Community Biocarbon Projects in West Africa: Challenges and Lessons learned

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Cover photos:
1. Djalia Diasso waters tree seedlings at the BIODEV resource centre in Cassou, Burkina Faso. She is a member of the Nezlekeou group supported by the BIODEV project.
2. Tree seedlings at the BIODEV resource centre in Vrassan, Burkina Faso
3. Souleymane Diasso on his farm in Cassou, Burkina Faso, next to a Parkia biglobosa tree, locally known as Néré
Photo: ICRAF/Susan Onyango
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## Annex 1 – West African biocarbon project inventory

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Introduction

The purpose of this report is to provide a current inventory of West African community biocarbon projects, and to document challenges encountered and lessons learned from a selection of case studies of established projects.

In order to achieve these goals, this report focuses on: (i) Projects that include local communities as intended beneficiaries and involve them, to some degree, in project development and implementation; (ii) Projects which have been designed and implemented within the last ten years (2006 to 2016).

To analyse specific experiences and challenges faced by community biocarbon projects, we selected case studies from West African biocarbon projects registered under a voluntary carbon market standard\(^1\). These projects were selected as the project design documents and third party validation and verification reports available provided a method for accessing information relating to project design and challenges encountered during implementation.

The report structure is as follows. Section 1 introduces the concepts of biocarbon, climate change mitigation and results-based finance. Section 2 describes the methodology used in compiling this report, by describing: i) How case studies were selected; and ii) The processes used to review case studies. The results of the case study review are described in Section 3. Finally, Section 4 summarises key conclusions that can be drawn from the case studies. A list of all biocarbon projects considered as case studies for the report is provided in Annex 1.

\(^1\) Voluntary carbon standards providing third-party certification of emission reductions and removals from land use projects include: the Verified Carbon Standard (VCS), The Gold Standard, and the Plan Vivo Standard. Plan Vivo is the only voluntary carbon standard that was designed specifically for community biocarbon projects.
1 Background

1.1 Biocarbon and climate change mitigation

When trees and plants grow they absorb carbon dioxide (CO₂) from the atmosphere and convert it to carbon, which is stored in their leaves, roots, stems and branches. As trees or plants die and degrade, these carbon stores are broken down. Some carbon returns to the atmosphere as CO₂, and some enters the soil as degraded plant material. The carbon in degraded plant material contributes to stocks of carbon in soil. This soil carbon is released slowly back into the atmosphere as CO₂. The carbon stocks in this biological carbon cycle can be referred to as biocarbon, and include carbon stored in trees, plants and soil.

Land-use practices that reduce terrestrial stocks of biocarbon (including deforestation, forest degradation, and some types of land management and agricultural practice) produce greenhouse gas emissions as stored biocarbon is broken down, and released into the atmosphere. These types of land management and land-use change contribute approximately 15% of global anthropogenic greenhouse gas emissions. Preventing greenhouse gas emissions by changing land management practices and preventing some types of land-use change are therefore considered key components of controlling (or mitigating) global climate change. Conversely, land-use change and land management practices that increase CO₂ absorption and biocarbon stocks can positively contribute to climate change mitigation, by reducing overall concentrations of CO₂ in the atmosphere. There is therefore potential for designing land-use and land-management interventions contribute to climate change mitigation by reducing or removing CO₂ from the atmosphere. A summary of these interventions is provided in Table 1.

<table>
<thead>
<tr>
<th>Intervention types and abbreviations</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afforestation and Reforestation (A/R)</td>
<td>Establishing or re-establishing forests, through tree planting in non-forested areas</td>
</tr>
<tr>
<td>Agricultural Land Management (ALM)</td>
<td>Changing agricultural practices, usually with the aim of increasing soil carbon stocks</td>
</tr>
<tr>
<td>Agroforestry (AF)</td>
<td>Introducing or increasing the number of trees in agricultural landscapes</td>
</tr>
<tr>
<td>Avoided deforestation or degradation (ADD)</td>
<td>Preventing loss or degradation of forests or woodlands</td>
</tr>
<tr>
<td>Improved Forest Management (IFM)</td>
<td>Changing practices relating to forest-use which may include assisting the regeneration of degraded forests or woodlands</td>
</tr>
</tbody>
</table>

As well as being designed to provide climate change mitigation benefits (hereinafter ‘carbon benefits’), many community biocarbon projects include supporting local biodiversity, increasing agricultural productivity and/or improving local livelihoods as key aims; and the emphasis placed on the delivery of carbon benefits versus these other ‘co-benefits’ is a key feature that differentiates projects. At one extreme are projects whose main purpose is the generate climate benefits, and participating communities assist in the delivery of this but receive few direct benefits themselves. At the other extreme are projects whose primary focus is improving local livelihoods or food security, with the delivery of climate benefits considered as a secondary aim that could provide the opportunity to access alternative sources of finance, for example through the sale of emission reduction certificates (or ‘carbon credits’).

1.2 Results-based finance

As described in Section 1.1, biocarbon projects have the potential to deliver carbon benefits. Because of this, there have been significant efforts to develop results-based financing mechanisms that provide support to these projects based upon the quantity of greenhouse gas emissions avoided or removed from the atmosphere, as a result of project activities. Results-based finance for emission reductions and removals in the land use sector has been an important consideration for the United Nations Framework Convention on Climate Change (UNFCCC), and has been embraced by projects seeking finance through the voluntary carbon market, and from donors and funders with an interest in providing results-based support for emission reductions and removals, for example through the World Bank BioCarbon Fund.

Biocarbon projects that seek results-based finance through the sale carbon credits face the challenge of demonstrating that emission reductions and removals have been achieved. Carbon credits are typically issued per
tonne of carbon dioxide equivalent that is prevented from being emitted or that is removed from the atmosphere. Biocarbon projects that develop carbon credits must therefore be able to quantify the emission reductions and removals that result from their activities, and establish monitoring, reporting and verification systems to demonstrate that these have been achieved.
2 Methodology

2.1 Selection of case studies

To identify biocarbon projects in West Africa\(^2\), that have been conceptualised and realised within the last ten years, online databases of the Forest Carbon Portal\(^3\) and The REDD Desk\(^4\) were conducted. In parallel, project registry searches under Plan Vivo\(^5\), VCS\(^6\), CCB\(^7\), CDM\(^8\), GEF\(^9\) and the Adaptation Fund\(^10\) were made. These efforts identified 67 biocarbon projects across fourteen countries (see Annex 1). No projects were found in four countries - Cape Verde, Gambia, St Helena and Sao Tome and Principe.

In order to identify challenges and extract lessons learned, it was necessary to access detailed information from project documents describing key features of the project. Submission of project documents is a requirement of all of the voluntary carbon market standards. Each standard has its own document templates that projects must complete to demonstrate how they meet the requirements of the standard. Prior to validation project documents are assessed to determine whether the standard’s requirements have been met. Once a project is validated its project documents are typically made available through the standard’s webpage. The selection of case studies was therefore limited to projects that: (i) are registered or seeking validation under a voluntary carbon standard; and (ii) have project documents available. Seven projects in the final project inventory (Annex 1) met these criteria and were selected as case studies. For details of the projects selected see Section 3.1.

2.2 Case study review

Prior to the review a list of challenges faced by community biocarbon projects, that could be assessed based on information provided in project design documents, was compiled, and refined to a short list of seven key categories:

i) Land and resource ownership – Many community biocarbon projects are carried out in areas where land ownership or tenure is unclear or disputed. Natural resource user rights are also often unclear, and legislation covering the rights to carbon benefits is not usually present. Without clearly defined rights to use and benefit from a land area, the long-term sustainability of community biocarbon projects cannot be assured. Defining, agreeing, and obtaining formal recognition of land, resource and carbon rights is therefore a key challenge to many projects.

ii) Community involvement and benefit sharing – The role of community members in community biocarbon projects can range from acting as implementation partners carrying out activities that have been conceived and designed by an external party, to being leaders in the design and implementation of all project activities. The distribution of benefits from a project within the participating community can also be a key determinant of project success, and projects that have a benefit sharing mechanism that is agreed and deemed fair and appropriate by the participating community can be an important factor contributing to the long term support for the project by participating communities. Determining a level of participation and benefit sharing mechanism that enable projects to achieve their aims, and have lasting impacts are therefore key considerations in the development of community biocarbon projects.

iii) Quantifying carbon benefits – To generate carbon credits that represent real emission reductions and removals, and that provide an assurance of credibility to buyers requires robust systems for assessing carbon benefits that result from project activities, against a baseline scenario describing

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\(^2\) We considered West Africa to be comprised of eighteen countries: Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Saint Helena, Senegal, Sierra Leone, Sao Tome and Principe and Togo

\(^3\) http://www.forestcarbonportal.com/

\(^4\) http://theredddesk.org/

\(^5\) http://www.planvivo.org/project-network-old/project-pipeline/

\(^6\) http://www.vcsprojectdatabase.org/#/home

\(^7\) http://www.climate-standards.org/category/projects/

\(^8\) https://cdm.unfcc.int/Projects/projsearch.html

\(^9\) http://www.globalenvironmentfund.com/category/portfolio/

\(^10\) http://www.iatreregistry.org/dataset/af-14
what would have happened in the absence of the project. Systems for measuring and monitoring climate benefits are therefore required. Balancing the costs of assessment and monitoring of carbon benefits against the need to maintain sufficient income from carbon credit sales to make the project feasible is therefore an important challenge for all community biocarbon projects.

iv) Delivering co-benefits – Many community biocarbon projects are developed to deliver benefits to local communities and ecosystems, as well as to provide carbon benefits. As a minimum, community biocarbon projects should not have negative impacts on local communities and ecosystems, and for some community biocarbon projects the ‘co-benefits’ to ecosystems and communities are the main reason for carrying out the project. Designing project activities that deliver both carbon benefits and additional ‘co-benefits’ is therefore an important challenge for community biocarbon projects.

v) Permanence and sustainability – An important concern for many carbon credit buyers is whether the carbon benefits achieved within the lifetime of the project will be maintained after the project period. This is usually referred to as the ‘permanence’ of a carbon benefit. To some extent the risk of non-permanence is beyond the control of projects, and most projects employ an insurance mechanism or ‘risk buffer’ against the risk of future reversals of emission reductions and removals. The sustainability of project activities is therefore an important consideration at the project design phase, to help provide carbon credits that are less likely to prove impermanent, and to ensure that benefits to local communities and ecosystems will endure beyond the life of the project.

vi) Project finance – The potential to access new sources of finance to support the development and implementation of projects is the reason that many community biocarbon projects choose to engage with voluntary carbon markets. Obtaining finance for project development remains a key challenge however, and even projects that do manage to develop to a stage where they can produce verified carbon credits still face considerable challenges to find buyers for their credits.

