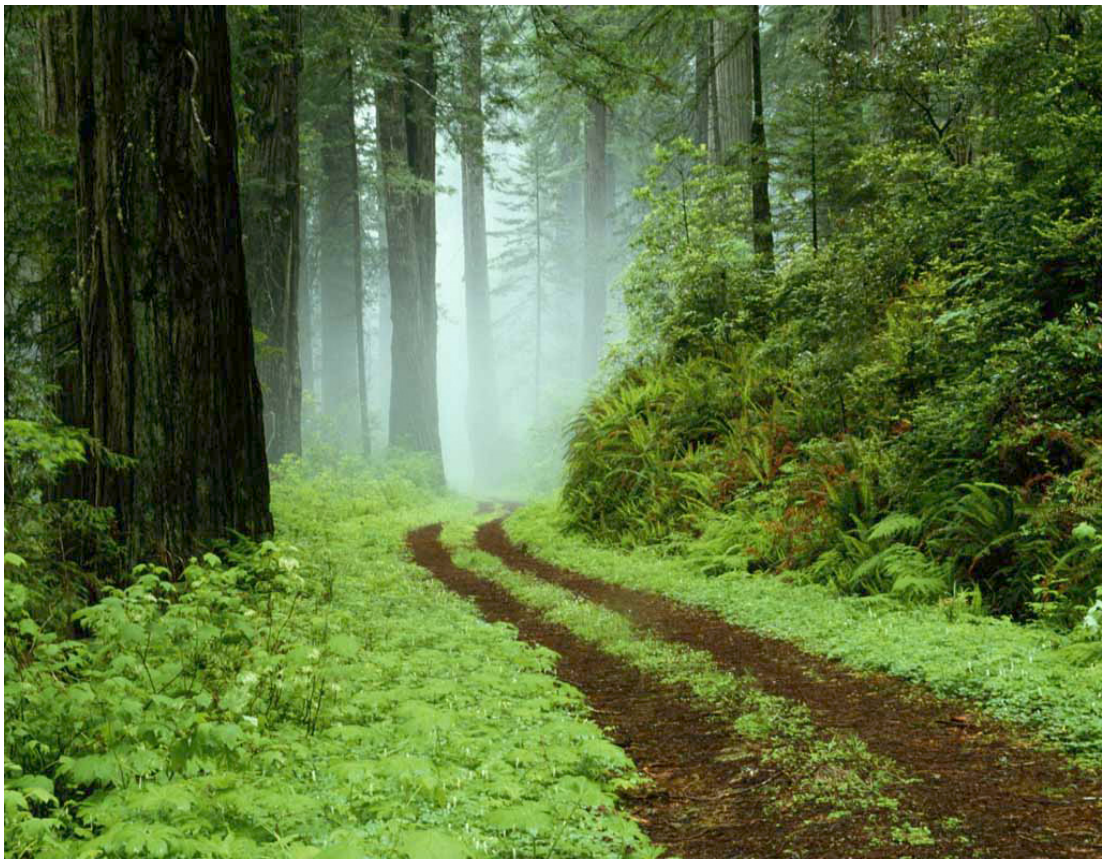
An Assessment of Investments & Financial Flows In The Gambian Forestry Sector



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Abbreviations

CBO	Community Based Organization
CH_4	Methane
CO_2	Carbon dioxide
DoF	Department of Forestry
DPWM	Department of Parks and Wildlife Management
FF	Financial Flow
GBoS	Gambia Bureau of Statistics
GDP	Gross Domestic Product
GMD	Gambian Dalasi
GGFP	The Gambia German Forestry Project
ha	Hectar
I&FF	Investment and Financial Flows
IF	Investment Flow
O&M	Operation and Maintenance
MOE	Ministry of Energy
MOFEN	Ministry of Forestry
NA_3	Cryolite
NBR	North Bank Region
NEA	National Environment Agency
NFF	National Forestry Fund
NO_2	Nitric oxide
SNC	Second National Communication
NGO	Non Government Organization
SGF	Stay Green Foundation
SLM	Sustainable Land Use Management
UNDP	United Nations Development Programme

Summary

In the Gambia, Forestry sub-sector has been identified as priorities for adaptation and mitigation respectively; these have been evaluated under this assignment and Investment & Financial Flows (I&FF) have been carried out to study the effects of climate change. To this end in the forestry sector, three mitigation measures are identified: (i) sustainable forest management, (ii) enrichment of degraded areas and (iii) afforestation with reforestation.

The I&FF evaluation team was composed of five (5) national experts who worked according to the guidelines contained in the UNDP User Guide and Guidebook for Assessing Methodology I&FF to Address Climate Change. However one of the team member (the statistician died in the early stage of the assessment and has not yet been replaced at the time of submission of the first draft).

The team agreed on the following entities:

- government allocations (annual budget and National Forestry Funds);
- NGOs and private investments.

Since domestic investments are not ready available of forest matters, this has not been included in the assessment. The team collected data from documents of the Government estimates on revenues and expenditures, national communications, the National Action Plan for Adaptation (NAPA) to climate change, the National Strategy on Climate Change, the Gambia Bureau of Statistics and NGOs.

Thus, to achieve the goals of reducing the level:

- Governmental entities should have $ 4,076,280.00 for sustainable forest management, (ii) $200,685.90 for enrichment of degraded areas and (iii) $73,642.21 for afforestation and reforestation. The expected total investment on the three activities from year 2012–30 is $4,350,612.00.
- Business (NGOs) should have $ **(Not Available)** for sustainable forest management, (ii) **$ (Not Available)** for enrichment of degraded areas and (iii) **$ (Not Available**) for afforestation and reforestation. These flows are from national sources.

Alleviating the pressure on forests in 2030 as projected will require an additional cost compared to the current situation.

Introduction

The forestry sector accounts for around 0.8% of the GDP. Though 85% of the populations derive their daily energy supply from forest resources, this domestic consumption of forest resources are not considered in the overall economic performance of the country. Women are highly involved in small–scale forest product commercialisation. They sell firewood (branched wood in particular), fruits, herbs and leaves. Though these are of low economic value in comparison with high value products like timber and split firewood sold by men, they provide an important alternative source of income for the women folk. The Gambia depends heavily on importation of commercial construction wood and processed boards both from the sub-region and Europe. The local productions certify more than 70% of wood requirements for furniture and other household. Charcoal production is banned in The Gambia in 1980 and therefore it is imported in the country. Land-use changes also result in GHG emissions through the burning of forest cover among others for farm clearing or game poaching. In converting forests to croplands a large quantity of the soil carbon can be released. As well, loss of forests results in the potential of reducing/loss of the absorbing capacity as sink of atmospheric gases such as, CO_2, CH_4, NA_3, NO_2.

The Gambia is small (11,700km^2) and developing country. It is endowed with forest cover, which is about 43% of the total land area. The trend analysis based on National Greenhouse Inventory (July, 2008) shows only slight reduction as change in the total area of forest cover but of greater significant is the rate of forest degradation which is apparently on increase thus reducing its absorptive capacity of the Greenhouse gases. The rate of emissions from the soils and forest burning has also increased recently.

Fuel wood contributes about 97% of the country's total household energy needs, constituting about 98% of rural household consumption and about 95.5% of urban household consumption. These statistics eloquently express the importance of fuel wood in the Gambia's household energy basket. The resource-base of the energy, the country's forest cover has been under severe pressure since the 1960s. The forest cover reduced from 81.2% of the land area in 1946 to just about 42.55% in 1993. The reduction in the closed forest type has been most dramatic, dropping drastically from 60.1% in 1946 to 0.7% in 1993. In effect, closed forest has almost disappeared from the Gambia's vegetation map within a period of 50 years. During this same period the country's population density grew from 35/ km^2 to about 108/km^2.

Land use changes between 1980 and 1993 observed by the Forestry Department in a recent monitoring exercise (draft 2010 monitoring results) concluded the following results:

- The total area under forest increased. This is due to a reversion of former agricultural land (mainly marginal fallow land) into tree and shrub savannah compared to previous inventory data. All Regions, with the exception of North Bank Region (NBR), registered an increase in tree and shrub savannah.
- Closed and open woodland was reduced by 3.1% per year due to forest degradation and conversion into agricultural land. Most severe degradation can be observed round middle and the eastern part of the country.

- Mangroves slightly decreased in their total surface area and some of the causes are due to die-backs because of disturbed water exchange, illegal exploitation and conversion of tidal areas into shrimp and fish farms.
- The fallow areas have decreased by almost 4.4% due to conversion into tree and shrub savannah, agriculture with no trees or to a lesser extent into agriculture with trees.

Agriculture with trees remained relatively unchanged and agriculture with no trees increased by 1.3% per year.

1.1 Objectives of the I&FF assessment

The main objective of the I&FF assessment on the forestry sub sector is to determine the amount and identify the sources of funds to address climate change concerns at the national level.

The following outcomes are expected:

- Information on investment and financial flows in key forestry sub-sectors;
- A projection of future I&FF in the baseline scenario;
- Identification of measures to address climate change and projections of future I&FF;
- Projection of future I&FF in the mitigation scenario;
- Identification of incremental I&FF needed to implement measures and political implications;
- Policies needed to address the change in the mitigation scenario.

