



GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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PART I: PROJECT INFORMATION

Project Title:	Integrated ecosystem management program for the sustainable human development in Mauritania		
Country(ies):	Mauritania	GEF Project ID: ¹	
GEF Agency(ies):	FAO	GEF Agency Project ID:	637241
Other Executing Partner(s):	Ministère de l'Environnement et du Développement Durable	Submission Date:	15 July 2016
GEF Focal Area(s):	Multi-focal Areas	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>		Corporate Program: SGP <input type="checkbox"/>
Name of parent program:	N/A	Agency Fee (\$)	781,138

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
BD-1 Program 2 (Nature's last stand)	GEF TF	507,567	1,230,887
CC-2 Program 4 (Promote conservation and enhancement of carbon stocks)	GEF TF	2,489,726	5,823,827
BD-3 Program 7 (Securing Agriculture's Future)	GEF TF	1,268,917	2,924,716
LD-1 Program 1 (Agro-ecological intensification)	GEF TF	2,281,795	5,337,490
SFM-3 Program 8 (Integrating SFM in landscape restoration)	GEF TF	1,674,500	7,833,080
Total Project Cost		8,222,505	23,150,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To increase sustainable human development through the restoration of ecosystem services and an integrated ecosystem management approach in the Wilayas of Southern Mauritania

Indicator: Extent to which ecosystem services in targeted areas provide a sustainable basis for livelihoods by the end of the project.

Project Components	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
1. Integrated and participatory planning for the sustainable	TA	1. The use of land and natural resources is informed and governed by an integrated,	1.1. A monitoring platform of selected key ecological indicators is prepared, operational and	GEF TF	861,405	5,900,000

¹ Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

² When completing Table A, refer to the excerpts on *GEF 6 Results Frameworks for GETF, LDCF and SCCF*.

³ Financing type can be either investment or technical assistance.

development of ecosystems.		<p>participatory and gender sensitive approach.</p> <p><i>Indicator:</i> <i>Extent to which dynamic agro-biodiversity, biodiversity, forest, soil and water conservation is integrated into community driven land use and forest management plans in the project areas.</i></p>	<p>maintained through time.</p> <p>1.2 Increased awareness of policy-makers and local communities about the full socio-economic value of agro-biodiversity and ecosystem services.</p> <p>1.3 Relevant existing traditional agro-pastoral practices and their contribution to agro biodiversity conservation documented and analyzed.</p> <p>1.4. An integrated land use and forest management plan that includes identification of ecosystem services is established through a participatory and gender-sensitive process.</p>			
2. Conservation, restoration and sustainable management of the landscape / ecosystem.	INV	<p>2. Land degradation is reduced and vegetation cover is restored through a participatory and integrated ecosystem approach.</p> <p><i>Indicators:</i> <i>Number of hectares of land under renewed vegetal cover and under sustainable management (target species indicators and corresponding practices TBD) – indicative target 30,000 ha</i></p> <p><i>Metric tons of carbon emissions reduced and avoided – indicative target 1.85 million metric tons CO₂ equivalent</i></p> <p><i>% increase of national land hosting</i></p>	<p>2.1. Land reforested, under renewed vegetation cover, and sustainably managed by communities (including protection and restoration of pastoral routes, reforestation using high value and endemic species, and other).</p> <p>2.2. Carbon sinks in soils restored and alternative or sustainable sources of energy promoted (including demonstration and promotion of biogas)</p> <p>2.3. One new terrestrial protected area formally established (boundary demarcation, official recognition, institutional arrangements for its management, capacity building of PA staff,</p>	GEF TF	4,385,336	11,000,000

		<i>biodiversity of global significance conserved as protected area</i> 3. Sustainable use and management of water reserves for increased water availability during dry spells <i>Indicator: % reduction in water scarcity during dry seasons – indicative target 30%</i>	community involvement mechanisms, financing). 3.1. Water management and rehabilitation plans implemented in participatory and community driven way (e.g. anti-erosion work, dissemination of traditional water harvesting and conservation techniques, and more)			
3. Reduction of pressure on ecosystems through income generation and funding mechanisms	INV	4. Increased, diversified and stable sources of income for local communities through more sustainable exploitation of natural resources <i>Indicator: % increase of direct beneficiaries incomes – target 25%</i>	4.1. Training, technical assistance and knowledge exchange catalyzed via farmer field school approaches for agro-pastoralists in pilot areas. 4.2. Producer groups established and supported, building biodiversity-friendly value chains and enhanced market access.	GEF TF	1,879,430	5,500,000
4. Inter-sectoral cooperation and programme monitoring	TA	5. The achievements and lessons of the program are well established and perpetuated <i>Indicator: Communication strategy and plan implemented</i>	5.1. Recommendations are put forth for the strengthening of development governance in the South 5.2 The program's results and lessons are identified, documented, and reported upon in a timely manner	GEF TF	704,786	500,000
Subtotal					7,830,957	22,900,000
Project Management Cost (PMC) ⁴				GEF TF	391,548	250,000
Total Project Cost					8,222,505	23,150,000

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here: (N-A)

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Recipient Government	Ministry of Agriculture	Grant	10,650,000
Recipient Government	Ministry of Hydraulics and Sanitation	Grant	6,650,000
Recipient Government	Ministry of Environment and Sustainable Development	Grant	4,650,000
Recipient Government	Government of Mauritania	In-Kind	150,000
GEF Agency	FAO	Grant	1,050,000
Total Co-financing			23,150,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS ^{a)}

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b
FAO	GEFTF	Mauritania	Climate Change	N/A	2,489,726	236,524	2,726,250
FAO	GEFTF	Mauritania	Biodiversity	N/A	1,776,484	168,766	1,945,250
FAO	GEFTF	Mauritania	Land Degradation	N/A	2,281,795	216,770	2,498,565
FAO	GEFTF	Mauritania	SFM	SFM	1,674,500	159,078	1,833,578
Total GEF Resources					8,222,505	781,138	9,003,643

a) Refer to the Fee Policy for GEF Partner Agencies.

E. PROJECT PREPARATION GRANT (PPG)⁵

Is Project Preparation Grant requested? Yes ☒ No ☐ If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

Project Preparation Grant amount requested: \$150,000					PPG Agency Fee: 14,250		
GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee ⁶ (b)	Total c = a + b
FAO	GEFTF	Mauritania	Climate Change	N/A	50,000	4,750	54,750
FAO	GEFTF	Mauritania	Biodiversity	N/A	50,000	4,750	54,750
FAO	GEFTF	Mauritania	Land Degradation	N/A	50,000	4,750	54,750
Total PPG Amount					150,000	14,250	164,250

⁵ PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF up to \$2m (for MSP); up to \$100k for PF up to \$3m; \$150k for PF up to \$6m; \$200k for PF up to \$10m; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁶ PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁷

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	15,000 Hectares
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	39,000 Hectares
3. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO _{2e} mitigated (include both direct and indirect)	1.85 million metric tons ⁸

PART II: PROJECT JUSTIFICATION

1. Project Description

1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed

The Islamic Republic of Mauritania is a 1,030,700 km² country located between the Sahel and the Sahara, and between the Maghreb and Sub-Saharan Africa. The country is weakly undulated with low altitudes and consists, in the most part, of rocky plains and dune formations. Three quarters of its' territory is desert, and only about 10 percent is arable land. The climate is hot and dry: precipitation in the northern Saharan part is almost zero, while in the extreme south of the country, average precipitation is less than 450 mm. Therefore, almost 80% of the territory, especially in the north, is desert-like and scarcely populated. Mauritania is also one of the Sahelian countries that have been hardest hit by successive droughts over the past 30 years⁹.

The Mauritanian territory is subdivided into 13 Wilayas (regions), 53 Moughataa (prefectures) and 216 communities. The country is also subdivided in 4 ecological zones: the fluvial agropastoral zone, the pastoral zone, the oasis zone and the coastal zone. The fluvial agropastoral zone covers the Wilayas of Guidimakha, Gorgol, Brankna and Trarza. The pastoral zone covers the Wilayas of Hodh El Gharbi, Hodh El Chargui and the Assaba. The oasis zone covers Adrar, Tagant, Inchiri and Tiris. The coastal zone covers the western part of Trarza, the Wilaya of Dakhlat Nouadhibou and the Nouakchott district. The project will be intervening in at least 4 of the 7 fluvial agropastoral and pastoral Wilayas listed above, that altogether represent in total an area of 39 million hectares, and house 2.2 million people (or 64% of the country). Within this broad area, the specific sites for intervention will be refined during the project preparation phase.

The Mauritanian population was estimated to be at 3,796,000 in 2012, with an average annual growth rate of 2.5%¹⁰. The urbanization rate is estimated to be at 3.5% annually with an estimated 59% of the population now living in urban centers¹¹. This rapid urbanization rate has been spurred by an exodus from rural areas, where a combination of human and climate-induced factors and feed-back mechanisms has been leading to the degradation of the productive base for almost a third of the country's population. Still, because of population growth, the absolute number of nomadic populations has also increased in the last 25 years. There

⁸ This estimate was derived from calculations made using the EX-ACT tool for estimating ex ante emissions reductions from activities including afforestation, reforestation, improved rangeland management, SLM and other land-based activities. See Annex 1 for summary details.

