, utilitarian, and ritual needs²⁶ (Belcher, 2003). However, in value terms, wood fuel and structural and fiber products (timber, poles, building materials, etc.) are the dominant forest products, accounting for about 60 percent of all forest products in value terms. Food accounts for another 30 percent (Andersen A, et al. 2014)²⁷.

9. To control and reverse the deforestation rate, the project will address the weak operational capacity of the Forestry Department, through the establishment of an operational governance framework sufficiently robust to ensure effective and sustainable surveillance and monitoring of GFs. The project will also support: (i) transfer of agricultural intensification techniques and agroforestry methods to simultaneously improve productivity, resilience to climate change, and sustainable forest resource management in dedicated agroforestry zones within GFs; (ii) protection of high conservation value areas; (iii) development of large-scale fuelwood plantations that help meet the growing demand for household domestic energy emanating from the country's major cities (Cotonou, Abomey-Calavi, and Porto-Novo); and (iv) development of selected Non-Timber Forest Products value chains and provide alternative revenues to forest-dependent communities, thereby reducing human pressure on GFs.

10. Economic analysis focuses only on selected benefits for the assessment of project feasibility due to lack of data ex-ante: selected environmental benefits (watershed value), assessment of the benefits from development of fuelwood plantations mainly focusing on charcoal production and taungya farming benefits as a result of NTFP value chain development (assessment of the revenue), and emission reduction/carbon sequestration benefits. Other benefits are discussed in a qualitative analysis. The project will generate significant long-term benefits as a

²⁵ 2014. Angelsen A, et al. Environmental Income and Rural Livelihoods: A Global-Comparative Analysis. World Development Volume 64, Supplement 1, December 2014

²⁶ B. M. Belcher. 2003. What isn't an NTFP? International Forestry Review 5(2): 161-168.

²⁷ 2014. Angelsen A, et al. Environmental Income and Rural Livelihoods: A Global-Comparative Analysis. World Development Volume 64, Supplement 1, December 2014



result of the timber production, but these were not accounted for as the revenue from the timber wood sales will start being generated after the life of the project .

11. The project's direct measurable benefits will be delivered via components 2 and 3 of the project:
 - Sub-component 2.3: Sustainable management of conservation forests (40 percent of the targeted GF area). The objective of this sub-component is to put up to 40 percent under conservation in selected areas of GFs to ensure natural or assisted regeneration of tree species and concomitantly restore habitats conducive to increased biodiversity.
 - Sub-component 2.4: Establishment and management of production forests. The objective of this component is to establish and manage fuelwood plantations to supply major consumption hubs (Cotonou, Abomey-Calavi and Porto-Novo). The project will develop 15,000 ha of *Acacia auriculiformis* plantations, a fuelwood tree species known not only for its rapid growth, but also for its soil fertility enhancing qualities. These soil fertility qualities will enable successful application of the taungya system of intercropping—with agricultural crops such as maize, peanut, soya interspersed among acacia trees – on 5,000 ha of acacia plantation.
 - Sub-component 3.1: Development of a shea value chain. The objective of this sub-component is to develop a shea nut value chain while promoting energy-efficient processing as well as establishing new plantations to replace the aging and less productive trees.
 - Sub-component 3.2: Development of a honey value chain. This sub-component aims at supporting the development of an acacia honey value chain from the 15,000 hectares acacia plantations installed by the project to provide alternative revenues to forest-dependent communities.
12. To avoid creating gaps after fuel wood harvest that may make the rest of the ecosystem vulnerable, the component will establish 7,000 hectares of teak and gmelina species to maintain forest cover after the acacia harvest. Future revenues from the sales of the teak and gmelina species were not accounted for in the analysis, as the high-quality timber will be available post project life – between 25-40 years after planting.
13. A matrix of project benefits was built based on the example of the World Bank forestry operations, including Forest Investment Program in Cote d'Ivoire, as an overview of four categories benefits associated with the project.

Table 1: Economic benefits generated by the project

	<u>Tangible</u>	<u>Intangible</u>
Direct	Climate benefits: reduction of GHG emissions, increased carbon sequestration capacity Increased revenue from timber production (7,000 ha timber plantations, revenue from high quality timber teak and gmelina) Revenue from fuelwood plantations (15,000 ha): income increase for local population engaged in nurseries, plantations works; revenues from the organized markets and woof fuel sales	Reduction in soil erosion Reduction in deforestation in GF Afforestation/reforestation Improvement of soil quality as a result of agroforestry applications in agricultural landscapes Reduction of farmer-herder conflicts as a result of enhanced management of transhumance corridors in target zones Biodiversity conservation/watershed value as a



	Revenue from yield from agricultural crops during the early stages of forest plantation establishment (taungya system, assumption is maize based) (not included in the analysis) Agroforestry: Increased yield as a result of soil conservation techniques, additional income as a result of introduction of other species, increased income (not included in the analysis) NTFP: increased income as a result of the value chain development for shea butter and honey, increased income as a result of the income generating activities supported by the project Transhumance: economic benefits from cattle production (not included in the quantitative analysis due to lack of data)	result of forestry management and transhumance Recreational: eco-tourism and recreation areas, including urban parks Poverty reduction
Indirect	Reduced pressure on Gazetted Forests Increased resilience to climate change/adaptation Developed/improved value chains for NTFP	Enhanced policy and regulations in GF management. Improved management of the GF: reduced illegal harvesting, reduced bushfires, reduced uncontrolled production of firewood and charcoal, sustainable use of fertilizers and pesticides as a result of agroforestry techniques Enhanced capacity for agroforestry application Improved markets of NTFP

Project area under economic analysis

14. The project targets different ecosystems, and their assessment is important for identification and valuation of the benefits generated by project interventions. 11 forest reserves have been targeted for project interventions on the basis of their conservation, production and NTFP development potentials. Four are in the south (Dan, Dogo-Kétou, Logozohè and Toffo), three in the center (Agoua, Ouémé-Boukou, and Tchaourou-Toui-Kilibo) and four in the north (Ouémé-Supérieur-Ndali, Alibori Supérieur, Trois Rivières, and Ouénou-Bénou) of the country. The total surface of these GFs is 917,951 hectares representing 63 percent of the total surface (1,457,247 ha) of the Country's 46 GFs.

15. The project interventions in the southern and central GFs will be focused on the establishment of large-scale fuelwood plantation activities, including 15,000 ha of acacia plantations and 7,000 ha of high-quality teak or gmelina timber plantations. In addition, a honey value chain will be supported in these areas as well. In the North, where shea trees are among the main species populating GFs and are aging and becoming less productive, project interventions will focus on their renewal and management to control a potential shortage in the long run, as local communities, especially women, depend on shea nut collection and processing for their livelihoods. Moreover



about 917,951 ha of the forests will be under sustainable management by the end of the project, with 40 percent of the area under strict conservation.