1.2 Background

From the past 40 years, the structure of The Gambian economy has not changed significantly and may, for analytical or descriptive purposes, be categorized into: (1) agriculture and natural resources, (2) services delivery, and (3) industrial development. Within the last five years, agriculture and natural resources-based economy activities account on average for 26.8 percent of GDP, whilst services and industry 14.5 percent and services 58.7 percent respectively (source Draft Second national Communication, SNC) 2011). Notice in particular that key sectors of the economy: agriculture, livestock, forestry, energy and tourism contribute 34% of GDP. The Government recognised the prospects of a balanced ecosystem for advancing the socio-economic development of the country. The policy framework for sustainable natural resource management put an adequate forest cover at the centre front. The forest policy (1995-2005) advocates a forest cover of 30% which will be sufficient for maintaining an ecological balance necessary for sustainable growth. 75% of the total forest cover, amounting to 200,000 ha should be managed by local communities and the private sector in partnership with Government.

The communities in The Gambia recognised the pivotal role forests play in their daily lives as well as the national economy contributing 1% to the gross domestic product (GDP). In the past, the management protection and control of the forests rest solely on the Department of Forestry (DoF). Around 1990, It was felt necessary to involve the local communities in the management of the forests. In 1952, 66 forest parks were demarcated to provide future wood requirement for

the local communities the exploitation of which will be on a sustained basis. The Gambia German Forestry Project (GGFP) introduced the community forestry initiative to involve the local populace in the management of the forests on a sustained basis. The first community forest management agreement was signed in 1991 involving the community of Berefet. Community managed forests have increased from 450ha in 1991 to over 23,501.6ha in 2002 and 2005 to almost close to 40,000 ha. However, over 100,000 ha of closed and open woodland have been converted to subsistence agricultural land. The rate of forest conversion to farmland stands at 1.3% or 14,000ha per annum.

Table 1; Forest Categories in The Gambia

Cover type	Area (ha)	Percentage
Tree and Shrub savannah	348,028	33.4
Upland agricultural Crops	275,088	26.4
Cultivated Swamps	81,276	7.8
Cultivated Swamps	33,344	3.2
Fallow or bush	102,116	9.6
Closed canopy woodland	83,360	8.0
Mangroves	66,688	6.4

Source: Samba, 2004.

In this report and analysis, the document used for the management of forests in The Gambia is the Forest Policy covering the period 1995 to 2005. It was the same policy the Department used until 2008 in the management of the forests and its resources. The new Forest policy now in use is from 2009 to 2019.

The unique attribute to the 1995 – 2005 policy is that its high sensitive to the needs of the country and complied to the international agreements and commitments such as the convention on desertification, biological diversity, climate change to mention but a few. It also incorporated a participatory forest management approach with forest ownership transfer from state to communities, which empowered women exclusive access right to branch wood from the forest to improve their economies, ensured river stability by strict protection of the mangroves, and upheld the 1980 ban on charcoal production. The policy emphasized on capacity building for staff and communities including Non Governmental Originations (NGOs) and Community Based Organizations (CBOs) in terms of work planning, forest resources accounting and above all the sustainable management of the forest.

The situation of forest in terms of the following, commercial fuel wood, timber and charcoal is given below:

Fuel wood

The value of commercial fuel wood in terms royalty paid at the four administrative divisions now called regions in The Gambia is shown on Figure 1 below. The payment of royalty per cubic meter of fuel wood in the referred period as indicated in the Forest legislation is D13.00 (Dalasis).

Table 2. Commercial fuel wood 1996-1999 (in GMD Dalasi)/US$

Year	Western Region	Lower River Region	Central River Region	North Bank Region Upper River Region	Total
1996	4,243.54	9,245.76	2,382.80	306.85	16,178.95
1997	3,858.65	7,670.45	3,689.79	326.93	15,545.82
1998	14,677.10	5,653.94	13,326.81	330.50	33,988.35
1999	28,891.26	5,479.12	9,048.69	359.82	43,778.89
Total GMD	**51,670.55**	**28,049.27**	**28,448.09**	**1,324.10**	**109,492.01**
Total US$ (US$1=D27.7)	**1,865.36**	**1,012.61**	**1,027.01**	**47.80**	**3,952.78**

The analysis of the above Table 1 shows that over the years (1996-1999), the production of fuel wood is more in Western Region (**D51,670.55)** followed by Central River, Lower River and North Bank Regions (**D1324.1)** based on the royalty payments. This trend of payments fuel wood is obvious because in the North Bank Region, fuel is scarce because of its past deforestation and degradation. This is followed by Lower River Region. Even though the Central River Region with the highest forest cover, access to wood in is difficult as compared to Western Region.

Charcoal

Prior to 1980 when charcoal was banned in the Gambia, it was one of the major energy sources in the urban areas of the Greater Banjul Area (Banjul, Serekunda, Bakau, Sukuta, Brikama etc.). The extensive production of charcoal to supply the urban need for domestic energy has caused a lot of forest depletion. The plant species Prosophis africana commonly called African Iron wood was the single species that was converted to charcoal. After number of years specifically in 1999 this tree was highly threatened and near extinction. Charcoal production was then extended to all kinds of trees resulting to forest degradation. The Government of the Gambia had no other option but to ban charcoal production country-wide in 1980 to present. The next strategy to government as an alternative was to allow the importation of charcoal through vendors in the country for domestic and commercial use. A total of 302 charcoal vendors were registered in 2007 in Western Region.

Timber production

Forest cover in the Gambia is not capable for commercial timber trade. Most of the timber being used in the country is for domestic use (carpentry and construction purposes). Re-export of timber is permissible and the wood being re-exported is sent to some Asian countries, particularly in China. Data on the total timber volume exported up to 2007 is not availabe because exportation illicit and illegal. This led to the ban on timber export until 2010.

In 2007, after an assessment, it was discovered that 42 saw mills were operating in The Gambia. Most of these saw mills were not registered. The rampant use of chains saws contributed to the depletion of the forest particularly the high valued tree species such as Pterocarpus erinaceus

(West African Rose wood), Khaya senegalensis (West African Mahogany), Danielia oliveri (Incense wood) and Chlorophora excelsa (White wood) etc.

1.2.1. Previous analysis used

a. Poverty Reduction Strategy Paper (PRSP)

The PRSP II is the Gambia five year (2002-2007) development Blue print strategy that is intended to form the basis for the economic development of the country. It has been under implementation until recently when it has been replaced by the Programme for Accelerating Growth and Employment (PAGE). The PRSP and the MDG's have been the foundation pillars of The Gambia's development agenda over the years. The PAGE is being developed by sectoral working groups from different government agencies, development partners NGO's and consultants. It is expected to mainstream environment and climate change as a cross-cutting issue in all sectoral programs in the PAGE five pillars.

b. National Biodiversity Strategy and Action Plan (NBSAP)

To fulfill its obligation under Article 6 of the CBD convention, The Gambia prepared its National Biodiversity Strategy and Action Plan in 1998. This important document sets out the overall goals, principles and strategic actions for the conservation and sustainable use of the Natural Resources in The Gambia. Its review and update has been proposed and preparations are being made to take into consideration climate change issues and programmes.

c. National Adaptation Programme of Action (NAPA)

The NAPA explicitly accounts for synergies between adaptation and national development plans, such the National Biodiversity and Strategy Action Plan, as well as with multilateral initiatives such as the Millennium Development Goals (MDGs), Convention on desertification, to name a few.

d. Convention on Biological Diversity: 4th National Report

The Gambia, through the Department of Parks and Wildlife Management, is preparing its fourth National Report on CBD. As in the third national report, targets were not achievable because not realistic as indicated in the NAGOYA CBD 2010 Report. Capacity building has been a constraint during the period.

e. National Communication:

The Gambia has reported his first national communication report and is compiling its second one. The objective of the communications is to share information among countries the status of climate change and its impact at the national level. The twelve objective of the SNC is to address the following: national geography, climate and demography, inventory of green house gases, assessment of options to mitigate concentration green house gases, research and systematic observations, capacity needs and strategic needs actions for development, constraints, gaps and related financial , technical and capacity needs, technology transfer, information and networking and finally international cooperation.

- Gambia Greenhouse gases

In 2000, the total greenhouse gases emitted in The Gambia was 3,623 Giga grams. Sulphur dioxide emission was recorded the highest (84%) coming from the Energy sector. Around 9% was recorded for Carbon dioxide, 5% for carbon monoxide and 1% from methane while other gases combined record 2% (The Gambia SNC draft 2011).

The total greenhouse gas emitted into the atmosphere from the Forestry sector in 2000 was 519 Gg of Carbon dioxide. Other Non-CO2 gases (CH4, N2O2, NO and CO) emitted was said to be non significant. In the Forestry sector alone, the combination of the net emissions of the CO2 gas was 3,698 Gg specifically from the forest and grasslands. Around 0.013 Gg of CO2 comes from Agricultural soils. The gas removal through forest activities and cover was 2,421 Gg while 757.6 Gg was from forest abandonment (draft SNC report 2011).

Therefore, emissions and gas removals of CO2 from Land Use, land Use Change (LULUCF) categories in The Gambia from 1994-2000 has indicated that forest sector serves as a CO2 sink. This reveals that forest cover has a direct correlation fro CO2 sink in The Gambia.