⁹ Government of Mauritania, National Action Plan – Combat against Desertification (PAN-LCD)

¹⁰ <http://data.un.org/CountryProfile.aspx?crName=mauritania>

¹¹ <https://www.cia.gov/library/publications/the-world-factbook/geos/mr.html>

is also a higher percentage of women among these groups than in urban areas due to the migration of men in search of employment in the cities. Furthermore, Mauritania is one of the poorest countries in the world, ranking 153rd out of 177 countries as assessed by the Human Development Index in 2006, and there is a large gap between urban and rural area. Indeed, over 61% of rural dwellers earn less than a dollar a day, whereas this situation only applies to about 25% of urban residents¹².

According to the 2010 Millennium Development Goals (MDG) report from the United Nations (UN) in Mauritania, successive strategies to fight poverty did not manage to reduce poverty levels in rural areas. Such limited success in fighting poverty can be explained by the very low impact of the agricultural and pastoral production development strategies, which remain very uneven and are substantially declining¹³. Poor human development in the country can also be partly explained by climate change, that causes prolonged drought and changes in rainfall patterns, themselves leading to land degradation and soil erosion, which contribute to low agricultural productivity. As one of the driest Sahelian countries, Mauritania is at constant risk from drought and desertification and its natural environment, human and animal populations suffer from such problems as they rely on constantly dwindling sources of fresh water. Limited rainfall in recent years has only exacerbated the overextended water system and hastened the decline of the water reserves.

Water scarcity and recurrent drought are an obstacle to the sustainable development of Mauritanian population. Water access and supply (infrastructure, services and institutional capacity), water harvesting, water use efficiency and productivity still are very poor in Mauritania. Rates of access to improved sources of water remain low, with an estimated 50% in rural areas¹⁴. There is nearly no treatment of water in rural areas, with the same water being used for drinking, livestock and irrigation. Nearly 70% of freshwater withdrawals in Mauritania are dedicated to agriculture, an estimated 1.7 billion cubic meters annually. Groundwater reserves are not well known, and over-pumping often leads to rapid decline in water tables, at rates which exceed recharge through rainfall. Water scarcity and the low rates of water use efficiency mean that agriculture remains a low-value development avenue for most people, leading further and further towards the degradation of land and biological resources, and the gradual abandonment of settlements.

Land degradation and soil erosion is also made worse by the loss of arable land due to land clearing for small-scale agriculture, as well as overgrazing and the resulting disappearance of vegetative cover. In addition, the unsustainable use of forest resources as a primary source of energy (i.e. charcoal) further contributes to land and soil degradation given the fact that there is a lack of knowledge and implementation of potential alternatives. This in turn leads to the depletion of carbon stocks in soils and forests, which represented in 2012 a net sink of 2,155 Gg of CO₂¹⁵. It also leads to the inability of soils to retain moisture, speeds up run-off and accelerates the overall aridification of the ecosystem. Aquifer recharge is slower, as drainage is impacted by degraded land, making agriculture more and more unsustainable.

Although such problems are ubiquitous worldwide in arid and semi-arid lands (ASALs), the root causes leading to human development issues in Mauritania are mainly the high population density (which is the highest in the targeted project area) and overall poverty of rural communities. Furthermore, traditional coping mechanisms used by pastoral communities (such as increased cattle herd sizes), are no longer adequate given the fragility of natural resources and are in fact leading to mal-adaptations and increased environmental degradation. For example, in its third National Communication, Mauritania noted that 68% of its emissions consisted in methane originating from cattle, another consequence of maintaining high cattle numbers. In turn, low agro-pastoral productivity means that communities are prevented from making investments into production assets, and continue to implement inefficient, short-term oriented production

¹² <http://www.ruralpovertyportal.org/country/home/tags/mauritania>

¹³ Nations Unies. 2010. Rapport sur les progrès vers l'atteinte des objectifs du millénaire pour le développement (OMD) en Mauritanie. http://www.mr.undp.org/content/mauritania/fr/home/library/mdg/rapport_OMD_2010/





















¹⁴ World Bank,

¹⁵ Mauritania, Third National Communication to the UNFCCC

strategies. This creates a downward cycle of environmental degradation, which further impoverishes populations who depend on natural resources for livelihoods.

These dynamics also directly contribute to the loss of terrestrial and marine biodiversity in the country. Given the country's unique climatic and geographic conditions, it hosts a biodiversity that is ecologically and socio-economically important. Mauritania is host to 1,100 plant species, 61 mammal species (10 threatened¹⁶), 172 bird species (2 threatened), 72 reptile species (2 threatened), 3 amphibian species, and 117 fish species¹⁷, with species such as the green turtle (*Chelonia mydas*), the african wedgefish (*Rhynchobatus luebberti*) and the monkfish (*Squatina aculeata*) being considered endangered. Other species, including many freshwater fish, which were an important source of subsistence for rural communities in the country (e.g. in the Konkassa Pond), have either disappeared (e.g. the Nile perch, *Lates niloticus*) or are becoming rare (e.g. the catfish, *Clarias gariepinus*).

In terms of agro-biodiversity, the country hosts more than 200 date palm cultivars, endemic crop wild relatives and endemic varieties of cultivated crops, as well as cereal cultivars such as rice, maize, sorghum and wheat¹⁸. The West and Central African subregion, including Mauritania, is the origin of some food crops and contains others that have been grown there long enough to have developed substantial diversity. The subregion is widely acknowledged as the primary centre of diversity for millet (*Pennisetum* spp.), cowpea (*Vigna unguiculata*), fonio (*Digitaria exilis*), yam (*Dioscorea rotundata*, *D. cayenensis*, *D. dumetorum*, *D. bulbifera*), African rice (*O. glaberrima* Steud.), Bambara groundnut (*Vigna subterranean*) and oil palm (*Elaeis guineensis*). It is also the secondary centre of diversity for sorghum (*Sorghum* spp.) and robusta coffee (*Coffea canephora*). In addition, several introduced crops (e.g., pineapple, groundnut, cotton, cocoa, rubber, cocoyam, maize, cassava, sweet potato, tobacco, banana, plantain, citrus, coconut, sugarcane, mango, taro and Asian rice) have developed genetic complexes and wild relatives that are well adapted to the environmental conditions (IPGRI et al. 1997).¹⁹ The agro-biodiversity in Mauritania is eroding rapidly, with crop wild relatives disappearing because of demographic pressure (cultivating on poor and degraded lands), salinization of soils due to poor water management, and poor pesticide and fertilizer management.²⁰

MAURITANIA	
	Native of North Africa
	Brune de l'Atlas
	Maure
	Chameau De L'Afrique
	Chameau Du Sahel
	Arabia
	Berber
	Diougy
	Moussoro
	Tuareg
	Tuareg
	Western Goat
	Arab-Barb
	Barbe
	Hodh
	Arab
	Blackhead Persian
	Fulani
	Touabire
	Mauritanian Local Chicken

With respect to domestic animal genetic diversity, about 30% of all farm animal breeds worldwide are at risk of extinction. The situation for Mauritania's livestock is particularly acute for example for the Maure breed of the Zebu, for which Mauritania is a hotspot.²¹

Still, the World Watch List for Domestic Animal Diversity 2000 (excerpt from Mauritania in picture to the left), indicates for Mauritania a considerable lack of data in order to draw conclusions on the risk level of extinction (dash in right column) for the registered breeds in the global databank for farm animal genetic resources.

Genetic erosion of animal breeds can be explained partially by the (lack of) investments into the agro-pastoral sector and important changes of the animal

¹⁶ Data on at risk species from 2002. More recent data was not available at time of writing, but will be sought during the project preparation phase.

¹⁷ <http://www.encapfrica.org/documents/biofor/MR118.119.Final.pdf>

¹⁸ <https://www.cbd.int/doc/world/mr/mr-nbsap-v2-fr.pdf>

¹⁹ Cooperating to make the best use of plant genetic resources in West and Central Africa: A regional imperative, Michael Halewood, Joseph Jojo Baidu-Forson, Evelyn Clancy and Raymond Sognon Vodouhe C. 2014

²⁰ Stratégie et plan d'action de la biodiversité 2011-2020

²¹ An approach to the optimal allocation of conservation funds to minimize loss of genetic diversity between livestock breeds, H SimianerS., B Marti, J Gibson, O Hanotte, J.E.O Rege. 2003

production system, from nomad dominated production systems (meat production) to transhumance and sedentarization (milk and meat production).²²

When it comes to forest and tree species conservation, 30 forests, covering a total land of 48,000 ha have been classified. It must be noted that the total area of classified forests is actually used for agro-pastoral purposes and the land is highly degraded. Forests are mainly found in Southern Mauritania: (i) along the Senegal River (19 classified forests – 22,000ha – Wilayas Trarza, Brakna, Gorgol); (ii) along the Karakoro (5 forests – 2,500ha – Wilayas Guidimakha); (iii) in the Assaba Wilaya (2 forests – 16,000ha); (iv) in Kiffa (3 forests – 6,000ha – Wilaya Tagant); and 1 forest in the Hodh El Gharbi Wilaya (1,500ha). The *Acacia nilotica* dominates these forests, though other tree species include: *Acacia sieberiana*, *Ziziphus mauritiana*, *Piliostigma reticulatum*, *Capparis corymbosa*, *Acacia macrostachya*, *Mitragina inermis*, *Acacia albida*, *Acacia raddiana*, *Acacia seyal*, *Balanites aegyptiaca*, and more.

Despite efforts to protect its biodiversity, notably through the designation and creation of protected areas Mauritania protects less than 2% of its territory²³.