Project documents from each of the case study projects were reviewed to identify approaches taken to address these key challenges. When validation or verification reports were available for the case study, examples of lessons learned through the application of these approaches were also identified where possible. The results are summarised in Section 3.2.

The sources of information for the review were: i) Project design documents that describe how the project conforms the requirements of the relevant standard; ii) Validation reports that provide an independent assessment of whether the requirements of the standard have been met, and suggest corrective actions required; iii) Project monitoring reports that provide information on monitoring conducted so that climate benefits can be verified; and iv) Verification reports that provide an independent assessment of the climate benefits that have been achieved. Since the primary purpose of these reports is to identify deviations of the project from the requirements of the particular standard, the review is focused on identifying challenges or issues with the projects and lessons that can be learned from these; as opposed to identifying best practices, unexpected positive benefits, or other axes of analysis. The reader should therefore be aware that this is the case, and that all of the issues identified in validation and verification reports were addressed by the projects prior to validation or verification.
# 3 Findings

## 3.1 Summary of case studies

Key characteristics of the seven case study projects are summarized in Table 2. Further details are provided in the following sections.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Area</th>
<th>Project period</th>
<th>Project Type*/ Standard**</th>
<th>Project Proponent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jatropha Curcas Grouped Project (Mali)</td>
<td>15,000 ha of degraded rural farm land</td>
<td>40 years</td>
<td>(AF, A/R) VCS</td>
<td>Jatropha Mali Initiative (JMI) - the Malian subsidiary of the French company Eco-Carbone (EC)</td>
</tr>
<tr>
<td>Jatropha Agroforestry (Senegal)</td>
<td>1,411 ha of degraded land</td>
<td>24 years and 6 months</td>
<td>(AF, A/R) VCS</td>
<td>The African National Oil Corporation (ANOC) a private Senegalese company owned by Italian Bioenergy Production</td>
</tr>
<tr>
<td>Arlomom Patako- (Senegal)</td>
<td>71 ha of deforested land</td>
<td>30 years</td>
<td>(A/R) Plan Vivo</td>
<td>Arlomom, a registered association in Senegal</td>
</tr>
<tr>
<td>Reforestation of Degraded Forest Reserves (Ghana)</td>
<td>1,506 ha of degraded forest</td>
<td>40 years</td>
<td>(AF, A/R)</td>
<td>FORM Ghana, FORM International, Sustainable Forestry Investments B.V. (Netherlands)</td>
</tr>
<tr>
<td>Livelihoods Mangrove Restoration Grouped Project (Senegal)</td>
<td>10,415 ha of degraded mangrove</td>
<td>30 years</td>
<td>(A/R, IFM) VCS</td>
<td>The ‘Livelihoods Fund’: a private international fund co-managed by private companies: Danone, Crédit Agricole, CDC Climat, Schneider Electric, Groupe La Poste, Hermès, Voyageurs du Monde, Firmenich and SAP</td>
</tr>
<tr>
<td>Project Togo (Togo)</td>
<td>935 ha of degraded rural land</td>
<td>30 years</td>
<td>(A/R) Gold Standard</td>
<td>Action Durable (a national NGO)</td>
</tr>
<tr>
<td>Gola REDD (Sierra Leone)</td>
<td>58,515 ha of tropical forest</td>
<td>30 years</td>
<td>(ADD) VCS/CCBS</td>
<td>The Gola Rainforest Conservation LG: Ministry of Agriculture, Forestry and Food Security, represented by the Forestry Division of the Government of Sierra Leone, the Conservation Society of Sierra Leone (CSSL) and the Royal Society for the Protection of Birds (RSPB)</td>
</tr>
</tbody>
</table>

* AF = Agroforestry; A/R = Afforestation/Reforestaion; IFM = Improved Forest Management; ADD = Avoided Deforestation or Degradation

** VCS = Verified Carbon Standard; CCBS = Climate Community and Biodiversity Standards
3.1.1 Agroforestry projects

Jatropha Curcas Grouped Project (Mali Jatropha)

The Mali Jatropha Curcas Grouped Project (hereinafter ‘Mali Jatropha’) was validated in 2012 as the first VCS agroforestry project in West Africa. Located in Kayes region, southwestern Mali the project aims to create agroforestry systems in which both agricultural practices generally and Jatropha cultivation are enhanced. Jatropha is used to stabilize and improve soil fertility, and provide shade and windbreaks. The project proponent, Jatropha Mali Initiative (JMI) holds control and responsibility for the project, with technical support from Eco-Carbone. The Union des Sociétés Coopératives des Producteurs de Pourghère du Cercle de Kita is the local implementing partner which is comprised of delegates from a ‘regional collection’ of villages (commune). JMI currently works with over 3,500 individual farmers. Each farmer is described as assigning a plot of size 0.5-2 hectares and Jatropha is planted at a density of 1,200 trees per hectare. The official start date of the project is 2007, when work on the first Jatropha nurseries commenced.

Jatropha Agroforestry (Senegal)

The Jatropha Agroforestry Project (hereinafter ‘Senegal Jatropha’) was validated under the VCS in 2013 and operates in several semi-rural areas of Senegal, around Fatick, Kaolack and Kaffrine. The project aims to apply sustainable management practices for the purpose of carbon storage (in plant biomass and soil), as well as providing opportunities for income and development for the local population. The project proponent is the African National Oil Corporation (ANOC) a private Senegalese company owned by Italian Bioenergy Production. ANOC cooperates with (i) the Biofuels Division of the Senegale Ministry of Energy and Biofuels and (ii) Agroils, the European leader in Jatropha consultancy. Carbon Sink provided technical and scientific consultation in project design, validation, monitoring and verification as well as on commercializing the produced credits. ANOC currently works with 20 villages (approximately 7,000 people). The project started in 2009 when the first Jatropha planting events occurred.

Arlomom Patako (Senegal)

The Arlomom Patako project in Senegal (hereinafter ‘Senegal Agroforestry’) is in the process of being validated under the Plan Vivo Standard. The project operates in the Patako Forest Landscape, Saloum region, West-Central Senegal. The project aims to reduce poverty by strengthening the local economy, reducing land degradation and promoting biodiversity. The project currently engages with nine participating communities from four villages. All focal communities lie within 2 km of Patako Forest. Arlomom, a registered association in Senegal is leading the project. Members of Arlomom are associated with the Institute of the Sciences and Environment (ISE) and Natural Ecosystems and the Environment Unit (URENE) at Cheikh Anta Diop University (Dakar). Arlomom is responsible for managing the project, community engagement; providing technical advice and managing the project payment fund and benefit sharing arrangement. Arlomom has agreed with the National Forestry Service to carry out forest research and implement a land management plan with local community approval. Arlomom has to date signed contracts with 30 individual males (establishing intercropping and boundary planting) and 9 women’s groups (involved in boundary planting and live fencing). The project is designed to: reduce pressure on the forest; protect watersheds; prevent soil erosion and improve soil structure and fertility; by demarcating land; providing wind-breaks; and building live fences to control grazing.

3.1.2 Reforestation projects

Reforestation of Degraded Forest Reserves (Ghana Reforestation)

The Reforestation of Degraded Forest Reserves project in Ghana (hereinafter ‘Ghana Reforestation’) was validated in 2013 by VCS and was the first validated biocarbon project to also achieve Forest Stewardship Council certification. Located in the area surrounding Asubima Forest Reserve in Central Ghana the project aims to restore degraded lands through tree planting. The project area faces threats associated with forest reserves in Ghana (illegal farming, bushfires and logging of the last remaining indigenous trees) and the imminent continuation of forest degradation in the absence of project action. Project proponent (FORM Ghana) is a limited company, established in 2007. FORM International (based in the Netherlands) has been contracted by FORM Ghana to deliver management and technical support. FORM International is responsible for managing the VSC certification. Sustainable Forestry Investments B.V. (Netherlands) is the owner and majority shareholder in FORM Ghana. The project began in 2008, when the first teak trees of the project were planted. To date more than 100 agreements with local farmers have been signed.
Livelihood Mangrove Restoration Grouped Project (Senegal)

The Livelihoods mangrove restoration grouped project (hereinafter ‘Senegal Mangrove’) was validated under the VCS in 2014. It operates in the three main coastal wetland areas of Senegal; Casamance, Sine-Saloum and River Senegal. The project aims to reduce poverty of local communities through employment creation in the short-term and through actions to improve the sustainability of collection of mangrove products in the mid-term. The objective is to manage the approach and behaviour of local populations leading to the sustainable management of mangrove areas. The project proponent is an international private fund ‘Livelihoods Fund’ co-managed by private companies: Danone, Crédit Agricole, CDC Climat, Schneider Electric, Groupe La Poste, Hermès, Voyageurs du Monde, Firmenich and SAP. A national NGO, Oceanium is the project developer. In the first phase of the project, a partnership developed between Danone, the Ramsar Convention on Wetlands and the International Union for Conservation of Nature (IUCN). IUCN has been supporting the project at a scientific level, while the Ramsar Convention is implementing the project as a pilot initiative to promote wetlands environmental services in the framework of Climate Change mitigation. Agresta S. Cooperative and Pôle Carto provide technical assistance.

The project currently engages a local workforce of more than 200,000 people. Planting plots are identified; based upon soil type, degree of immersion and health of surrounding mature mangroves. Propagules are collected (Rhizophora racemose and Rhizophora mangle) from mature mangrove (on soil or on trees); transplanted and replanted the same day. Propagule planting density is 5,000 per hectare. The project start date is 2009, which is the point at which first planting occurred.

Project Togo (Togo)

Project Togo (hereinafter ‘Togo Reforestation’) was validated by the Gold Standard in 2015. The project is located in the Plateau Region of Togo, and aims to replant degraded lands in the project area. The project area is described as wasteland, which was covered by rainforest sixty years ago. It is anticipated that afforestation will assist in the conversion of this wasteland into a conservation area and wildlife refuge. The project proponent is Action Durable (a national NGO), who have technical support from Nature Office.