- Mitigation of Greenhouse gases in The Gambia

In order to understand and address the impact of Greenhouse gases, The Gambia implemented training for 12 experts from the Forestry and Agriculture sectors from January 2006 to December 2008. The objectives of the training were to provide expert knowledge for compiling, achieving, updating and managing green house gas inventory. The experts were able to acquire good practical skills and guidance on identifying appropriate methods to determine gas emissions and analysing them with efficient interpretation.

The experts were able to conduct workshops in The Gambia at the regional level. This training of trainers was aimed at targeting a wide range of the population to understand green house gases and its management.

1.2.2 Institutional Arrangement and Collaborations

Climate change cuts across all sectors and regions. It affects all and sundry. Consequently, actions to address this phenomenon should be concerted, holistic and inter-sectoral. For this reason climate change should be tackled firstly as a national priority with significant resources of relevant ministries and agencies devoted to combating climate change, including financial, material and human resources.

To demonstrate this need and urgency for collaboration and inter-sectoral cooperation to address climate change, the I&FF Team for Forestry Mitigation includes experts from the Ministry of Forestry (MOFEN), Department of Forestry (DoF), Department of Parks and Wildlife Management (DPWM), Stay Green Foundation (SGF), National Environment Agency (NEA), Ministry of Energy (MOE), Gambia Bureau of Statistics (GBoS).

Table 3. The Forestry I&FF Team comprised of the following experts:

No	Name	Position	Institution
1	Kebba .N. Sonko	Permanent Secretary	MOFEN
2	Abdoulie Sanneh	Director	DoF
3	Baboucarr Mbye	Executive Secretary	SGF
4	Ousainou Touray	Senior Programme Officer	DPWM
5	Arona Jobe	Programme Officer	NEA
6	Kemo Ceesay	Ag. Director- Energy	MOE
7	Malamin Keita (deceased)	Statistician	GBoS

The UNFCCC is housed in the MOFEN whilst the National Focal Person is in the Department of Water Resources, and his office coordinates climate change activities in the country. The I&FF assessment, funded with technical guidance of the UNDP. Later on during the assessment exercise only three of the consultants worked seriously on the document. These are Kebba N Sonko, Baboucarr Mbye and Ousainou Touray.

1.2.3 Basic Methodology and Key Terms

Basic methodology

The methodological approach of the national assessment of the I&FF for forestry mitigation followed the nine (9) steps outlined in the UNDP guideline:

a. Establish key parameters of assessment:
   - Define detailed scope of the sector
   - Identify preliminary mitigation (or adaptation) measures
   - Specify assessment period & base year
   - Select analytical approach.

b. Compile historical I&FF data and other input data for scenarios:
   - Compile annual I&FF data, disaggregated by investment entity, source, & investment flow versus financial flow
   - Compile annual historical O&M data, disaggregated by investment entity & source
   - Compile other input data for scenarios.

c. Define baseline scenario:
   - Socioeconomic trends
   - Technological change/advances
   - Business-as-usual investments
   - Define model/spreadsheet to be used for the assessment.

d. Derive I&FF for baseline scenario:
   - Derive annual IF & FF estimates, disaggregated by investment entity & source
   - Derive annual O&M estimates, disaggregated by investment entity & source.

e. Define Mitigation scenario:
   - Sector is selected for Mitigation
   - A baseline scenario & a mitigation scenario will be developed for that sector.

f. Derive I&FF for Mitigation Scenario:
   - Derive annual IF & FF estimates, disaggregated by investment entity & source
   - Derive annual O&M estimates, disaggregated by investment entity & source.

g. Estimated changes in annual I&FF needed to implement mitigation:
   - Estimate changes in cumulative I&FF
   - Estimate changes in annual I&FF.

h. Evaluate Policy implication:
   - Determine policy instruments & measures to encourage changes in I&FF
   - Identify the entities that are responsible for the significant incremental changes in I&FF
   - Determine the predominant sources of their funds, important to distinguish between public & private sources of finance.

i. Synthesize results and complete report:
   - Integrate I&FF results, & evaluation of policy instruments & measures, across sectors, & across mitigation & adaptation
   - Summarize objectives of study, methodology, inputs, & results in report
   - Complete reporting templates.

Key terminology

The Investment and Financial Flows (I&FF) methodology distinguishes between two distinct types of investments: investment flows and financial flows. An **"investment flow" (IF)** is the capital cost of a new physical asset with a life of more than one year, such as the capital cost of a new power plant, a new automobile, a new household appliance, or a new agricultural irrigation system. Investment flows are limited to new physical assets because such investments have climate change implications for the duration of the operating lives of the facilities and equipment purchased. It excludes the purchase of an existing physical asset, such as an existing vehicle. However, investment flows to retrofit, or considerably expand, an existing physical asset such that the climate change implications of that asset are significantly altered would be included in IF. Investments in financial assets (such as stocks and bonds), and in physical assets that neither affect climate nor have climate impacts implications are also excluded because they are unrelated to climate concerns.

A "Financial flow" (FF) is an ongoing expenditure on programmatic measures, the costs of operation and maintenance (O&M) of new assets (e.g., salaries of personnel, fuel costs) and encompass expenditures other than those for expansion or installation of new physical assets.

The physical assets purchased with investment flows will have **operation and maintenance (O&M)** costs associated with them (i.e., ongoing fixed and variable costs such as salaries and raw materials). Operation and maintenance costs of new assets need to be included in I&FF assessments because these costs can vary considerably among investment flow types, and can have a significant effect on the total cost of an investment over its lifetime. For example, O&M costs are a much greater share of total costs (capital costs plus O&M costs) for gas-fired electricity generation than photovoltaic electricity generation. O&M costs include the following categories of costs:

- Salaries or wages of personnel
- Fuel costs such as power and/or fuel for operations, fuel for production
- Public utilities such as telephone service, Internet connectivity, etc.
- Raw materials
- Maintenance and/or leasing of equipment
- Office supplies and consumables
- Advertising
- License or equivalent fees (such as Corporation yearly registration fees) imposed by a government
- Real estate expenses, including: rent or lease payments, office space, furniture and equipment, property taxes and equivalent assessments
- Operations fees, such as fees assessed on transportation carriers for use of highways, and production or operation fees, such as subsidence fees imposed on oil wells
- Insurance
- Damage due to uninsured losses, accident, sabotage, negligence, or terrorism.

An "investment entity" is an entity that is responsible for an investment. This methodology utilizes three types of **investment entities**: households, corporations, and government. These are described below:

i. **Households** are individuals or groups of individuals (e.g., families) who act as one unit financially.
ii. **Corporations** include both financial corporations and non-financial corporations, and can be either for-profit or not-for-profit.
iii. **Governments** are the national, provincial, state, and local governments of a country. Financial and non-financial corporation's owned wholly or in part by governments, such as public universities and research institutions, and publicly held oil companies, utilities, and water authorities, are included in this category.

The **"sources of the I&FF funds"** are the origins of the funds invested by the investment entities. They can be both domestic and foreign, and can be in the form of equity, debt, domestic government assistance (subsidies), or foreign aid or official development assistance.

The **assessment period** is the time horizon for assessment; i.e., the number of years spanned by the baseline and climate change scenarios and the associated stream of annual IF, FF, and O&M costs. The assessment period for I&FF assessment should be at least 20 years and not more than

30 years. 20 to 30 years is a reasonable period over which to analyze alternative investment decisions. Also, most significant physical assets with GHG implications have lifetimes of 20 to 30 years, and many forestry mitigation measures require at least 20 to 30 years for the full effects to be realized. If models are used in the analysis, the choice of the assessment period may be dictated by the forecasting period of the models used. A single assessment period for all sectors is preferred; however, the assessment period could differ by sector, and between mitigation and adaptation within a sector, especially if models are used in the analysis. The base year is the first year of the assessment period, i.e., it is the first year of the baseline, mitigation, and adaptation scenarios.

The **base year** should be set at a recent year for which I&FF and O&M information is available so that the IF, FF, and O&M costs for the first year of all the scenarios are historical data. This grounds the start of the streams of cost data for each scenario in reality. A base year of 2005 is recommended.

An end year of 2030 is recommended for the last year of assessment period since this year aligns with typical sector development plans, and results in a reasonable assessment period length. Therefore, an assessment period of 2005 through 2030 is recommended. An end year of 2030 is recommended for the last year of assessment period since this year aligns with typical sector development plans, and results in a reasonable assessment period length. Therefore, an assessment period of 2005 through 2030 is recommended and adopted by this team.

The relevant investment costs for a sector are projected for two future **scenarios**: 1) a **baseline scenario**, which reflects a continuation of current policies and plans, i.e., “business-as-usual” scenario, and 2) a **climate change scenario**, in which new mitigation measures are taken (a “mitigation scenario”). The investment costs of the baseline and mitigation (or the baseline and adaptation) scenarios are then compared to determine the changes in investments needed to mitigate emissions from the sector (or to adapt to the impacts to the sector). Note that changes in investments may include not only increases in investments (new funding), but also shifts in existing investments (reallocations of existing and currently projected funding levels such that funds in one area decrease, and funds in another area increase).

Scope, input data and scenarios

2.1 Sectoral scope

Key parameters of the assessment

In the Gambia, to undertake investment and financial needs assessment on the forestry sub sector is difficult. Most activities of the forestry department are geared towards the conservation, restoration and enhancement of existing forests and to create pools through planting trees. But financial data for the cost of implementing projects, programmes and activities throughout the country remains scattered and sometimes inaccessible. It is worth noting that numerous projects (GGFP), (UNDP) and many other activities, sponsored Forestry Trust Fund and other interventions of the government, public and private sectors (from 1980 to present) have significantly contributed no meager means to enhance existing pools and to create new ones in and around the country.