Name of protected area	Location and area covered	Eco-system type and species	IUCN category
Banc d'Arguin national park	Wilayas of Dkhlet Nouadhibou and Inchiri 1,200,000ha	Coastal and marine eco-system: fauna includes dolphins, grey hirons, green sea turtle and continental vegetation includes <i>Acacia raddiana</i> , <i>Macrura crassifolia</i> , <i>Euphorbia balsamifera</i> and more	II
Diawling national park	Wilaya of the Trarza 16,000 ha	Coastal and marine eco-system: domestic and migrating bird species and the lower river basin plant species, including <i>Acacia raddiana</i> , <i>Acacia nilotica</i> , <i>Acacia albida</i> , and more	II
Tilemsi natural reserve	Wilaya Hodh Echarghi 7,300 km ²	Grassland eco-system: Habitat for Addax and Oryx and other large antilopes	Ia
Guelb Richatt natural reserve	Wilayas Adrar and Moughataa de Ouadane 20,000km ²	Desert eco-system: Habitat for mouflons Rich Saharian fauna and flora	Ia
El Aguer natural reserve	Wilaya Hodh El Gharbi 2,700km ²	Desert eco-system: Habitat for West African elephant Rich fauna and Soudanien vegetation due to its microclimat, including <i>Adansonia digitata</i> , <i>Adenium obesum</i> , <i>Commiphora africana</i> , and more	Ia

Mauritania has therefore a network of protected areas that do represent fairly well the marine eco-systems, but that is less representative of the continental eco-systems, as the protected areas only represent a limited number of endemic species and altogether do not represent the wetlands and eco-systems in Southern and Eastern Mauritania.²⁴

²² Stratégie et plan d'action de la biodiversité 2011-2020

²³ Rapport - État actuel des ressources génétiques forestières en Mauritanie. 2012. FAO. It should be noted that the sheer size of the Mauritanian territory, a large part of which is desert, artificially reduces the ratio.

²⁴ Stratégie et plan d'action de la biodiversité 2011-2020

Furthermore, it has been reported that pressure on protected areas is large. The protected areas are relatively small 'islands' of land within largely degraded landscapes bordering the protected areas. Consequently, significant changes of the natural environment can be noted within the protected areas due to climate change, mining, overgrazing, deforestation, and infrastructure development.

Low human and environmental development is particularly pervasive in the area formed by the Senegal River Valley, the Assaba and Hodh El Gharbi (part of the proposed project intervention site), a region that is rich in natural resources and, as a result, has been subject to intensive and ever increasing pressure over the years due to its agricultural vocation, extensive livestock production and fishing.

As a consequence of its precarious climate, Mauritania is one of the largest recipients of donor assistance in Sub-Saharan Africa. Agricultural and rural development initiatives have made up the bulk of support with the aim of stimulating the rural economy, improving rural livelihood, improving agricultural productivity, promoting sustainable land and natural resource management, and improving food security. However, despite these initiatives and other interventions by the government and development partners (see baseline scenario below), Mauritania still struggles to build a strong and sustainable human development, especially in rural communities, as there are barriers that remain to be addressed:

a. Lack of an integrated and ecosystem-based approach to supporting sustainable human development

Most of the projects and initiatives developed so far in the Southern part of Mauritania have been developed selectively around the issues of livelihood improvement, natural resources management, agricultural productivity or food security. While targeted interventions, that are guided and are anchored within the national development and sector strategies and plans, help address the urgent survival needs of communities, the lack of an integrated approach means that one aspect of the ecological, cultural or economic landscape, always goes ignored. Such interventions have a very low rate of sustainability, as has been seen from previous interventions in one sector or another. Furthermore, the size of the Mauritanian territory (e.g. ecosystems and Wilayas) also often leads to interventions being dispersed throughout, leading to a dilution of impact.

In order to truly curb poverty as well as environmental degradation in rural areas, and in recognition that livelihoods depend on ecosystem health, and in particular on the ability of the ecosystem to provide and conserve water, interventions should be oriented along an integrated and ecosystem-based approach that also takes into consideration the socio-cultural aspects of the agro-pastoral lifestyle. Focusing on well circumscribed ecological or territorial units, each containing a distinct ecosystem feature (for example, a pond, a palm-grove, a forest) would allow for such an integrated approach, through a combination of investment, technical assistance and policy support, to ensure lasting capacity is built at all levels. Using an integrated ecosystem-based approach would allow for a full consideration of root causes that are affecting human and environmental sustainable development in the targeted area, removing obstacles and disincentives for the sustainable use of natural resources. Indeed, a fundamental and underlying barrier to effective agro-biodiversity conservation in Mauritania is the inadequate appreciation of the full socio-economic and cultural value of traditional varieties. Benefits derived from agro-biodiversity include superior nutritional value, cultural significance, and higher resilience against shocks like pests, invasive alien species, extreme weather events, and soil regeneration. However, lack of information and awareness of these benefits among policy-makers, producers and consumers leads to an incorrect valuation of traditional varieties and agro-biodiversity.

b. Lack of means to support technical expertise in the monitoring, planning and management of ecosystems

As was emphasized during the project conception phase, rural communities targeted by the project have a low mastery of the methods for agricultural production and natural resource management. There is a

generally low level of professionalization within the agro-ecological value chain, meaning very low productivity and income are derived from the exploitation of fragile natural resources. This leads to expansion (for example larger herd sizes to compensate for losses, or larger but less productive clearings for agriculture), which in turn causes further degradation and depletion of land, water and biological resources. In addition, there is a lack of technical expertise within various production systems, with communities using out dated or maladapted production techniques, and with little support being provided by the over-stretched local authorities. In general, there is a low understanding of how ecosystems function and the services that they provide in the areas concerned by the project, owing to a lack of systematized data, observation protocols, and resources for planning and management. Investments in technical capacity among governments, NGOs, and local communities, aligned towards shared goals of conservation and productivity, should be made within a long-term perspective. Targeted trainings and ad hoc approaches that have been used in the past have proven only moderately successful, and it is likely that some reflection will be needed on the institutional framework that is most conducive to lasting capacity development and economic growth in the area.

c. The livelihood base is too weak to support lasting investment in regenerating natural ecosystems

An initial survey of potential targeted project areas reveals that extreme poverty and deprivation among local communities prevents the rational exploitation of natural resources. Unsustainable natural resource uses, such as deforestation for fuel-wood or agricultural expansion are increasingly noted. Meanwhile, the weak income derived from ecological services means that there is no incentive to maintain the natural environment. Populations go from responding to one crisis after another, and resistance to climate shocks, such as droughts or prolonged dry seasons, is very weak. Alternatives to ecosystem-based livelihoods are rare, while pressures on remaining land, water and biological resources continue to erode the ecosystem services. A long-term programmatic approach would ensure that incremental gains in livelihoods and income are not lost after the closing of the project, since each subsequent phase would build on a gradual increase in local capacity.

Therefore, to address the above-mentioned barriers, the FAO and the Ministry of the Environment and Sustainable Development (MEDD) of Mauritania have decided to develop a sustainable human development program based on an integrated ecosystem management approach. The program's main objective will be to increase the sustainable development of communities by reducing natural resources degradation through ecosystem rehabilitation, all the while creating and diversifying the sources of income for local communities.

2) Baseline scenario and associated baseline projects

In the baseline scenario, interventions in Mauritania are targeting selective dimensions of the complex dynamic that relates communities and their environment. Most programming focuses on increasing food production and human security, without restoring key ecological services. For example, interventions in the agriculture sector provide technical assistance to production, or investments into water mobilization, without promoting watershed management, reforestation or water use efficiency, which does not address the full breadth of the problems facing water scarce regions. Projects targeting biodiversity conservation remain isolated from the mainstream of development programming leading to a lack of coordination and sometimes counter-productive investments being made in biologically fragile areas. In some project sites, it was possible to observe that tree cutting permits were being granted without consideration for the rarity of the resource and its role in the broader ecosystem. Beyond the National Communications exercises, there is no accounting of emissions from land use change and loss of forest cover, because such processes have little relevance to local planners. Ecosystem services, from biological resources to carbon storage, are not fully understood or valued. Therefore, trade-offs are being made without proper information, and such trade-offs tend to favour short-term gains versus long-term progress. This, in turn, perpetuates the cycle in which most communities remain, which is to simply survive each crisis.

A number of baseline projects are taking place in Mauritania, as described below. These projects are mainly addressing livelihood improvement, natural resources management, agricultural productivity and food security, whereas some projects seek to address targeted aspects of the institutional framework related to natural resources management.