Main assumptions

16. A cost-benefit-analysis was applied to assess the economic efficiency of this project. A sensitivity analysis was conducted for the main parameters including discount rate. For the discount rate, alternative rates of 5 percent, 12 percent, and 20 percent were applied. To test the robustness of initial results the economic benefits were reduced by 50 percent and lower:

- a) For fuelwood plantation 15,000 ha, the assumption was made that the first benefits will arrive in year six of the project, The Mean Annual Increment (MAI) - average volume of wood growing on one hectare of forest plantation during one year – was taken into account to calculate benefits associated with fuelwood production.
- b) For crop production using taungya system – the assumption was made that the maize will be harvested on 5,000 ha of acacia plantation during first three years after fuelwood harvest,
- c) For production of honey, the assumption was made that the first harvest will be made in year six of the project, assuming that capacity building and management plans will be developed during the first years of project implementation, and considering the growth period of the Acacia trees on the new plantation;
- d) For shea the assumption was made that the first harvest will be made in year 13 of the project life, taking into account the growth characteristics of shea trees, and development of the value chain.

17. A carbon price is applied in the subsequent analysis. All sensitivity analyses were run for all discount rate scenarios. The results of the quantitative results are complemented with description of qualitative benefits to conclude overall project feasibility.

18. An assessment of climate benefits considered incremental sequestered carbon and storage as a result of direct interventions during the project life of 20 years, without accounting for the additional benefits resulting from the improved forestry management. In addition, carbon benefits delivered by the agroforestry interventions were not accounted for here due to the on-demand nature of this subcomponent.

Project duration and time

19. Project duration is seven years. The “with-project”, with carbon benefits and “without- project” situations were compared over the lifetime of investments made to promote the green economy, i.e. the project life, which is estimated at 20 years. In total, the project will generate net emissions reductions of 12.6 million tons tCO₂-eq over a period of 20 years.

20. The shadow price of carbon was calculated based on the World Bank guidance document²⁸ (2017). As recommended in the guidance document, the scenarios considered in the economic analysis were done both with and without the shadow price of carbon, to reflect the local and global impacts of the project. In line with the High-Level Commission on Carbon Prices²⁹, this guidance note recommends that the project’s economic analysis use a low and high estimate of the carbon price starting at US\$40 and US\$80, respectively, in 2020 and increasing to US\$50 and US\$100 by 2030. Beyond 2030 the guidance note recommends that the low and high values on

²⁸ 2017. World Bank. Guidance note on shadow price of carbon in economic analysis. Washington DC

²⁹ https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/59244eed17bffc0ac256cf16/1495551740633/CarbonPricing_Final_May29.pdf



carbon prices are extrapolated from 2030 to 2050 using the same growth rate of 2.25 percent per year that is implicit between the 2020 and 2030, leading to values of US\$78 and US\$156 by 2050.

Poverty alleviation

21. Following definitions provided in the PEN study³⁰ the project targets environmental forest income and timber plantation, including portions of the income from crop production focused on the taungya, agroforestry and NTFP. According to the PEN study findings, the share of forest income (natural forest and plantation) is 21.4 percent in the Africa region³¹; crop income is 32.2 percent but does not specify the share of the agroforestry. If the project reaches its objective, it will increase the size of the forest income - one of the largest shares of the household income in targeted areas. An increase in forest income by 15 percent will result in an increase of total household income at 6 percent for forest dependent communities of the project targets GFs, a population of about 536,368 (68,954 households) of which 267,626 men and 268,204 women. An assessment of the livelihood impacts was made by using the following assumptions: rural per capita income of at least 70 percent of the reported per capita income (2016) US\$820, incremental benefits at a highly conservative one percent³² increase (vs estimated 6 percent) received by the project beneficiaries (US\$5.7). The results of the incremental benefits stream to the project beneficiaries over the project life is demonstrated in table 2.

Table 2: Project livelihood incremental benefits

project life	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
project beneficiaries	76.6	76.6	76.6	76.6	76.6	76.6	76.6	0	0	0	0	0	0	0	0	0	0	0	0	0
cumulative beneficiaries, thousand	76.6	153.2	229.9	306.5	383.1	459.7	536.4	536.4	536.4	536.4	536.4	536.4	536.4	536.4	536.4	536.4	536.4	536.4	536.4	536.4
Incremental Benefits, US\$ thousand	439.8	879.6	1,319.5	1,759.3	2,199.1	2,638.9	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8	3,078.8

22. These incremental benefits are calculated based on a conservative assumption. However, considering that project interventions under components 2 and 3 will be implemented by the communities of the selected GFs, including site preparation, establishment of the nurseries, maintenance of the plantations, fuelwood harvest, carbonization, NTFP – expected benefits stream will provide full employment and income generation for the communities during the project life, and beyond.

Biodiversity and Watershed Values

23. Forests within the GFs provide valuable benefits in terms of habitats for biodiversity, water protection, erosion control and soil preservation. A recent study of the hydrological status of Ouémé basin³³ demonstrated that current water availability does not meet the annual needs of the population, and soil losses are an important factor in water availability. The agro-hydrological model SWAT confirmed the soil losses are important in the basin

³⁰ Study conducted by the CIFOR's Poverty Environment Network (PEN) 2014. Angelsen A, et al. Environmental Income and Rural Livelihoods: A Global-Comparative Analysis. World Development Volume 64, Supplement 1, December 2014

³¹ Stallholder-dominated tropical and subtropical landscapes with moderate-to-good access to forest resources

³² Income increase in 6 percent is an optimistic assessment, considering successful and timely implementation of project component, value chain for NTFP built and charcoal sales at the urban market prices

³³ 2014. Sintondji Luc Ollivier 1*, Zokpodo Barnabé 1, Ahouansou D. Maurice 1, VISSIN W. Expédit 2, Agbossou Kossi Euloge. Modelling the water balance of Ouémé catchment at the Savè outlet in Benin: contribution to the sustainable water resource management. International Journal of AgriScience Vol. 4(1): 74-88, January 2014 ISSN: 2228-6322© International Academic Journals



since direct measurements reported huge losses in agricultural areas. Project interventions will directly contribute to the reduction of soil loss and erosion prevention.

24. Given the importance of forests in preservation and restoration of the hydrological balance, watershed values were considered in the quantitative economic analysis. Cote d'Ivoire's Forest Investment Program economic analysis referred to several assessment studies on accounting forests value, including TEEB (2009) valuing intact tropical forests as US\$6,120 ha/year, Pearce (2001) watershed value at a range between US\$15 and US\$850 ha/year with the higher value of tropical forests. The World Bank³⁴ estimates watershed values at US\$129/ha for developed and US\$27/ha/year in developing countries. In the case of this project, the conservative approach was applied, with the value of US\$27/ha/year, considering that 40 percent of the targeted GF area will be put under strict conservation (approximately 367,180 ha).

