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Report No: 76765-AFR

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON

PROPOSED CREDITS

IN THE AMOUNT OF SDR 18.6 MILLION (US$28.5 MILLION EQUIVALENT)
TO THE REPUBLIC OF GUINEA

IN THE AMOUNT OF SDR 35.6 MILLION (US$54.5 MILLION EQUIVALENT)
TO THE REPUBLIC OF MALI

IN THE AMOUNT OF SDR 46.3 MILLION (US$71.0 MILLION EQUIVALENT) TO THE ISLAMIC REPUBLIC OF MAURITANIA

IN THE AMOUNT OF SDR 38.2 MILLION (US$58.5 MILLION EQUIVALENT)TO THE REPUBLIC OF SENEGAL

FOR A
SENEGAL RIVER BASIN MULTIPURPOSE WATER RESOURCES DEVELOPMENT PROJECT 2

ONE PROPOSED GRANT IN THE AMOUNT OF US$16.0 MILLION FROM THE GLOBAL ENVIRONMENT FACILITY TRUST FUND
AND THE LEAST DEVELOPED COUNTRIES FUND
TO THE ORGANISATION POUR LA MISE EN VALEUR DU FLEUVE SENEGAL
(ORGANIZATION FOR THE DEVELOPMENT OF THE SENEGAL RIVER)

FOR A SENEGAL RIVER BASIN CLIMATE CHANGE RESILIENCE DEVELOPMENT PROJECT

NOVEMBER 8, 2013

AFTN2 / AFRVP

CURRENCY EQUIVALENTS

(Exchange Rate Effective September 30, 2013)

Currency Unit	=	Franc CFAF (XAF) for Mali and Senegal; Euro for Guinea and Mauritania
CFAF	=	US$ 0.00206
Euro	=	US$ 1.35050
SDR	=	US$ 1.53407

January 1 December 31

ABBREVIATIONS AND ACRONYMS

APL	Adaptable Program Loan
ADRS	*L'Agence de développement rural de la vallée du fleuve Sénégal* (Rural Development Agency for the Senegal River Valley)
ARMP	Autorité de Régulation des Marchés Publics
CAS	Country Assistance Strategy
CHSG	Conference of Heads of State and Government
CIA	Community Implementing Agency
CIWA	Cooperation in International Waters in Africa
CMU	Country Management Unit
COM	Council of Ministers
CPAR	Country Procurement Assessment Review
CPS	Country Partnership Strategy
DA	Designated Account
DNGR	*Direction Nationale du Génie Rural* (National Directorate of Rural Engineering)
EA	Environmental Assessment
ECOWAS	Economic Community of West African States
ERR	Economic Rate of Return
ESIA	Environmental and Social Impact Assessments
ESMF	Environmental and Social Management Framework
FCFA	*Franc de la Communauté Financière Africaine* (African Financial Community Franc)
FM	Financial Management
FMR	Financial Management Reports
GCM	Global Climate Model
GEF	Global Environmental Facility
HC	High Commission
HEP	Hydroelectric Project
IAS	International Accounting Standards
ICB	International Competitive Bidding

IDA	International Development Association
IRR	Internal Rate of Return
ISN	Interim Strategy Note
IPF	Investment Project Financing
IT	Information Technology
IUCN	International Union for Conservation of Nature
IWT	Inland Water Transport
LDCF	Least Developed Countries Fund
LLIN	Long Lasting Insecticide-Treated Bed Net
LQAS	Lot Quality Assurance Sampling
LTEQO	Long-Term Environmental Quality Objective
M&E	Monitoring and Evaluation
MIS	Malaria Indicator Survey
MWRD	Multipurpose Water Resources Development
NCB	National Competitive Bidding
NGO	Non-governmental organization
NPPC	National Project Planning Committee
NTD	Neglected Tropical Disease
OERS	*Organisation des Etats Riverains du fleuve Sénégal* (Organization of Senegal River Riparian States)
OMVS	*Organisation pour la Mise en Valeur du fleuve Sénégal* (Organization for the Development of the Senegal River)
PACV	*Programme d'Appui aux Communautés Villageoises* (Village Communities Support Program)
PCU	Project Coordination Unit
PDIAM	*Programme de Développement de l'Irrigation en Aval de Manantali* (Program for the Development of Irrigation Downstream of Manantali)
PDRI	*Programme de Développement Rural Intégré - Mauritania* (Integrated Rural Development Program – Mauritania)
PFS	Project Financial Statement
PNIA	*Programme National d'Investissement Agricole - Senegal* (National Agricultural Investment Program – Senegal)
PNLB	*Programme National de Lutte contre la bilharziose* (National Program against Schistosomiasis)
PNLP	*Programme National de Lutte contre le paludisme* (National Program against Malaria)
PPMP	Pest and Pesticide Management Plan
PRSP	Poverty Reduction Strategy Paper
PWC	Permanent Water Commission
RBM	Roll Back Malaria
RFP	Request for Proposal
RPF	Resettlement Policy Framework
SAED	*Société d'Aménagement des Terres du Delta* (Delta Management Holding Company)
SBD	Standard Bidding Document
SDAGE	*Schéma d'Aménagement et de Gestion des Eaux* (Comprehensive

	Senegal River Basin Master Plan)
SEI	Stockholm Environment Institute
SIGMAP	International Conference on Signal Processing and Multimedia Applications
SOGED	*Société de Gestion et d'Exploitation de la Barrage de Diama* (Diama Dam Holding Company)
SOGEM	*Société de Gestion et d'Exploitation de la Barrage de Manantali* (Manantali Dam Holding Company)
SOGENAV	*Société de Gestion et d'Exploitation de la Navigation sur le fleuve Sénégal* (Senegal River Navigation and Transport Holding Company)
SONADER	*Société Nationale de Développement Rural* (National Company for Rural Development, Mauritania)
SYSCOA	*System Comptable Ouest Afrique* (West African Accounting Standards/Plan)
TDA	Trans-boundary Diagnostic Analysis
TF	Trust Fund
UNDB	United Nations Development Business
UNDP	United Nations Development Programme
US$	United States Dollar
WAEMU	West African Economic and Monetary Union
WARDS	West Africa Regional Disease Surveillance Project
WARN	West Africa Roll Back Malaria Regional Network

Regional Vice President:	Makhtar Diop
Country Director:	Colin Bruce
Sector Director:	Jamal Saghir
Sector Manager:	Jonathan Kamkwalala
Task Team Leader:	Shelley McMillan

SENEGAL RIVER BASIN
Multipurpose Water Resources Development Project 2

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PAD DATA SHEET

Senegal River Basin

Multi-Purpose Water Resources Development Project 2 (P131323)
Climate Change Resilience Development Project (P131353)

PROJECT APPRAISAL DOCUMENT

Africa

Water Resources – AFTN2

Basic Information

Date:	November 8, 2013	Sectors:	General water, sanitation and flood protection sector (30%), Irrigation and drainage (25%), Health (20%), General agriculture, fishing and forestry sector (15%), General public administration sector (10%)
Country Director:	Colin Bruce	Themes:	Water resource management (40%), Regional integration (30%), Malaria (15%), Climate change (10%), Gender (5%)
Sector Manager/Director:	Jonathan Kamkwalala / Jamal Saghir	EA Category:	A
Project ID:	P131323/P131353		
Lending Instrument:	Investment Project Financing (IPF)		
Team Leader(s):	Shelley McMillan		

Joint IFC: No

Borrower: Republic of Guinea, Republic of Mali, Islamic Republic of Mauritania and Republic of Senegal
Recipient: Republic of Guinea Republic of Mali, Islamic Republic of Mauritania, Republic of Senegal and OMVS

Responsible Agency: L'Organisation pour la Mise en Valeur du Fleuve Sénégal (OMVS)

Contact:	Haut Commissariat Immeuble OMVS Fan Bel Air ROCADE, BP : 3152, Dakar, Sénégal	Title:	Kabiné Komara
Telephone No.:	(221) 33 859 81 81 Fax : (221) 33 864 01 63	Email:	omvssphc@omvs.org

Project Implementation Period:	Start Date: November 26, 2013	End Date:	December 31, 2020
Expected Effectiveness Date:	January 1, 2014		
Expected Closing Date:	June 30, 2021		