3.1.3 Forest protection project

Gola REDD (Sierra Leone)

The Gola REDD project (hereinafter ‘Sierra Leone REDD’) was validated in 2015 under VCS and CCB Standards. The project is located in the Gola Rainforest National Park which spans the Eastern and Southern Provinces of Sierra Leone. The project aims to prevent deforestation inside the National Park, and benefit 122 marginalised settled local communities. The project aims to build capacity to maintain, improve and capitalise on natural resources and agricultural activities, so that food security and income will increase resulting in a reduction in poverty and an enabling environment for communities to become environmental stewards and actively participate in sustainable land use planning and resource management. The project proponent is a company (the Gola Rainforest Conservation LG) established by the Ministry of Agriculture, Forestry and Food Security, represented by the Forestry Division of the Government of Sierra Leone, the Conservation Society of Sierra Leone (CSSL) and the Royal Society for the Protection of Birds (RSPB). Planned livelihood improvements include agricultural training, support for cocoa-farmers, educational scholarships and establishment of village savings and lending groups.
3.2 Lessons learned

The case study projects provide a range of examples of different land use practices and approaches to biocarbon project development and implementation. Many of the results from these projects provide examples of best practice in the development of biocarbon projects. It is the nature of the information sources used to conduct and write this review however that many of the lessons learned are related to challenges encountered by the projects and approaches they have found to overcome them. A summary of these challenges and the lessons they provide to other project developers, is provided below.

3.2.1 Land and resource ownership

In many contexts land tenure and land and resource user rights are unclear or disputed, and in most of West Africa land rights are characterised by legally plural systems. As a generalisation, communities’ customary tenure is often recognized in law, but the processes of formally registering land can be challenging to navigate and arduous for communities and project developers alike. Rights to trees and forest resources are often closely linked to land rights, but management rights can be separate. As a final complication, specific legislation relating to carbon rights is also rare in West Africa, but securing land tenure and the rights to carbon is the starting point for any community biocarbon project.

Case study projects encountered three broad approaches to land and resource ownership depending on whether participating communities had: i) Formal (state-recognised and registered) land tenure, for example land titles; ii) Customary land tenure which is recognised by the state, but not formally registered as a land title or community forest; or iii) Little or no recognised tenure.

The different mechanisms adopted by the case study projects appeared to offer various levels of security to the communities or smallholders involved, and to the project itself. Two of the case study projects secured legal status by acquisition of lease agreements for carbon rights in the project areas (Ghana Reforestation) and legal concessions for project lands and associated carbon rights (Senegal Jatropha), while the Mali Jatropha project used contracts for carbon rights with farmers based on verified customary land rights for individual small-holders.

The Sierra Leone REDD project is implemented in an area within and adjacent to a National Park. Communities surrounding the park lost their customary tenure to areas within the park prior to the project, when the park was declared in 2010, and use-rights within the park are now limited to the collection of NTFPs. Project activities include a community compensation scheme, to pay for the loss of timber harvesting opportunities by these communities, although it is noted in the project documents that it was the establishment of the national park rather than the initiation of the REDD project that removed the potential for local communities to receive revenue for timber harvested within the National Park.

In comparison to these other case studies, Senegal Agroforestry aimed specifically to secure and formalize communities’ land tenure using available legal mechanisms. Since women in Senegal seldom own land under customary tenure systems, the project encouraged the formation of Women’s Associations registered by local rural councils, ensuring that eligibility for land titles was extend to participating women. High fees and transaction costs for land title registration, eventually limited the number of areas that could be formally registered, however.

In summary, the majority of the case studies aimed principally to secure carbon rights through formal lease and contractual arrangements with communities, based on their existing and state-recognized (but not formally registered) land and resource use rights, rather than using existing formal mechanisms to secure communities’ land rights and then sign agreements with communities. In two cases, the Sierra Leone REDD project and the Ghana Reforestation project, there was an additional layer of complexity generated from the occurrence of state-recognised conservation and forest management areas, which overlapped with areas governed by communities’ customary rights.

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11 Benjaminsen and Lund 2002
3.2.2 Community involvement and benefit sharing

Approaches to community involvement in community biocarbon projects can broadly be categorised as: i) Informing - telling communities what will happen, answering queries, but with few opportunities to share or input ideas; ii) Consultation – involving communication, checking ideas with communities and elaborating plans based of their feedback; and iii) Full participation – where project activities are designed with a high level of input from the participating communities and there is an attempt at full transfer of decision-making. Although it is noted that any attempt to simplify the complex relations between projects and communities results in subjective judgements and categories that do not fully represent individual situations.

Different voluntary carbon standards require different levels of participation of communities in the various stages and components of the projects. The case studies illustrate that the level of community involvement include participation (Senegal Agroforestry and Senegal Mangrove), consultation (Mali Jatropha, Ghana Reforestation, Sierra Leone REDD), and informing (Senegal Jatropha).

The case-studies all describe some level of working with local communities, and the most common model appeared to be a consultative process. None of the case studies describe a fully participatory planning process, although the Senegal Agroforestry and Senegal Mangrove appeared to go to lengths to ensure that project activities, species and management plans were developed in close collaboration with the smallholders and communities in question.

Understanding the benefit-sharing arrangements in place in the case study projects was challenging, as the nature of agreements between project proponents and local communities can be sensitive material and is not always described in project documents. From the review it was evident that the majority of the seven case studies delivered benefits directly to participating smallholders (individuals or households) and, in the case of the Senegal Agroforestry project, to groups (Associations). This is a common approach in agroforestry projects. The nature of a REDD project is that the forest resources being protected often belong to entire villages (rather than individual smallholders), and so benefit-sharing is often at a village level (as in the Sierra Leone REDD project).

The project documents identified a number of challenges when working with local communities. In the case of the Senegal Jatropha and Mali Jatropha projects local communities were unaccustomed to farming non-food crops and Jatropha planting met with some resistance, and required a lot of up-front training. In the Ghana Reforestation project local communities were initially unwilling to establish plantations on land which was formerly under customary ownership but which was secured legally by the project proponent under a 50 year lease agreement. This lead to delays in plantation development. The Senegal Agroforestry project involved developing agreed limits on NTFP collection, and managing tensions between community members exposed to new sanctions and the Forestry Administration responsible for enforcing control measures has been a challenge for the project.

The case studies highlight two principle approaches to community involvement and benefit sharing. One approach was essentially leasing land from smallholders and communities, providing employment opportunities, and using informing or consultation as the approach to engagement. The second approach does not involve paying community members for project activities, but instead attempts to develop a sense of local ownership by ensuring that community members benefit from the carbon and other products produced, and therefore work voluntarily under the carbon agreements.
3.2.3 Delivering co-benefits

A key challenge faced by all biocarbon projects that aim to benefit local ecosystems and livelihoods is the design and implementation activities that are not only effective in reducing or removing greenhouse gas emissions, but that also bring social, economic and environmental benefits to the participating communities. These additional benefits are necessary for various reasons, depending on the land tenure and benefit-sharing structure of the project. They can aim to incentivise community involvement in the project activities (when there are competing land use activities communities could be engaged in), to compensate for lost access, or simply as a mechanism to ensure activities are carried out through provision of employment.

Social co-benefits may be in the form of paid employment, as is reported for three of the case study projects (Mali Jatropha, Ghana Reforestation, and Senegal Jatropha); and/or through the development of new livelihood opportunities linked to the land use systems implemented by the project. Agroforestry systems are typically designed to bring co-benefits from tree products, as well as improvements to agricultural land, including restoring vital ecosystem services such as soil fertility and erosion prevention. The opportunity to make soap under the Mali Jatropha project significantly enhanced the financial gains of project participants.

Reforestation and forest protection projects have clear environmental benefits if they are used to re-establish or protect native ecosystems in areas that are threatened or degraded. As well as supporting global conservation efforts in areas where habitat of threatened or endangered species is protected or improved, protection and improvement of ecosystem services used by local communities are an important co-benefit of well designed community biocarbon projects.

Similar to community involvement and benefit sharing, there appear to be two principle approaches to co-benefits. One approach provides employment opportunities and/or some additional benefits from the land use practice, with the former being essential for activities to go ahead, and the latter an additional benefit to the smallholder in question. In the other approach, the co-benefits could be considered as important or more important than the benefits, as these co-benefits act as the longer-term incentive for smallholders or communities to continue in their land management activity.

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3.2.4 Quantifying carbon benefits

For a biocarbon project to develop carbon credits, it must be demonstrated that the carbon benefits are achieved, and that they are the result of project activities. To achieve this carbon benefits are assessed against a baseline scenario that describes land-use patterns and associated greenhouse gas emissions that would be expected to occur in the absence of project interventions. Mechanisms are then put in place to monitor changes that occur during the project period so that carbon benefits can be estimated by comparing the achievements of the project with the baseline scenario. This Section describes approaches used by the case study projects to define baseline scenarios, and to assess and monitor carbon benefits.

3.2.4.1 Baseline scenarios

In all biocarbon projects, emission reductions and removals achieved by the project are assessed in comparison to a baseline scenario that describes the situation that would occur if no project interventions took place. The approach to defining a baseline scenario, and estimating its associated emissions depend on the type of project intervention. This Section summaries the approaches used, and lessons learned from West African biocarbon projects that focus on Forest Protection (or reducing emissions from deforestation and forest degradation; REDD), Agroforestry and Reforestation.

Forest Protection

Only one of the case study projects aimed to reduce emissions from deforestation and forest degradation. For its baseline scenario, the Sierra Leone REDD project developed a deforestation scenario for the project area using computer models and satellite imagery from other forest reserves and buffer areas in Sierra Leone. The project demonstrated that in the absence of project interventions the area was susceptible to agricultural encroachment by smallholder farmers. A baseline deforestation rate for the 68,515 ha project area was estimated at around 1,000 ha per year. The expected emissions under this baseline scenario were estimated using information from an inventory of forest carbon stocks. The approach used required a high level of technical expertise and considerable investment in data collection. However, since the project estimates protection of the project area will prevent more than 5 million tCO₂e emissions during its first ten years, the high initial costs of establishing a baseline scenario should easily be covered by expected income from certificate sales.

Agroforestry and reforestation

Most of the pilot projects that involved tree planting activities in agroforestry systems (Senegal Jatropha and Mali Jatropha) or for reforestation (Ghana Reforestation, Senegal Mangrove) were carried out in areas where land use patterns in the absence of project interventions were expected to reduce carbon stocks in biomass and soil as a result of agricultural activities, logging, bushfires and drought. Because of this, these projects were able to adopt conservative baseline emission scenarios that did not require detailed modelling or quantification of changes in carbon stocks. Instead it was either assumed that carbon stocks would remain constant or decline under the baseline scenario (Mali Jatropha, Ghana Reforestation, Senegal Mangrove); or national default values for carbon stocks in trees and shrubs were applied (Senegal Jatropha). This type of simplifying assumption reduces the work needed to quantify baseline emissions, and is valid as long as the baseline emissions are not under estimated.