25. Under various discount rates, improved forestry management and governance, and strict protection of the 40 percent of the gazetted forests, results in a positive NPV, even under a conservative watershed value of US\$27/ha/year³⁵:

Table 3: Biodiversity and Watershed Values discounting

Discount rates, percent	5	12	20
NPV, US\$ million	63.3	25.4	9.1
IRR, percent	30 percent	22 percent	14 percent
B/C ratio	7.3	4.2	2.5

Baseline

26. The direct drivers of deforestation and forest degradation in the GFs are: (i) the extensive and shifting slash and burn agriculture; (ii) bushfires (accidental or intentional, for agriculture or hunting); (iii) uncontrolled production of firewood and charcoal, on which 80 percent of the population depend for cooking; (iv) unsustainable production and harvesting of timber for local consumption and export; (v) seasonal transhumance of local and foreign herds in search of pasture and water in the GFs; (vi) urban encroachments in the GFs adjacent to cities, a minor factor in the past, now growing, (vii) installation of dwellings of local residents and migrant agricultural settlers inside GFs, with the emergence of related infrastructure (boreholes, roads, electricity, telephone cables); and (viii) large-scale use of herbicides and pesticides, a new and fast-growing factor, also threatening forest cover and biomass.

Fuelwood

27. The objective of this component is to reverse the trend of unrestrained collection of fuelwood in GFs by establishing fuelwood plantations to supply major city centers (Cotonou, Porto-Novo, Abomey-Calavi, Parakou). The project will develop 15,000 ha of the acacia plantation during the implementation period, in selected GFs. The management and exploitation of these plantations can be ensured in two ways: (i) concessions to private operators or local associations or (ii) delegated management to local communities.

³⁴ The Changing Wealth of Nations – Measuring Sustainable Development in the New Millennium (2011)

³⁵ This analysis considered that component 1 Support to GF Governance and subcomponent 2.3 Sustainable management of Conservation forests will result in increased conservation value of the forest.



28. Nurseries for the production of fast-growing local species will be established and managed by local communities with technical assistance from the Forestry Administration. The following interventions will also be financed: (i) reinforcement of the Forestry Administration's control and supervision over fuelwood production, before and after cuts; (ii) reorganization of existing rural wood markets and creation of new ones, as necessary; (iii) training of charcoal producers in improved carbonization techniques and provision of higher performance furnaces; (iv) development and implementation in each GF of a fuelwood development plan to ensure sustainable harvesting in natural forest (plots, harvestable volumes, species and diameters); and (v) the development of an effective incentive-based tax system without adverse effects, and enforceable by the Forestry Administration.

29. The general idea behind the taungya system is to simultaneously plant agricultural crops and trees at the same area and let it grow until the tree canopy closes.

30. Assumptions for the economic analysis are based on the visit made during the project preparation mission to the Pahou acacia fuelwood plantation. Considering project interventions in charcoal production, it was assumed that 100 percent of the wood output will be used for charcoal production. The following growth and market characteristics were considered:

- Planting density 1,111 trees per ha
- Mean Annual Increment (MAI) (average) 16 m³/ha/year³⁶
- Rotation Length 5-6 years (acacia)
- Average price of CFA5,500 per m³ fuelwood
- Yield - 80 m³ of fuelwood from one ha plantation
- One sack/bag charcoal (weight 60) kg, price per bag 2,500 (US\$4) FCFA in rural areas, and CFA 7,000 (US\$12.3) in urban centers
- Charcoal production – 10 m³ of the fuelwood in average is used in producing one ton (1,000 kg) of (7 to 11 m³ (solid))³⁷; regional data referenced to yield of 300 bags of charcoal from ha of the acacia plantation
- Taungya method – various crops will be planted by farmers, however maize yield and price were applied in the analysis on 5,000 ha; maize will be planted during three years after fuelwood harvest.

31. For project purposes, it was assumed that there would be no expansion in the planted area, only replanting of harvested areas. The management systems included in the analysis have been chosen as the most common systems in forest plantation for bioenergy purposes. Moreover, it is assumed that trees are not thinned or pruned in the default profiles. The analysis focuses on productive plantations, excludes protective plantations and semi-natural planted forests. The calculations are made before tax, without including rent. There is a significant difference in the scenario's fuelwood sale and charcoal production with the taungya approach, as under the first scenario (fuelwood sale) intervention is not economically viable. Table 4 below provides a summary of the assessment taking into account the described assumptions:

³⁶ The Mean Annual Increment (MAI) is the volume of wood growing on one hectare of forest plantation during one year, on average, since the establishment of the forest plantation. This is expressed in m³/ha/year. Default values are estimated using average values from existing literature at the global level. For calculation purposes, the MAI is defined as the merchantable stand volume at harvesting time divided by the rotation length (2014. FAO. Natural Resources Module. Woodfuel and Wood Residues Component)

³⁷ 1983. FAO. Simple technologies for charcoal making. Link: <http://www.fao.org/docrep/x5328e/x5328e00.htm#Contents>



Table 4: Assessment of Fuelwood Benefits

	Charcoal production, 15,000 acacia, taungya system (maize)			Fuelwood production and sale, 15,000 acacia, taungya system (maize)		
Discount rate, percent	5	12	20	5	12	20
NPV, US\$ million	56.3	21.5	6.2	3.1	5	-7.4
IRR, percent	22 percent	15 percent	7 percent	2 percent	-5 percent	-11 percent
B/C ratio	3.1	1.9	1.2	1.0	0.6	0.4

Non-Timber Forest Products (NTFP)

32. Recent studies from the region found NTFP to be an important source of income source for the households, however there are no relevant studies assessing all elements of the rural household income. In the various case studies, NTFP income contribution in the household income vary between 10-27 percent in Malawi (wild and planted fruit trees)³⁸, Congo (wild plants)³⁹ and Ethiopia (various NTFP, including fuel wood)⁴⁰. Assessment of the NTFP input in household income⁴¹ in Benikoara municipality, Benin demonstrated that NTFP (mainly mushrooms and wild fruits) contributes on average 11.45 percent of the household's total annual income (FCFA 255,484 or US\$ 448 per year)⁴². A study conducted in northern Benin⁴³ (Papatia and Chabi-Couma, Department of Atakora) estimates that on average, 39 percent of annual income is generated by diverse NTFPs. The findings of the PEN study demonstrate that the share of NTFP income in the total forest income globally reaches over 35 percent, and 30 percent in Africa.