Project Financing Data(US$M)

[ ]	Loan	[X]	Grant	[X]	Other
[X]	Credit	[ ]	Guarantee		

For Loans/Credits/Others

Total Project Cost :	240.5	Total Bank Financing :	212.5

Total Cofinancing :	28.0	Financing Gap :	0.0

Financing Source	Amount (US$Million)
BORROWER/RECIPIENT	12.0
IBRD	0.0
IDA: New	212.5
IDA: Recommitted	0.0
Others	Global Environment Facility (GEF) 4.0 Least Developed Countries Fund (LDCF) 12.0
Financing Gap	0.0
Total	240.5

Expected Disbursements (in US$ Million)

Fiscal Year	2014	2015	2016	2017	2018	2019	2020	2021	
Annual	12.0	27.0	31.0	47.0	39.0	32.0	27.0	13.5	
Cumulative	12.0	39.0	70.0	117.0	156.0	188.0	215.0	228.5	

Project Development Objective(s)

The overall Program Development Objective is: to enhance regional integration among the riparian countries of the Senegal River Basin through OMVS for multi-purpose water resources development to foster improved community livelihoods.
The MWRD2 Project Development Objective is: to improve coordinated management of water resources for socially, environmentally and economically sustainable development in the Senegal River Basin.
The Global Environmental Objective is: to strengthen trans-boundary water resources management in the Senegal River Basin including climate change adaptation and implementation of priority actions of the Strategic Action Plan.

Components

Component Name	Cost (US$ Millions)
1: Institutional Development for Water Resources	19.11
2: Multi-Purpose Water Resources Development: (a) Hydro-Agricultural development; (b) Water Resources Protection; (c) Sustainable fisheries management and aquaculture; (d) reduction of the incidence of water-related diseases; and (e) Pilot Approaches to improve climate resilience	174.23
3: Infrastructure Management and Planning	29.62
Contingency allowances	17.54

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes	[ ]	No	[X]
Does the project require any waivers of Bank policies?	Yes	[ ]	No	[X]
Have these been approved by Bank management?	Yes	[-]	No	[-]
Is approval for any policy waiver sought from the Board?	Yes	[ ]	No	[X]
Does the project meet the Regional criteria for readiness for implementation?	Yes	[X]	No	[ ]

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	

Natural Habitats OP/BP 4.04	X	
Forests OP/BP 4.36	X	
Pest Management OP 4.09	X	
Physical Cultural Resources OP/BP 4.11	X	
Indigenous Peoples OP/BP 4.10		X
Involuntary Resettlement OP/BP 4.12	X	
Safety of Dams OP/BP 4.37	X	
Projects on International Waterways OP/BP 7.50	X	
Projects in Disputed Areas OP/BP 7.60		X

Legal Covenants

Name	Recurrent	Due Date	Frequency
Article V, 5.01 (a)	No	Effectiveness condition	Once

Description of Covenant
The Subsidiary Agreement has been executed on behalf of the Recipient and the Project Implementing Entity.

Name	Recurrent	Due Date	Frequency
Article V, 5.01 (b)	No	Effectiveness condition	Once

The GEF/LDCF Grant Agreement has been executed and delivered and all conditions precedent to the effectiveness or to the right of the Project Implementing Entity to make withdrawals under said GEF/LDCF Grant Agreement have been fulfilled.

Name	Recurrent	Due Date	Frequency
Article V, 5.01 (c)	No	Effectiveness condition	Once

Each legal agreement has been signed and delivered and all conditions precedent to the entry into force or the right to withdraw funds pursuant to each agreement have been fulfilled.

Name	Recurrent	Due Date	Frequency
Article V, 5.01 (d)	No	Effectiveness condition	Once

The Project Implementing Entity has prepared and adopted, or caused to be prepared and adopted, a Project Implementation Manual, in form and substance satisfactory to the Association.

Name	Recurrent	Due Date	Frequency
Article V, 5.01 (e)	No	Effectiveness condition	Once

The Project Implementing Entity has: (i) established the Project Coordinating Unit (PCU), in form and substance satisfactory to the Association; and (ii) recruited to the PCU a financial officer, and an accountant for the National Cellule of the Republic of Senegal, all in accordance with Section III.C of Schedule 2 to the Project Agreement.

Name	Recurrent	Due Date	Frequency
Article V, 5.01 (f)	No	Effectiveness condition	Once

The OMVS has established the Regional Steering Committee.

Name	Recurrent	Due Date	Frequency
Schedule 2, Section IV, C	Yes	April 30, 2015	eight

1.In accordance with Section 4.03 of the General Conditions and without limitation to the Recipient's obligations under said Section 4.03 of the General Conditions, the Recipient shall provide for the account of the Project Implementing Entity a total counterpart contribution of three million seven hundred twenty-seven thousand Dollars ($3,727,000 each for Mali, Mauritania and Senegal; $2,184,000 for Guinea) ("Counterpart Funds") in accordance with paragraph 2 below.

2. The Recipient shall deposit in the Project Implementing Entity's account an amount equivalent to twelve and one half percent (12.5%) of the

required Counterpart Funds no later than the last day of every semester starting on April 30, 2015 and continue until such time as the total Counterpart Funds have been disbursed (or such later date as the Association may establish in consultation with the Recipient and the Project Implementing Entity.

Name	Recurrent	Due Date	Frequency
Project Agreement, Section 1, D, 4	No	Within six months of project effectiveness	Once

The Project Implementing Entity shall establish, no later than six (6) months after the Effective Date, and thereafter maintain, an independent dam safety panel comprised of experts having qualifications and experience acceptable to the Association, to advise on associated dam safety risks.

Name	Recurrent	Due Date	Frequency
Project Agreement, Schedule, Section II, B, 3	No	Within four months of project effectiveness	Once

The Project Implementing Entity shall not later than four months after the Effective Date: (a) recruit the independent external auditor referred to in Section 4.09 (b) of the General Conditions, in accordance with Section III.C of the Schedule to this Agreement; and (b) upgrade the accounting software at the National Cellule of each Participating Country, in form and substance satisfactory to the Association.

Team Composition

Bank Staff

Name	Title	Specialization	Unit	UPI
Shelley McMillan	Task Team Leader	Sr. Water Resources Specialist	AFTN3	
Salamata Bal	Sr. Social Development Specialist		AFTCS	
Sylvestre Bea	Consultant	Economist	AFTU2	
Wolfgang Chadab	Senior Finance Officer		CTRLA	
John Paul Clark	Senior Technical Specialist	Malaria and NTDs	AFTHW	
JB Collier	Senior Operations Officer		AFTN3	
Sidy Diop	Procurement Specialist		AFTPW	
Ijeoma Emenanjo	Natural Resources Management Specialist	Climate change	AES	
Claire Grisaffi	Technical Specialist	Water Engineer	AFTN2	
Mohamed Khatouri	Monitoring and Evaluation Specialist		AFTDE	
Edith Ruguru Mwenda	Senior Counsel		LEGAM	
Boury Ndiaye	Team Assistant		AFCF1	
Celestin Ajarou Niamien	Senior Finance Officer		CTRLA	
Robert Robelus	Sr. Environmental Consultant		AFTN2	
Osval Rocha Romao	Financial Management Specialist		AFTMW	
Aurore Simbananiye	Program Assistant		AFTN3	
Andy Chi Tembon	Senior Health Specialist	Malaria and NTDs	AFTHE	

Non Bank Staff

Name	Title	Office Phone	City
Cedric Boisrobert	Fisheries Consultant		Brussels
Alassane Chérif Guisset	Sr. Irrigation Consultant		Nouakchott
André Ndikuyeze	Health Consultant		Ottowa
Amadou Soumaila	Sr. Irrigation Specialist	FAO +251 11 647	Addis Ababa

		8888	
Chakib Zouaghi	Sr. Economist	FAO	Rome

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Guinea					
Mali					
Mauritania					
Senegal					

I. STRATEGIC CONTEXT

A. Country Context

1. The Senegal River Basin covers a surface area of about 300,000 km^2. The high plateau in northern Guinea represents 31,000 km^2 (11 percent of the basin), 155,000 km^2 is situated in western Mali (53 percent of the basin), 75,500 km^2 is in southern Mauritania (26 percent of the basin) and 27,500 km^2 is in northern Senegal (10 percent of the basin). The basin has three distinct parts: the upper basin, which is mountainous, the valley (itself divided into high, middle and lower) and the delta, which is a source of biological diversity and wetlands. Topographical, hydrographic and climatic conditions are very different in these three regions and seasonal temperature variations are extensive. The upper valley receives 700 – 2,000 mm of rainfall annually and provides most of the flow in the river. The middle valley and delta only receive 150 – 300 mm of rainfall annually. The total annual discharge of the Senegal River is estimated at 24 billion m^3 per year but this annual flow is highly irregular. An overview of the river basin is shown in the map in Annex 9.