Name of project	Financing, dates and Implementing partners	Objectives	Baseline Problems addressed by the project
Projet de Gestion des Ressources Naturelles (PRoGRN)	US\$ 7,360,000 from GIZ through the MEDD (2014-2017)	The project aims at strengthening the institutional framework for the management of natural resources, including in particular the management of protected areas	The low level of institutional and policy capacity at central level for sustainable management and conservation of natural resources.
Programme de Lutte contre la Pauvreté Rurale par l'Appui aux Filières (ProLIPRAF)	US\$ 17,000,000 from IFAD through the Ministry of Agriculture (2010-2016)	The objective of the project is to promote the development of a number of value chains, to increase the social and economic integration of populations and to increase benefit sharing from agricultural value addition	The project addresses issues related to the low productivity of main agricultural value chains (crop and livestock).
Projet Régional Appui au Pastoralisme au Sahel (PRAPS)	US\$ 45,000,000 from World Bank through the Ministry of Agriculture (2013-2020)	The project aims at improving access to essential resources and production services and markets for pastoralists and agro-pastoralists in border areas and along transhumance routes. It also aims at improving the government's ability to respond in a timely and effective manner under a pastoral crisis or an eligible emergency	This project will address some of the key challenges that threaten pastoralists livelihoods such as the rapid growth of the population, conflicts, animal diseases, loss of pasture lands and declining water sources. The project is designed to fight against poverty and to promote shared prosperity in the participating countries, including for women and youth.
Programme de renforcement de la résilience à l'insécurité alimentaire et nutritionnelle récurrente au Sahel (P2RS)	US\$ 14,000,000 from the African Development Bank through the Ministry of Agriculture (2015-2019)	The goal of the program is to contribute to reducing poverty and improving food and nutrition security in the Sahel region. The project will aim at achieving this objective by sustainably improving the productivity and agro-forestry-pastoral and fish production in the Sahel.	The project will address the need to develop resilience to climate change, and long-term financing of the agricultural sector, as well as a regional integration of trade development
Programme National Intégré pour la	US\$ 102,000,000 from the World	The project will aim at developing optimal use	The project will address the need to support targeted capacity for

Décentralisation, le Développement Local et l'Emploi (PNIDDLE)	Bank and EU through the Ministry of Economic Affairs and Development (2013-2019)	of the resources allocated to local development for quick access of populations to quality infrastructure and services, while respecting the choices of the government in terms of decentralization and regional planning	local governments, regional and national institutions and organization.
Projet National Intégré dans le Secteur de l'Eau en Milieu Rural (PNISER)	US\$ 4,200,000 and US\$ 3,500,000 from a ADF loan and grant, respectively, and RWSSI grant of US\$ 3,220,000 through the Ministry of Water and Sanitation (2011-2017)	The project will contribute to: the improvement of living conditions of rural populations in Brakna, Gorgol and Tagant through the service water for various uses (drinking water, small irrigation, pastoral water and sanitation), and; (ii) the development of an integrated national strategy of mobilization and water resource management	The project will address the need to 1) develop drinking water, pastoral, sanitation and small irrigation infrastructures, and to; 2) support institutional capacities
Projet Aménagement Hydroagricole Brakna Ouest (PAHABO)	US\$ 23,000,000 from the Arab Fund, the ADF and the Nigeria Trust Fund (NTF) through the Ministry of Agriculture (Phase II starting in 2016)	The project's objective is to contribute to improved food security and to increase sustainable irrigated agricultural production in order to increase farmers' income	While phase I of the project focused on the development, enhancement and management, the second phase will address a constraint identified in the first phase, namely the lack of access to agricultural credit for small farmers and women cooperatives
Projet de Développement de la résilience à l'insécurité alimentaire et nutritionnelle au Sahel en Mauritanie	US\$ 2,700,000 from the Arab Fund (AFESD) through the Ministry of Agriculture (2015 – 2019)	The project aims at providing solutions to food and nutrition insecurity by rehabilitating and preserving livelihoods in targeted communities	The project will address the following needs and problems: the development of resilience to climate change and food security; the rehabilitation and preservation of livelihoods in the Senegal River Valley and agro-forestry-pastoral areas.

3) The proposed alternative scenario, GEF focal area strategies, and expected outcomes and components

The proposed alternative scenario consists in adopting an ecosystem-based integrated approach to planning human development in the targeted areas. First, the project will be deployed within well circumscribed ecological territorial units that may span across multiple Wilayas, within the broader region mentioned above. This will require selecting, in each ecological or territorial unit, a fragile ecological feature around which program interventions will be deployed. For example, this could be a pond, a palm-grove, a degraded forest, a wadi, or a rangeland, or even a biodiversity hotspot. Criteria for selection would be agreed during the project preparation phase, and could include:

- Presence of a fragile ecosystem feature (species at risk, unique water body, water catchment, degraded rangeland, protected area, forest, etc.);
- Evidence of human-induced degradation;
- Degree of local vulnerability, food insecurity and poverty; and
- Willingness of community to participate in rehabilitation.

Around each of these, the program will deploy a holistic strategy that will include a combination of targeted technical support, capacity building at institutional and community levels, as well as investments into the rehabilitation of ecological services and the development of alternative, sustainable and resilient livelihood strategies. It is expected that the combination of interventions in each site will be used as demonstrations of how integrated ecosystem-based development planning can be deployed further. Activities in each component will act as reinforcement for the others: for example, activities in the planning component (Component 1) will serve as a basis for activities on ecological restoration (Component 2) and on livelihoods (Component 3). In each site, activities will include some form of participatory planning, some ecological restoration and some livelihoods support activities, to ensure that all three critical barriers are addressed in each site. However, the scope and nature of these activities may need to be modulated to the needs of the specific site, and depending on the breadth of the area covered by the program.

The components and expected outcomes of the project are as follows:

Component 1. Integrated and participatory planning and management for the sustainable development of ecosystems

This component will provide support to the relevant governmental and territorial authorities to better understand and manage the ecosystems, using updated, relevant information and based on a participatory approach to land use planning. The component will include the design and development of a knowledge platform through which governments and local planners will be able to access timely and relevant data on specific ecological and socio-economic indicators in order to ensure land and resources use and production is maximized without undermining or degrading the plant, animal and crop diversity. In parallel, the project will also support the strengthening of local capacity to undertake participatory planning for more rational land use planning, identification of high conservation value, and attribution. This will help avoid land use conflicts and resolve issues around land tenure, as well as to set aside areas for conservation and regeneration, placed under the stewardship of communities. This component will also include an analysis of risk reduction and sharing mechanisms, so as to ensure that communities identify and understand ecological services that they wish to protect and rehabilitate, while reducing the risks involved in such an endeavour.

As a result of activities under this component, authorities will have a set of key baseline indicators for monitoring ecosystem health, including biodiversity and socio-economic indicators. Capacity will be strengthened to undertake appropriate monitoring and surveillance of various territorial and ecological entities, including through training. Furthermore, it is expected that this component will result in a better cooperation among local communities who are shared users of a given ecosystem. Local associations, cooperatives and NGOs will form an integral part of this process, by helping to facilitate land use planning exercises that are based on the recognition of ecosystem services (using indicators developed for the baseline assessment and monitoring platform). Using a fragile ecosystem feature as an entry point will provide a focus for conservation efforts by the communities, help define stronger participatory monitoring frameworks, and build local buy-in around shared conservation objectives. At the end of this process, each ecosystem selected by the project should have a consensus-based land use plan that balances conservation priorities with sustainable use and management mechanisms.

Expected outcome

Outcome 1. The use of land and natural resources is informed and governed by an integrated, participatory and gender sensitive approach.

Component 2. Conservation, restoration and sustainable management of the landscape / ecosystem

Under Component 2, the project will support the rehabilitation of key ecological services that sustain livelihoods. This will include the conservation and sustainable management of degraded rangelands, reforestation using high-value resilient tree species (for example fruit trees, neem, local palm varieties, acacia, or other indigenous species), accompanied by the required training for local communities and authorities. It is expected that this will help maintain habitats for key species of birds and small animals, while providing land restoration services, carbon stocks and pasture. In order to ensure that the pressures on land cover are reduced, the program will also develop interventions to promote sustainable charcoal production through the creation of dedicated charcoal woodlots, as well as demonstrations on the use of alternative energies, including biogas and solar energy, and the production of charcoal from invasive ligneous species (e.g Typha, Prosopis). This will help ensure that carbon stocks are gradually restored and maintained in the program zones.

In parallel to this, the project will work with the government to support the designation of a new protected area around one of the most fragile hotspots of the region (to be determined during project preparation phase). This will include support for the assessment, demarcation, official designation, institutional arrangements for its management, capacity building of PA staff, and development of community involvement mechanisms. This exercise will be based on participatory planning processes undertaken in Component 1, and will serve to increase awareness and buy-in of conservation objectives, while providing avenues for development planning in and around PA boundaries. As a priority, the new protected area will address the concerns of sustainable use and management of classified forested areas in Southern Mauritania that are nearly entirely occupied by agro-pastoralists in unsustainable ways, and that are therefore in an advanced degree of degradation²⁵. To this end, a IUCN category VI protected area is aimed for, though the exact location and extension will be determined in a participatory way during project preparation.

In terms of agro-biodiversity, the project will prioritise actions to conserve and to promote the sustainable use of the following endemic CWR, for which Mauritania, and particularly the East and Southern parts of the country, are a genetic reserve location of global significance:

- *Cynara humilis* L.²⁶
- *Oryza barthii* A. Chev.²⁷ (rice)
- *Oryza glaberrima* Steud.²⁸ (rice)
- *Pennisetum glaucum* (L.)²⁹ (pearl millet)

In addition, the project may focus on the following important native CWR depending on the selected project sites:

²⁵ Stratégie et Plan d'Action National de la Biodiversité 2011-2020.

²⁶ Reference of significance: USDA, ARS, National Genetic Resources Program (2011). Germplasm Resources Information Network - (GRIN). National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <http://www.ars-grin.gov/>

²⁷ Reference of significance: Germplasm Resources Information Network - (GRIN) - USDA, ARS, National Genetic Resources Program.