The Togo Reforestation project used default carbon stock values for the land cover types present in the project area to estimate carbon stocks in the absence of the project. When trees or shrubs are present in the planting areas prior to the start of the project, these can be excluded from the baseline emission scenario if project activities will not result in their removal. In these cases monitoring the continued presence of these trees and bushes is necessary throughout the project period, as is practiced by Senegal Jatropha and Senegal Mangrove projects.

3.2.4.2 Monitoring carbon benefits

To achieve emission reductions and removals, biocarbon projects implement a suite of activities that aim to prevent the degradation or loss of carbon stocks, or that aim to increase carbon stocks in vegetation and soils. To estimate the emission reductions and removals achieved, projects need to describe the impacts of these activities on carbon stocks and greenhouse gas emissions. Different approaches can be used depending on the project type, but these can be considered in three broad categories: i) Use of remote sensing to assess vegetation cover and estimate carbon stocks; ii) In-situ measurements of carbon stocks in biomass and soils; and iii) Activity based monitoring linked to models of expected impacts of project activities on carbon stocks.
Remote sensing

Remotely sensed images are often used by large scale REDD projects to estimate emissions from any deforestation or degradation that is detected within a monitoring period. To determine the emission reductions achieved by the Sierra Leone REDD project, an analysis of remote sensing data from 2011 and 2015 was carried out to identify any deforestation that had taken place. During this period less than 13 ha of forest was lost each year. The low level of deforestation suggests that the suite of activities implemented by the project, which included interventions to increase production in existing agricultural areas, and compensation payments for foregone income from logging, have successfully prevented encroachment into the forest by the surrounding communities which was predicted to result in around 1000ha of deforestation per year under the baseline scenario.

Remote sensing is also a component of the Senegal Jatropha project monitoring plan, with satellite images used to assess tree and shrub cover within the project areas.

In-situ measurement

When project activities involve tree planting, direct measurements of planted trees can provide an accurate method of quantifying increases in carbon stocks. Both of the Jatropha agroforestry projects (Senegal Jatropha and Mali Jatropha) use direct measurements of planted trees in sample plots throughout the project area to estimate increases in biomass carbon stocks. By making use of allometric equations describing the relationship between diameter measurements and total tree biomass, this approach can provide a cost effective method for estimating increases in carbon stocks within the plantations.

A similar approach is used by the Ghana Reforestation project to assess increases in carbon stocks in planted teak and indigenous species, and by the Senegal Mangrove project to assess increases in carbon stocks in planted mangrove species. The monitoring plan in the Ghana Reforestation project included measuring all planted trees in inventory plots covering 1% of the total project area. The first monitoring event revealed that this level of sampling was insufficient to meet the level of precision required by the methodology adopted. In an attempt to rectify this the sample size was increased to 2.7% of the project area, but despite this increase in sampling effort their precision still fell short of that required; and rather than continuing to survey more sample plots, the project opted to apply an adjustment for uncertainty, reducing the number of certificates they were issued for the monitoring period. The Senegal Mangrove project was also required to make an uncertainty adjustment when a pilot survey indicated it was not feasible to survey the number of plots needed to achieve the required level of precision.

Measuring trees in sample plots provides an effective method for monitoring increases in carbon stocks, and is a clear way to demonstrate the link between project activities and certificates issued with participating communities. Where methodologies include prescribed margins of error, however, care is needed to ensure that the level of sampling carried out is sufficient. In landscapes where tree growth or planting systems are heterogeneous, the level of sampling required to give precise estimates of increases in carbon stocks can mean that this approach becomes unfeasible.

Activity-based monitoring

The Ghana Reforestation and Senegal Mangrove projects combined in-situ measurements of vegetation in sample plots, with activity-based monitoring approaches for estimating increases in soil carbon stocks as a result of project activities. The Ghana Reforestation project developed a model of expected changes in soil carbon in plantations using a time series of soil sampling in an area where similar planting systems had been applied, while the Senegal Mangrove project adopted a default value for carbon accumulation from studies conducted in the areas. In both cases, activity-based indicators describing the area and age of plantations are then used to estimate expected increases in soil carbon stocks as a result of the planting activities.

The Senegal Agroforestry project adopted an entirely activity-based approach to monitoring. Models of expected growth of planted trees, and biomass increases from natural regeneration as a result of project activities were developed. Planted tree survival rates, presence of fire breaks, and implementation of measures to protect degraded areas from livestock are assessed annually to determine whether the expected increases in carbon stocks are likely to have been realised.

While activity-based monitoring does not generate direct measurements of carbon stock changes, it can provide a solution for assessing changes in carbon stocks that are not feasible to measure directly. It can therefore enable projects to estimate their impacts on difficult to measure carbon pools, such as soil carbon; and enable projects that have limited potential to generate climate benefits to go ahead when more expensive monitoring approaches
would not be financially viable.

3.2.5 Project finance

Financial inputs are required for community biocarbon projects for the initial project set up, which include i) the coordination and transaction costs associated with working with communities, individual producers and other stakeholders; ii) investment in any processing activities that generate income for communities such as Village Savings and Loan Associations (VSLAs) or income generating activities, and; iii) training and capacity development to allow the activity to take place. Once the project is established, there are then on-going running costs for i) monitoring reporting and verification; ii) further capacity development, and; iii) project coordination and communication.

The costs of the project, and therefore the timing and amount of investment required, depend to a large degree on the initial context, the nature of activities introduced, the approach to community participation adopted, the scale of the initiative, and the methods used for monitoring and evaluation. The Ghana reforestation project reported inputs of approximately €1,500-3,000 per hectare, but this level of information was not available for all projects.

The case studies reviewed here appeared to be faced with a number of financial challenges. General challenges faced by all projects were 1) the need to identify carbon certificate purchasers/buyers, and 2) the high level of dependence on carbon finance. The only project that appeared to have secured all the required finance was the Mali Jatropha project which secured a buyer willing to pay up-front for all carbon credits to be produced. This enabled the project to move ahead with confidence that its financial needs will be met.

While the challenge of having complete funding was common to almost all case studies, the strategies for financing projects were different between donor-funded and investor-funded projects. Donor funded projects are usually assured of covering running costs and producer payments during a fixed donor period (often 3-5 years), and the challenge is then to secure running costs and funds for producer payments through certificate sales during this limited project development period. In the case of the Sierra Leone REDD project, the strategy used by the project was for the RSPB to provide bridging funding until sales could be secured. The strategy in the Senegal mangrove project was a fund based mechanism, while the Senegal Agroforestry project is currently developing a short-medium term financial plan.

In comparison to donor-financed initiatives, investor-financed projects had an established business plan with a break-even point, and the challenge was in securing a full complement of funds for that time, which varied between 6 and 9 years for those projects where this information was available (Senegal Jatropha and Ghana reforestation respectively). Whether donor orientated or investor orientated, all projects are challenged with marketing their project and attracting interested parties to support their initiative.
3.2.6 Permanence and sustainability

To help ensure that carbon and livelihood benefits of community biocarbon projects are sustained, projects should be designed so that the benefits endure beyond the period when results based finance is available. Building this sustainability into project design is a key challenge for community based biocarbon projects. The case-studies cited in this synthesis all include specific challenges to achieving financial sustainability, durable livelihood benefits, and permanent emission reductions or removals. Six of the case studies (Ghana Reforestation, Senegal Jatropha, Senegal Mangrove, Togo Reforestation, Senegal Agroforestry and Sierra Leone REDD) face some financial uncertainty as they attempt to secure performance based finance through the voluntary carbon market. The Sierra Leone REDD project has acquired bridge-funding to sustain project activities before they can be fully supported by the carbon credit sales.

Threats to sustainability of project activities, and the permanence of carbon benefits go beyond financial considerations, however. Identifying land use systems that are well suited to areas they are implemented is a vital consideration for all biocarbon projects. In arid regions, water demand of planted species is a key consideration to avoid exacerbation of existing water shortages and the potential for creation of conflict over water use. Concerns over water demand of Jatropha curcas for example have been raised\(^{13,14}\) and will be an important consideration as the Mali Jatropha and Senegal Jatropha projects expand. When cash crops, such as Jatropha are planted at the expense of food crops, there is also a concern that local food security could be endangered if intended sales are not realised.

Agroforestry and reforestation projects can face short term opportunity costs if there is a lag time between planting and the point at which planted trees become profitable. Under the Ghana Reforestation project, teak plantations are expected to take 12 years before the first thinning so provision of alternative means of support, for example through performance based finance, is vital in this period.

In some cases, the success of a project in one area could also bring new threats to sustainability. Early results from the Sierra Leone REDD project suggest that forest protection has led to an increase in wild animal populations. This was a key aim of the project, but it has also resulted in increased reports of an increase in crop raiding by wildlife, presenting a potential threat to support of the project from local communities.


4 Conclusions

The main conclusions drawn from the case study review are summarised below.

Land resource and ownership

- Although different mechanisms exist for securing carbon rights for communities and for projects, there was a preference for lease and contractual agreements based on customary tenure arrangements over formalizing community land tenure in the case studies.
- Mechanisms employed depend upon the standard requirements, and these requirements are more rigorous for CCB and Plan Vivo.
- A solid understanding of the complex and legally plural systems of land and forest management is required at the outset, particularly in projects where communities’ access to resources have already been constrained by other recent interventions.
- There are high transaction costs for those projects and communities seeking to secure formal land title, including financial costs (fees) and the sometimes lengthy and arduous process to register land. Establishing agreements and contracts to support existing customary tenure might reduce these costs for project development, but do not give the same security of tenure (a co-benefit) to smallholders or communities.

Community involvement and benefit-sharing

- Case studies illustrated very different levels of community engagement in the different projects and project processes, from informing communities to communities leading on the design of activities themselves.
- Consultative participation appears to allow project proponents to work with a larger number of participants, but with the trade off that a fully participatory processes is not followed.
- Limited involvement of communities in selecting and designing activities has led to some implementation issues.

Delivering co-benefits

- There is a contrast between the employment-consultative model (mostly VCS projects), and the voluntary-participatory model: in the former the co-benefits are mostly employment and payments (from carbon sales), and in the latter the co-benefits are a more important incentive, including restored ecosystem services and access to the products of land use activities.
- Income-generating benefits from the tree products and agricultural products are all conditional upon good access to market, which is rarely the case.
- Projects illustrate a good range of strategies and development interventions (eg, VSLAs, use of agricultural training/extension services, etc) to bring about co-benefits.