2. The four riparian countries of the Senegal River Basin rank among the poorest countries in the world with 42-53% of the population living below the poverty line and a GNI per capita as low as $430 in Guinea. All have some of the lowest Human Development Indices, with rankings within the bottom 32 countries in the world. The total riparian population is estimated at 35 million inhabitants, of which 12 million live in the basin. These are mostly subsistence or smallholder farmers so are among the most vulnerable groups in the region. The population growth rate is estimated at 2.7 percent and the population is expected to double every 25 years. All the riparian countries are facing energy shortages and growing demand, which is hampering their economic performance. Food security is another critical need across the basin. Yet, the basin's hydropower and irrigation potential are significantly underexploited, as described in the next section. Increased water storage and infrastructure, coupled with multi-purpose water resources development and management, are therefore crucial to addressing the growing demand for water and food, and to ensure sustainable growth and the welfare of the people living in the Basin. Furthermore, unilateral planning and development of water infrastructure could have far reaching consequences for socio-political stability and sustainable development in the region.

3. Coordinated river basin planning and coordinated investment is therefore essential in such a vulnerable area to ensure that the risks of large scale water investment are mitigated and the benefits of investments are shared. The *Organisation pour la mise en valeur du fleuve Sénégal* (Organization for the Development of the Senegal River - OMVS) has the mandate of securing countries' economies and reducing the vulnerability of peoples' livelihoods through coordinated water resources and energy development. OMVS was established in 1972 in the context of severe droughts, famine and degradation of the natural resource base. The current OMVS structure includes four countries: Guinea, Mali, Mauritania and Senegal. Guinea is a recent entrant since 2006. Following the Nouakchott Declaration of May 2003, which sets the strategic orientation for development of the Senegal River Basin, the OMVS vision for regional integration includes accelerating the development of multi-purpose water resources infrastructure to augment the availability of water and generate low cost hydroelectricity. OMVS is a strong, stable regional organization and critically important for regional integration in West Africa.

B. Sectoral and Institutional Context

4. In the Senegal River Basin sustainable development requires development in the energy and agriculture sectors while protecting local health and livelihoods. In addition, planning for future development needs to be done factoring in the increased climate risks and uncertainty. As one of the most advanced basin organizations in the region, and the only one to have jointly owned and managed water infrastructure, OMVS ensures an environment conducive to investments and is well-positioned to undertake multi-purpose and multi-sectoral investments as those proposed in the Senegal River Basin Multi-Purpose Water Resources Development (MWRD) program.

5. The overall sectoral and institutional context is outlined below and given in more detail in Annex 2. The Senegal River Basin Multi-Purpose Water Resources Development (MWRD2) Project is the second phase of a 10-year Program. Phase 1 of the program (MWRD1) has positively impacted the Basin across the agriculture, health and fisheries sectors. There have also been important contributions at the regional level for improved water resources management. The impacts of MWRD1 on the sectorial and institutional context are discussed below. A further more detailed description of the activities and achievements of MWRD1 is given in Annex 7. The remaining sector and institutional needs are outlined at the end of this Section.

Sector Context:

Water Resources Development: Needs and Potential

6. Within the Senegal River Basin and beyond in the region, energy costs and food insecurity are increasing; in parallel with very slow development of the large potential for hydropower and irrigation development. The Basin has seen considerable migration of people due to worsening droughts and desertification since the early 1970s. Annual rainfall has a high variability between wet and dry seasons and also from year to year. Generally, decreasing mean annual rainfall levels have been the trend in West Africa over the last two decades illustrating the effects of climate change. A time series analysis of the Senegal River's annual low volumes strongly suggests that water resources availability has been substantially curtailed since 1960. During the coming century, climate change will contribute to increasing the population at risk of increased water stress in Africa to 75-250 million and 350-600 million people by 2020 and 2050, respectively. Furthermore, the region is struggling under the burden of soaring energy costs. Currently, irrigated farming remains limited to the middle and lower river valley between Mauritania and Senegal. Less than half of the irrigation potential for the basin, estimated at 375,000 ha, is currently developed. Of the 130,000 ha to 140,000 ha that are developed, only 90,000 ha are really usable. Hydropower potential is estimated at 1,200 MW of which less than 30 percent is currently exploited. Recent work led by the Economic Community of West African States (ECOWAS) to prioritize the pipeline of proposed dams and develop supporting guidelines indicates increased regional support for water resources development. The Felou Hydropower Project will add another 60MW to the energy supply for Mauritania, Mali and Senegal but there are several other viable hydropower projects to be developed in the Senegal River Basin.

7. The development of navigation in the basin would contribute significantly to unlocking this latent potential. Commercial navigation on the Senegal River was practiced for about three centuries until the 1970s. During this period, river ports were constructed and river navigation was subject to official regulations. However, the construction of the port of Dakar, the Dakar-Bamako railway line, and the development of the road network, combined to cause the decline in Inland Water Transport (IWT) on the Senegal River. Despite this historical decline the Diama Dam and Manantali Dam were designed and constructed to also cater for the requirements of river transport and navigation is a key priority for upstream riparian states.

8. In trying to meet the needs of energy and food security, it is important to note that the construction of large dams for irrigation and hydropower in the past has contributed to negative impacts on the basin population. The increased regulation of the Senegal River and associated infrastructure have been widely linked to environmental impacts, damage to local livelihoods and increased public health risks.

9. Water-related diseases associated with large water infrastructure are still prevalent, negatively affecting the Basin population's health and economic productivity. According to a recent malaria indicator survey[1], malaria prevalence rates in the Senegal River Basin are estimated at 14.3% among children under 5 and 9.0% among pregnant women, the most vulnerable groups. Epidemiological mapping shows that Neglected Tropical Diseases[2] (NTDs) affect almost all districts along the Senegal River Basin. Studies have shown that integrated disease control measures, coupled with sound water management, are essential to mitigate the burden of malaria and NTDs in locations near irrigation or dam sites.

10. Reduced productivity of the fishing sector and environmental degradation has also negatively impacted the basin population. Large areas of floodplain used for recessional agriculture, the basic means of livelihood for an important segment of the population, have been lost. Fishing is the largest economic activity in the basin after agriculture. However fish catches have declined across the basin, in part due to changes in hydrology and also from unsustainable fishing practices.

11. The successful Senegal River Basin Water and Environmental Management Project, which was supported by the GEF (Global Environmental Facility) and executed between 2004 and 2008 by OMVS in partnership with the World Bank, UNDP and International Union for Conservation of Nature (IUCN), included: the development of a Trans-boundary Diagnostic Analysis (TDA) and Strategic Action Plan (SAP). The TDA identified the most urgent environmental problems in the River Basin as: (a) land degradation and desertification; (b) decreased water supply and degradation of water quality; (c) proliferation of invasive species; (d) prevalence of water related diseases; and (e) threats to biological diversity. The SAP then focused on the following: (a) consolidation of identified national priorities; (b) the description of public perceptions towards proposed development actions in the basin and perceptions on transboundary environmental management issues; (c) the prioritization of transboundary and national actions; (d) the identification and definition of priority interventions; and (e) the

[1] Carried out by OMVS between November 2011 and January 2012
[2] Schistosomiasis, soil transmitted helminthes/geohelminths, trachoma, lymphatic filariasis and onchocerciasis

identification of necessary additional policy and institutional reforms to facilitate enhanced transboundary management actions.