²⁸ Reference of significance: *Oryza glaberrima* Steud.: Stress tolerance, nutritional and grain quality improvement IRRI (2007). Annual Report of the Director General, 2006/07. Project 1, Germplasm conservation, characterization, documentation, and exchange. International Rice Research Institute, Manila, Philippines. <http://www.iri.org/science/progsum/pdfs/DGRreport2007/Project-1.pdf>

²⁹ Reference of significance: Vincent, H. et al. (2013) A prioritized crop wild relative inventory to help underpin global food security. *Biological Conservation* 167: 265–275.

- *Cucumis prophetarum* L.
- *Echinochloa stagnina* (Retz.) P.Beauv.
- *Sorghum arundinaceum* (Desv.) Stapf
- *Sorghum bicolor* (L.) Moench subsp. *verticilliflorum* (Steud.) de Wet ex Wiersema & J. Dahlb.
- *Sorghum verticilliflorum* (Steud.) Stapf
- *Sorghum virgatum* (Hack.) Stapf
- *Sorghum virgatum* (Hack.) Stapf

In addition, the program will also include investment into anti-erosion works, as well as works to increase water availability and conservation in the targeted project areas. Combined with efforts under Component 3 to increase productivity (including water use efficiency), this component will help remove the key constraints to sustainable agro-pastoral development. Small water works will be promoted, such as small retention dams, stone dykes or the valorisation of wadis and ponds, as well as the adoption of traditional water conservation techniques such as the zaï and half-moon trenches. Best practices in terms of irrigation will be disseminated through farmer training. Land degradation and water scarcity are at the root of the problems in the targeted area. Therefore, increased water availability, even during dry season, will help support livelihoods and provide much needed respite from the crisis response mode communities are living in currently.

The approach taken will be to associate all ecological restoration with the adequate planning framework (component 1) and to reduce pressures through more productive or alternate livelihoods (component 3). Community-based appropriate management systems will be devised and promoted for each key part of the integrated landscape (forests, water bodies, agricultural land, rangelands.)

Expected outcomes

Outcome 2. Land degradation is reduced and vegetation cover is restored through a participatory and integrated ecosystem approach

Outcome 3. Sustainable use and management of water reserves for increased water availability during dry spells

Component 3. Reduction of pressure on ecosystems through income generation and funding mechanisms

Activities under Component 3 will assist in the reduction of pressures on ecosystems by adopting a two-pronged strategy. First, technical assistance will be provided to local producers and groups so as to increase productivity from existing agro-pastoral value chains. This will include technical training, using the tried and tested Farmer Field School approach, as well as the provision of key productive assets, particularly to increase value addition. The capacities of the agro-pastoral community and farmers (both women and men) to participate in the identification, the development and the implementation of technologies and market linkages to promote in-situ agrobiodiversity conservation will be enhanced. Community-based management has been hailed as a way of conserving animal and plant genetic resources in developing countries. It combines the sustainable use of a breed/crop wild relative/cultivar with the empowerment of the rural people that keep it. While this concept holds considerable promise, projects have been rare so far and have attracted little donor support. There are however several successful examples of conservation projects which reflect the standards set for community based management.³⁰ The purpose is to increase the professionalization of existing production chains, and thereby creating added income from ongoing activities. In addition to this, the project will work with communities and producer groups to identify promising alternative livelihoods sources, both agricultural and non-agricultural. This will include support to the creation of producer groups, acquisition of productive assets, value-chain building, market access support, and technical training. This

³⁰ http://www.hubrural.org/IMG/pdf/int_legal_framework_an_gen_res.pdf

second strategy will have a particular accent on women-run cooperatives and producer groups, in order to reduce their vulnerability.

Expected outcome

Outcome 4. Increased, diversified and stable sources of income for the local population through more sustainable exploitation of natural resources

Component 4. Intersectoral cooperation and programme monitoring

This final component will strengthen the institutional implementation and monitoring of the program and its outcomes. The purpose is to create a long-term programmatic approach that can be replicated in other areas during subsequent phases. This will include providing support to the participating stakeholders towards the monitoring of program outcomes, outputs and indicators, as well as the creation of a long-term inter sectoral coordination platform. This platform will, among other tasks, contribute to a review and analysis of the best governance options for the development of the area, including to make recommendations on the most appropriate long-term institutional and policy framework to support integrated sustainable development in the south. Lessons learned from community-based management schemes, financing schemes and stewardship-transferring schemes that will be tested in the program sites will be analysed and synthesized with a view of providing key information on how to create the most enabling environment for continued integrated programming in the region and, ultimately, in the country. Lessons learned from the implementation of this first phase of the program will be identified and disseminated, and where possible, pathways for future replication and upscaling will be determined. The component will also support the development of local capacity to monitor GHG emissions changes as a result of the project, in collaboration with other initiatives working on emissions inventories in the country.

Expected outcome

Outcome 5. The achievements and lessons of the program are documented and replicated

In line with the integrated approach, activities under each component are expected to contribute to the simultaneous fulfilment of Focal Area Strategies under Land Degradation, Sustainable Forest Management, Biodiversity Conservation, and Climate change Mitigation.

4) Incremental / additional cost reasoning and expected contributions from the baseline, the GEF TF, LDCF, SCCF and co-financing

The incremental cost reasoning for each component is as follows:

Component/Outcome	Baseline contribution	GEF TF contribution
Component 1: Integrated and participatory planning for the sustainable development of ecosystems		
1. The use of land and natural resources is informed and governed by an integrated, participatory and gender sensitive approach	The Programme National Intégré pour la Décentralisation, le Développement Local et l'Emploi (PNIDDLE) contributes to the baseline for the Outcome 1 by building government capacity for sustainable development, by strengthening macro-level institutional capacity and promoting regulatory changes. The estimated value of baseline co-financing in the project sites during the implementation period, is \$5 million. However, this program does not promote community-based land use planning, and is not informed by any precise or recent data on the state of	The Program will strengthen local capacity to understand the ecosystem services that are at the basis of livelihoods, strengthen community-based planning and land-use allocation, as well as promote a science-based monitoring of ecological conditions. The additional funding required to achieve this is US\$861,405 from the GEF Trust Fund.

	ecosystems. In addition, the FAO is promoting through the voluntary guidelines on land tenure, baseline programming in the region on addressing key land tenure issues. The value of this co-financing is US\$900,000.	
Component 2. Conservation, restoration and sustainable management of the landscape / ecosystem		
2. Land degradation is reduced and vegetation cover is restored through a participatory and integrated ecosystem approach	The ProGRN project helps to build capacity at institutional level towards the sustainable management of natural resources. In particular the project provides a useful baseline by assisting in the creation of a framework towards the sustainable management of protected areas. The value of the baseline co-financing from ProGRN project is US\$4.5 million. However the project does not build capacity at local level for the management and rehabilitation of ecosystem services. The ProGRN project also does not provide any substantial investment into the rehabilitation of degraded ecosystems	The program will build local capacity of communities to identify, understand and sustainably manage the ecosystem services that form the basis of their livelihoods. The program will also provide substantial investment into the rehabilitation of key degraded ecosystems, such as forests, water sources and bodies, rangelands and agricultural irrigated perimeters. Additional funding of US\$3,508,269 is requested from the GEFTF to achieve this.
3. Sustainable use and management of water reserves for increased water availability during dry spells	The Projet National Intégré dans le Secteur de l'Eau en Milieu Rural (PNISER) is implementing various activities towards water mobilization in arid areas of the country, as well as working towards the development of a strategy for the integrated management of water resources. The value of this baseline programming is US\$6.5 million. However this program does not address the multi-sectoral pressures on water, nor does it increase water use efficiency.	The program will not only contribute to the conservation of existing available sources of water (permanent and seasonal), but it will also work with communities to devise water use efficiency schemes that provide the most added value per liter extracted. Furthermore, the project will work to reduce erosion and deforestation, which play a large role in the decreased availability of surface and ground water. The Additional financing from GEFTF for this outcome is US\$877,067.
Component 3. Reduction of pressure on ecosystems through income generation and funding mechanisms		
4. Increased, diversified and stable sources of income for the local population through more sustainable exploitation of natural resources	The Projet de Développement de la résilience à l'insécurité alimentaire et nutritionnelle au Sahel en Mauritanie (PDRISM), Projet Aménagement Hydroagricole Brakna Ouest, (PAHABO) Programme de renforcement de la résilience à l'insécurité alimentaire et nutritionnelle récurrente au Sahel (P2RS), Projet Régional Appui au Pastoralisme au Sahel (PRAPS), and Programme de Lutte contre la Pauvreté Rurale par l'Appui aux Filières (ProLIPRAF) projects all provide baseline for this component. The value of this baseline programming is US\$5.5 million. These programs and projects together contribute to creating a minimum level of food security and economic activity in the areas concerned by the project. The provision of basic services in the agricultural sector, such as extension, rural financing, productive assets, are all	This program will build on existing production and productive capacity to create economic incentives for the maintenance and rehabilitation of ecosystem services. This will not only include efforts to increase productivity and resource use efficiency under current value chains, but also the identification of new and innovative ways of increasing income for targeted communities. Innovative livelihoods sources and value chains will be pursued. Additional financing from the GEF TF is required to the tune of US\$1,879,430.

	provided by these baseline programs. However, none of these programs seek to create additional revenue streams for local communities and none of them adopt an integrated approach whereby the ecosystem services at the root of the agricultural sector are maintained. While basic training is provided to some communities, these baseline programs do not encourage the formation of new producer groups, alternative livelihoods outside of the agricultural sector, and therefore continue to encourage dependency on natural resources for livelihoods.	
Component 4. Inter-sectoral cooperation and programme monitoring		
5. The achievements and lessons of the program are well established and perpetuated	This component will build on baseline efforts within the Ministry of Environment and Sustainable Development as well as ongoing programming undertaken in various sectoral ministries. There already exists a multi-sectoral platform whereby ministries coordinate on programs such as these, which is expected to be strengthened by this program. The estimated value of this baseline co-financing is US\$500,000.	Additional financing for cooperation, monitoring and replication of program achievements total US\$704,786 from the GEF TF.