Quantifying carbon benefits

- Voluntary carbon market standards have different requirements regarding acceptable levels of uncertainty in the assessment and monitoring of carbon benefits.
- Conservative assumptions can reduce the cost of establishing credible baseline emission scenarios as long as it is clear that baseline emissions will not be under estimated. For example, if all project activities are carried out in areas where biomass is expected to be degraded without the intervention of the project, assuming that biomass carbon stocks would remain constant is a conservative assumption. It is therefore not always necessary to invest in detailed survey and modelling to establish credible baseline scenarios.
- The costs of achieving precise estimates of carbon benefits through remote sensing analysis and in-situ measurements can be high, and are only justified if they can be financed through certificate sales without undermining the financial feasibility of the project.
- Activity-based monitoring can provide relatively low-cost solutions for assessment of carbon stocks that cannot be directly measured, or for projects where remote sensing or in-situ measurements are not financially viable; but this approach is not accepted by all standards.
Project finance

- Projects are rarely able to secure all funding for running costs and payments to participants up-front, and there is an inherent level of financial uncertainty for projects that are not able to secure all these funds.
- For donor-financed projects there is a clear fully-funded project development period, and finding bridging funds to the point where the project is sustainable is the challenge.
- For investor-led projects, sourcing enough investment to allow the project to reach the break-even point is the challenge.
- For both donor and investor projects, there is a 3-6 year period which is normally funded, and due to the recent establishment of these projects (2007-2015) it is not possible to say with any certainty here if they will overcome the challenge of sourcing further investment or sales.
- Foreseeing and planning for the running costs of the project is always a challenge, while planning for income from carbon certificate sales and payments to producers is slightly less variable.
- The majority of projects have carbon certificate sales as their sole or major income stream, leaving projects exposed to changes in certificate prices and demand.
## Annex 1 – West African biocarbon project inventory

<table>
<thead>
<tr>
<th>Project Title and Developers/Funders; Validation Intention (if stated)</th>
<th>Project Type, Location, Area (ha), Species</th>
<th>Community Involvement; Tenure status; Target Population</th>
<th>BioCarbon benefits</th>
<th>Co-Benefits</th>
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<tbody>
<tr>
<td><strong>Benin</strong></td>
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<tr>
<td>1. Forests and Adjacent Lands Management Project (Great Green Wall)(^{15}) GEF Trust Fund/ World Bank</td>
<td>ADD, A/R, IFM</td>
<td>None specified</td>
<td>- REDD+ Incentive mechanism</td>
<td>- Promotion of local governance; - Forest management plan implementation</td>
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<tr>
<td><strong>Burkina Faso</strong></td>
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<tr>
<td>2. Community CAF Cassou (3C)</td>
<td>A/R, IFM</td>
<td>27 communities/villages Local communities own the land surrounding the CAF</td>
<td>- Farmers will plant trees species selected for shade and nutrient flow;</td>
<td>- Indirect activities that contribute to food security, income generation, soil restoration and women’s empowerment</td>
</tr>
<tr>
<td>Ministry of Environment; Ministry for Foreign Affairs, Government of Finland; the World Agroforestry Centre (Seeking Plan Vivo validation)</td>
<td>Cassou district, Ziro province, in the Centre-South Region 30,000 ha <em>Vitellaria</em> (shea butter), <em>Parkia</em> (sumbala) and cashew</td>
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<tr>
<td>3. Moussa Ta Yiri(^{16}) Association Munyu Des Femmes De la Comoé/ SocieTrees (Denmark) (Seeking Plan Vivo validation)</td>
<td>AF, ALM Province of Comoé 50 ha <em>Parkia Biglobosa</em></td>
<td>10 villages Land ownership lies with chef de terre; use-rights are granted to respective women of the Moussa ta Yirri Association; Membership of association includes all ethnic groups</td>
<td>- Carbon sequestration; - Planting on fallow land and secondary forest</td>
<td>- Joint management, Partnership; - Common responsibility encouraged; - Sale of NTFPs</td>
</tr>
</tbody>
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\(^{15}\) [https://www.thegef.org/gef/project_detail?projID=5215](https://www.thegef.org/gef/project_detail?projID=5215)

\(^{16}\) [http://www.planvivo.org/docs/PIN_Mousso-Ta-Yiri_PUBLISHED.pdf](http://www.planvivo.org/docs/PIN_Mousso-Ta-Yiri_PUBLISHED.pdf)
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<tr>
<td><strong>4. Rehabilitation and sustainable management of degraded Pastures in the Sahel Region of Burkina Faso</strong>&lt;sup&gt;17,18&lt;/sup&gt; AGED (Association Pour la Gestion De l’Environnement Et de Développement) REACH Italia, ONG Alain (Seeking Plan Vivo validation)</td>
<td>FR, ALM Provinces of Seno, Djibo and Oudalan 1,600,000 ha Mix of native species</td>
<td>More than 25 villages; Local land charters defined by participatory community meetings</td>
<td>- Carbon sequestration through assisted natural regeneration</td>
<td>- Demarcation of community pasture areas; - Rehabilitated pastures managed by Village Development Committees - Conflict between pastoralists and sedentary farmers addressed</td>
</tr>
<tr>
<td><strong>5. Restoration of degraded ecosystems in the Sahel</strong> Ondernemers Zonder Grenzen (OZG; Entrepreneurs without Borders) (Seeking Plan Vivo validation)</td>
<td>A/R, FR Lilingo village (Gorom-Gorom) 1,000 ha Acacia species; Balanites aegyptiaca; Ziziphus Mauritia</td>
<td>Involving local communities; livestock farmers; agro-pastoralists; transhumant herders; users of timber and NTFPs Population signs a cooperation agreement to protect newly forested land for a minimum of 20 years; this encourages regeneration</td>
<td>- Carbon sequestration in planted trees and natural regeneration</td>
<td></td>
</tr>
<tr>
<td><strong>6. Sub-Program for Sustainable Land Management in Boucle de Mouhon region</strong>&lt;sup&gt;19&lt;/sup&gt; GEF/ UNDP</td>
<td>ALM 6 Provinces; 47 departments, 6 urban communes, 41 rural communes 200,000 ha</td>
<td>1,139 villages Aims to improve land tenure security</td>
<td>- Increases in soil and carbon stocks from sustainable land use; - Soil reclamation practices applied to irrigated and farmed land; - Pastoral areas, river banks and wetlands</td>
<td>- Decentralisation of sustainable land management practices - Promotion of best practice for soil reclamation</td>
</tr>
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<sup>19</sup> [https://www.thegef.org/gef/project_detail?projID=4233](https://www.thegef.org/gef/project_detail?projID=4233)
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<tr>
<td><strong>7. Reducing vulnerability of natural resource dependent livelihoods in two landscapes at risk of the effects of climate change: Boucles du Mouhoun Forest Corridor and Mare d’Oursi Wetlands Basin</strong>&lt;sup&gt;20&lt;/sup&gt; UNDP/GEF</td>
<td>A/R 1600 ha (wetland)</td>
<td>Communities not specified Commune leaders Producers; women</td>
<td>- Restore wetland and natural pasture; - Rewetting with herbaceous and wooded vegetation</td>
<td></td>
</tr>
<tr>
<td><strong>8. Agro-ecology</strong> AnandaMarga Universal Relief Team (AMURT) Norway</td>
<td>AF, ALM nitrogen fixing and fruit bearing trees</td>
<td>Existing community based organisations Rural villagers Facilitate transfer rights of access/ control of forest resources to forest management groups made up forest users, including entrepreneurs, farmers, animal herders, traditional authorities and fuel wood collectors</td>
<td>- 1000 trees planted</td>
<td>- Increased agricultural productivity</td>
</tr>
<tr>
<td><strong>9. Trees for Change</strong>&lt;sup&gt;21&lt;/sup&gt; TreeAid; UK Department for International Development’s Civil Society Challenge Fund; Swedish International Development Agency</td>
<td>IFM</td>
<td>8 Communities 26,500 people</td>
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<tr>
<td><strong>10. Women’s Forest Livelihood Programme</strong>&lt;sup&gt;22&lt;/sup&gt; TreeAid; BioClimate</td>
<td>IFM Yako, Passoré Province, northern region 1,000 ha</td>
<td>Poor and marginalised women in Yako, northern Burkina Faso</td>
<td>- Six nurseries - 84,000 seedlings</td>
<td>- Establish six Women’s Forest Management Groups; - Establish six women’s beekeeping groups; - Eighteen women’s shea nut butter groups</td>
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<td><strong>Chad</strong></td>
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<tr>
<td><strong>11. Enhancing the resilience of agricultural ecosystems</strong> IFAD/ GEF</td>
<td>A/R, AF, ALM Four communities Local management committees Most vulnerable (economically; nutritionally); most exposed to climate risk; women)</td>
<td>- Introduction of orchards; - Integration of agro-forestry and community forestry - Intensified and resilient agricultural production</td>
<td>- Farmer’s Organisations are trained on resilient cropping systems; - Soil and water conservation schemes scaled up to control floods; - Flood recession cropping promoted</td>
<td></td>
</tr>
<tr>
<td><strong>12. Lake Chad Basin Project (LCBP)</strong>&lt;sup&gt;23&lt;/sup&gt; Lake Chad Shorelines and Niger-Chad Northern Diagnostic Basin Pilot DFID/ GEF</td>
<td>A/R, ALM Lake Chad Shoreline 300,000 - 2,500,000 ha Emphasis is on native species/ species that do not increase evapotranspiration</td>
<td>Farmers and Herders Including Transhumant populations States that area lacks traditional tenure security</td>
<td>- Planting perennial trees and shrubs as fences and barriers for dune stabilisation</td>
<td>- Increased awareness; - Compensation scheme; - Alternative income opportunities; - Improved livestock rearing (tethering, fencing) - Conflict resolution</td>
</tr>
<tr>
<td><strong>13. Lake Chad Basin Project: Chari Logone Pilot Project</strong> DFID/ GEF</td>
<td>ADD Waza National Park</td>
<td></td>
<td></td>
<td>- Human resettlement program - Rehabilitate and conserve a wildlife pond; - Prevent over-grazing and degradation of habitat</td>
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<td><strong>Côte d’Ivoir</strong></td>
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| **14. Assessment of Land Degradation in Coffee-Cocoa Production and Northern Ivory Coast**<sup>24</sup>  
GEF (UNEP) | ADD, ALM  
N’Zi and Iffou; Bounkana, Poro, Kabadougou; Bélier | Six regions  
Local land-users specified | - Agricultural land extension-to reduce deforestation | - Local sustainable land management institutions, with strengthened capacity and training;  
- Alternative livelihoods;  
- Awareness raising |
| **Ghana** | **15. Reforestation of Degraded Forest Reserves**<sup>25</sup>  
FORM Ghana Ltd (VCS- Validated 2013) | AF, A/R  
Asubima Forest Reserve, Central Ghana  
1,506 ha  
Teak and Indigenous trees | Proponent FORM Ghana has signed a 50 year lease over forest land; signed by local communities and the Forestry Commission;  
Communities are not specified | - Expected to generate 360,943 VCUs over 40 years crediting period | - Provides local employment  
- Provides opportunity for local farmers to inter-crop and enhance food production, using plantation areas |
| **16. Climate Stewards and A Rocha Ghana**<sup>26</sup>  
Supported by Climate Stewards (UK) | A/R  
Kumasi, Larabanga, Damongo  
91 ha planted (around schools)  
Indigenous varieties mahogany, kapok, dawadawa and ebony | School communities  
Teachers and pupils engaged in monitoring | - Maintenance of planted trees (weeding, providing fire-breaks);  
- EER: 400,000 tonnes CO2e (total) | - 10% of planting at each site comprises a commercial crop variety: cashew, mango, citrus, palm oil  
- Environmental clubs in schools;  
- Incentives for schools and communities (beehives, seeds, payment for labour)  
- Training in maintenance of planted trees (weeding, providing fire-breaks) |