Impacts and Progress under MWRD1

12. Under MWRD1, support was provided to improve sector planning and advance water resources development, while mitigating the negative impacts of such development. Important achievements across several sectors (agriculture, energy, health, environment, fisheries) were realized through regional cooperation. The main activities and sectorial impact are outlined below and detailed in Annex 7:

(a) Water resources planning and development:
   (i) The Master Plan and Water Management Plan of the Senegal River was developed, which defines the guidelines for the strategic planning of the development and management of the Senegal River Basin; it reflects the shared vision of the OMVS and the riparian governments until the year 2025.

   (ii) Pre-investment studies for multi-purpose dams (Boureya - 161 MW, Gourbassi 170MW and Koukoutamba 280MW) were developed and validated by the four riparian countries. These dams have been identified as high political priorities and sound investments; they have been reviewed under a multi criteria analysis, including economic, technical, environmental and social issues.

   (iii) Water intakes, pumping stations and canals were rehabilitated to foster the development of irrigated agriculture. Approximately 5,000ha of land were rehabilitated or developed for irrigated agriculture.

   (iv) Studies were completed to assess the condition of Diama dam, including design of the rehabilitation required for the cathodic protection system and the electronic systems and control boards

   (v) In addition to the work under MWRD1, the 2004 to 2008 Senegal River Basin Water and Environmental Management Project supported by the GEF completed an inventory of potential micro-hydro sites in Guinea.

(b) Protecting public health, environmental protection and restoring livelihoods;
   (i) The high incidence of malaria, schistosomiasis and geohelminthiasis was addressed through community-based information, education and communication strategies and the distribution of more than 3.1 million long-lasting insecticide treated bed nets (LLINs) and over 2 million praziquantel and 7 million albendazole tablets. As a result, the use of LLINs increased from 27.6% to 46% overall. In the most vulnerable groups, LLIN use increased from 57.5% to 74.1% for children under the age of 5 years and from 33.3% to 65.2% for pregnant women. This resulted in visible decreases in the incidence of parasitaemia. Over 80% of children were treated for schistosomiasis and geohelminthiasis resulting in a significant decrease in the prevalence of severe schistosomiasis infections.

(ii) The improvement of traditional fishing practices and the revival of the sector were supported by strengthening the technical capacity of fisheries stakeholders (fishermen, fishmongers, processors, carpenters). More than 1,200 fishermen were trained, 10 fishing councils were formed and fishing equipment (boats, nets, etc.) was purchased and distributed to fishermen's organizations.

(iii) Reforestation was carried out to protect the watershed and improve community livelihoods in the upstream areas of Guinea.

Sector Needs to be met under MWRD2

13. Although steps have been taken under the previous project, significant needs still remain to be addressed under MWRD2. These are described below.

14. Although agriculture is the main economic activity for the majority of the population, less than half of the irrigation potential for the basin is currently developed and the investment in the development of irrigated agriculture during MWRD1 addressed 1-2% of the total potential in the basin. Therefore, there is still much which remains to be done to increase food security in the region through irrigated agriculture. OMVS and the riparian states have identified irrigated agriculture as their highest priority and OMVS has a strong mandate related to this in terms of development of bulk water infrastructure. Furthermore, in May 2003 at the 13th Conference of the Heads of State, under the adopted Resolution No. 32, OMVS was mandated to develop a regional hydro-agricultural program and to accompany the member states in agricultural development because of delays in the implementation of national agriculture programs, It is also worth noting that in MWRD, the member states of OMVS have prioritized the advancement of public irrigated agriculture schemes over large scale private commercial schemes. Public schemes to support smallholders have a greater direct impact on the poverty alleviation for the population in the Basin and it is more difficult to find financing sources for this work.

15. Due to the high public health vulnerability of the population in the basin, it is critical that development of irrigation and other infrastructure is completed in parallel with programs to protect local communities from the associated public health risks. With a growing basin population of more than 12 million people and new water infrastructure planned or under construction, further steps are needed to continue the support for mass coverage of LLINs and effective treatment of schistosomiasis and geohelminthiasis. In addition, member states of OMVS have demanded support to expand the control of NTDs to include other water-related diseases that are co-endemic in the river basin. These NTDs are Lymphatic Filariasis, Onchocerciasis and Trachoma. Integrated treatment of these diseases will be a more efficient intervention and will reduce overall costs for treatment of NTDs. As the riverine population is mobile across the four riparian countries any public health strategy has to address treatment at a regional level and across the four countries simultaneously in order to be most effective.

16. The impacts of climate change in the future will necessitate adaptation on the part of water resource management institutions and water users. Adaptation may involve trade-offs among the needs of different sectors, for example, maximizing power production or maintaining in-stream flows for fish. Climate change predictions will also have a significant impact on the

management of the dams in the Senegal River Basin. Examples of adaptations to climate change in the water sector in developing countries are not well documented. Studied adaptation options for arid and semi-arid regions include; rainwater harvesting, water storage in underground reservoirs, the development of salt tolerant crops to make use of brackish water and options that reduce the demand for water such as improved irrigation efficiency and water recycling. Where water resource management decisions are taken without proper information on possible future climate change impacts, sub-optimal adaptation may result in exacerbating vulnerabilities to future climate change.

17. There are wide areas where the water resources base needs protection from soil erosion, particularly in the upper catchment of the river basin. In the upper catchment, there is potential to protect the watershed in parallel with developing community livelihoods through agroforestry. An update of the TDA to include emerging knowledge related to climate change is also needed to inform water resources management to increase resilience to climate change.

18. Fish catches and fisheries management have improved in the communities where activities were implemented in MWRD1. However there are a large number of communities, with equivalent needs in the river basin, which did not benefit under MWRD1, in particular in Guinea. Further steps are needed to continue to scale-up these activities so that local communities can develop sustainable fishing practices and robust livelihoods.

19. Water Resources planning has been advanced; however there are further steps to be taken to ensure that this translates into investments in sustainable water infrastructure. Despite the needs for power and food security, a pipeline of transformative investment projects has not been well developed. In addition, studies are needed to integrate Guinea into the West Africa power pool, and to unlock the huge hydropower potential there. The activities proposed under MWRD2 will therefore ensure that OMVS continues to contribute effectively to addressing regional and national priorities and has a viable portfolio of investments for future financing.

20. Following the studies completed on Diama dam it has been established that emergency maintenance is required to ensure that the life of the structure is extended. Diama dam, built in 1986, both protects and facilitates the majority of investments in irrigation and fisheries in both Mauritania and Senegal, with upstream impacts reaching as far as Mali. However following almost 30 years of operation in a highly corrosive environment some elements, including control systems and gates, are in a critical condition.

21. Currently, water allocation is not a critical issue in the Senegal River Basin as the water resources are significantly under-developed. However climate variability and increased pressure on existing water resources will necessitate adaptation on the part of water resource management institutions and water users in the future. The knowledge base and tools for adaptation are not adequate, namely:

(a) The flow gauging network, largely complete in Senegal and Mauritania, is incomplete in Mali and Guinea;

(b) The water resources management models for the Senegal River Basin need to be reviewed and updated (or replaced) where necessary to take account of new infrastructure and the increase in extreme events expected under climate change;
(c) Cartography of the Senegal River Basin was last updated in the 1970s for much of the basin;
(d) The TDA completed in 2008 did not include a comprehensive assessment of the impacts of climate change.

22. Where water resource management decisions are taken without proper information on possible future climate change impacts, sub-optimal adaptation may exacerbate vulnerabilities to future climate change. An improved knowledge base with which to plan for climate risk adaptation needs to be developed.

23. The navigation potential of the Senegal River Basin was not developed under MWRD1 as there was a parallel project, the Senegal River Basin Integrated multi modal Transport Project, under preparation at that time. However this project did not advance as planned. Technical studies need to be carried out to help OMVS move forward with the navigation of the Senegal River, including mobilization of donor support.