5) Global environmental benefits (GEFTF)

The project will provide a range of global environmental benefits (GEBs) through improved understanding and management of the ecosystems. Such GEBs include the following:

- reduction in land degradation through better management of agricultural lands, rangelands, as well as anti-erosion measures and conservation methods;
- benefits associated with the maintenance of ecosystem goods and services (i.e. soil health and quality, water and air quality);
- increased sustainable use and conservation of biodiversity (including the creation of a protected area);
- conservation of globally significant agricultural biodiversity through the support of in-situ conservation and sustainable use of several endemic crop wild relatives and endemic varieties of cultivated crops as well as endemic breeds of domestic animal species;
- increased water availability;
- increase in carbon sinks as a consequence of sustainable land and ecosystem management.

Nb of ha of land (agricultural and rangeland) under SLM	30,000 ha
Nb of ha of forests restored/reforested	9,000 ha
Nb of species protected and conserved (in situ)	5 species of palm 3 species of bird 5 crop varieties 4 breeds of domestic animals
Nb of tons of CO _{2e} mitigated ³¹	1.85 million metric tons

The GEBs and improved ecosystem services that will result from the proposed project should also contribute to the reduction in unsustainable natural resource exploitation and the improvement of the livelihoods of the

³¹ Please, refer to Annex I for direct and indirect GHG benefit estimates from the project, based on EX-ACT calculations.

targeted communities (improved and sustainable production systems, alternative and diversified income sources, etc.). This should have a direct impact on communities and social structures, and perhaps even contribute to prevent the exodus of rural dwellers to urban centers. Finally, the project is also expected to generate benefits in terms of adaptation to climate change as the restoration and sustainable management of the landscape will contribute to climate-resilient ecosystems.

6) Innovation, sustainability and potential for scaling up

Innovativeness: As seen in section 1, the ongoing initiatives to address sustainable human development have all looked at the underlying problems associated with human development individually. The innovativeness of the proposed project resides in the fact that it will take an integrated and ecosystem-based approach to sustainable human development that also takes into consideration the socio-cultural aspects of the agro-pastoral lifestyle. The proposed project's innovative strategy therefore resides in the fact that it will use such an integrated approach in a specific ecosystem area that is faced with the root causes affecting sustainable human development (as seen in section 1), and then scale that up to other and larger areas. Furthermore, the project will implement innovative financing mechanisms such as payment for ecosystem services schemes as well as micro-credit schemes as means of developing alternative livelihoods.

Sustainability: The planned trainings at the local and institutional levels for the sound and sustainable management of the ecosystems and the services they provide will contribute to the sustainability of this initiative, and so will the reduction in natural resources dependence and the improvement of the livelihoods. More importantly perhaps, the integrated and ecosystem-based approach design of the project will form the basis of its sustainability. It is expected that the creation of direct, observable economic benefits arising from the sustainable use of resources for the targeted communities will create strong incentives to maintain sustainable practices in the longer term.

Potential for scaling up: The tools and trainings developed under the various components of this project have the potential to be scaled up and reproduced in other targeted areas of the country. For instance, the development of a knowledge platform that governments and local planners will be able to use to gain access to data on ecological and socio-economic indicators, as well as the strengthening of local capacities, should be conducive for scaling up. Thus, the initiatives undertaken in this project may be replicated for sustainable human development issues in other parts of the country. The programmatic approach undertaken will help facilitate the identification of best practices and lessons learned that may be upscaled in other parts of the country through subsequent phases.

2. *Stakeholders.* Will project design include the participation of relevant stakeholders from civil society and indigenous people? (yes ☒ /no ☐) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation.

There are several stakeholders that will be involved in the project, ranging from civil society organizations to ministry departments and service provider. The table below showcases the relevant stakeholders that are likely to be involved in the project, as well as their respective roles.

Table 2.1. List of relevant stakeholders involved in the project and their roles

	Institutions/Organisations	Roles/Responsibilities
Ministries departments	Ministère de l'environnement et du Développement Durable (MEDD)	Responsible for the development, implementation, and monitoring and evaluation of policies, strategies, initiatives and sustainable management of natural resources tools; MEDD ensures the promotion and make sure that issues related to climate change, the fight against desertification and biodiversity conservation are taken into consideration in sectorial strategies and programs. It is responsible for monitoring and implementation of the UNFCCC, the UNCCD and the CBD in the country.

	Ministère de l'Intérieur et de la Décentralisation (MID)	This department is responsible for both the territorial administration and municipalities. The Walis and the Hakems will provide support to the creation or the revitalization of community associations. The municipalities will contribute to the dissemination of the project's results while helping their ownership by the beneficiary communities.
	Ministère de l'Hydraulique et de l'Assainissement (MHA).	The MHA manages water policy. The "Direction hydraulique" (DH) is responsible for water management and the National Water Resources Center (CNRE) is responsible for the knowledge and monitoring of water resources. These structures will play an important role in water supply for people and infrastructure developments of wetlands and watersheds. The Department of Hydrology and Dams is a structure in charge of drinking water.
	Ministère de l'Agriculture (MA)	The Agriculture Department is responsible for the development of facilities and production of vegetable crops. This structure will have a role to play in the management and use of water resources for irrigation. The Rural Development Directorate is responsible for the construction of retaining dams and structures for collecting water runoffs.
	Ministère de l'Élevage (ME)	This department's overall mission is to design, implement, monitor and evaluate government policies on the development of animal husbandry. As such, it is responsible for, among other things, (i) contributing to the technical support of the producers; (ii) promoting the structuring of the pastoral world; (iii) providing necessary support and technical advice on animal husbandry for the sustainable improvement of production and productivity.
	Ministère des affaires sociales, de l'enfance et de la famille (MASEF)	This ministry has the responsibility of ensuring the inclusion of gender into sectorial policies and to work directly with communities. Its activities are transversal and diversified.
	Ministère des Pêches et de l'Économie Maritime	The Minister of Fisheries has the overall responsibility of designing, coordinating, promoting and monitoring the implementation of government policy in the field of fisheries. Part of its functions are: (i) the development and conservation of fishery resources and aquatic ecosystems; (ii) the health inspection of goods, facilities and production areas of fisheries and aquaculture; (iii) the promotion of responsible fishing in marine, brackish and inland waters.
Civil society	National NGOs, Groupement National des Associations Pastorales (GNAP), la Fédération des Agriculteurs et Éleveurs de Mauritanie (FAEM), women cooperatives, AGLC, etc.	Civil society will be put to contribution in this project with the role of key partners in the implementation of the program, particularly for the management of the project, the strengthening of community organizations and producers' capacities, the establishment of nurseries, organizing market gardens, raising awareness, etc. To fulfill their roles, these organizations will be trained in the areas corresponding to their field of action in the program.
Service providers	NGOs, independent consultants and/or think tank	This group consists of operators with different skills in the areas of: (i) the animation, (ii) the training and management of organizations, (iii) the support to community organizations; (iv) the support to marketing, (v) supporting the preparation of action plans of community organizations, (vi) training for women and youth of partner villages, (vii) conducting various studies, etc.
Research Institutions	Institut Supérieur d'Enseignement Technologique (ISET) de Rosso, Centre National de Recherche Agronomique et de Développement Agricole (CNRADA), Centre National d'Élevage et de Recherche Vétérinaires (CNERV), Université de Nouakchott	These institutions can conduct research in the field of science and technology, and agricultural production expertise. They can help the program through various trainings and making available the results of their research that are related to the areas of the program.

	Agence de développement de l'électrification rurale (ADER)	ADER's mission is the coordination and facilitation of decentralized rural electrification process. Its areas of intervention are (i) the programming of rural electrification investments; (ii) delegated supervision of rural electrification projects; (iii) management of a Decentralized Electrification Fund (FERD); (iv) management of rural electrification equipment; (v) the identification and support for the emergence of private operators that can support the management and maintenance of decentralized electrification equipment; (vi) the testing of technical electrification studies; (vii) the training of rural electrification actors.
	Agence Grande muraille verte (AGMV)	The mission of the AGMV is to "take effective and urgent measures in the drylands of Africa, to halt/reverse the land degradation, impoverishment of biological diversity, to ensure that ecosystems are resilient to climate change and continue to provide essential services by 2025, contributing to human well-being and poverty eradication".
	Agence nationale pour le développement des énergies renouvelables (ANADER)	ANADER is the delegated supervisor for all major projects in the field of renewable energy. To this end it aims at putting the conditions in place for the development and use of national expertise in the country, to enable a quick and seamless access to functional energy systems to a greater number of people, particularly in rural areas.

3. *Gender Considerations.* Are gender considerations taken into account? (yes ☒ /no ☐). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

The program as a whole will have a gender sensitive approach to it. Specifically, Component 1 will seek to ensure that the use of land and natural resources is governed by an integrated, participatory and gender sensitive approach. Furthermore, the alternative livelihoods that will be developed under Component 3 will also have to take into consideration gender issues given the fact that men and women may play different roles in the generation of new and diverse incomes. Women producer groups will be encouraged and facilitated, and active women's groups will be called upon to build the capacity of other emerging groups. The project will build on the comparative strengths of both men and women, and will seek to identify suitable opportunities for participation of both groups. All relevant project indicators will be gender-disaggregated.