<sup>24</sup> https://www.thegef.org/gef/project_detail?projID=5788

<sup>25</sup> http://www.vcsprojectdatabase.org/#/project_details/987

<sup>26</sup> https://www.climatestewards.org/partners/ghana/
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<tr>
<td>17. Atewa Critical Conservation Action Programme (ACCAP)27 A Rocha Ghana (ARG) Leventis Foundation</td>
<td>ADD, IFM Atewa Forest (recently upgraded to a Globally Significant Biodiversity Area) 258.3 km²</td>
<td>Communities not specified, but advocacy of local communities is an objective</td>
<td></td>
<td>- Awareness; - Advocacy, - Education, - Alternative livelihoods (farming giant land snails, grass-cutters and mushrooms)</td>
</tr>
<tr>
<td>18. REDD+ Project in Cocoa landscapes Around Kakum Park28 Conservation Alliance Pilot project selected to provide lessons for Ghana’s REDD+ Implementation</td>
<td>ADD, A/R, ALM, IFM 800 ha</td>
<td>None specified</td>
<td></td>
<td>- Enhance carbon stocks in low shade cocoa farms by planting trees - Raising awareness on tree ownership among farmers</td>
</tr>
<tr>
<td>19. Increased Resilience to Climate Change in Northern Ghana29 Adaptation Fund</td>
<td>A/R Upper East, Upper West and Northern regions of Ghana</td>
<td>Community-Based Management</td>
<td>- Planting of tree nurseries and wood lots</td>
<td>- Improved dry-season gardening activities; - Community based fish-farming - Rehabilitate floodplains, hillsides and watersheds</td>
</tr>
<tr>
<td>20. Nyankamba Community Resource Management Area REDD Project30 Forest Trends</td>
<td>ADD, A/R, IFM 24,000 ha</td>
<td></td>
<td>- Forest and carbon enhancement with forestry practices</td>
<td>- Sustainable farming; - Charcoal production; - Sales of NTFPs (shea nuts); - Ecotourism</td>
</tr>
</tbody>
</table>

27 http://ghana.arocha.org/projects/protecting-atewa-forest/
28 http://theredddesk.org/countries/initiatives/redd-project-cocoa-landscapes-around-kakum-park
<table>
<thead>
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<th>Project Title and Developers/Funders; Validation Intention (if stated)</th>
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<tbody>
<tr>
<td>21. Cocoa Carbon Initiative&lt;sup&gt;31&lt;/sup&gt; Forest Trends, Nature Conservation Research Centre, Katoomba Group</td>
<td>ADD, A/R, FR, IFM Bonsambepe Landscape; a forest corridor of six forest reserves of high biodiversity value 60,000 ha (off-reserve) and between 20,000-50,000 ha on reserve</td>
<td></td>
<td>- Planting of shade trees; - Assisted natural regeneration</td>
<td>- Improving ecological resilience of the cocoa farming system through access to associated agronomic and economic resources; - Improving livelihoods from increased farming income and access to other project benefits</td>
</tr>
<tr>
<td>22. Managing the Cocoa Production Landscape for Increases in Forest Carbon Stocks and Biodiversity Conservation&lt;sup&gt;32&lt;/sup&gt; Cocoa Research Institute of Ghana (CRIG)</td>
<td>ADD, A/R, ALM Aowin-Suaman area in the Western Region of Ghana 271,000 ha</td>
<td></td>
<td>- Reducing degradation; - Enhancing forest carbon stocks</td>
<td>- Use climate-smart agricultural practices, to produce cocoa in a sustainable way;</td>
</tr>
<tr>
<td>23. Bee-keeping and Woodlot Development to Alleviate the Degradation of the Agro Ecosystems of Dawadawa and Surrounding Areas in Northern BrongAhafo&lt;sup&gt;33&lt;/sup&gt; VicDoris Pharmaceuticals Ltd</td>
<td>ADD Northern BrongAhafo Region of Ghana</td>
<td></td>
<td>- Reduce the pressure of degradation on the forest reserve</td>
<td>- Provide alternative livelihoods</td>
</tr>
</tbody>
</table>

<sup>31</sup> http://theredddesk.org/countries/initiatives/cocoa-carbon-initiative
<sup>32</sup> http://theredddesk.org/countries/initiatives/managing-cocoa-production-landscape-increases-forest-carbon-stocks-and
<sup>33</sup> http://theredddesk.org/countries/initiatives/bee-keeping-and-woodlot-development-alleviate-degradation-agro-ecosystems
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<tbody>
<tr>
<td><strong>24. Piloting REDD+ Project in Ghana</strong>(^{34}) K.A Opoku Farms</td>
<td>ADD, IFM Kwamisa Forest Reserve, in Offinso District in the Ashanti Region 208 ha</td>
<td></td>
<td></td>
<td>- Fire control; - Enhance carbon</td>
</tr>
<tr>
<td><strong>25. Permian REDD+ Project in Ghana</strong>(^{35})</td>
<td>ADD, IFM Atewa and Atewa Extension Forest Reserves</td>
<td></td>
<td></td>
<td>- Implement strategies for Biodiversity Conservation</td>
</tr>
<tr>
<td><strong>26. Portal Agroforestry Model</strong>(^{36}) Portal Ghana</td>
<td>ADD, AF, FR, IFM 4660 ha</td>
<td></td>
<td></td>
<td>- Social Forestry</td>
</tr>
<tr>
<td><strong>27. Bongo River Trees Project</strong>(^{37}) TreeAid, RPS (UK)</td>
<td>A/R, ALM Bongo District, north-east Ghana; 50 kilometres of riverbank</td>
<td>8 Communities, (20,000 people)</td>
<td></td>
<td>- Restore 50 km of riverbank to reduce flooding and reverse erosion; - Plant 60,000 trees; - Plant 45,000 shrubs; - Encourage locally controlled/managed buffer zones; - Encourage new income generating activities</td>
</tr>
<tr>
<td><strong>28. Community Self-Reliance Project</strong>(^{38}) TreeAid, Community Self-Reliance Centre</td>
<td>AF, ILM Northern Ghana</td>
<td>17 villages</td>
<td></td>
<td>- Agroforestry; - Tree planting around schools; - Training in sustainable land and tree management; - Income generation (honey/mango);</td>
</tr>
<tr>
<td><strong>29. Kandema Rural Generation Project</strong>(^{39}) (2008) TreeAid; Kandema Community Group</td>
<td>A/R, AF, IFM Buiisa District, northern Ghana</td>
<td>Villages of Kanwasa, Tolensa, Yipala and Nyansa</td>
<td></td>
<td>- Plant 52,000 trees in woodlands and orchards - Develop tree product enterprises</td>
</tr>
</tbody>
</table>

\(^{34}\) [http://theredddesk.org/countries/initiatives/piloting-redd-project-ghana](http://theredddesk.org/countries/initiatives/piloting-redd-project-ghana)  
\(^{35}\) [http://theredddesk.org/countries/initiatives/permian-redd-project-ghana](http://theredddesk.org/countries/initiatives/permian-redd-project-ghana)  
\(^{36}\) [http://theredddesk.org/countries/initiatives/portal-agroforestry-model](http://theredddesk.org/countries/initiatives/portal-agroforestry-model)  
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</table>
| **30. Engaging Local Communities in REDD+/ Enhancement of Carbon Stocks (ELCIR+)
World Bank’s Climate Investment Funds; Forest Investment Program; African Development Bank Group; Forestry Commission Ministry of Lands and Natural Resources
Pilot project selected to provide lessons for Ghana’s REDD+ implementation** | ADD, AF, FR, IFM Western and Brong Ahafo region | - Enhance carbon stocks; - EER; 3.9 million metric tons of CO₂ over 25 years | - Secure land tenure; - Food availability |
| **31. IUCN Towards Pro-poor REDD+ Project
IUCN
Danish International Development Agency
Pilot project selected to provide lessons for Ghana’s REDD+ implementation** | IFM Five forest countries (Cameroon, Ghana, Guatemala, Uganda and Papua Province. of Indonesia).
In Ghana project is based in Asankragwa in the Wassa Amenfi West District of the Western Region | - Demonstrate the value of Human Rights-based Approach and Pro-Poor principles in REDD+;
- Develop economic development strategies through landscape-level results;
- Developing synergies between pro-poor REDD+ mechanisms and good forest governance;
- Building connections between the local and the national level for REDD+; | |

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<tbody>
<tr>
<td>Guinea 42</td>
<td>32. Sustainable &amp; Thriving Environments for West African Regional Development (STEWARD) Funded by USAID Implemented by USFS; Bioclimates; CARE PCI-Media Impact Inc., Thomson Reuters, AUDER, FFI</td>
<td>ADD, A/R, AF, ILM Northern Sierra Leonean and Southern Guinean border</td>
<td>20 rural agricultural communities Customary laws of tenure exist. The project advocates registration of Community Forests, to ensure rights to carbon ownership</td>
<td>- Assist natural regeneration; - Maintain fire breaks; - Agro-forestry</td>
</tr>
<tr>
<td></td>
<td>33. Community Ecosystem Management Program (CEMP)43 GEF</td>
<td>ADD, AF, A/R, ILM National</td>
<td>Involves 100 communities</td>
<td>- Avoiding land degradation;</td>
</tr>
</tbody>
</table>

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42 Ecosystem-Based Adaptation Targeting Vulnerable Communities of the Upper Guinea Region
https://www.thegef.org/gef/project_detail?projID=5382