Institutional Context:

24. OMVS was established in 1972 with the mandate of securing countries' economies and reducing the vulnerability of peoples' livelihoods through coordinated water resources and energy development. Since 1978, OMVS has formally adopted the principles of equality and equity, with the allocation of benefits and costs based on the needs of the member states, their capacity to put to use the benefits provided by the river, and the actual uses derived from the river (Nguyen, 1982). The current OMVS structure includes four countries: Guinea, Mali, Mauritania and Senegal. The river basin integrated development program has three pillars: (i) water resources management; (ii) hydropower development; and (iii) inland water transport as a "dorsal spine" of an intermodal/multimodal transport system. The program is the product of a long process of cooperation among Mauritania, Mali and Senegal which commenced during the colonial era to jointly develop shared resources. Over this period OMVS has become a key river basin authority in the region, with influence beyond the basin boundaries; for example it has hosted the African Network of Basin Organizations since its formation in 2002. As one of the most advanced basin organizations in the region, OMVS ensures an environment conducive to investments, particularly large water-related infrastructure. With a long-standing, established track record spanning more than 40 years, OMVS is well-positioned to undertake the multi-purpose and multi-sectoral investments proposed in this program.

Impacts and Progress under MWRD1

25. With the support of MWRD1, OMVS completed the Inclusive Framework to integrate the fourth riparian country - Guinea - into the Senegal River Basin Development Program. In March 2006, the treaty was signed to integrate Guinea as the fourth riparian country and the four Heads of State approved the implementation of the joint Senegal River Basin Development Program. The inclusion of Guinea provided an opportunity for OMVS to embark on a

comprehensive program of legal and institutional reforms, incorporating environmental and social issues, among other aspects which were not fully considered at the initial establishment of the organization.

26. The inclusion of Guinea within OMVS in MWRD1 was a critical step for regional development and economic integration. This is only the second time the Bank has brokered such an agreement on international waters (the first time being the Indus Treaty). By joining OMVS, Guinea has benefited from the lifting of financial constraints to developing its significant hydropower potential, thereby strategically positioning itself in the West Africa Power Pool market. In return, Guinea's contributions to the joint development and protection of the headwaters of the Senegal River will benefit the other riparian countries. However the inclusion of Guinea also introduces a number of risks into the operations of OMVS due to the country's much lower capacity and critical position at the source of the Senegal River.

27. The institutional reform of OMVS was completed with the implementation of a new organizational structure. This new structure better positions the organization for the current and future challenges and strengthens the involvement of all stakeholders in the decision-making processes. This is important as other development issues come to the forefront of water resources management (e.g. health and climate change adaption) and more participation from civil society is demanded. The project also helped to modernize OMVS' headquarters and the documentation center.

28. A number of studies were also completed to support implementation of the Water Charter and to strengthen the technical support OMVS provides to member states including flood risk management and establishing critical limits for water abstractions for use in developing permitting systems. The Water Charter of May 2002 is an innovative instrument based on four pillars: (i) sustained and structured cooperation among member states to secure equity, solidarity, and equal treatment of all water-using sectors; (ii) joint and indivisible ownership of all infrastructures in the basin; (iii) equal access to the resources, and (iv) equitable allocation of costs and charges. The Water Charter also determines the rules for preserving and protecting the environment, particularly concerning fauna, flora and the ecosystems of the flood plains and wetlands. This places OMVS in an advantageous position that is still unreachable for most other river basin organizations.

Institutional needs to be met in MWRD2

29. The Bank's investment program and support to OMVS is extremely critical for reasons that go beyond the immediate energy and water sector needs in the Senegal River Basin, and incorporate regional socio-political stability, environmental sustainability and protection of highly vulnerable communities. The MWRD program represents the first major test of OMVS' Inclusive Framework by including Guinea as a full member in the joint ownership, financing and management of water infrastructure in the Senegal River Basin.

30. Although major steps were taken in MWRD1 there are still a number of key issues which need to be resolved to support the continued implementation of the Inclusive Framework. The main issues are renegotiation of the partition of benefits and costs among the four member states

and updating the national legislation for water resources management in Guinea, now that the country has adopted OMVS legislation as the overarching framework.

31. The sharing of benefits among Mali, Mauritania and Senegal was formally agreed by the Council of Ministers in 1981; and although some aspects have been adjusted and updated in line with basin developments they have never been formally adopted. Differences between the new and old sharing of benefits were too large to be politically acceptable and finally no revisions were ever made to the 1981 partition. With the recent inclusion of Guinea, the member states of OMVS want to re-evaluate the sharing of benefits and costs and formerly adopt a new "key" i.e. a new matrix for the partition of costs and benefits. Recent studies by the World Bank on OMVS have also highlighted inequalities in how the benefits and costs of development are shared with the population at large. Some segments of the population have benefited from the developments facilitated by OMVS (for example urban populations) while others have not – and in some cases, have been negatively impacted (for example traditional recessional farmers). This issue of sharing of benefits, both internationally and within the basin populations illustrates why it is crucial that the relationship between OMVS and the riparian countries, especially Guinea, be supported through sustained regional investments.

C. Higher Level Objectives to which the Project Contributes

32. The project is consistent with the general goals of improved environmental and water resources management expressed in the riparian countries' Country Partnership Strategies (CPS: Senegal, Mauritania, Guinea) and Interim Strategy Note (ISN: Mali). For all recipient countries, the project is also consistent with the general sector goals of strengthening governance, building institutional capacity and increasing sustainable management practices to reduce poverty as described in the strategy documents. In the same way, the project conforms to the countries' PRSP goals for good governance and sustainable development. Specific indicators are consistent with country goals wherever possible, for example coverage levels for mosquito net distributions are set in line with national targets.

33. **Mali.** The Interim Strategy Note (ISN, 2013-2014) supports the government's strategy to accelerate its interventions and strengthen its focus on food security, equitable access to services, economic recovery for job creation and infrastructure development. This ISN program aims to both rapidly provide support to meet the needs of populations across the country and initiate new activities to better address long-term governance challenges. The Bank recognizes the centrality of the human development challenges that Mali faces in the aftermath of the 2011-12 period of conflict and insecurity and proposes a strong program focused on strengthening capacities and delivering basic services. The program is articulated around three priority areas: (i) laying the foundations for long-term accountability and stability; (ii) protecting human capital and building resilience; and (iii) preparing the conditions for economic recovery. This includes efforts to support growth of the rural sector with focused attention on sustainable agriculture. Navigation within the Senegal River was listed in the previous CAS as part of the Indicative Regional Pipeline. The ISN also underlines the importance of hydropower development and the importance of water resources development in the Senegal River to the sustainable development of Mali.

34. **Mauritania.** The CPS (2013-2016), approved in October 2013, highlights the importance of Mauritania's cooperation with the OMVS on sustainable development of the Senegal River Basin, specifically to develop irrigated agriculture for food security, developing infrastructure for electric power production and transport, and improving economic returns from forestry management, including agroforestry. The PRSP, within the context of the country's National Environmental Action Plan (NEAP), identifies development of agriculture, livestock, forestry, and fisheries as some of the priority areas for intervention to address the national challenges for preserving natural resources while achieving sustainable development. This project also contributes to the Rural Development Strategy which focusing on agriculture development in order to generate rural employment and increase food security.

35. **Senegal.** The updated CPS (2013 – 2017), dated February 2013, for Senegal for the period highlights sustainable land and water management as a foundation of development. The importance of joint management of the Senegal River Basin is also identified, with priority areas linking closely to the project, including the development of hydropower, strengthening of transportation links such as the navigation of the Senegal River and development of irrigated agriculture. Pillar 1 of the CAS, Accelerating Growth and Generating Employment, targets sustainable management of fisheries, agricultural development and improved access to electricity – all of which will be enhanced through the project.

36. **Guinea.** The Guinea CPS (2014-2017), approved in October 2013, highlights MWRD2 as a key project in the portfolio. The CPS also identifies hydropower development and linking to the regional power pool as an important growth area. Increased rice yields are a strategic area for investment. Support to the fisheries sector is identified as a future growth area, and the importance of fisheries to food security is noted, although the focus is currently on coastal, rather than continental, fish stocks.

37. **World Bank Strategy for Africa**: MWRD2 is in line with Pillar 2 of the 2011 World Bank Strategy for Africa, Vulnerability and Resilience which highlights the importance of increasing resilience to health shocks with preventative treatment and resilience to climate change.

38. **Regional Integration Assistance Strategy (RIAS) for Sub Saharan Africa**: MWRD2 has strong linkages to two of the three key pillars identified in the RIAS including: (i) coordinated development of clean power networks under Pillar 1 Regional infrastructure, and (ii) the development of transboundary waters, support to regional river basin organizations and cross border malaria prevention under Pillar 3 Coordinated Interventions to provide Regional Public Goods. Furthermore, MWRD2 is highlighted as a key program for the region under the proposal for the **Sahel Regional Approach**. It proposes that regional energy development be implemented using the existing connections provided by OMVS.