4 *Risks.* Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

Risk	Rating	Mitigation Strategy
Weak capacity of government institutions to support the project	L-M	The project will mitigate this risk by emphasizing on a participative approach, making sure that there is a national ownership of the project objectives and activities. Furthermore, government officials will take part of the preparation stage of the project as well as being part the governance and implementation process, which should strengthen ownership of the project, thus ensuring its success. Finally, during training and capacity building will also be provided under Components 1 and 2, which should provide learning incentives for government institutions.
Lack of interest from the local communities to explore alternative livelihoods	L-M	Training and support will be provided to targeted communities so that they can fully grasp the extent of benefits associated with a reduced natural resources degradation and the enabling of an ecosystem-based approach (Component 1).
Tools and methodologies (components 1 and 3)	L	Training will be provided to the appropriate end-users for the use of the tools and methods to be developed – i.e. monitoring platform under Component 1 and agropastoral techniques under Component 3.

developed fail to reach intended users		
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5. *Coordination.* Outline the coordination with other relevant GEF-financed and other initiatives.

In addition to the projects mentioned in the baseline section, the proposed project will coordinate with other existing projects (GEF funded and non-GEF funded) in order to capitalize on related initiatives that may provide support for this project's activities.

Other initiatives with which coordination will be necessary will include the following:

The Great Green Wall initiative: The Great Green Wall (GGW) initiative is a pan-African proposal to green the continent from west to east to battle desertification. It aims at tackling poverty and the degradation of soils in the Sahel-Saharan region, focusing on a strip of land of 15 km wide and 7,100 km long from Dakar to Djibouti. First envisioned in 2005 by the former President of the Federal Republic of Nigeria, Chief Olusegun Obasanjo as a mean to combat ecological degradation, the vision evolved into an integrated ecosystem management approach in 2007, when the African Union adopted declaration 137 VIII, approving the "Decision on the Implementation of the Green Wall for the Sahara Initiative". The participating countries hope that by linking national-level efforts across borders, they will tackle policy, investment, and institutional barriers that exacerbate the effects of climate change and variability, leading to desertification and deterioration of the environment and natural resources and the risk of conflicts between communities. The GGW's US\$ 2 million budget, stems largely from World Bank co-financing and partnerships fostered by the African Union, and ensures that participating countries will have the means to see the project through to the end. Given the scope of the GGW initiative, the current project may possibly work closely with this GGW coordination team to assist in the design and implementation phases of the project, in particular in terms of monitoring of ecological conditions, reforestation and forest conservation, as well as within the multidisciplinary platform.

Sustainable livelihoods for returnees and host communities in the Senegal river valley: This project funded by the World Bank (US\$ 2,500,000) seeks to improve access to livelihood support for returnees and host communities, as well as to enhance conflict prevention and risk management mechanism in Brakna and Trarza in the Senegal River Valley area. More specifically, the project will seek (i) to contribute to reducing food insecurity through support in the provision of production inputs for 3,830 households, with emphasis on women and youth, (ii) to enhance capacity for women and youth for 1,500 households, (iii) to establish and strengthen community-based organizations to work with communities to identify, develop, implement and evaluate their own community development plans; and (iv) to promote social cohesion efforts by strengthening 22 community structures, such as local conflict prevention, risk management and participatory M&E.

Programme Aftout Sud Karakoro II (PASKII): The overall objective of PASK II (US\$ 38,000,000) is to improve incomes and living conditions of the target populations (Aftout South and Karakoro). Its specific objective is to contribute to building, in the Project Area, an economic and social fabric based on the sustainable valuation of natural resources, inclusive of poor rural households, particularly women and youth. This will be achieved through: the restoration of soil, mobilization and management of surface water; efficient and sustainable agriculture, livestock and forestry-pastoral resource systems; the establishment of a "local partnership", oriented towards poverty reduction, and whose target populations will be full participants.

Observatoire du Sahel et du Sahara (OSS): In its Strategy 2020, the organization's work revolves around two programmes: (1) the land programme, dedicated to observation, environmental monitoring and monitoring-evaluation, and (2) the water programme, dedicated to the sustainable management of shared water resources in the Sahara-Sahel region with a focus on transboundary aquifers.

For instance, the OSS has contributed to the **REPSAHEL**. This project, supported by the Swiss Development and Cooperation, aims at improving the Sahelian populations' resilience to environmental change by strengthening the

tools for production, dissemination and exploitation of environmental data and information in national and sub-regional organizations of the Sahel region. The project is composed of four project components: 1) supporting the development and maintenance of environmental monitoring systems; 2) developing and implementing an information-sharing system and a communication strategy; 3) strengthening the capacity of the local population, and; 4) strengthening the capacity of political decision makers. The project is expected to conclude at the end of 2015.

Drinking Water and Development of Oases in Rural Areas: This US\$ 72,000,000 Arab Fund (AFESD) supported project aims at providing drinking water to the inhabitants of rural villages in different parts of Mauritania, as well as improving their health and living conditions. It also aims at developing groundwater sources and regulating surface water in oases for agricultural use. Overall, the project will contribute to strengthening the efforts to fight poverty and unemployment, improving farmers' income, providing employment opportunities and maintaining the population in rural oases areas. The project will develop the rural areas in the oases through the provision of groundwater for the irrigation of about 1,100 hectares of palms and vegetables, and regulate surface water for the irrigation of about 1,150 hectares of grain, as well as replenish groundwater supplies. This project is expected to be completed in the 3rd quarter of 2018.

Value Chains Development Programme for Poverty Reduction: This IFAD US\$ 17,000,000 project aims at developing the value chains of various products (vegetables, dates, milk, etc.) so that the value added to these goods enables poor rural people to realize the market potential and to reduce their poverty. This programme, which aims to support economic growth in Mauritania, comes at an important time in the country's development. People involved in the programme will be encouraged to network and to share knowledge and experiences with peers in other similar projects.

The project will also seek to cooperate with other GEF-Funded initiatives, including in particular:

- the recently approved FAO-Implemented regional project for the Adaptive Management of Oases in the Maghreb,
- the IFAD-supported project "Support to the Adaptation of Vulnerable Agricultural Production Systems",
- the AfDB project "Improving Climate Resilience of Water Sector Investments with Appropriate Climate Adaptive Activities for Pastoral and Forestry Resources in Southern Mauritania"
- the UNEP supported "Development of an Improved and Innovative Delivery System for Climate Resilient Livelihoods in Mauritania" project
- The World-Bank implemented "PSG-Sustainable Landscape Management Project under SAWAP".

All of these projects can provide useful technologies, knowledge and systems on which this new initiative will build. Active coordination among agencies will be pursued through the FAO Office in Mauritania, as well as through the coordination of the regional representations of the Mauritanian government.

6. *Consistency with National Priorities.* Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes ☒ /no ☐). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

Perhaps one of the most comprehensive effort of the Mauritanian government to improve the human development of rural communities comes from its third **Poverty Reduction Strategy Paper** (PRSP) action plan (2011-2015), which puts poverty reduction as the ultimate objective of the country's economic, social and institutional development policies³². The action plan's implementation was fruitful as the country strengthened its political, economic, environmental and democratic governance, through decentralization processes in terms of territorial and local governance. The country also launched in 2011 the **Environmental and Sustainable Development Policy**

³² Report on Implementation of the Third PRSP Action Plan. 2013. <http://www.imf.org/external/pubs/ft/scr/2013/cr13189.pdf>

Declaration³³, which recognizes that the development of the country starts with environmental conservation. The proposed program contributes to these high-level policy priorities.

The program is also well aligned with several global priorities, such as UNCCD, UNFCCC, CBD, the Monitoring of Rio +20, the UNDAF 2012-2016 and FAO's CPF 2013-2016. The project aligns with the country's 2011-2020 **National Biodiversity Strategy and Action Plan (NBSAP)**³⁴ which specifically aims at maintaining the functions of ecosystems over the long term, including their capacity to adapt to environmental and climate changes, which will contribute towards a more sustainable environmental and human development. The project will be contributing to achieving a number of Aichi Targets, including Targets 7, 11 and 14. The contribution of the GEF project towards the progressive achievement of these 3 Aichi Targets will be monitored through the selected indicators of the project outcomes, in particular:

- Target 7 (By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.) This target is captured by outcome 2 indicator *Number of Ha of land under renewed vegetal cover and under sustainable management*.
- Target 11 (By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.). This target is captured by outcome 2 indicator *% increase of land hosting BD of global significance conserved as protected area*.
- Target 14 (By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.) This target is captured by outcome 4 indicator *% increase of direct beneficiaries' incomes*. This indicator shows the positive trends in benefits that humans derive from biodiversity and ecosystem services deriving from the project.