33. Studies referenced above (PEN (2010), Heubach et al (2011)) found that the economic significance of NTFPs differs between households: the lower the total household income, the higher the share of NTFP income. The study in northern Benin (Heubach 2011) demonstrated that the amount of NTFPs extracted and the cash income through local sales increases with income status, mainly due to better access to farmland. Poorer households face higher opportunity costs in terms of extraction (distance to extraction sites and competition for the resources). However, as a result of population growth, expansion of agricultural land, and increased restricted access to woodland, demand for NTFP will increase as well. Moreover, a number of studies find that while NTFP extraction helps to prevent further poverty and sustains current livelihoods, respectively, it might not help to lift people out of poverty (Angelsen and Wunder, 2003⁴⁴; Belcher, 2003⁴⁵; Dewi et al., 2005⁴⁶). Therefore, lowering the opportunity costs of conserving woodlands might be achieved by creating stable income opportunities independent of NTFP extraction or by increasing the efficiency of crop production systems, thus also increasing

³⁸ 2009. Kamanga, P., Vedeld, P., Sjaastad, E. Forest incomes and rural livelihoods in Chiradzulu District, Malawi. *Ecology Economics* 68, 613–624.

³⁹ 2004. de Merode, E., Homewood, K., Cowlishaw, G. The value of bushmeat and other wild foods to rural households living in extreme poverty in Democratic Republic of Congo. *Biological Conservation* 118, 573–581.

⁴⁰ 2009. Babulo, B., Muys, B., Nega, F., Tollens, E., Nyssen, J., Deckers, J., Mathijs, E. The economic contribution of forest resource use to rural livelihoods in Tigray, Northern Ethiopia. *Forest Policy and Economics* 11, 109–117.

⁴¹ Bonou, Alice. (2013). Valeur économique des Produits Forestiers Non Ligneux (PFNL) au Bénin. 10.13140/2.1.4470.2406

⁴² NTFP considered for the analysis in this study is Shea almonds

(*Vitellaria paradoxa*), the seeds of Néré, the pulp of Néré (*Parkia biglobosa*) and the leaves of Baobab (*Adansonia digitata*). It is assumed that firewood is collected for own consumption only, and main source of the household income is agricultural production (cotton)

⁴³ 2011. Katja Heubach [a,*](#), Rüdiger Wittig [a,b](#), Ernst-August Nuppenau [c](#), Karen Hahn. The economic importance of non-timber forest products (NTFPs) for livelihood maintenance of rural west African communities: A case study from northern Benin. *Ecological Economics* 70 (2011) 1991–2001

⁴⁴ 2003. Angelsen, A., Wunder, S. Exploring the Forest — Poverty Link: Key Concepts, Issues and Research Implications. CIFOR, Bogor, Indonesia. pp. viii, 58p.

⁴⁵ 2003. Belcher, B.M. What isn't an NTFP? *International Forestry Review* 5, 161–162.

⁴⁶ 2005. Dewi, S., Belcher, B., Puntodewo, A. Village economic opportunity, forest dependence, and rural livelihoods in East Kalimantan, Indonesia. *World Development* 33, 1419–1434.



the resilience of affected rural populations. These measures will improve rural livelihoods and contribute to forests and biodiversity conservation.

34. Considerable potential for NTFP development exists in Benin. NTFP demand is growing but value chains are poorly organized or non-existent. NTFP trade is informal, underappreciated, and not fully captured in statistics, and often characterized by lack of knowledge among actors about value chain, and lack of knowledge about processing techniques. Market information systems are often absent or inefficient, and results in low value added due to lack of chain vision and low technology. At the same time, organized NTFP trade have positive impacts on forest based, rural and urban livelihoods and might play a big role in food security, health and income to meet basic needs.

35. The NTFP sub-component aims at increasing the NTFP's contribution to the national economy and improving local communities' livelihoods. The component will focus on the development of shea and honey value chains in selected GFs and plantations.

36. Shea butter is used by the rural population in West Africa as a food oil, for medicine, a soap base, and various cultural purposes. The fruit is also consumed and is commonly eaten during harvest or dried for later use. It is estimated that approximately 18 million women are involved in shea collection and production⁴⁷. Exports from the region are growing and estimated at an annual average of about 220,000 tons⁴⁸. There are various uses of the shea kernel in exports – for cosmetics and food production – for example cocoa butter improver (CBI) for chocolate sold in the European Union. Most common method for shea tree growth is natural regeneration. For new growth from seedlings, the juvenile stage is long - up to 15-20 years from the seedling. Moreover, seedlings take two to three years to reach field planting size, a very costly and laborious process, and in addition the long period of maturity affects investment attractiveness of this process for private sector. These are major disincentives for planting shea plantations.

37. The project will finance technical assistance to: (i) assess the stock of shea trees in and around the three largest gazetted forests in the North (Alibori Supérieur, Trois Rivières and Ouénou-Bénou), the highest production area in the country; (ii) develop a production and management plan of the shea plantations with the aim to establish 1500 hectares to respond to market demand on long-term and avoid shortage in supply given the aging of shea trees; (iii) technical assistance including research on improvement of collection, conservation, and processing techniques; (iv) training of shea nut collectors on those techniques; (v) a marketing study looking at sources of demand, packaging, labeling and certification options and provide recommendations to implement the best options which the project will finance.

38. Production and yield data are based on the following assumptions:

- New plantation 1,500 ha: 100 trees per ha. Research and field trials have indicated that the optimum spacing of shea trees for hastening maturity and improving yield per hectare is 10 x 10 meters, or about 100 trees per hectare or 4 trees per acre⁴⁹.

⁴⁷2015. Naughton, Colleen C., Peter N. Lovett, and James R. Mihelcic. Land Suitability Modeling of Shea (*Vitellaria Paradoxa*) Distribution across Sub-Saharan Africa. *Applied Geography* 58 (2015): 217–27.

⁴⁸ 2015. Bello-Bravo, J., P. Lovett, and B. Pittendrigh. The Evolution of Shea Butter's 'Paradox of paradoxa' and the Potential Opportunity for Information and Communication Technology (ICT) to Improve Quality, Market Access and Women's Livelihoods across Rural Africa." *Sustainability* 7: 1572–92.

⁴⁹ Bole, Ghana: Research and development of the shea tree and its products. <https://www.solutions-site.org/node/110>



- About 8-10 shea trees per hectare of natural forest in the largest gazetted forests in the North (Alibori Supérieur, Ouémé-Supérieur-Ndali, Trois Rivières and Ouénou-Bénou), a total area of 731,853 ha. Assumption based on 40, 30, and 20 percent of existing shea trees being utilized for shea butter production.
- Maximum yield of shea nuts is 45 kg per tree per year. Average harvest of 5-15 kg of nuts per year per tree, but well-tended trees produce up to 45 kg from tree⁵⁰. However, for the analysis the average yield was considered as 30 kg per tree annually.
- Trees raised from seed bear their first fruits after 10-25 years and taking 30-50 years to achieve full productivity⁵¹; for the analysis assumption was made the first yield will start year 13 after project start.
- Average price per ton of the shea butter, urban market in Benin – CFCA 2,500,000 or US\$4,386

39. The process of extraction in shea butter production falls into three main categories: manual traditional, semi-mechanized (using hydraulic/screw presses) and industrial systems. Rural women using traditional methods extract crude butter at an extraction rate of about 20 percent. The semi-mechanized system achieves extraction rates of 35-40 percent. Mechanized processing in West Africa yields 30-40 percent of shea butter from raw nuts. More efficient, fully mechanized systems achieve extraction rates of between 42 percent and 50 percent. However, most of the exports of shea from West Africa consist of crude butter with virtually no significant refining⁵². The project will support semi and fully mechanized systems. Therefore, 30 percent output is considered for the analysis.