43 https://www.thegef.org/gef/project_detail?projID=1877
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<tbody>
<tr>
<td>34. Support for the Consolidation of a PA System in Guinea-Bissau's Forest Belt[^44] (GEF/ UNDP March 2009; Completed 2014)</td>
<td>IFM Dulombi-Boé-Cheché (DBC) complex To increase PA coverage by 415,651 ha</td>
<td>Communities not specified Riparian communities mentioned</td>
<td>- Addition of 8 Protected Areas</td>
<td>- Policy and legal framework developed to allow expansion of PAs through creation of DBC complex; - Agreements established; - Agreements with key productive sectors (loggers, hunters) to mainstream conservation into activities; - Co-management mentioned; - Training in forestry and agro-forestry</td>
</tr>
</tbody>
</table>

**Liberia[^45]**

| 35. Wonegizi community-based REDD+ project[^46] Funded by NORAD Facilitated by FFI; Skills & Agriculture Development Services | ADD 37,979 ha | Twenty Ziama Clan communities | - Reduce rate of forest clearance | - Increase sustainability of NTFP harvesting |

[^44]: [https://www.thegef.org/gef/project_detail?projID=3575](https://www.thegef.org/gef/project_detail?projID=3575) (no completion documents available)

[^45]: SPWA-BD: Biodiversity Conservation through Expanding the Protected Area Network in Liberia (EXPAN) (no documentation available)

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<tbody>
<tr>
<td>36. Plantation 1 Rivercess[47] Developed by GITG and Quantum Resources</td>
<td>A/R, IFM Rivercess 980 ha Genus Gmelina to be planted</td>
<td>Land use concessions by government or private entity; Local communities have complained that logging camps are still being constructed on community land without permission</td>
<td>- EER: 100,000 - 499,999 t CO₂e/ year</td>
<td>- Sustainable energy (charcoal, fuel wood production); - Sustainable agriculture; - Direct employment; - Training and/or capacity building; - Targeted benefits to women; - Endangered species protection; - Watershed protection; - Sustainable forest management</td>
</tr>
<tr>
<td>37. Improving efficacy of forestry policies and activities in Liberia through REDD+ demonstration projects[48] International Tropical Timber Association (ITTA) NORAD Implemented by FFI</td>
<td>IFM Tarjuowon Statutory District in Sinoe County</td>
<td>Forest-dependent Indigenous Communities Community Rights, Gender Issues</td>
<td>- Improved Livelihoods; - Capacity building, - Planned, sustainable and efficient timber extraction; - Efficient use of land and forest resources; - Sustainable Forest Management</td>
<td></td>
</tr>
</tbody>
</table>


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<tbody>
<tr>
<td>38. Improve sustainability of mangrove forests and coastal mangrove areas in Liberia through protection, planning and livelihood creation - as a building block towards Liberia’s marine and coastal protected areas(^{49}) (IFM)</td>
<td>ADD, IFM Sustainable management of 35% of Liberia’s mangroves</td>
<td>Community Involvement; Tenure status; Target Population</td>
<td>- Safeguard 15% of priority mangrove</td>
<td>- Include mangrove forests within the PA network of Liberia - Community management agreements met; - A further 5% of priority mangrove habitat managed through community based conservation - Five year M&amp;E program for mangroves</td>
</tr>
<tr>
<td>39. Enhancing Resilience of vulnerable coastal areas to climate change risks in Liberia(^{50})</td>
<td>ADD, IFM Area not specified</td>
<td>Community Involvement; Tenure status; Target Population</td>
<td>- Mangrove systems and coastal natural “buffer zones” restored and maintained to withstand climate-induced pressures</td>
<td>- Integrated Coastal Zone Management plans; - Coastal development policies/programs - Master Plan for urban coastal cities (Monrovia and Buchanan)</td>
</tr>
<tr>
<td>40. Establishing the Basis for Biodiversity Conservation on Sapo National Park and in South-East Liberia(^{51})</td>
<td>ADD, IFM Sapo National Park will act as a pilot project 231,000 ha of lowland (threatened) rainforest</td>
<td>Community Involvement; Tenure status; Target Population</td>
<td></td>
<td>- 70,000 ha of adjacent forest communally managed under sustainable-use conservation management; - Community participation in monitoring, management; - Local forest resource extraction monitored;</td>
</tr>
</tbody>
</table>

\(^{49}\) https://www.thegef.org/gef/project_detail?projID=5712

\(^{50}\) https://www.thegef.org/gef/project_detail?projID=3885

\(^{51}\) https://www.thegef.org/gef/project_detail?projID=1475

\(^{52}\) https://www.thegef.org/gef/project_detail?projID=3699
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</table>
| **41. Jatropha Curcas Grouped Project**  
Jatropha Mali Initiative (JMI); Eco-Carbone; Novartis (VCS- Validated 2012) | AF, A/R  
Kayes Region (southwest Mali)  
15,000 ha of degraded rural farm land | 3,500 individual farmers  
Customary use-rights prevail in the area; Participants must prove customary rights over land | - Jatropha planted at a density of 1,200 trees per hectare;  
- 120 tCO2/ha over a period of 10 years. | - Project buys all carbon credits and Jatropha seeds from farmers;  
- A ‘white soap’ (from processed Jatropha oil) enhances participant household credibility, reputation and financial capital;  
- JMI provides specially sourced seedlings of ‘improved genetic quality’  
- Training in Jatropha management  
- Fire-risk reduction  
- Biofuel production facility |
| **42. Reforestation Technical Assistance focusing on the Ségou Region**  
Forestry Service International Program; USAID/ Mali and Millennium Challenge Corporation (MCC) Mali | A/R, ALM  
Alatona Zone  
23,550 ha  
Native; Ecologically sustainable species that provide a range of services (wood and medicinal products, habitat, clean water, erosion mitigation) rather than fast-growing monocultures  
33 villages (population 7433)  
Creation of water users’ organizations/ women’s economic groups/ water source maintenance committees/ school support groups/ and credit institutions  
Settled villagers; re-settled populations | - Improve irrigation and agricultural production;  
- Irrigate 5,200 ha;  
- Forestry service proposes planting woodlots;  
- Remove vegetation from 3,500 ha of riparian habitat | - Ensure adequate pasture; fodder and grazing for re-settled Peuhl herders;  
- Strengthen Forest Management;  
- Build capacity for integrated resource management;  
- Incentivise canal bank stabilisation program |
| **43. Programme Support for Climate Change Adaptation in the vulnerable regions of Mopti and Timbuktu**  
Adaptation Fund Grant Proposal | A/R, AF, ALM  
Area not specified  
Species not specified | 20 communities  
Management committee; Women’s committees; Women’s groups; Village associations; Community associations; Rural villagers; women | - Forest Conservation;  
- Agroforestry | - Communities supported to design and construct wood lots and nurseries;  
- Communities trained to manage woodlots and nurseries;  
- Savings (micro-credit) groups |
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<tr>
<td>44. Scaling up and replicating successful sustainable land management (SLM) and agroforestry practices in the Koulikoro region of Mali&lt;sup&gt;53&lt;/sup&gt; GEF/UNEP</td>
<td>ADD, ALM 100,000 ha</td>
<td>Targets 2,500 farmers and 1,000 herders</td>
<td>- Reduce land degradation; - Improve soil health; - Increase productivity of agroecosystems; - Agroforestry</td>
<td>- Conserve indigenous food crops; - Climate smart livestock production program; - Women and youth groups diversify their revenue through agroforestry and manure management; - Six alternative income generating activities implemented with 300 households; - Conflict resolution program</td>
</tr>
<tr>
<td>45. Strengthening the resilience of women producer group’s and vulnerable communities in Mali&lt;sup&gt;54&lt;/sup&gt; GEF/UNDP</td>
<td>A/R, AF, ALM 100,000 hectares Indigenous varieties of trees planted</td>
<td>Women’s farmer groups/ Producer groups</td>
<td>- Climate resilient multipurpose farming (including agro-forestry/ tree planting)</td>
<td>- Ensure access to water for subsistence farming - Dredging and protection of rivers/ ponds - Small-scale irrigation schemes - Cereal banks - Dry season gardening - Milk processing units</td>
</tr>
</tbody>
</table>

<sup>53</sup>https://www.thegef.org/gef/project_detail?projID=5746

<sup>54</sup>https://www.thegef.org/gef/project_detail?projID=5192
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<tr>
<td>46. PSG: Mali Natural Resources Management in a Changing Climate Project[^55] GEF/ World Bank</td>
<td>A/R, ADD, IFM 107,48 ha of forest</td>
<td>Communities not specified</td>
<td>- Restoration and enhancement of carbon stocks in forests and non-forest lands, including peatland; - Establish communal forests (700 ha) within the Great Green Wall corridor - EER: 18.6 million t CO₂e (total)</td>
<td>- Technical staff receive PES training; - Piloting of forest management schemes; - Delineation of 14 pastoralism corridors; - Agroforestry training; - Livestock management plans; - Support to income generation</td>
</tr>
<tr>
<td>48. Enhancing resilience of communities to the Adverse Effects of Climate Change in Food Security[^56] Adaptation Fund Implemented by UN-WFP</td>
<td>A/R Southern Mauritania;(regions) Trarza; Brakna; Gorgol;Tagant Assaba; Gudimaka; Hodh El Gharbi; Hodh El Chargu Appropriate species</td>
<td>2-3 communities within each region (~ 84,000 households) Priority given to asset-poor (little land, few animals; severe soil condition) Inclusion of pastoralists and transhumant herders</td>
<td>- Between 1,000-1,500 ha of community fuel-wood forests planted; - 300,000 trees planted for revenue generation; - Nurseries; - Fire-Breaks</td>
<td>- Establish 20 inter-village associations; - Community trainings; - Establish 4 community radio stations; - Establish monitoring systems</td>
</tr>
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[^55]: https://www.thegef.org/gef/project_detail?projID=5270

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<tr>
<td><strong>49. Improving climate resilience of water sector investments with appropriate climate adaptive activities for pastoral and forestry resources</strong>&lt;sup&gt;57&lt;/sup&gt; GEF/ AfDB</td>
<td>A/R, AF, ALM Wilayas of Gorgol, Brakna and Tagant 40 ha (small-scale irrigation) Acacia Senegal nurseries</td>
<td>Rural populations</td>
<td>- Increase agro-forestry and pastoral productivity; - Promotion of nursery plantations and agro-forestry</td>
<td>- Organization an awareness campaign (pastoral code); - Promote sustainable climate change adapted water and agriculture practices; - Training producers in farmers organization, investment maintenance and farm management; - Trainings in forest management; - Disseminate information on diversification of revenues through tree management (firewood, medical plants, fruits, etc.)</td>
</tr>
</tbody>
</table>