39. **National sector strategies and programs:** MWRD2 is fully aligned with the national sector strategies in the four member states. For example, the hydro-agricultural activities planned in Mauritania and Senegal are fully aligned to the Integrated Rural Development Program (*Programme de Developpement Rural Integre, PDRI*, 2015-2020) and the National Agricultural Investment Program *(Programme National d'Investissement Agricole, PNIA)* respectively.

40. The Bank team worked with OMVS and member states to identify the priorities for the MWRD program, consistent with the issues detailed in each of the four ISN/CPS and the strategies above. The pressing challenges in the Senegal River Basin continue to be: (i) ensuring the equitable uses of water resources during periods of water shortages and drought and building resilience and adaptation to climate change; (ii) ensuring favorable social and environmental conditions through improved land and water resource practices; (iii) increasing incomes through increased agricultural productivity and other related water-resources based activities; (iv) optimizing benefits from existing infrastructure while developing appropriate new infrastructure; and (v) addressing increasingly competitive water uses and trade-offs between them. All of these challenges are directly linked to the World Bank's twin goals of ending poverty and boosting shared prosperity.

41. All the riparian states acknowledge the necessity for continued regional cooperation and support OMVS as the leader for trans-boundary water resources initiatives. The member states' commitment to cooperate is more broadly confirmed by their active participation in MWRD1 and in regional institutions including ECOWAS and the New Partnership for African Development (NEPAD).

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

42. The overall Program Development Objective is: to enhance regional integration among the riparian countries of the Senegal River Basin through OMVS for multi-purpose water resources development to foster improved community livelihoods.

43. The MWRD2 Project Development Objective is: to improve coordinated management of water resources for socially, environmentally and economically sustainable development in the Senegal River Basin.

B. GEO

44. The Global Environmental Objective is: to strengthen trans-boundary water resources management in the Senegal River Basin including climate change adaptation and implementation of priority actions of the Strategic Action Plan.

C. Project Beneficiaries

45. In total, more than 4.5 million people within the Senegal River Basin are expected to benefit directly from this project. The majority of these beneficiaries are additional to those supported under MWRD1. Areas of intervention are illustrated on the map given in Annex 9. Direct project beneficiaries are summarized below.

(a) Regional and national agencies working in water resources management, fisheries, agriculture and water infrastructure, which will benefit from technical training, management support, improved processes, systems and equipment.
(b) More than 58,000 small holder or subsistence farmers[3] will benefit from improved access to irrigated land, agroforestry or enhanced water resources management, including improved control for flood agriculture. This includes at least 2,500 women, benefitting from small fields/gardens. In addition irrigation cooperatives from MWRD1 will be supported to continue to put irrigation areas into production and increase the sustainability of the project.
(c) 12,000 people working in artisanal fisheries, either in fish catches, processing or sales of which 58% are women. More than 8,000 beneficiaries are new to the project. Support will be provided to 4,000 beneficiaries from MWRD1 to consolidate the gains made and support the sustainability of the project.
(d) 5,000 project beneficiaries and water user association members supported to increase their climate resilience through pilot projects.
(e) 4,570,000 people living within the Senegal basin benefiting from distributions of mosquito nets, aiming for universal coverage.
(f) 2,100,000 school age children and 1,000,000 adults treated each year for neglected tropical diseases.

46. The indirect benefits are expected to be far reaching. For example, increased fish catches will also provide nutritional benefits and better fishing practices and conservation of stocks would impact upon fishing communities along the length of the Senegal River. There are also indirect livelihoods impacts for retailers, transporters, boat builders and other laborers such as those involved in building fish ponds for aquaculture. Increased capacity of regional and national organizations would also have long term positive impacts. Control of public health risks from malaria and the most common water related diseases will protect new migrants to the area. The development and rehabilitation of bulk water infrastructure will enable additional areas to be put into production for irrigated agriculture. The urgent maintenance works on Diama dam will protect the livelihoods of upstream fishing and farming communities. The technical studies for hydropower and navigation will help advance the actual investments in hydropower and navigation driving economic growth of the region in the future.

D. PDO Level Results Indicators

47. Responding to the needs of OMVS and the riparian states, MWRD2 will have broadly similar components to MWRD1 as follows: (i) consolidating and further strengthening the institutional, legal and technical framework of the Senegal River Basin to better serve all four riparian countries, (ii) expanding the scope and coverage of concrete water resources development activities at the local level that generate significant income to reduce poverty, and (iii) supporting water resources development and planning, both by developing and maintaining water infrastructure, and in supporting future planning within the basin. MWRD2 activities will primarily be located in the priority zones defined by studies in MWRD1. Each component will

[3] This is based around the following assumptions (average ha/household – 1 beneficiary counted per household); low lands 0.25 (Mali)-0.3 (Guinea); irrigation 0.5 (Senegal) -1 (Mauritania); agroforestry 0.25; flood agriculture 2, small market gardens 0.1-0.2.

scale-up activities started under MWRD1, incorporating lessons learnt and taking forward successful elements for further development. Climate resilience will also be strengthened through the activities supported by GEF funding.

48. Key results indicators for each component of the project contributing to the overall Program and Project Development Objectives are summarized in Table 1 below and described in detail in Annex 1.

Table 1: PDO Level Results Indicators

Component	PDO Level Results Indicators
Overall	Number of direct beneficiaries, indicator breakdown; • Number of female beneficiaries • Number of project beneficiaries benefiting from the pilot activities to build climate resilience
(1) Regional institutional development;	New framework for partition of costs and benefits in the river basin is finalized, validated at country level and presented to the CoM
(2) Local level multipurpose water resources development	Area provided with irrigation and drainage services (ha)[4] Number of LLIN distributed Sub indicator: Proportion of children 6-59 months and women 15-49 years[5] sleeping under LLINs
(3) Regional Planning	Improved tools are used in decision making on water allocation during the meetings of the Permanent Water Framework

III. PROJECT DESCRIPTION

49. The project design aims to simultaneously increase the productive uses of water and enable macro-economic growth while safeguarding the health and livelihoods of vulnerable communities in the river basin. The regional integration process establishes the inter-related parameters for sustainable water resources development across all sectors and the project components provide mutually reinforcing interventions at regional, local and national levels.

50. There is significant value added by working through a regional body, such as; (i) relative stability in a volatile context; (ii) economies of scale; (iii) provision of technical expertise and sharing lessons learnt; (iv) improved cooperative management/development of shared infrastructure, including irrigation, bulk water supply and dam development, avoiding the conflict and delays which affect many transboundary projects; (v) increased implementation capacity, for example the mandate for irrigation development was conferred on OMVS in 2002 precisely because national level programs had stalled (vi) greater impact in terms of managing shared community resources, such as fisheries, where a regional response is necessary to make

[4] Incorporating all agricultural development, low lands, irrigation, flood agriculture
[5] This indicator intends to measure the likely proportion of pregnant women sleeping under LLINs.

sustainable practices effective and (vii) a more effective response to disease by reducing transmission across the region.

51. The three components are mutually reinforcing. Component 2 contains the major investments into community livelihoods and protecting public health. The cooperative implementation of this project will be supported by Component 1 and future sustainable planning for investments will be advanced under Component 3. Specifically, MWRD2 will support the update of the partition of costs; improve the knowledge base in the Senegal River Basin; and build capacity at OMVS, national cellules, national executing agencies and local community organizations for sustainable management of water infrastructure. MWRD2 will also support interventions to raise household income, safeguard the existing hydropower supply through essential maintenance works and build a pipeline of water infrastructure investments for future financing. With GEF financing, climate resilience in the Senegal River Basin will be improved.

52. Building on the achievements from MWRD1, support will be provided under MWRD2 to initiate fisheries activities in Guinea and scale-up in the remaining states, incorporating new elements of aquaculture. MWRD2 will continue to address the public health risks from water related diseases, incorporating treatment for new NTDs. The treatment of the 5 critical NTDs will be incorporated into the health sub-component of the project. In addition, the project will continue to contribute to achievement of universal LLIN coverage and improved malaria control in the river basin. Following the increased and visible impacts of climate change, MWRD2 also incorporates additional measures to improve planning for climate resilience in the future.