40. Development of the shea plantations and support to shea butter value chain will have large socio-economic impact beyond the estimated economic efficiency. Export markets for shea are growing. In Burkina Faso, sales to a major shea buyer, L'Occitane increased from less than 100 tons in 2003 to 660 tons in 2013, generating about US\$1.3 million in farmer revenues (considering that collectors and processors are predominantly illiterate women - over 90 percent⁵³). Shea trees are highly climate resilient. Beyond shea butter, this tree produces edible fruits, edible flowers, medicines, and feed for animals⁵⁴. Moreover, with the 200-year lifespan it provides big opportunity for CO2 sequestration

41. In addition, the project is aiming to promote the development of an acacia honey value chain from the 15,000 hectares acacia plantations to be established by the project, for the benefit of forest-dependent communities. The project will finance the acquisition of hives and capacity building of selected forest-dependent communities to make honey in acacia plantations and train them in the best honey making practices; a marketing study looking at sources of demand, packaging, labeling and certification options and provide recommendations to implement the best options which the project will finance to support forest-dependent communities; and small honey processing units for beneficiaries organized in cooperatives with support from the project.

⁵⁰ Assessment of the Benin Forestry Administration

⁵¹ National Research Council 2006. *Lost Crops of Africa: Volume II: Vegetables*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/11763>. <https://www.nap.edu/read/11763/chapter/19#313>

⁵² 2004. USAID. *The Shea Butter Value Chain Refining in West Africa*. WATH Technical Report No. 3

⁵³ <http://springjournals.net/full-articles/springjournals.net/jaeerdarticlesindex=15kouakou.pdf?view=inline>

⁵⁴ National Research Council 2006. *Lost Crops of Africa: Volume II: Vegetables*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/11763>.



42. Data for the assessment of honey production were derived from the evaluation report of IGAs⁵⁵ for the Additional Financing for Forests and Adjacent Land Management Project (P132431), Directorate General of Water and Forests and Hunting data and assessment made by the Benin Forestry study⁵⁶ and various research studies in the region. On average, it is possible to manage 10-15 hives per one hectare of managed acacia plantation, with the yield of about 15 kg of honey per year from one hive. With the average price for honey US\$5 per kg, annual revenue is US\$75/hive, or with the modest estimate of 10 hives per ha of acacia – US\$750, or US\$11.25 million from 15,000 ha of acacia plantation.

43. Assumptions for the analysis were made based on the interviews in Parakou, the Forestry study⁵⁷, and country case studies in the region:

- setting up shea tree plantations under the project based on the technical assessment study, with the first harvest 12 years after project start. The assumption is based on the semi-mechanical/full industrial processing.
- gradual increase of the honey production capacity, to 10 hives per ha of acacia plantation during project implementation, assuming the average price as FCFA 2,000-3,000 (average as US\$5) per kg of honey. It is also assumed that honey production will be reduced after wood is harvested every six years
- assumption is based on the subsidy/grant mechanism.

44. Results of the analysis demonstrate a positive NPV, assuming a developed value chain for both types of NTFP and semi or fully mechanized shea butter processing and a benefit cost ratio of three and over.

Table 5: Assessment of the NTFP benefits

Discount rate, percent	5	12	20
NPV, US\$ million	48.0	20.2	8.1
IRR, percent	48	39	29
B/C ratio	15.5	8.5	4.8

45. Sensitivity Analysis: The sensitivity analysis conducted based on the analysis of scenarios allowed for simulating financial performance indicators (NPV, IRR and C/B Ratio) based on the most sensitive endogenous variables of the analysis model used, namely prices and production output. The simulations show that financial performance falls, albeit much more slowly, as the prices of products fall.

Results

46. Results of the economic analysis show positive outcomes for the project. A summary of economic simulations is summarized in Table 6 below. The table shows the NPV, benefic cost ratio and IRR (selected interventions) for various discount rates, carbon prices scenario and variations of benefits, including for simulations without carbon benefits.

⁵⁵ 2018. Juan López Villar. Rapport d'évaluation de l'impact des AGRs de première génération (PGFTR-FA).

⁵⁶ 2018. Benin. Evaluation Des Forets Classees. Banque Mondiale: Washington DC. On the average basis of 100 hives per GF each producing 20 liters per year, totaling 40 000 liters at an average price of Fcfa 2,000. Highest income received by the IGA participant in apiculture reached FCFA 110,000 during 6 months in average

⁵⁷ 2018. Benin. Evaluation Des Forets Classees. Banque Mondiale: Washington DC.



Table 6: Summary of economic analysis

	All Benefits with low carbon price			All Benefits with high carbon price			All Benefits without carbon			50 percent Benefits and low carbon benefits		
Discount rate, percent	5	12	20	5	12	20	5	12	20	5	12	20
NPV, US\$ million	529.6	270.2	148.4	907.3	487	284.7	151	52.6	11.5	423	219.4	123.3
B/C ratio	9.3	6.3	4.6	15.4	10.7	8.1	3.2	1.8	1.1	7.7	5.4	4.1

47. This analysis was limited to the benefits and values that can be attributed to the project and can be measured at the time of assessment. Thus, benefits from wide adoption of agroforestry methods, including improved climate resilience, sales of the high-quality teak and gmelina (which will be harvested at the appropriate maturity level), or revenue of the shea butter under the export scenario with significantly higher prices are not accounted for. If additional and downstream benefits are accounted for, the analysis would demonstrate even higher efficiency.

Discussion

Agroforestry

48. The recent Economics of Ecosystems and Biodiversity (TEEB) study⁵⁸ defines agroforestry as a practice involving the deliberate integration of trees or shrubs in farming landscapes involving crops or livestock to obtain benefits from the interactions between trees and/or shrubs, trees and crops or livestock. In Zomer et al. (2014)⁵⁹ the extent of agroforestry, considering agricultural landscapes with at least 10% tree cover, is estimated at over 1 billion hectares of land (more than 43 percent of all agricultural land area), supporting more than 900 million people, mostly in the tropical and sub-tropical regions inhabited by poorer populations.