The project is also well aligned with the policies and strategies of the Mauritanian government and fits in the 2013-2016 country level FAO's CPF which refer to:

- The National Environment Action Plan Environment (NEAP II)
- The Strategic Framework for the fight against poverty (PRSP 3)
- The National Action Plan for the fight against desertification
- The National Adaptation Plan to Climate Change
- The National Strategy on Biological Diversity
- The Strategic Framework for Sustainable Land Management Investment
- The National Strategy for Sustainable Development
- The Domestic Energy Strategy
- The National Strategy for Food Security

7. Knowledge Management. Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

Knowledge generation and management is integrated throughout the program's components. Component 1 will help generate useful knowledge and information for decision makers, regarding ecosystem health. Component 2 will provide knowledge relevant to natural resources users through trainings and capacity building. Component 3 will also provide information on the most profitable pathways towards sustainable development. Component 4 will identify and disseminate lessons learned, best practices, and support awareness raising through and beyond the

³³ République Islamique de Mauritanie. 2011. Déclaration de politique d'environnement et de développement durable. <http://aires-marines.ugr.ca/27/1/DPEDDRIM.pdf>

³⁴ <https://www.cbd.int/doc/world/mr/mr-nbsap-v2-fr.pdf>

project's region. Exchanges among project beneficiaries will be encouraged through study tours, forums and workshops, and the program will use best available technologies and partnerships with key national and international partners to ensure lasting capacity building.

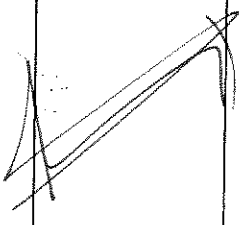
PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT³⁵ OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

NAME	POSITION	MINISTRY	DATE
Mohamed Yahya LAFDAL	GEF Operational Focal Point	Ministry of Environment and sustainable development	8 April 2015

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies³⁶ and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Gustavo Merino Director, Investment Centre Division Technical Cooperation and Programme Management FAO Viale delle Terme di Caracalla 00153, Rome, Italy		15 July 2016	Athman Mravili, FAO Representative Mauritania	+ 222 45253157/4525 6045	Athman.mravili @fao.org
Jeffrey Griffin Senior Coordination GEF Unit Investment Centre Division FAO			Maude Veyret-Picot Technical Officer GEF Unit Investment Centre Division FAO	+39.065705236 2	Maude.VeyretPi cot@fao.org

³⁵ For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

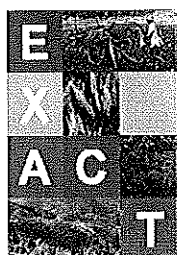
³⁶ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF



Annex I

EX-ACT brief:

Ex-Ante GHG Appraisal of the Integrated Ecosystem Management Program for the Sustainable Human Development in Mauritania



About EX-ACT: The *Ex Ante* Carbon-balance Tool aims at providing *ex-ante* estimations of the impact of agriculture and forestry development projects on GHG emissions and carbon sequestration, indicating its effects on the carbon balance.

EX-ACT website: www.fao.org/tc/exact

Contact: EX-ACT@fao.org

Introduction

This *EX-ACT Brief* concisely presents the results of the ex-ante GHG assessment of the Integrated Ecosystem Management Program for the Sustainable Human Development in Mauritania. It was prepared for submission as annex to the project identification form.

The brief intends to quantify main project GHG impacts by project component and transparently document the input data of agricultural field activities and areas on which the assessment is based. It thus allows subsequent GHG assessments at mid-term and project finalization stages to update area target and monitor ongoing achievements of GHG benefits. The results of the EX-ACT brief may likewise be used to target potential, more comprehensive GHG monitoring activities under the project to the most relevant priority project components from a GHG point of view.

The EX-ACT appraisal used Tier 1 level of specification and is based on area targets of sustainable land management provided by the project appraisal team. A brief summary of methodology and practicalities of the EX-ACT tool and its application is accessible through the [EX-ACT Quick Guidance](#) document.

Project Activities

The EX-ACT tool utilizes area estimates of improved land management and production practices at project end as input data and compares them to an alternative baseline scenario that would materialize in absence of the project. The current analysis adopts the continuation of the status-quo as the baseline scenario. In the absence of refined field data it is thus conservatively assumed that in absence of the project land degradation processes would not further intensify beyond current stages. This decision avoids that strong claims of mitigation benefits are made on a basis without the provision of justifying field data.

The analysis below differentiates between direct project impacts that are achieved by direct project activities and indirect project impacts that are supported through project actions and will result from the associated scaling-up process and the baseline projects and initiatives. The main project components can thereby be differentiated as follows.

Table 1: Direct and indirect project activity targets with GHG mitigation impacts

	Direct project targets (ha)	Indirect project targets (ha)
Grassland rehabilitation	20,000	200,000
Forest rehabilitation	6,000	50,000
Cropland rehabilitation	10,000	100,000
Reforestation	3,000	150,000
Total	39,000	500,000

Results

Considering the above activity scenario, the Integrated Ecosystem Management Program in Mauritania will provide direct total mitigation benefits of roughly 1.85 million t CO₂-eq over a period of 20 years. This is equivalent to annual mitigation benefits of 2.4 t CO₂-eq per year.

Thereby afforestation on degraded land can be identified as providing the strongest single mitigation benefits, whereby the other three project components – cropland, grassland, and forest rehabilitation – provide carbon sequestration impacts of roughly similar scale.

Major parts of the estimated carbon sequestration benefits under the analysis thereby stem from increased soil carbon levels as a consequence of the rehabilitation process. Estimates could be refined during project implementation by utilizing improved data on current degradation states and measurements of actual achieved improvements. As part of this ex-ante assessment the average soil carbon levels as reported by the IPCC for tropical dry area have been used instead, as detailed in the EX-ACT methodology.

Table 2: Ex-ante Carbon-balance of direct project impacts on 39,000 ha

Project Name	0	Climate	Tropical (Dry)	Duration of the Project (Years)					20		
Continent	Africa	Dominant Regional Soil type	LAC Soils	Total area (ha)					39000		
Components of the project	Gross fluxes			Share per GHG of the Balance					Result per year		
	Without	With	Balance						Without	With	Balance
	All GHG in tCO2eq			CO2			N2O	CH4			
	Positive = source / negative = sink			Biomass	Soil	Other					
Land use changes											
Deforestation	0	0	0	0	0		0	0	0	0	0
Afforestation	0	-609,722	-609,722	-377,567	-232,155		0	0	0	-30,486	-30,486
Other LUC	0	-435,417	-435,417	-146,667	-288,750		0	0	0	-21,771	-21,771
Agriculture											
Annual	0	0	0	0	0		0	0	0	0	0
Perennial	0	0	0	0	0		0	0	0	0	0
Rice	0	0	0	0	0		0	0	0	0	0
Grassland & Livestocks											
Grassland	0	-462,000	-462,000	0	-462,000		0	0	0	-23,100	-23,100
Livestocks	0	0	0				0	0	0	0	0
Degradation & Management	0	-345,514	-345,514	-276,214	-69,300		0	0	0	-17,276	-17,276
Inputs & Investments	0	0	0			0	0		0	0	0
Total	0	-1,852,653	-1,852,653	-800,448	-1,052,205	0	0	0	0	-92,633	-92,633
Per hectare	0	-48	-48	-20.5	-27.0	0.0	0.0	0.0			
Per hectare per year	0.0	-2.4	-2.4	-1.0	-1.3	0.0	0.0	0.0	0.0	-2.4	-2.4

When considering also indirect project impacts instead, a total of 500,000 ha are targeted with improvements in the long run. With the improvements on such a wider scale that include contributions of reforestation on 150,000 ha under the Great Green Wall initiative and the baseline projects and initiatives, a total of 42 million t CO₂-eq of mitigation benefits could be achieved over 20 years. This is equivalent to annual mitigation benefits of 4.2 t CO₂-eq per hectare. Such high project mitigation benefits thereby rely on the actual realization of the extended land area with rehabilitation and reforestation measures.

Table 3: Ex-ante Carbon-balance of indirect project impacts on 500,000 ha

Project Name	0	Climate	Tropical (Dry)	Duration of the Project (Years)					20			
Continent	Africa	Dominant Regional Soil Type	LAC Soils	Total area (ha)					600000			
Components of the project	Gross fluxes:			Share per GHG of the Balance					Result per year			
	Without	With	Balance	CO ₂	Biomass	Soil	Other	N ₂ O	CH ₄	Without	With	Balance
	All GHG in tCO ₂ e											
	Positive = source / negative = sink											
Land use changes												
Deforestation	0	0	0	0	0	0	0	0	0	0	0	0
Afforestation	0	30,486,082	-30,486,082	-18,878,332	-11,607,750			0	0	0	-1,524,304	-1,524,304
Other LUC	0	-4,354,167	-4,354,167	-1,466,667	-2,887,500			0	0	0	-217,708	-217,708
Agriculture												
Annual	0	0	0	0	0			0	0	0	0	0
Perennial	0	0	0	0	0			0	0	0	0	0
Rice	0	0	0	0	0			0	0	0	0	0
Grassland & Livestocks												
Grassland	0	-4,620,000	-4,620,000	0	-4,620,000			0	0	0	-231,000	-231,000
Livestocks	0	0	0					0	0	0	0	0
Degradation & Management	0	-2,879,287	-2,879,287	-2,301,787	-577,500			0	0	0	-143,964	-143,964
Inputs & Investments	0	0	0				0	0		0	0	0
Total	0	-42,339,535	-42,339,535	-22,646,785	-19,692,750	0	0	0	0	0	-2,116,977	-2,116,977
Per hectare	0	-85	-85	45.3	-39.4	0.0	0.0	0.0	0.0			
Per hectare per year	0.0	-4.2	-4.2	2.3	2.0	0.0	0.0	0.0	0.0	0.0	-4.2	-4.2