Detailed scope of sector:
This assessment will consider investments and financial flows already made in the following forestry sub sectors:

- natural forest management,
- forest plantation development form state and private, and
- the community forestry scheme.

In using these three sectors for scoping purposes, we are compelled to define the following forest mitigation options to be considered during the length of this assessment:

- Reducing emission from deforestation and forest degradation (REDD)
- Addressing forest degradation by enhancement of carbon density of degraded and other existing forests through SFM / forest restoration (FR)
- Afforestation and reforestation (A/R) as defined in the CDM framework, which includes agro forestry.

Due to data constraints, it was decided to focus only on the third of these measures, namely afforestation and reforestation.

For the private sector investment (represented by Mourthala Holdings, and other individuals) it is very hard to access data. This is mainly due to the fact that people are reluctant to expose themselves for future taxation exercise of the government on their earnings. After series of attempts in the quest for data and available expenditures on private investment, the assessment was finally conducted on the available government expenditures. There is also an acute shortage of information on household expenditures and data. This has never been recorded anywhere in the Gambia.

As the assessment exercise became more pressing with time factor, there was a limited possibility to collect available data. The public investment data is available through the annual

government budgetary allocations. This pool of data is coupled with the Government's allocation on the National Forestry Funds.

Social groups

The social groups involved in the forest resources use in the country are mainly women, children and men. The women and children predominantly sell branch wood, charcoal, fruits and nuts for commerce and collect firewood for domestic household energy. However, timber re-export is dominated by men and solid fuel wood and partly charcoal sale are dominated by foreigners.

Activities

The main products collected from the forest are: timber, poles, posts, herbs for medicine, incense, fruits and nuts, mushroom, firewood, fronds, oysters, clams and grasses. Timber, firewood, incense, fruits are usually destined for towns where there are easily marketable. There are vendors who normally pay vendor license to sell timber and firewood. Incense is usually sold in the open markets. Some timber and firewood are also sold locally in villages but mostly they are sold in towns by vendors, acquiring valid vendor license. Timber is used in the construction of houses (roof), boat building, furniture, harbour construction, door construction, arts and craft, etc. Firewood is used for cooking. Poles are used in house construction whilst posts are used in gardens and orchards.

In the past, felling of trees was done with the use of an axe or pit-saw and conversion into timber was done with the use of the pit-saw. Now with the coming of the chainsaw, felling as well as conversion into timber is being done with the use of the chainsaw and re-saw machines. The collection of logs from the felling sites is aided with trucks with winches making easy and fast for deforestation. In the past decade collection of branches of trees is for domestic use at village level and sold in the cities. Currently Branch woods are sold in villages as well as in towns and cities. The use of the chainsaw is recently temporary banned by the forestry department throughout the Gambia. Both male and female are involved in the firewood trade. In some communities, more female are involved in the trade than the male folk. The activities under the Afforestation as a mitigation measure can be broadly stated as follows:

1. Plantations (Woodlots/Orchards/Gardens/Agroforestry)
2. National Annual tree planting and
3. Road-side tree planting.

Processes

The processes involved in the mitigation measure for afforestation needs a little elaboration. The Gambia from 1989, decided to shift from large scale intensive plantation establishment of monoculture to natural forest management. This initiative in the Gambia was later in shinned in the Forest Policy 1995-2005 and later emphasized in the 2009-19 Policy. It allowed Public-Private sector including community with individual participation in forest management (all- inclusive in forest management). It was purely for forest conservation, protection and sustainable utilization

of the forest resources. The concept brought about the laudable community and private forest management in the Gambia. In 2010, it is estimated that over 40,000 ha of natural forest is owned by communities and managed by them through a gradual process of forest and land transfer from Government to communities.

However, prior to the shift to natural forest management, the six established forest plantation (Nyambai, Bamba, Kabafita, Salagi, Furuyar and Fintongmanereg Forest Parks) is around 34,000 ha (1959) for the State and 120 ha for a Cooperate business enterprise called Mouhtara Holdings in Bunto Village.

Around 1980, the Government of The Gambia with support for human financial aid from the United States of America (USAID) intensified the afforestation programme for the Gambia. During this time, Salagi and Fintongmanereg Forest Parks were established. This was followed by support from the Food and Agriculture Organization out of which a few woodlots of 1 ha were established in some parts of the country (Sotumata Sere and Kuntaya villages). All the above mentioned forest plantations were planted with Gmelina arborea (Malina) or a combination of Gmelina with Tectona grandis (Teak) including Eucalyptus spp.

In ensuring that the plantations or afforestation takes effect on the ground, the following activities are involved namely: total site clearing of natural vegetation, stumping of felled trees, seed treatment and sowing through nursery establishment or planting stumps, thinning of planted trees, singling, climber cutting and finally doing selective felling or clear felling of the compartments. Apart from the six forest plantations mention, tree planting stock are either collected from the said plantations or at Department of Forestry Administrative or forest centers or stations nurseries.

The labour force was on a contractual agreement between the Department of Forestry and the Forest contractors. The labour supply for the afforestation at the plantations and for other woodlots demanding Gmelina spp was provided by the Contractors from Brikama, Kembuji, Sotokoi, Farato, Yundum and Banjul-nding villages. Women formed the dominant labour suppliers for Gmelina seed collection while the male sector for Gmelina stump.

In the other hand, The Gambia Forest Management Concept (GFMC) aims at regulating the access to forest resources among local communities by transferring exclusive forest ownership rights from the Government to the communities. Prior to the transfer of rights, the forest and its future managers have to be identified.

The community Forest (CF) approach is comprised of three phases implemented in various steps: the start-up, preliminary and consolidation phases. The CF set-up is considered to be completed whenever the concern communities are able to manage their forest on their own with minimal external contributions. In the start-up phase, the forest is identified and demarcated on the ground, a local organisation in charge of forest management is formed and trained on basic CF issues, the situation and development options are analysed and finally a preliminary forest

management plan prepared. During the start-up phase, the communities have no additional rights to utilize the forest than they previously had before the process began.

The preliminary phase starts when the preliminary Community Forest Management Agreement (PCFMA) has been signed by the communities and the DoF. The PCFMA grants the communities extended forest user rights for a defined time period according to the rules and regulations specified therein. Equip with these rights, the communities shall demonstrate during this phase their capacity to protect and manage the forest according to the plan established by them. In this respect, the preliminary phase constitutes a probation period for the communities during which they will gain increased insights and skills in forest management. If it is revealed that the communities performed adequately, the consolidation phase starts upon the conclusion of the evaluation and eventually leads to the signing of the Community Forest Management Agreement (CFMA). The CFMA grants the communities permanent ownership rights over the forest resources, but not over the land, according to the Community Forest Rules governing the management of natural forests by communities.

During the consolidation phase, the communities will be further trained in managerial and technical forestry skills until they have the capacity to manage their forests in a sustainable manner. This phase is open-ended but will come to a conclusion after the communities have achieved an adequate level of self-management.

2.2 Data inputs and scenarios

2.2.1 Assessment period and cost accounting parameters

After a thorough desk review of various forestry study and climate change documents, the forest consultancy group accepted working on the assessment period of 25 years with 2005 as the base year.

The currency of the Gambia is the Dalasi. The team used Google search (http://en.wikipedia.org/wiki/Tables_of_historical_exchange_rates_to_the_United_States_dollar) to convert the Gambian Dalasi from 2005-08. From 2005 to 2008, the currency conversion rate of the US$ to the Dalasi is 29.24, 25.00, 27.75 respectively. From 2009 to 2010, the currency fluctuates between 27.00 t0 29.00. For this scholarly work, the team used 1US$: GMD27.70 as an average for the current conversions on the investments.

This study used the average Gambian currency values for the year 2005 at D25.40 and 2010 at D30.00 per US Dollar. The discounting rate used for 2010 to 2030 was based on a successive three years average cost. For example we use the average amounts for 2001 to 2013 for the discounting. The dalasi average for the three years estimates (2008-2010) is 27.7. Therefore 3x27,7/100%= 0.82, thus a discount rate of 1% was used.

2.2.2 Selection of analytic approach

With the unavailability of proper software, it was agreed to use and excel spreadsheet for data entry and analysis in providing the assessment report.

2.2.3 Historical Data on FI, FF, and O&M costs

The historical data on the IF, FF and O&M were collected from the approved Republic of the Gambia's National Forestry Fund, Estimates of Recurrent Revenue and Expenditure with Estimates of Development from the year 2000 to 2010.

According to the source of record stated above, a guide has been provided as a General warrant of the Republic of The Gambia which states thus 'Hon. Minister name specified as the Secretary of State for Finance and Economic Affairs, Department of State for Finance and Economic Affairs, Banjul, The Gambia to the Accountant General; You are hereby authorized and required to make during the period…to… (both dates inclusive) the payments specified in the Scheduled hereto, out of the Consolidated Revenue Fund, as they become due, in accordance with the Laws and Standing Financial Instructions of this Government.

Also, for so doing, this together with the Accounts, Certificates and Acquaintances prescribed in the laws and instructions shall be your sufficient warrant and discharge.