49. Agroforestry comprises various benefits for farmers such as firewood, timber but also supplementary income possibilities due to tree crops (Nair, 2007b⁶⁰). In addition, it is a promising solution to alleviate soil erosion on agricultural plots and hence helps to stabilize or even improve yields (Gebreegziabher et al., 2010⁶¹). TEEB analysis (2015) defined a list of ecosystem services delivered by agroforestry as provisioning services (cash crops, food crops, tree products, medicines, wild food and all other non-timber forest products, timber and poles, wood fuel/charcoal and fresh water provisioning), regulating and supporting services (carbon, soil erosion control, soil fertility (nitrogen, phosphorus and potassium, runoff, water quality, biological pest control, pollination and biodiversity)).

50. However, these positive effects only persist if agroforestry is preserved over a long-time period (Mercer, 2004⁶²). Overutilization of agroforestry systems is associated with the decline of tree stocks, and may weaken the

⁵⁸ 2015. Sara Namirembe, et al. Agroforestry: an attractive REDD+ policy option? The Economics of Ecosystems and Biodiversity (TEEB)

⁵⁹ Zomer, R.J., et al. (2014) Trees on Farms: An Update and Reanalysis of Agroforestry's Global Extent and Socio-Ecological Characteristics. Working Paper 179, World Agroforestry Centre (ICRAF) Southeast Asia Regional Program, Bogor, Indonesia, 33 p.

⁶⁰ Nair, P.K.R., 2007b. Agroforestry for sustainability of lower-input land-use systems. Journal of Crop Improvement 19 (1–2), 25–47.

⁶¹ Gebreegziabher, Z., Köhlin, G., Mekonnen, A., 2010. Household Tree Planting in Tigray, Northern Ethiopia: Tree Species, Purposes, and Determinants. Ethiopian Development Research Institute (EDRI), Addis Ababa, Ethiopia.

⁶² Mercer, D., 2004. Adoption of agroforestry innovations in the tropics: a review. Agroforestry Systems 61–62 (1–3), 311–328.



positive impact on soil fertility, food production, firewood and timber availability, and thus farmers' income in rural areas. Some studies solely promote the implementation of agroforestry as a sustainable system (Kang and Akinnifesi, 2000⁶³).

Implications on food security and resilience

51. Food security is typically analyzed in terms of four dimensions, namely food availability, accessibility, utilization and stability (FAO 2008; Mohamed-Katerere and Smith, 2012). Food security is also closely connected to the concept of ecosystem stability (TEEB, 2015). It is closely connected to the resilience of the ecosystems. Applying the resilience concept to the farm and household levels, this implies the ability of households to adapt to changing socio-economic and ecological circumstances and maintain a diverse livelihood portfolio.

52. Research has shown that agroforestry contributes to food security by boosting field crop yields, diversifying income, and increasing resilience to climate change^{64,65}. Agroforestry requires relatively little land as trees can be planted around the homestead and on field boundaries. It also has low labor requirements. Furthermore, many trees require cash inputs only for the purchase of seed or seedlings⁶⁶.

53. Adoption of agroforestry depends on various factors. As discussed earlier, assets related to ecosystem services and to food security are the main motivating factors. In addition, other functions are considered during decision making such as improvement of soil fertility, water recycling resulting from the various management approaches. Many agroforestry options achieve this through low external input requirements, high recycling rates and crop-livestock integration⁶⁷. They may thus be a viable option for smallholder farmers with limited resources, but where land holdings are small or insecure, farmers are often unwilling or unable to spare land for agroforestry establishment or reluctant to make decisions that might show impact only several years later. More research is needed to define factors how and when agroforestry can contribute to enhance food security and overall resilience.

Timber and fuelwood

54. Timber and fuelwood plantations, if managed sustainably, could potentially play a positive role in landscape restoration, although these new forests will not match the original old-growth forests in specie composition. Forest restoration could contribute to restoration of various ecosystem functions in degraded landscapes and could contribute to recovery of many components of the original biodiversity. The figure below⁶⁸ demonstrate various approaches in restoration and desired outcomes. The proposed project combines various elements thus maximizing the impact for income generation and landscape restoration.

⁶³ Kang, B.T., Akinnifesi, F.K., 2000. Agroforestry as alternative land-use production systems for the tropics. *Natural Resources Forum* (24), 137–151.

⁶⁴ 2012. I. Dawson, F. Place, E. Torquebiau, E. Malézieux, M. Iiyama, W. Sileshi, K. Kehlenbeck, E. Masters, S. McMullin, R. Jamnadass. Background Paper for the International Conference on Forests for Food Security and Nutrition, 13–15 May FAO, Rome (2013)

⁶⁵ 2012. O.C. Ajayi, F. Place Policy support for large-scale adoption of agroforestry practices: experience from Africa and Asia

2012. P.K.R. Nair, Garrity DP (Eds.), *Agroforestry: The Future of Global Land Use*, *Advances in Agroforestry* 9, Springer (2012)

⁶⁶ 2014. Evelyne Kiptot, Steven Franzel, Ann Degrande, Gender, agroforestry and food security in Africa,

Current Opinion in Environmental Sustainability, Volume 6, 2014, Pages 104–109, ISSN 1877-3435

⁶⁷ 2012. A.M. Altieri, R.F. Funes-Monzote, P. Petersen. Agroecologically efficient agricultural systems for smallholder farmers: contributions to food sovereignty. *Agron Sustain Dev*, 32 (1) (2012), pp. 1–13

⁶⁸ Beyond Deforestation- Restoring Forests on degraded lands

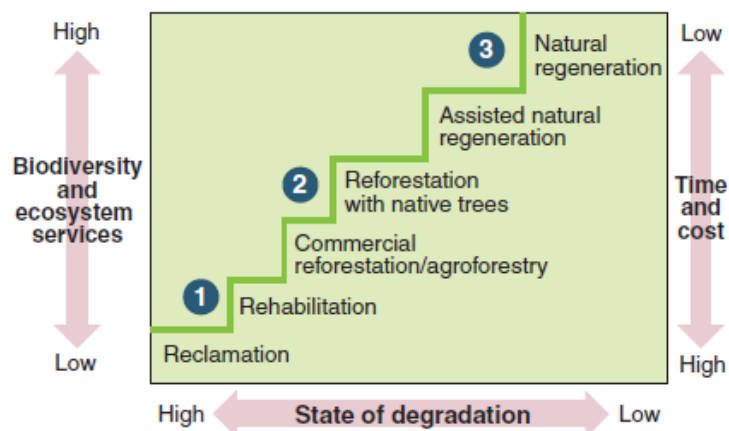


Figure 0.1: Restoration staircase

55. Public financing is justified in this case for various reasons: timber plantations will increase forest cover and result in long-term income generation for the local population in the form of wages for those engaged in the plantation works and benefiting from the plantation operational cycle by consuming younger trees for wood fuel, and at the mid-cycle – as consumers of lower cost low diameter trees.