**Niger**

| **50. Acacia Senegal Plantation Project** Achats Services International; Spanish Carbon Fund (CDM-Discontinued) | A/R, ALM Six regions: Tillabéri, City of Niamey, Dosso, Maradi, Zinder and Diffa 8,472 ha Acacia senegalensis (Acacia Senegal) a native species | 26 rural community sites Land tenure investigated by Cofo (National Authority), tenure defined and contracted among private and community land-owners | - Seeds sourced by ICRISAT and Tree Seed Centre; - 46 nurseries constructed (near to plantation sites) - Plantation planting with half-moon pits - EER: 24,957 t CO2e/ year | - Community maintenance, harvest, extraction and sale of gum from plantations; - Production of ~ 4,600 tonnes of Arabic gum/ year); - Protection from cattle (vigilance committees) |

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<sup>57</sup> https://www.thegef.org/gef/project_detail?projID=5190
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<tr>
<td><strong>51. Community action project for climate resilience</strong>&lt;sup&gt;58&lt;/sup&gt;</td>
<td>A/R, FR</td>
<td>38 Communes Community organizations, associations of civil society, and producer groups Chronically poor; rural producers; women</td>
<td>- Village nursery creation; - Vegetative bands; - Windbreaks; - Natural regeneration; - Community planting of multipurpose trees (hedges / windbreaks); - Dune fixation</td>
<td>- Dune fixation; - Training and technology transfer; - Cash transfers; - Food vouchers; - Paid employment; - Production of timber</td>
</tr>
<tr>
<td>World Bank (19&lt;sup&gt;th&lt;/sup&gt; December 2011). Duration 5 years</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>52. Scaling up Community-Based Adaptation</strong></td>
<td>A/R, AF, FR</td>
<td>3,300 households (20,000 individuals) Village committees</td>
<td>- Rehabilitate 200 ha of degraded land; - Establish half-moon techniques on 200 ha land; - Establish embankments of 200 ha (compact earth/ stones); - Plant Acacias at the rate of 3 plants per half-moon and 16 plants per embankment - Stabilise 100 ha of dunes; - Install plant barrier, plantations - Implement agro-forestry - Install 500km of windbreaks/ live hedges (100 plants/km) - Promote natural regeneration of 1,000 ha</td>
<td>- Scale up and implement measures to build rural communities' adaptive capacities</td>
</tr>
<tr>
<td>UNDP/GEF (18th February 2014) Duration 48 months</td>
<td>Seven municipalities in Maradi Region; 2,200 ha Acacia Plantations</td>
<td></td>
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<tr>
<td><strong>53. Cross River State REDD+ (2012-2014)</strong>&lt;sup&gt;59&lt;/sup&gt; UN REDD Policy Board</td>
<td>AD</td>
<td></td>
<td></td>
<td>- Improve capacity of forestry commission staff; - Mapping; - Analysis</td>
</tr>
<tr>
<td><strong>Senegal</strong></td>
<td></td>
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<tr>
<td><strong>54. Jatropha Agroforestry</strong> African National Oil Corporation (ANOC); Biofuels Division of the Senegal Ministry of Energy and Biofuels; Agroils; Carbon Sink (VCS-Validated 2013)</td>
<td>AF, A/R Fatick, Kaolack and Kaffrine 1,411 ha of degraded urban land</td>
<td>Involves 20 villages (approximately 7,000 people); ANOC buys lands from participating farmers;</td>
<td>- 2 152 tCO₂ (average annual) during the crediting period</td>
<td></td>
</tr>
<tr>
<td><strong>55. Livelihoods mangrove restoration grouped project</strong>&lt;sup&gt;60&lt;/sup&gt; (2009) The ‘Livelihoods Fund’ (EU); Oceanium; Danone, Crédit Agricole, CDC Climat, Schneider Electric, Groupe La Poste, Hermès, Voyageurs du Monde, Firmenich and SAP (VCS-Validated 2015)</td>
<td>A/R Casamance, Sine-Saloum and River Senegal 10,415 ha Planting of native mangrove species</td>
<td>Project involves 200,000 people; Communities/farmers maintain collective or customary tenure; Project land ownership is in the domain of the state; while management is in the competence of local communities</td>
<td>- Planting density is 5,000 trees per hectare; - 48,598.17 tCO₂e (average annual)</td>
<td>- Increased local fish populations and the presence of oysters</td>
</tr>
</tbody>
</table>

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<sup>59</sup> http://www.gcftaskforce.org/documents/GCF_Cross_River_Barcelona.pdf  
<sup>60</sup> http://www.forestcarbonportal.com/project/oceanium
<table>
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<td>56. Arlomom Patako Arlomom; UNDESERT (EU); Institute of the Sciences and Environment (ISE); Natural Ecosystems and the Environment Unit (URENE) at Cheikh Anta Diop University (Dakar) (Plan Vivo registered)</td>
<td>A/R</td>
<td>Patako Forest Landscape (Saloum region) of West-Central Senegal 71 ha</td>
<td>Project currently involves 30 individual males and 9 women’s groups; Land ownership around Patako Forest is under customary tenure system;</td>
<td>- 35.24 t CO₂/ha</td>
</tr>
<tr>
<td>57. Sine-Saloum delta mangrove ecosystem restoration project (2012) Face the Future; WAAME (Seeking Plan Vivo validation)</td>
<td>A/R</td>
<td>Djilor, Djirnda and Bassoul (Sine-Saloum Delta) 25,000 ha</td>
<td>50 villages (30 000 people) Activities will involve men and women; and youth respectively - Planting will occur inside village perimeters, owned and managed by community councils;</td>
<td>- 100 replanting trips over first 5 years;</td>
</tr>
<tr>
<td>58. SPWA-BD: Participatory Biodiversity Conservation and Low Carbon Development in Pilot Ecovillages61 (2012) GEF Trust Fund; Duration 60 months (Seeking independent validation)</td>
<td>A/R, ALM, IFM</td>
<td>50,000 ha Community Nature Reserves 400 ha mangrove rehabilitated</td>
<td>Aims to eventually reach 350 villages in Senegal</td>
<td></td>
</tr>
</tbody>
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61 https://www.thegef.org/gef/project_detail?projID=4080
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| **59. Vetiver Project Naac Baal**<sup>62</sup> 2008 La Cure (Senegalese NGO) Identifying potential partners in Voluntary Carbon Offsetting | A/R, ALM Planting of Vetiver grasses in Sebikotane, Senegal | Participatory involvement of local communities and individual farmers |  | - Pollution removal;  
- Erosion control;  
- Soil and Water Conservation;  
- Agricultural support |
| **60. Kaolack Agroforestry**<sup>63</sup> Carbon Me (UK) Accounting period- from 2010) £5.00 per tonne CO₂e (Accounting period- from 2010) | AF Kaolack |  | - Agroforestry | - Training farmers;  
- Fruit tree production;  
- Vegetable production |
| **61. Promoting SLM practices to restore and enhance carbon stocks through adoption of Green Rural Habitat Initiatives**<sup>64</sup> (2014) GEF Trust Fund Duration 36 months | A/R, ALM Area not specified Species not specified | Communities not specified | - Enhancing carbon stocks to boost productivity;  
- Agroforestry | - Scaling up SLM Practices;  
- Control grazing |

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<sup>64</sup> [https://www.thegef.org/gef/project_detail?projID=5802](https://www.thegef.org/gef/project_detail?projID=5802)
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<td><strong>62. Strengthening land &amp; ecosystem management under conditions of climate change in the Niayes and Casamance regions (2013)</strong> UNDP/GEF; Duration 60 months</td>
<td>A/R, ALM Lake Ourouaye Total area not specified Leucaena species (reforestation); Filao trees (Casuarina equisetifolia)</td>
<td>Communities not specified Community organizations; associations of civil society; producer groups Small-holder producers; women; youth</td>
<td>- 10 hectares of mangrove plantations are planted to reduce the impact of storm surges, coastal erosion; - Reforesting 20 hectares in key vulnerable areas; - Climate resilient multipurpose community woodland tested in the Niayes vegetable gardens to protect production from wind erosion and prevent the encroachment of sand dunes by (i) the planting windbreaks around individual vegetable cuvette in Mboro area</td>
<td>- Reduce climate driven risks in target ecosystem and land through adaptive restoration measures; - Restore mangrove-based livelihoods; - At least 5 women groups in Casamance supported to implement climate resilient agroforestry and sustainable water management practices in rice fields to protect production from climate impacts</td>
</tr>
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Sierra Leone

**63. Gola REDD** The Gola Rainforest Conservation Limited Group; Ministry of Agriculture, Forestry and Food Security; Forestry Division; Conservation Society of Sierra Leone (CSSL); Royal Society for the Protection of Birds (RSPB). (VCS-Validated 2015) Gola Rainforest National Park (spanning the Eastern and Southern Provinces) 122 marginalized settled local communities; | | 5, 028, 179 tCO$_2$ in first ten years | - Livelihood activities are designed to compensate communities for their potential loss of access to resources inside the protected forest project area. |
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<td>64. Moyamba&lt;sup&gt;65&lt;/sup&gt; (2011) Green Energy Corporation Ltd; Certified by FSC, ISO; Crediting period (21 years) Seeking CDM validation</td>
<td>A/R, ALM 17 ha Native and exotic trees (&lt; 50% native)</td>
<td>Tenure maintained by Individual farmers/private landowners</td>
<td>- EER: 20,000 t CO2e</td>
<td>- Agricultural Land Management</td>
</tr>
<tr>
<td>65. Conservation of the Sierra Leonean Western Area Peninsula Forest Reserve (WAPFR) &amp; its Watershed&lt;sup&gt;66&lt;/sup&gt; EU; Environmental Forum for Action (ENFORAC), Welthungerhilfe (WHH) Forestry Division of the Ministry of Agriculture Forestry and Food Security (MAFFS) (2009) Duration 4 years Seeking VCS validation</td>
<td>A/R, ADD, ALM 18,000 ha</td>
<td>None specified</td>
<td>- 200,000 tree seedlings planted in the buffer zones for local woodlots and tree farms</td>
<td>- Farmers introduced to agro-forestry and participatory processes in decision making relating to natural resources</td>
</tr>
<tr>
<td>Togo</td>
<td>A/R Agou, Plateau Region 935 ha (degraded land)</td>
<td></td>
<td>- 180,000 t CO2-e (total reduction over 30 years)</td>
<td>- A livestock breeding program which will provide the regional meat market; - Expansion of food supply; - Creation of additional income generating opportunities</td>
</tr>
</tbody>
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<sup>65</sup> [http://www.forestcarbonportal.com/project/Moyamba-Sierra-Leone](http://www.forestcarbonportal.com/project/Moyamba-Sierra-Leone)

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