In other words, the Estimates of expenditure are presented under each Head in terms of Sub-heads and Items. This is followed by Details of establishment which list personnel emolument, namely; salaries Code 010) , and allowance Code 020).

On Table 4, below shows the investments on forest management in terms of sustainable forest management, enrichment of degraded lads and afforestation/reforestation. From 2000 to 2010, a total sum of US$1,875,499.60 covering the main activities on investment.

As shown on table below, the main source of investment comes from the National Forestry Fund (NFF). From the National Budget, investment is mainly done on sustainable forest management.

It should be noted that even where the business sector invest on forest management, access to their invest records is not readily available to Authors. Several attempts have been made to get data from one of the Main Investors, Mouhtala Holdings but response was not forth coming for the CEO was not in country.

Plantation (Woodlots/orchards/Gardens/Agroforestry)

From 2006-2008, woodlot development took a center stage in the fight against desertification and supply of fuel wood for domestic energy at community level. The government of the Gambia with IFAD through a participatory Integrated Watershed Management (PIWAMP) established over 150 ha of forest plantation country-wide. These planting sites varied from 0.5 ha to 4 ha in

some villages and were planted with fast growing or multi-purposes trees like Gmelina, Mangoes, Eucalyptus, Oranges, Cassia, and Cashew. In some sites, the trees are planted in conjunction with agricultural crops like Cassava, Maize, Solanaceae spp. as found in an Agroforestry system. It was only in the agroforestry sites (within or on farm boundaries planted with agricultural and forest plants) that were planted directly with plants. Also, the planting stocks for the plantations were provided to the farmers by PIWAMP or the Department of Forestry between July-August annually). In this agroforestry practice, 10 farmers were targeted in the project, and the implementation of the project had a spill over on over 100 farmers country-wide. All the woodlots were fenced but due to current limitation of funds, the programme is at a standstill. Furthermore, the PIWAMP forestry component is ending at end of December, 2011. The supervision of work implementation, monitoring and evaluation of the PIWAMP Forestry component was done jointly by the project planning and monitoring unit with the Department of Forestry. The communities provided the direct labour force for the afforestation project.

1) National tree planting

In 1996, the Government of The Gambia through the Office of the President **(Presidency**) gave a directive for the Ministry of Forestry through its technical arm, the Department of Forestry with the entire populace of The Gambia to annually plant 1,000,000 trees. This directive is being carried out until present. The seedlings or planting stock supplies is provided from the National Forestry Fund, individuals and sometimes the private sector. Records of the seedling or stumps supplied by the Department of Forestry are kept at the department of Forestry forest stations or administrative centers. For example, the Standard Bank Gambia Ltd. As a cooperate responsibility to its customers from 2008-11 provided funding to plant over 60 ha of degraded forest lands in Nyambai and Furuyar Forest Parks costing over USD5,000.00

Road side tree planting

Road side tree planting to enhance road drainage, road stability and providing attraction to all road users is being done in a small scale as part of the afforestation programme. Prior to 200, there was a massive road side tree planting done under the context of national tree planting using Gmelina and Neem plant species on the entire road stretching from Banjul to Koina. This planting was done mainly within the villages. Most of the trees planted on the road side were felled because of road construction, rehabilitation for improvement including rural electrification.

However, road side planting gain a second momentum from 1994 to present and done on major roads such as the Banjul to Serekunda highway, airport road, and other towns and villages from Brikama to Koina including the North Banks of the Gambia (Barra to Passa-massi village). Most of these plantings were supported by the Timber and forest users association including the annual budget allocation from Government. Direct labour supply is provided by communities and some individuals and environment association. A total of over USD4, 000.00 have been spent on the tree plantings by the Timber and forest users association. To ensure that the road side planting becomes successful, the investments done were on silvicultural operations that provided planting stock, transportation of plants, tree protection guards with their erection and plant irrigation. Full

assessment of tree survival for the programme is yet to be done. The tree plants serves as a mitigation measure for the investment on forests. The forestry sector is expected to have a significant change over the assessment period. With the new forest policy which is all inclusive for the private sector including the communities, there will be more development in all the three investment areas including O&P. The mitigation measures will be that more afforestation programmes will be under taken on degraded lands, eco-tourism encouraged for forest conservation including wildlife management.

Included in development programme of the forestry sector, research and development will be done to ensure that appropriate measures are adapted towards conserving the genetic pool of species natural to the Gambia that are more drought resistant and useful for community livelihoods. More appropriate technologies will be applied to improve resource utilization and value adding to them for higher income to communities. The protection and conservation of mangroves which have the highest value for carbon sequestration will be encouraged including their multiplication through plantings. The management of forest trees on marginal and farm lands will have more protection as indicated in the new forest policy.

The forestry sector will be more equipped with vehicles and transport facilities that could enhance forest intension services to prevent the frequent occurrences of forest fires and illegal loggings. More trainings will be done at all levels from communities to staff of the collaborating institutions to ensure that forest resources are rationally utilized and replaced as they are harvested. This means that the forestry sector will produce more projects on sustainable land use management which has already secured over 2 million Euros under the GEF 5 Star Allocation and around 0.5 million from the Great Green Wall for Sahara and Sahel Initiative (GGWSSI) of the African Union for afforestation. The National Forestry Fund will continue supporting forestry programmes. The forestry sector will continue to benefit from the expected Programme on Accelerated Growth and Employment which is being developed as a new initiative to replace the Poverty Reduction Strategic Paper (PRSP II).

The timing, number and technical specification will depend on the projects developed, source of project funds and the guiding principles for the funding sources. Therefore, more renovation of dilapidated forest buildings serving as administrative centers, stations, forest entities and communication facilities have to be made available through funding. Forest fire fighting equipments, nursery centers with proper equipment to produce adequate planting stocks will have to be developed over time. Finally, community forestry be highly promoted with adequate staff and community trainings

Investments

The total investment in the afforestation activities mentioned above (woodlots, national tree and roadside planting) was mainly from Government budget and allocation (see I&FF flow tables). The PIWAMP cost was not captured in the assessment because of data access. Even though Government invested heavily on forest management, the investments were more on Sustainable Forest Management (SFM) and Operational Cost (O&M).

The main funding source as of current on forest management in the country is the Gambia Government. There is very high expectation that funds will be available from the Global Environment Fund (GEF 5 Star) at a tune of US$ 2.00 million. This fund is for Sustainable Land use Management (SLM). The total investment on an annual base fluctuates as shown on table below.

Table 4. Investments on Forest management

Year	Investments in GMD	Sustain. Forest Management	Enrichment of degraded areas	Afforestation & Reforestation	Total
2000	National Budget	1,965,590	0	0	1,965,590
	National forest Fund	775,998	194,000	51,053	1,021,051
	Total	**2,741,588**	**194,000**	**51,053**	**2,986,641**
	private investment	00	00	00	00
	Household	00	00	00	00
2001	National Budget	2,119,680	0	0	2,119,680
	National Forest Fund	1,123,326	280,831	73,903	1,478,060
	Total	**3,243,006**	**280,831**	**73,903**	**3,597,740**
	private investment	00	00	00	00
	Household	00	00	00	00
2002	National Budget	1,417,674	0	0	1,417,674
	National Forest Fund	506,312	126,578	33,310	666,200
	Total	**1,923,986**	**126,578**	**33,310**	**2,083,874**
	private investment	00	00	00	00
	Household	00	00	00	00
2003	National Budget	2,415,430	0	0	2,415,430
	National Forest Fund	529,720	132,430	34,850	697,000
	Total	**2,945,150**	**132,430**	**34,850**	**3,112,430**
	private investment	00	00	00	00
	Household	00	00	00	00
2004	National Budget	2,472,690	0	0	2,472,690
	National Forest Fund	1,108,000	273,000	72,000	1,453,000
	Total	**3,580,690**	**273,000**	**72,000**	**3,925,690**
	private investment	00	00	00	00
	Household	00	00	00	00
2005	National Budget	2,829,160	0	0	2,829,160
	National Forest Fund	1,399,000	643,000	85,000	2,127,000
	Total	**4,228,160**	**643,000**	**85,000**	**4,956,160**
	private investment	00	00	00	00
	Household	00	00	00	00
2006	National Budget	2,908,422	0	0	2,908,422
	National Forest Fund	1,215,000	240,000	45,000	1,500,000
		4,123,422	**240,000**	**45,000**	**4,408,422**
	private investment	00	00	00	00
	Household	00	00	00	00
2007	National Budget	3,649,067	0	0	3,649,067
	National Forest Fund	2,559,500	355,000	90,000	3,004,500
	Total	**6,208,567**	**355,000**	**90,000**	**6,653,567**
	private investment	00	00	00	00
	Household	00	00	00	00
2008	National Budget	5,151,000	0	0	5,151,000
	National Forest Fund	5,814,900	245,000	130,000	6,189,900
	Total	**10,965,900**	**245,000**	**130,000**	**11,340,900**
	private investment	00	00	00	00

	Household	00	00	00	00
2009	National Budget	5,151,605	0	0	5,151,605
	National Forest Fund	3,205,000	230,000	80,000	3,515,000
	Total	**8,356,605**	**230,000**	**80,000**	**8,666,605**
	private investment	00	00	00	00
	Household	00	00	00	00
2010	National Budget	?	?	?	?
	National Forest Fund	3,755,000	140,000	250,000	4,145,000
	Total	**3,755,000**	**140,000**	**250,000**	**4,145,000**
	private investment	00	00	00	00
	Household	00	00	00	00
Total GMD		**52,072,074**	**2,859,829**	**945,116**	**55,877,019**
1US$ Equivalent = GMD 27.70		**1,879,858.27**	**103,242.92**	**34,119.71**	**2,017,220.90**

2.2.4. Baseline Scenario

The evolution of the sector in terms of investment over the period in relation to climate change in the absence of a new policy is critical for the Gambia. The Forestry sector over the years prior to the 1995 Forestry policy was mainly an adhoc of programmes and projects that were tailor made to address some specific country needs. Such programmes were the establishment of fast growing forest plant species (Gmelina arborea, Eucalypttus species, Tectona grandis and so on) for plantation development used for firewood and construction materials such as light timber.