Fuelwood plantation management approaches and economic analysis

56. Choice of the management approach for fuelwood plantation will affect the economic results of the project. A World Bank Energy Sector Management Assistance Program (ESMAP) study⁶⁹ analyzed two main approaches to the management of the fuelwood plantation: community based forestry management (CBFM) or private operators.

57. The study found that CBFM is costly, needs active long-term financing instruments in place to ensure sustainable implementation; in many locations neither producers nor community forest funds can currently support these programs over the long run (resulting from low prices for forest products and NTFP, inconsistent selection of fees and other payments by users groups). Rolling out of the CBFM is often an issue, due to changes in the forestry agency management, and lack of adequate capacity development support for new supervisory and advisory roles. As a result, harvesting systems in the CBFM are not sustainable, and require additional funding and technical assistance.

58. At the same time, evaluation of the projects in Niger and Senegal demonstrated positive results in achieving overall objectives in forestry management: considerable annual increase in the forest stock was reported after local communities took over the management of their forest resources. CBWP was instrumental in promoting forest rehabilitation and reducing deforestation rates. Moreover, decentralization of forest management indirectly benefited enhanced governance, civil society development, and conflict resolution in the areas where it was implemented.

⁶⁹ 2010. Rogério C. de Miranda, Steve Sepp, Eliane Ceccon, Stefan Mann, Bipulendu Singh. Sustainable Production of Commercial Woodfuel: Lessons and Guidance from Two Strategies. ESMAP. World Bank.



59. Under the private sector model (Forest Replacement Associations, FRA) small, medium-sized, and other wood-consuming businesses that are legally responsible for the sustainability of their wood consumption unite among themselves to create a reforestation program. Lessons learned from the FRA model implementation included the following: i) farmers see multiple benefits in participating in FRAs, especially the incentives (technical assistance, free high-quality seedlings) that play a key role in their satisfaction and the success of their small forest plantations; ii) business consumers of wood benefit from a legal and guaranteed supply of quality wood; iii) FRAs can be an effective partner and intermediary between government and private sector in mitigating the impact of wood consumption on natural forests; and iv) FRAs requires minimal support for the business.

Agroforestry

60. Agroforestry comprises various benefits for farmers such as firewood, timber but also supplementary income possibilities due to tree crops (Nair, 2007b⁷⁰). In addition, it is a promising solution to alleviate soil erosion on agricultural plots and hence helps to stabilize or even improve yields (Gebreegziabher et al., 2010⁷¹). TEEB analysis (2015) defined a list of ecosystem services delivered by agroforestry as provisioning services (cash crops, food crops, tree products, medicines, wild food and all other non-timber forest products, timber and poles, wood fuel/charcoal and fresh water provisioning), regulating and supporting services (carbon, soil erosion control, soil fertility (nitrogen, phosphorus and potassium, runoff, water quality, biological pest control, pollination and biodiversity).

61. However, these positive effects only persist if agroforestry is preserved over a long-time period (Mercer, 2004⁷²). Overutilization of agroforestry systems, associated with the decline of tree stocks, may weaken the positive impact on soil fertility, food production, firewood and timber availability, and thus farmers' income in rural areas. Some studies solely promote the implementation of agroforestry as a sustainable system (Kang and Akinnifesi, 2000⁷³).

Transhumance

62. In the Sahel and West Africa, transhumant pastoralism is one of the major livestock production systems, with an estimated 70-90 percent of cattle and 30-40 percent of small ruminants⁷⁴. There is agreement among experts that this method preserves the environment and is viable, competitive and a provider of seasonal work⁷⁵.

63. Trade routes in West Africa for the export of live cattle and small ruminants lie from Sahel to coastal countries. Animals leave from Mali and Burkina Faso to supply Côte d'Ivoire, Ghana, Togo and Benin ('central corridor'), from Chad, Niger, Sudan, Central African Republic, Mali and Burkina Faso to supply Cameroon, Nigeria, Benin and Togo, and from Mauritania and Mali to Cote d'Ivoire, Senegal, Gambia and Guinea Bissau ('western route').

⁷⁰ Nair, P.K.R., 2007b. Agroforestry for sustainability of lower-input land-use systems. *Journal of Crop Improvement* 19 (1–2), 25–47.

⁷¹ Gebreegziabher, Z., Köhlin, G., Mekonnen, A., 2010. Household Tree Planting in Tigray, Northern Ethiopia: Tree Species, Purposes, and Determinants. Ethiopian Development Research Institute (EDRI), Addis Ababa, Ethiopia.

⁷² Mercer, D., 2004. Adoption of agroforestry innovations in the tropics: a review. *Agroforestry Systems* 61–62 (1–3), 311–328.

⁷³ Kang, B.T., Akinnifesi, F.K., 2000. Agroforestry as alternative land-use production systems for the tropics. *Natural Resources Forum* (24), 137–151.

⁷⁴ 2015. Bouslikhane, M. Cross Border Movements of Animals and Animal Products and Their Relevance to The Epidemiology of Animal Diseases in Africa.

OIE Regional Commission

⁷⁵ OECD, ECOWAS



64. According to information received from the United Nations High Commissioner for Refugees (UNHCR) regional office based in Dakar (August 2018): it is estimated that 62,000 persons were internally displaced in Nigeria in 2017 as a result of farmer-herder conflicts, and 3000 persons in the northern part of Benin (country) in June/July 2018 for the same reasons.⁷⁶

65. The direct economic value considers measurable and quantifiable production, (live animals, meat, milk, hides and skins). The economic weight of animal-drawn transport and jobs in the livestock sector should also be included in this. For example, pastoralism's contribution to the agricultural sector ranges from 24 percent in Burkina Faso to 84 percent in Niger. Finally, in terms of employment, pastoralism is a source of income for 80 million people in West Africa (SIPSA- Information System on Pastoralism in Sahel)); it is in fact a major source of revenue for local governments⁷⁷.

66. The indirect economic values should be assessed, such as benefits of grazing for soil regeneration, management of biodiversity or carbon storage, artisanal products and gathered substances (gum arabic, honey, medicinal substances, bicarbonate); the social capital represented by the herdsmen's technical and organizational knowhow; cultural wealth and social bonds; and livestock-based savings⁷⁸.

⁷⁶ 2018. Pastoralism and Security in West Africa and the Sahel: Towards Peaceful Coexistence. UNOWAS.

⁷⁷ 2016. De Haan, Cornelis. Prospects for livestock-based livelihoods in Africa's drylands (English). A World Bank study. Washington, D.C.: World Bank Group.