53. The focus for increasing resilience to climate risks is on improving the knowledge base and future planning including identifying the climate resilience needs, how these should be factored into future planning and identifying methods to make local livelihoods more climate resilient. Resilience to climate risks is supported through improved monitoring of flows; a review and update of the water resources management tools to take into account climate variability; and piloting projects for climate resilience.

54. MWRD2 builds on regional, national and local level experiences in addition to consolidating thirty years of cooperation and joint development in the Senegal River Basin, including; (i) the successful completion of MWRD1; (ii) the development of jointly-owned energy infrastructure in the Manantali and Diama dams; (iii) the Inclusive Framework that encouraged the full involvement of Guinea in the joint management of the Senegal River Basin; (iv) the GEF-funded Senegal River Basin Water and Environmental Management Project which laid the foundation for more integrated land, water and environmental management in the Basin; (v) the Bank financed Health Sector Support Project in Guinea which helped to strengthen procurement and supply chain management; (vi) the ongoing Felou Hydropower Project; and (vii) the Bank's current and previous experience internationally in transboundary river basins.

55. MWRD2 is also closely linked to the national sector level interventions in the member states and will catalyze with parallel regional projects, especially the agriculture interventions. In Mali, Mauritania and Senegal the project will coordinate with the Sahel and West Africa World Bank/GEF Program in support of the Great Green Wall Initiative. MWRD2 will be completed in parallel with Dutch Trust Fund financed activities to reduce invasive species, which block

irrigation channels, and support Water User Associations to complete maintenance works. The health sub-component of MWRD2 will link with the Bank funded West Africa Regional Disease Surveillance Project (WARDS), which aims to build capacity for field epidemiology and laboratory practice in ECOWAS countries. MWRD2 will benefit from WARDS financed training courses for national and district level staff from Guinea, Mali and Senegal.

56. Lessons and experiences from the above, coupled with the Bank's long standing involvement in the Senegal River Basin, clearly demonstrate that regional integration fosters more effective sustainable development and multi-sectoral investments. Therefore, the project provides a unique comparative advantage to mainstream close collaboration between institutions working on water resources management of the Senegal River Basin at regional, national and local levels while consolidating donor interventions through a coherent framework of actions. The different agencies and actors within the project are defined in Annex 3.

A. Project Components

57. The project will have three inter-related components supporting the project development objective: (1) Institutional development; (2) Multi-purpose water resources development and (3) Infrastructure management and planning. The project financing is summarized in Table 2 below and further detail is given in Annex 2.

Table 2: Project Financing

	IDA ($k)	%	Govt. Co finance ($k)	%	GEF* ($k)	%	Totals ($k)
1. Institutional Development							
Total Allocation	**15,148**	**79**	**986**	**5**	**2,980**	**16**	**19,114**
2. Multi-purpose Water Resource Development							
Total Allocation	**156,218**	**90**	**11,014**	**6**	**7,000**	**4**	**174,232**
Water resources protection and hydro-agriculture	114,532	98	2,200	2	0	0	116,732
Fisheries (Sustainable fisheries management and aquaculture)	7,775	74	2,725	26	0	0	10,500
Malaria and NTDs reduction program	33,911	85	6,089	15	0	0	40,000
Pilot approaches for climate resilience	0	0	0	0	7,000	100	7,000
3. Infrastructure Management and Planning							
Total Allocation	**23,600**	**80**	**0**	**0**	**6,020**	**20**	**29,620**
Dam Management and hydropower Development	14,600	100	0	0	0	0	14,600
Planning for climate resilience	4,000	40	0	0	6,020	60	10,020
Navigation	5,000	100	0	0	0	0	5000
Total contingency 3% price contingency, 15% physical contingency for Diama dam works, 10% physical contingency for all other civil works	**17,531**	**100**	**0**	**0**	**0**	**0**	**17,531**

	IDA ($k)	%	Govt. Co finance ($k)	%	GEF* ($k)	%	Totals ($k)
Total Costs ($k)	**212,500**	**88**	**12,000**	**5**	**16,000**	**7**	**240,500**

Component 1: Institutional Development (US$19.11 million)

58. The overall objective of Component 1 is to build capacity for cooperative management. This first component will support both institutional development and project implementation through the following sub-components:

(a) 1.1 - Updating the Inclusive Framework and strengthening the role of Guinea within OMVS
(b) 1.2 - Modernizing and reinforcing the institutional capacities of OMVS and related agencies
(c) 1.3 - Strengthening the capacity of OMVS and national agencies to lead climate adaptation efforts in the region
(d) 1.4 - Strategic management of the project

59. Sub-component 1.1 would support finalization and implementation of the basin wide Inclusive Framework through (i) updating the partition of costs and benefits; (ii) improving data management; and (iii) supporting the implementation of the Water Charter, with a focus on Guinea, and capacity building for Guinea through dissemination and training on the basic texts of OMVS. [GEF funded]

60. Sub-component 1.2 aims to build upon the extensive studies and support provided under MWRD1 through targeted and practical actions which will support or improve the future operation of OMVS, including improving communication and information sharing at the local level and outside the basin.

61. Sub-component 1.3 will support the institutional capacity building of OMVS, national Ministries of Environment, and other relevant agencies of the member states to improve their management and technical capacities to lead climate change adaptation efforts in the region. This sub component will also train pilot program beneficiaries (individual stakeholders, water user associations, and farmers' professional cooperatives) on appropriate climate change adaptation measures [GEF funded].

62. The final Sub-component 1.4 covers the management of MWRD2 by the Project Coordination Unit (PCU) including operating costs for the project, monitoring and evaluation of implementation and support to implementing safeguards. The household surveys are financed by GEF.

Component 2: Multi-Purpose Water Resources Development (US$174.23 million)

63. The overall objective of this component is to promote income-generating activities and to improve livelihoods for the basin population. This component includes a number of core multi-

sectoral activities related to the development of water resources in some sub-basins. Sub-components are:

(a) 2.1 - Hydro-agricultural development and water resources protection;
(b) 2.2 - Sustainable fisheries management and aquaculture
(c) 2.3 - Increased coverage of interventions to address water-related diseases;
(d) 2.4 - Pilot Approaches to improve climate resilience.

Sub-component 2.1 Hydro-agricultural development and water resources protection

64. The activities included in this sub-component are targeted at each country, based on national level priorities and assessed needs. Key activities under this sub-component include:

(a) Extension of agriculture development or intensification through (i) recalibration, reshaping and compacting principal canals and intakes supplying irrigated areas; (ii) rehabilitation of rice irrigation schemes; (iii) development of low lands and flood plain agriculture (iv) development of small irrigated fields/gardens and (v) work to install or improve main pumping stations;

(b) Water resources protection through (i) slope stabilization works and reforestation of river banks and (ii) agroforestry on slopes adjacent to low-land agricultural areas;

(c) Improved water resources management and operation and maintenance of systems installed through training and support to relevant agencies.

Sub-component 2.2 Sustainable fisheries management and aquaculture

65. This sub-component will continue to contribute to the development of sustainable livelihoods from fisheries along the Senegal River. There are four complementary activities in this sub-component to support the development of inland fisheries and aquaculture in selected areas of the river basin. The activities include: (i) institutional support to create and reinforce local organizations to guide the implementation of the project; (ii) support to develop sustainable fisheries management, including information, education and communication planning; (iii) support to enhance the value of fish catches including; landing points, cold stores and processing areas, local capacity building in the management of these structures and fish processing techniques; and (iv) support to develop aquaculture and related activities, developing fish farming in small ponds, dam reservoirs and in the irrigation infrastructure described in the previous sub-component.