In Around 1980, United States of American through their Aid provided substantial funding to the Gambia for forest plantation management. In a similar vain, German Government through their technical cooperation around 1995 to 2000 supported the country on natural forest management too. Following the successful project implementation of the Gambia-German Forestry Projects (GGFP) in the Western Division, the Central River Division Forest Project (CRDFP) overall funding amounted contribution by Germany to the Gambian forestry sector was around 20 million Euros since 1980 (:http://allafrica.com/stories/200104300032.html). Also, the Upper River Division forestry funding was 1,825,400 Euros for a 36 months period from 1996 -1998 (Appletoft S., 2000). The three projects were mainly emphasizing on natural forest management. However, all these projects were outside the current policy. Their successful implementation of the projects paved way for the elaboration of the current policy which has gained reorganization worldwide.

The development of forests through investments by sectors is not adequate discussed in this document because of limited data from the sector. The baseline scenario for the period is being described below.

i) <u>Scenario Description</u>

The scenario on the evolution of the sector over the assessment period is that the previous policy (1995-2005) has made provision for the following themes; 1) Community involvement on forest management with the state and gradual transfer of forest and land to communities, 2) River bank stability by creating a buffer of 100 meters strip along the entire length of the River Gambia and the Atlantic Ocean. Thus, this intervention is giving protection to the mangroves and allied species.

In addition, a private forestry investment which was encouraged has resulted to a few hundreds of hectares of plantation and natural forests over the country. Although author has no data on these private investments in terms of the funding arrangement, significant results have been realized within this area (Mouhtara Holding Gmelina plantation of 100 plus hectares and Dr. Nyambi Touray's natural forest at Gungur village). All of the above information given above has helped to tackle some of the problems on climate change and its impact on human livelihood in the country. The conservation and protection of the flora and fauna using different mechanisms has reduced floods, erosion, heat waves and above all forest fires. The emission of CO2 sequestration is assured because the green vegetation is always there to mitigate it.

The socio-economic trends have undergone series of transformations because of new emerging technologies such as moving from plantation to natural forest development. There is always the assurance for women to access fuel wood both for their domestic energy and the markets. Communities have the authority to access forests resources within the community forests including the plants they grow for their own use. With the use of emerging technologies, forest entities are easily protected from forest fires by creating fire belts called green belts around the forests under management. A strip of ever green plants such as Cashew and Cassia are planted on a 10 meter strip around plantations and community forest where they serve as fire breaks. The plants so planted are later harvested for their nuts or wood for fire wood for households. This new green belt approach helped to stop cutting plant branches for fire control.

In both the private sector and public got the opportunity to train in developing forest management plans. The physical assess and programmes were dependent on the annual budget release from the Government which begins in late January to February each year. The investment scale is provided on the Table 4, above. Mostly, research and education has been dependent on the recruitment of new staff at the Forestry School in Kafuta village with a bi-annual intake of 22-25 students. Also included in the training programme, the Department gives short-term training support to communities and NGOs in the form of workshops with a minimum of 15 trainees per session. Most of these funds come from the state fund (National forestry Fun or NFF).

Access to land and services is highly dependent on community demand for such lands and services. According to the Forest Policy 1995-2005, about 30% of total country land should be under forest cover. Out of that 30% forest land, 75% or 200,000 hectares should be sustainably managed by communities. As of current, around 40,000 hectares is under sustained management by communities. Therefore, the former and present forest policies are enhancing forest land access using appropriate procedures for access (community or private forestry). There is always an element of simple research or adaptive research methods included in forest management in The Gambia. The infrastructural developments were mainly on forest parks, stations and administrative centers such as in Western, Lower River, Central River and Upper River Regions. These developments were either building staff quarters, forest engineering works on road access within forest parks. The amount of money invested is enormous in terms of their dollar value but data on them needs to be accessed. Therefore, to justify the estimated baseline scenario will prove difficult using the investment flow on Government investments because these actions

were purely project driven by the German Government and European Union. Therefore, factors influencing the entire development are community and state driven needs to achieve their institutional objectives. As a result, the baseline (2005) for IF, FF and O&M are no true reflection to justify the costs on reasons as stated above.

Table: 5. Historical data: Cumulative IF, FF, and O&M Estimates, By Investment Type, Investment Entity, and Funding Source from 2000-2010

Category of Investment Entity	Source of I&FF Funds	Cumulative IF, FF, & O&M Estimates For Historical Period (2005US$)								
		Sustainable Forest Management			Enrichment			Afforestation		
		IF	FF	O&M	IF	FF	O&M	IF	FF	O&M
Households	Domestic									
	Total Household Funds									
Corporations	Domestic									
	Foreign									
	Total Corporation Funds									
Government	Domestic Funds (budgetary)									
	Foreign									
	Total Government Funds US$	1,879,858.27		753,311.32	103,242.92		41,372.30	34,119.71		13,672.71
Total US$		1,879,858.27		753,311.32	103,242.92		41,372.30	34,119.71		13,672.71

i) Baseline Scenario IF, FF, O&M Costs

Table: .Baseline Scenario: Cumulative Discounted IF, FF, and O&M Estimates, By Investment Type, Investment Entity, and Funding Source

Category of Investment Entity	Source of I&FF Funds	Cumulative Discounted IF, FF, & O&M Estimates For Baseline Scenario (thousand 2005US$)								
		Sustainable Forest Management			Enrichment			Afforestation		
		IF	FF	O&M	IF	FF	O&M	IF	FF	O&M
Households	Domestic									
	Total Household Funds (all domestic)									
Corporations	Domestic									
	Foreign									
	Total Corporation Funds									
Government	Domestic Funds (budgetary)		152,641.20			23,212.99	76,344.37		3,068.59	
	Foreign									
	Total Government Funds US$ (2005-30)		152,641.20			23,212.99	76,344.37		3,068.59	
Total US$			152,641.20			23,212.99	76,344.37		3,068.59	

Table: 6. Baseline Scenario: Annual IF, FF, and O&M Estimates by Investment Type

	Annual IF, FF, & O&M Estimates for Baseline Scenario (2005US$)											
	Sustainable Forest management			Enrichment			Afforestation			All investment types		
Year	FF	IF	O&M	FF	IF	O&M	FF	IF	O&M	IF	FF	O&M
2005	152,641.20		76,344.37	23,212.99		4,119.76	3,068.59		11,028.65		178,922.70	91,492.78
2006	148,860.00		78,080.40	8,664.25		4,213.44	1,624.54		11,279.44		159,148.80	93,573.28
2007	224,136.00		94,095.75	12,815.88		5,077.67	3,249.09		13,593.00		240,201.00	112,766.40
2008	395,880.90		113,708.20	8,844.76		6,136.02	4,693.14		16,426.21		409,418.80	136,270.40
2009	301,682.50		120,415.10	8,303.24		6,497.94	2,888.08		17,395.07		312,873.80	144,308.10
2010	135,559.60		144,347.80	5,054.15		7,789.42	9,025.27		20,852.38		149,639.00	172,989.60
2011	413,267.20		270,504.80	270,504.80		14,597.22	14,560.77		36,449.11		698,332.80	321,551.10
2012	690,974.80		396,661.90	396,661.90		21,405.01	20,096.26		54,673.66		1,107,733.00	472,740.60
2013	135,560.60		522,818.90	522,818.90		28,212.81	25,631.76		72,898.21		684,011.30	623,929.90
2014	413,268.20		648,975.90	648,975.90		35,020.61	31,167.26		91,122.77		1,093,411.00	775,119.30
2015	690,975.80		775,133.00	775,133.00		41,828.40	36,702.75		109,347.30		1,502,812.00	926,308.70
2016	135,561.60		901,290.00	901,290.00		48,636.20	42,238.25		127,571.90		1,079,090.00	1,077,498.00
2017	413,269.20		1,027,447.00	1,027,447.00		55,443.99	47,773.75		145,796.40		1,488,490.00	1,228,687.00
2018	690,976.80		1,153,604.00	1,153,604.00		62,251.79	53,309.24		164,021.00		1,897,890.00	1,379,877.00
2019	135,562.60		1,279,761.00	1,279,761.00		69,059.59	58,844.74		182,245.50		1,474,168.00	1,531,066.00
2020	413,270.20		1,405,918.00	1,405,918.00		75,867.38	64,380.24		200,470.10		1,883,568.00	1,682,255.00
2021	690,977.80		1,532,075.00	1,532,075.00		82,675.18	69,915.73		218,694.60		2,292,969.00	1,833,445.00
2022	135,563.60		1,658,232.00	1,658,232.00		89,482.97	75,451.23		236,919.20		1,869,247.00	1,984,634.00
2023	413,271.20		1,784,389.00	1,784,389.00		96,290.77	80,986.73		255,143.70		2,278,647.00	2,135,823.00
2024	690,978.80		1,910,546.00	1,910,546.00		103,098.60	86,522.22		273,368.30		2,688,047.00	2,287,013.00
2025	135,564.60		2,036,703.00	2,036,703.00		109,906.40	92,057.72		291,592.90		2,264,325.00	2,438,202.00
2026	413,272.20		2,162,860.00	2,162,860.00		116,714.20	97,593.22		309,817.40		2,673,725.00	2,589,392.00
2027	690,979.80		2,289,017.00	2,289,017.00		123,522.00	103,128.70		328,042.00		3,083,126.00	2,740,581.00
2028	135,565.60		2,415,174.00	2,415,174.00		130,329.80	108,664.20		346,266.50		2,659,404.00	2,891,770.00
2029	413,273.20		2,541,331.00	2,541,331.00		137,137.50	114,199.70		364,491.10		3,068,804.00	3,042,960.00
2030	690,980.80		2,667,488.00	2,667,488.00		143,945.30	119,735.20		382,715.60		3,478,204.00	3,194,149.00
Total	**9,901,875.00**		**30,006,921.00**	**29,446,825.00**		**1,619,260.00**	**1,367,508.00**		**4,282,222.00**		40,716,208.20	**35,908,403.20**