⁷⁸ 2013. World Bank. High-Level Forum on Pastoralism in The Sahel Nouakchott (Mauritania), 29 October 2013



Annex 3: GHG Assessment

67. At the national level, Benin's Greenhouse gas emissions total up to 14.1 megatons of CO₂ equivalent (MtCO₂e), or 1.5 ton of CO₂e per capita in 2012, without Land Use, Land-Use Change and Forestry sector (LULUCF). These emissions are mainly from the sectors of energy (47.4 percent), agriculture (45.9 percent), waste (5.0 percent) and industrial processes (1.6 percent). Taking LULUCF into consideration, the record of GHG emissions (14.9 MtCO₂e) and absorptions (50.3 Mt CO₂) shows globally that Benin remains a GHG sink with a net absorptive capacity of 35.4 MtCO₂ in 2012. However, its capacity of carbon sequestration, even of absorption of CO₂, with regard to its green cover is declining (20.6 percent between 1995 and 2005 versus 32.0 percent in 2012) (GoB, 2017). With inadequate energy supply, wood fuel and charcoal for cooking represents the highest share—49 percent—of the country's energy balance, accelerating the decline of forest cover and exacerbating the effects of climate change.

68. Benin is ranked 149 out of 188 countries in per capita GHG emissions and contributes only 0.03 percent to global emissions. However, Benin is highly vulnerable to climate change, ranking 155 out of 181 countries in the ND-GAIN index for climate vulnerability. Benin emphasizes the need in its climate change actions to alleviate extreme poverty and promote economic growth which are reflected in its Initial and Second National Communication and its National Adaptation Programme of Action (NAPA, 2008). The Low Carbon and Climate Resilient Development Strategy for 2016-2025 emphasizes the need to address the adverse effects of climate change in particular the identification, adoption, dissemination and appropriation of adaptation measures on the one hand, and the desire to contribute to the reduction of GHG emissions on the other. The overall objective of this strategy includes strengthening the resilience of local communities and economic production systems; reducing GHG emissions from anthropogenic sources and strengthen the protection of communities, especially those most vulnerable to natural disasters. In addition, Benin has ratified the Convention to Combat Desertification (CCD) in 1996 for which it developed a National Action Programme in 2000, and the Framework Convention on Climate Change (UNFCCC) in 1994. Benin signed the Paris Agreement in April 2016 and ratified the agreement in October 2016 with it entering into force in November 2016.

69. The World Bank applies the Ex-Ante Carbon-balance Tool (EX-ACT) developed by FAO in 2010 to assess a project's net carbon-balance. The EX-ACT calculation consists of the net balance of tons of CO₂ equivalent (tCO₂e) emitted or sequestered greenhouse gases (GHG) as a result of project implementation compared to the "baseline" and "without project" scenario. EX-ACT thus estimates the carbon stock changes as well as GHG emissions per unit of land, expressed in tCO₂e per hectare and year. This annex presents an Ex-Ante assessment of the net emissions reduction calculations of the Benin Gazetted Forests Management Project (P167678) with use of the EX-ACT tool. Vulnerability, risks and challenges associated with climate change are predominant in Benin. Deforestation will not only contribute to carbon emissions to the atmosphere but also increase exposure to vulnerability of the most needed. The livelihood of vulnerable communities will need to be diversified in order to strengthen the communities towards the impacts of climate change.

Description of results

70. The project activities that will mainly provide emissions reductions are avoided emissions through reduction of deforestation. Other activities which benefit with enhancement of carbon sequestration are reforestation with fuelwood plantation and agro-forestry. In total the project will generate net emissions reductions of 12.6 million tons tCO₂-eq over a period of 20 years, see table 1 for results. The estimation of carbon stock changes was done based on IPCC Tier 1 default values. The project will be implemented over a period of



seven years and for the calculation of net carbon balance a capitalization phase of 13 years was inserted. The climate was set to Tropical Moist and with Low Activity Clay soils as dominant soil types and Tropical dry forest as dominant vegetation type.

Project activities

71. The project will support activities for the sustainable management of Gazetted Forests on a total area of 917,000 ha which include strengthening of forest surveillance, efficient charcoal production, livelihood alternatives and fuelwood plantations. The current average deforestation rate is 2.45 percent from 2007-2016. With the implementation of the project the deforestation rate is aimed to be reduced to 1 percent. Further, the project will support the establishment of 15,000 ha of acacia trees for fuelwood production on set aside lands and 7,000 ha of timber planting strips (teak and gmelina). Finally, the project activities aim to establish 5,000 ha maize, peanut and soya intercropping with acacia and 1,500 ha of shea plantations. There are other activities that would lead to sequestration/emission of GHGs such as land rehabilitation and management of pasture lands. However, at this early stage this data is not yet available therefore these were not included in the assessment.

Table 1: Results of gross and net emissions up to 20 years for all reported project activities that will lead to carbon sink/emission.

Components of the project	Gross fluxes		
	Without	With	Balance
	All GHG in tCO2eq		
	Positive = source / negative = sink		
Land use changes			
Deforestation	12,318,520	4,864,050	-8,208,084
Afforestation		-2,986,900	-2,986,900
Other LUC		-505,620	-505,620
Agriculture			
Annual	18,680	-38,841	-57,522
Perennial		-820,417	-820,417
Total	12,337,200	512,272	-12,578,543
Per hectare	14	1	-14
Per hectare per year	0.7	0	-0.7



Annex 4: List of Project targeted GFs and their surface areas

N°	Gazetted Forests	Surface Area (ha)	
1	Dan	1,530	
2	Logozohè	2,248	
3	Kétou	11,000	
	Dogo	31,683	
4	Toffo-Lama Sud	2,500	
5	Ouémé-Boukou	20,500	
6	Ouénou-Bénou	34,683	
7	Tchaourou	1,292	41,337
	Toui-Kilibo	40,045	
8	Agoua	75,300	
9	N'Dali	4,128	181,670
	Ouémé Supérieur	177,542	
10	Alibori Supérieur	256,000	
11	Trois Rivières	259,500	
	TOTAL	917,951	



Annex 5: Ten most endangered flora species for protection

	Scientific names	Current names (French)	Current names (English)
1	<i>Pterocarpus erinaceus</i>	Vène	African barwood, African teak
2	<i>Milicia excelsa</i>	Iroko	Iroko
3	<i>Khaya senegalensis</i>	Acajou	Mahogany
4	<i>Khaya grandifoliola</i>	Acajou à larges feuilles	Broad-leaved mahogany
5	<i>Afzelia africana</i>	Doussié/Lingué	Afzelia, African oak
6	<i>Berlinia grandiflora</i>	Mélégba des galeries	Berlinia
7	<i>Ceiba pentandra</i>	Fromager/kapokier	kapok tree, silk cotton tree
8	<i>Antiaris toxicaria</i>	Ako	Antiaris, false iroko
9	<i>Isoberlinia doka</i>	Doka	doka
10	<i>Danielia oliveri</i>	Arbre à vernis	West African copal tree



Annex 6: Map of Selected Gazetted Forests