The results on the above investments flow is significant because more state money is spent on the combined I and FF for sustainable forest management against Enrichment and Afforestation. In the year 2010, more money was spent in 2005 for Enrichment and less in 2010. Also more money was invested in 2010 on Afforestation and least for 2006. All the sources of investment captured in this study are from state funds. The annual fluctuation can be said to be significant too. The study capture investment on Operation and Maintenance (O&M) for the funds pay for staff salary, maintenance of administration and station buildings including utilities.

2.2.5 Mitigation Scenario

Forest investments (IF &FF) in the forestry sector in the Gambia from 2012 to 2030 are broadly categorized below:

1. Sustainable forest management
Both private and the public sector will implement the following activities:

- Community forest (state natural forests ownership transfers to communities) management and their development.
- Apiculture for forest production, protection and communities livelihood.
- Ecotourism for forest conservation and biodiversity enhancement.
- Forest fire management and forest protection towards carbon sequestration.

2. Enrichment
The department of forestry including other stakeholders from 2012 to 2030 will implement the following activities:

- Improving degraded forest.
- Planting of trees within and around farm lands, park lands and avenue plantings.
- Investment in mangrove planting and management within the mangrove ecosystems.

3 Afforestation/plantations
The investment and financial flows from 2012 to 2030 are for the following activities:

- Village woodlots: to establish and consolidate woodlots of about 0.5 to 5ha in villages or within communities to ensure that firewood becomes available in a sustainable base for domestic energy needs. At the stage of establishment, the activities planned for these woodlots will be site demarcation, fencing, seed procurement, seed collection, seedlings or stumps planting, thinning, singling, weeding, beating-up and fire protection. The sites will be planted with fast growing tree species (gmelina, mangoes, eucalyptus, etc. The major source of irrigation will be from the rains and sunken wells. This practice may call for water harvesting using appropriate technologies.
- Orchards/gardens : the planned activities are the same discussed above.
- Wasteland planting: same as above, but other important degraded areas like wetlands and swamps will be planted with mangroves stumps and other related species.
- Private plantation development: same as in woodlots.
- Provision of forest planting stock (nursery establishment for seedling production and plantation management for gmelina, mangrove stumps supplies).

- Observing the annual 1.000.000 tree planting exercise: this is a presidential directive to ensure that on annual base, over 1 million trees are planted countrywide. Activities include collection of Gmelina collection from the established plantations, distribution, planting out in the field. The establishment of forest tree nurseries as another source of planting stock.

Finally the following activities are to be implemented across the three main categories mentioned above:

1. Capacity building and or development at all level (infrastructure and human resources)
2. 2. Education, extension and communication for the popularization of the activities mentioned above. In addition, there will be continuous advocacy towards sustainable natural resources management and development at all fora.

The following I&FF assessment is focused on the measure 'Afforestation', as for the other two measures 'Sustainable Forest Management' and 'Enrichment' the analysis wasn't carried further due to a lack of data.

i) Mitigation Scenario IF, FF, O&M Costs

Table: 7. Mitigation Scenario: Cumulative IF, FF, and O&M Estimates, By Investment Type, Investment Entity, and Funding Source in The Gambia in Dollars

Category of Investment Entity	Source of I&FF Funds	Afforestation			All Investment Types		
		IF	FF	O&M	IF	FF	O&M
Households	Domestic						
	Total Household Funds (all domestic)						
Corporations	Domestic						
	Foreign						
	Total Corporation Funds						
Government	Domestic Funds (budgetary)		1,367,508.00	4,282,222.00		1,367,508.00	4,282,222.00
	Foreign						
	Total Government Funds		1,367,508.00	4,282,222.00		1,367,508.00	4,282,222.00
Total			1,367,508.00	4,282,222.00		1,367,508.00	4,282,222.00

Table: 8 a. Mitigation Scenario: Annual IF, FF, and O&M Estimates by Investment Type Dollars

Year	Afforestation			All Investment Types		
	IF	FF	O&M	IF	FF	O&M
2005	00	3,068.59	11,028.65	00	3,068.59	11,028.65
2006	00	1,624.54	11,279.44	00	1,624.54	11,279.44
2007	00	3,249.09	13,593.00	00	3,249.09	13,593.00
2008	00	4,693.14	16,426.21	00	4,693.14	16,426.21
2009	00	2,888.08	17,395.07	00	2,888.08	17,395.07
2010	00	9,025.27	20,852.38	00	9,025.27	20,852.38
2011	00	14,560.77	36,449.11	00	14,560.77	36,449.11
2012	00	20,096.26	54,673.66	00	20,096.26	54,673.66
2013	00	25,631.76	72,898.21	00	25,631.76	72,898.21
2014	00	31,167.26	91,122.77	00	31,167.26	91,122.77
2015	00	36,702.75	109,347.30	00	36,702.75	109,347.30
2016	00	42,238.25	127,571.90	00	42,238.25	127,571.90
2017	00	47,773.75	145,796.40	00	47,773.75	145,796.40
2018	00	53,309.24	164,021.00	00	53,309.24	164,021.00
2019	00	58,844.74	182,245.50	00	58,844.74	182,245.50
2020	00	64,380.24	200,470.10	00	64,380.24	200,470.10
2021	00	69,915.73	218,694.60	00	69,915.73	218,694.60
2022	00	75,451.23	236,919.20	00	75,451.23	236,919.20
2023	00	80,986.73	255,143.70	00	80,986.73	255,143.70
2024	00	86,522.22	273,368.30	00	86,522.22	273,368.30
2025	00	92,057.72	291,592.90	00	92,057.72	291,592.90
2026	00	97,593.22	309,817.40	00	97,593.22	309,817.40
2027	00	103,128.70	328,042.00	00	103,128.70	328,042.00
2028	00	108,664.20	346,266.50	00	108,664.20	346,266.50
2029	00	114,199.70	364,491.10	00	114,199.70	364,491.10
2030	00	119,735.20	382,715.60	00	119,735.20	382,715.60
Total	00	1,367,508.00	4,282,222.00	00	1,367,508.00	4,282,222.00

The significant changes that are shown on table above for IF/IFF in USD (000) can be summarized on table 8b below.

Table 8b. Changes on I&FF

Year A	Year B	Year B Amount	Year A Amount	Difference (B-A)
2005	2010	9,025.27	3,068.59	5,956.68
2015	2020	64,380.24	36,702.75	27,677.49
2025	2030	119,735.20	92,057.72	27,677.48

There is a significant change between 2005 and 2010 (USD 5956.68) but no significant change between the five year intervals between 20010 t0 20 30 Value difference (USD 27677.49). The annual change in investment does not seem significant. The funding sources have been a direct Government investment.

The significant changes that are shown on table above for IF/IFF in USD (000) can be summarized on table 8c below.

Table 8c. Changes on O&M costs

Year A	Year B	Year B Amount	Year A Amount	Difference (B-A)
2005	2010	20,852.38	11,028.65	9,823.73
2015	2020	200,470.10	109,347.30	91,122.80
2025	2030	382,715.60	291,592.90	91,122.70

There is a significant change between 2005 and 2010 (USD9823.73) but no significant change between the five year intervals between 20010 t0 20 30 Value difference (USD91122.8). The annual change in investment does not seem significant. The funding sources have been a direct Government investment including direct investment from Multi-lateral Agencies (FAO Forest facility, USD 400,000 and UNDP Support to Environment and Energy, USD 100,000 in 2010 - 11).

3. Results

3.1 Changes of I&FF and O&M costs

On Table 9 above; the cumulative changes observed were on governments investments and Financial Flows on afforestation and also their operation and maintenance costs. There was no change in the Investment flows because the private sector did not provide the data for analysis. However changes in government financial flows shows that the total financial flow is US$119,735.20 and the operation and Maintenance cost is US$382715.60.[1]

[1] It has to be noted that throughout the assessment there are inconsistencies in I&FF figures, which require further work.

Table: 9. Incremental Cumulative IF & FF Estimates, By Investment Type, Investment Entity, and Funding Source

Category of Investment Entity	Source of I&FF Funds	Incremental Cumulative IF, FF, & O&M Estimates thousands 2005US$)					
		Afforestation			All Investment Types		
		∆IF	∆FF	∆O&M	∆IF	∆FF	∆O&M
Households	Domestic						
	Total Household Funds (all domestic)						
Corporations	Domestic						
	Foreign						
	Total Corporation Funds						
Government	Domestic Funds (budgetary)		119,735.20	382,715.60		119,735.20	382,715.60
	Foreign						
	Total Government Funds		119,735.20	382,715.60		119,735.20	382,715.60
Total				502,450.80			502,450.80

Table 9: Incremental Annual IF & FF Estimates by Investment Type in Thousands of Gambian Dalasi

Year	Afforestation			All Investment Types		
	∆IF	∆FF	∆O&M	∆IF	∆FF	∆O&M
2005	0	3,068.59	11,028.65	0	3,068.59	11,028.65
2006	0	1,624.54	11,279.44	0	1,624.54	11,279.44
2007	0	3,249.09	13,593.00	0	3,249.09	13,593.00
2008	0	4,693.14	16,426.21	0	4,693.14	16,426.21
2009	0	2,888.08	17,395.07	0	2,888.08	17,395.07
2010	0	9,025.27	20,852.38	0	9,025.27	20,852.38
2011	0	14,560.77	36,449.11	0	14,560.77	36,449.11
2012	0	20,096.26	54,673.66	0	20,096.26	54,673.66
2013	0	25,631.76	72,898.21	0	25,631.76	72,898.21
2014	0	31,167.26	91,122.77	0	31,167.26	91,122.77
2015	0	36,702.75	109,347.30	0	36,702.75	109,347.30
2016	0	42,238.25	127,571.90	0	42,238.25	127,571.90
2017	0	47,773.75	145,796.40	0	47,773.75	145,796.40
2018	0	53,309.24	164,021.00	0	53,309.24	164,021.00
2019	0	58,844.74	182,245.50	0	58,844.74	182,245.50
2020	0	64,380.24	200,470.10	0	64,380.24	200,470.10
2021	0	69,915.73	218,694.60	0	69,915.73	218,694.60
2022	0	75,451.23	236,919.20	0	75,451.23	236,919.20
2023	0	80,986.73	255,143.70	0	80,986.73	255,143.70
2024	0	86,522.22	273,368.30	0	86,522.22	273,368.30
2025	0	92,057.72	291,592.90	0	92,057.72	291,592.90
2026	0	97,593.22	309,817.40	0	97,593.22	309,817.40
2027	0	103,128.70	328,042.00	0	103,128.70	328,042.00
2028	0	108,664.20	346,266.50	0	108,664.20	346,266.50
2029	0	114,199.70	364,491.10	0	114,199.70	364,491.10
2030	0	119,735.20	382,715.60	0	119,735.20	382,715.60
Total	0	1,367,508.00	4,282,222.00	0	1,367,508.38	4,282,222.00

Above table 9, shows all the investment types from Sustainable Forest Management, Enrichment and Afforestation extracted from the baseline scenario. Domestic or local investments on domestic fire utilization (cooking stoves and energy serving bulbs) are not included in the matrix because data was not available on them. From the table which shows positive values on investments indicates that there is an increase in spending for the mitigation scenario.

There will be a significant change in mitigation if direct foreign investments are made available for investment particularly on Afforestation that allows mitigation. Since the country depends heavily on fussil fuel for generating electricity and powering motorized machines, the cumulative greenhouse gase release continuous to increase with the increase in population whose daily needs depend on it. As a result, more funding is needed to mitigate the gas release for their sequestration using forest cover. There is need to shift from heavily investing on SLM to Afforestation on degraded lands.

3.2 Evaluation of policy implications

Land tenure

Land tenure as a concept has brought several definitions attached to it. According to … and 'land tenure' is a derivative of the concept of natural resources tenure, while the concept of 'tenure' is a social construct, defining the relationship between individuals and groups of individuals by which rights and obligations (with respect to control and use of resources are defined (ECA, 2009).

In The Gambia, the Local Government Act (2003) states that all lands within the country is State. However, traditional land ownership including lease hold has been recognized too. For traditional lands within rural areas, it is the Governors, Chiefs and Alikalolu who are assigned to administer land ownership o behalf of Government. Land could be acquired by linage, Islamic codified law and the statutory laws of The Gambia.

However, under the context of the Forestry Act 1998, all natural forest belongs to the State. Owning land does not necessarily make an individual the owners of the natural forest that stands on it. Therefore land ownership in the country goes along with forest ownership transfer to an individual or a community through a forest tree transfer process. This process in the country is the new initiative of Community Forestry. It has three phases and steps for forest ownership from state to communities and individuals namely;

1. Start-up phase
2. Preliminary Forest management Agreement (PCFMA) and
3. Community Forest Management Agreement (CFMA).

In the entire land ownership, the Forest Policy has not discriminate gender in the transfer of forest ownership to any sector of the society. Women have been given a special priority to acquire tree branches for domestic and commercial purposes in order to reduce forest dry biomass against fires.

However, community forest is mainly used on lands that have vegetation but the concept did not exclude land devoid of forests or wastelands.

Waste lands

Waste land or degraded land in Africa is estimated to be over 500 ha millions. These lands have undergone soil degradation since 1950. This waste lands are a result of the destruction of soil structure, nutrients depletion and are prone to erosion. Some of the causes of wastelands in Africa particularly in The Gambia are the increasing application of chemicals, use of appropriate equipment and technologies, commercial monoculture of specific crop for farmings, expanding settlements, bushfires, road constructions and electrification, over grazing, illegal logging and so on. The land becomes impoverished by continuous wind erosion, physical and chemical deterioration and with intermittent prolonged drought; it is leading to desertification in the North Bank Region of The Gambia.

As the call for food self sufficiency in The Gambia is a priority including the supply of domestic energy, the rehabilitation of waste lands for agricultural and afforestation cannot be avoided if the country has to manage its forests sustainably. The establishment of fast growing tree species to improve the waste land condition and provide the numerous benefits that a forest can provide is long overdue in The Gambia. Therefore, forest investments and Financial Flows should give high priority on waste land rehabilitation and management. These waste lands can be used for plantations to control desertification and its consequences on livelihoods in The Gambia.

Co-benefits

The principles of access and benefit sharing between Government and communities are important for the sustainable development of The Gambia's forest and natural resources. Co-benefits as a means of a conservation measure towards alternative energy conservation and use cannot be over emphasized in the country because of its numerous health implications in The Gambia.

Unsustainable forest harvesting and non-rational use of the wood for domestic energy has lead to the Gambia Government to introduce appropriate technologies for energy need for the country since 1980.

The Departments of Community Development, Forestry and Energy have over the years introducing alternative domestic energy apparatus to ensure that they devices are environment friendly and socially acceptable such as the introduction of the modernized cooking stoves so called in the Gambia as the 'Kumba Gaye, No Fly' and so on including briquetting of biomass and waste.

It has been reported that on a daily base, each household uses 1kg of fuel wood for heating or cooking in the Gambia (Kinteh, Energy study, 2008). With the use of the new stoves and briquetting of biomass, results show a very high down trend of fuel wood use and reduction of ill

health on women who are the sole collectors and users of fire wood as opposed to the open three stone stoves in The Gambia.

Disease like bronchitis, lung cancer, chest problems including burns and eye reddening from smoldering and open fires on women have been highly reduced in The Gambia. The emission of Carbon dioxide using modern stoves can be said to be insignificant for the country.

Policy implication for all kinds of investments is such that more funds are spent on Sustainable Land Use Management than on Enrichment and Afforestation. Even though the policy seems to be sensitive on gender community participation on forest management it should also give attention to Afforestation because this is the area that can provide more land for forest development and reduce conflict between land users.

Furthermore the following recommendations for mitigation measures might be considered as proposed by the Ministry of Trade and Industry, and the Ministry of Energy:

- Logging activities need to be done through national agencies. – Those required partnerships are hard to make.
- Alternatives to forest logging for cooking, including alternative cooking stoves and fuel wood from sustainable sources including from plantations of fast growing species should be promoted.

The priority measures to induce investments would be incentives for investing on forests such as loans, grants and so on. Land tenure arrangement should be revisited that people who are interested land for forest use can have the right to do so. People should be adequately sensitized on sustainable forest management through extension practice. Private individuals with the potential to establish plantations on degraded land should be encouraged. The same support should be extended to communities too.

The potential implementation barrier on the investments are that neither the Government responsible for budget allocation nor the vast majority are aware of the enormous long term benefits they could realize if adequate funds are timely invested in forest management. Also, there is high illiteracy in the country that is disabling the population to appreciate investing in forests. The notion that God will do all is not encouraging sustainable forest management. Financial information from multi-lateral or bi-lateral agencies and their access is limiting forest investments.

3.3 Uncertainty and key limitations of the methodology

Some of the key uncertainties are the following:

- Regular and reliable funding from funding sources
- Stable climatic environment
- Less staff attrition
- Community confidence in forest ownership transfers from the state to them
- Forest destruction and degradation

- Forest fire ravages
- Competition on land for other uses
- Etc.

Future analytical efforts should focus on funding of projects and programmes including capacity development for staff, communities and infrastructural development (O&M).

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