Sub-component 2.3 Reduction of the incidence of water-related diseases

66. This sub-component will support the following activities to reduce malaria and NTDs related morbidity among the local population:

(a) Coverage of LLINs through mass distribution campaigns, contributing to the universal coverage objectives of member states;

(b) Geographic mapping of NTDs and mass preventive chemotherapy of the targeted NTDs through integrated mass distribution of medicines in affected communities;

(c) Health promotion in communities through information, education and communication, with an emphasis on the prevention of malaria and NTDs, and social mobilization in support of the periodic distribution of LLINs and integrated treatment of NTDs;

(d) Capacity building, coordination and trans-border collaboration to control malaria and NTDs, including improving disease surveillance, monitoring and evaluation; and strengthening technical capacity of implementing partners by improvement of coordination mechanisms at all levels and strengthening collaboration. This will be done through harmonization of control/elimination methods, synchronization of activities, and sharing information and experiences.

Sub-component 2.4 Pilot approaches to improve climate resilience [GEF Funded]

67. This sub-component will focus on the demonstration of climate change adaptation measures, based on the knowledge generated in sub-components 1.3 and 3.2. The tentative pilot activities will likely include the following: (i) demonstration of small-scale agronomic water-saving measures, including land leveling and deep plowing; (ii) training for water user associations and farmers' professional cooperatives; (iii) installation of water-measuring facilities and equipment; and (iv) preparation and implementation of community watershed management plans. Pilot projects will be assessed during project implementation and successful pilots will be scaled up where possible. The analysis from the vulnerability studies will add to the current climate risk knowledge base and will be essential in determining which pilots are most appropriate for the different geographic zones in the Senegal River Basin.

Component 3: Infrastructure Management and Planning (US$29.62 million)

68. The overall objective of Component 3 is to advance climate resilient water resources planning and development in the region. There are three main sub-components:

(a) 3.1 - Dam management and hydropower development
(b) 3.2 - Planning for climate resilience
(c) 3.3 – Development of navigation along the Senegal River Basin

Sub-component 3.1: Dam Management and hydropower development

69. This sub-component will prepare new water infrastructure and safeguard current infrastructure, including the following activities:

(a) Advancement of the development of high priority dams by: (i) completing complementary studies including access roads and transmission lines for Koukoutamba dam; (ii) preparing the feasibility studies for Balassa dam; and (iii) scoping study for micro-hydro development in Guinea and preparing the feasibility studies for identified priority sites;

(b) Complete urgent maintenance at Diama dam based on technical studies done in MWRD1.

Sub-component 3.2: Planning for climate resilience

70. This sub-component will support development of the knowledge base to identify climate change impacts and support future water resources planning to increase climate resilience. These tools would be used by the Permanent Water Commission to improve decision making on future development in the basin as well as six monthly planning for water allocation and artificial flood releases. The main activities are summarized below:

(a) Review and update of water resources management models and use of modeled scenarios to assess the impacts of flood and droughts on the ecology in the Basin; in consultation with stakeholders new operational rules for infrastructure will be proposed if needed [GEF funded];
(b) Mapping of the Senegal River Basin;
    (i) Overall mapping of the river basin;
    (ii) Detailed mapping of critical areas and capacity building in the use of the tools [GEF funded]
(c) Knowledge generation and dissemination including the update of the TDA and SAP (if needed) and participation in the International Water Learning Exchange and Resource Network (IW-Learn) activities. [GEF funded]
(d) Climate variability and change improvements including improving the hydro-meteorological network; climate risk and vulnerability assessments.

Sub-component 3.3: Development of navigation along the Senegal River

71. This subcomponent will prepare the upstream studies to assess the feasibility and advance the design for navigation on the Senegal River including the following; (i) studies on the renovation of the lock in Diama dam (ii) design and environmental impact assessment for ports, jetties and channel dredging and (iii) support to putting in place a monitoring system

B. **Project Financing**

72. Project financing in the amount of US$212.5 million will be provided by IDA and US$16 million provided from the GEF and LDCF (Least Developed Countries Fund).

73. Counterpart funding of US$12 million will be provided to support the implementation of discrete activities which are high priorities for member states. As such, and as agreed with member states, the counterpart funding is allocated to increase the coverage of interventions to reduce the incidence of water-related diseases, development of sustainable fisheries and aquaculture, in addition to some project management costs.

74. In line with OMVS and member state priorities, approximately 40% of the IDA financing will go towards infrastructure; around 20% to design and supervision; approximately 20% to institutional strengthening; and approximately 20% to the purchase of goods and equipment. At

mid-term, the project will assess the extent to which activities are adequately implemented and make needed adjustments.

75. Distinct activities are financed by GEF/LDCF or IDA as outlined in the cost table given in Annex 2. OMVS has previous experience working with the GEF and the activities supported by GEF/LDCF will build upon previous engagement and will be complementary to the IDA-funded activities.

76. The Dutch Government is planning to finance a parallel project to MWRD2 with OMVS. Proposed activities include addressing the problems of invasive aquatic species and support for water users associations. The *Agence Française de Développement* (AFD) has also expressed interest to provide parallel financing to support OMVS in activities related to further development of the Schéma d'Aménagement et de Gestion des Eaux (Comprehensive Senegal River Basin Master Plan - SDAGE), such as development of country level planning tools and for sanitation improvements in the basin.

Lending Instrument

77. The Adaptable Program Loan (APL) was initially planned to span 10 years and to be implemented in 2 phases (MWRD1 & MWRD2), each with an IDA envelope of US$ 110 million. The rationale for using the APL instrument was to ensure long-term commitment and sustainability in scaling up multipurpose water resources development activities in the Senegal River Basin. The phased approach facilitates the prioritization of investments in alignment with appropriate funding. The APL instrument has now been superseded by Investment Project Financing (IPF) so MWRD2 is now effectively the 2nd part of a series of projects[6] with a common overall objective.

78. MWRD1 was approved by the Board in June 2006 and completed in March 2013. Triggers were established for continuation with the second phase (MWRD2) and, as defined during the Level 1 Restructuring in June 2011, these are: (i) satisfactory integration of Guinea into OMVS' institutional, legal, and financial structures; and (ii) clear consensus among riparian countries to build one dam to complement the hydroelectric capacity of the OMVS member countries. These triggers have been successfully met. Guinea is now an operational member of OMVS; among other steps taken Guinea has ratified the OMVS convention, is paying contributions, has adopted OMVS legislation as the overarching legal framework for water resources management and Guinean staff are fully integrated into the revised organizational structure of OMVS. The only steps remaining to finalize this integration are to update the partition of costs and benefits and the national legislation of Guinea. OMVS has completed and validated the pre-investment framework and multi-criteria analysis for dam selection and consensus has been reached to develop Koukoutamba dam (294 MW).

[6] On April 8, 2013, OP 8.0 was integrated into the new World Bank Policy of Investment Project Financing (IPF, OP 10.0). As such, OP 8.0, used for MWRD1, no longer exists at the time of the publication of this report. It was agreed at the Decision Meeting on June 13, 2013 that the project be processed under OP/BP 10.0.In compliance with OP/BP10.0 IPF, MWRD1 has demonstrated satisfactory performance. Most indicators have been met or exceeded and disbursement was 92% as at March 31, 2013. MWRD1 was fully compliant with all World Bank standards and policies.

79. Discussions were carried out during project preparation regarding the possibility to develop a longer term Series of Projects. However any future phases would be dependent on clear needs to continue in parallel with the successful implementation of MWRD2 including the adoption of the revised partition of costs and benefits.

Project Cost and Financing

80. The cost summary is shown below in Table 4. Refer to Annex 2 for a detailed breakdown of costs by sub-component and activity.

Table 3: Cost Breakdown

Project Components	Project cost ($k)	IDA Financing ($k)	% Financing
1. Institutional Development	19,114	15,148	79
2. Multi-Purpose Water Resources Development	174,234	156,220	90
3. Infrastructure Management and Planning	29,620	23,600	80
Total Baseline Costs	222,968	194,968	87
Physical contingencies	6,375	6,375	100
Price contingencies	11,157	11,157	100
Total Project Costs	240,500	212,500	88
Interest During Implementation	0	0	
Front-End Fees	0	0	
Total Financing Required	**240,500**	**212,500**	

C. Series of Projects Objective and Phases

81. The overall Program Development Objective is: to enhance regional integration among the riparian countries of the Senegal River Basin through OMVS for multi-purpose water resources development to foster improved community livelihoods. The MWRD1 Development Objective to improve management and use of water resources in the Senegal River Basin reflected the immediate need to build the capacity of OMVS and work to develop well managed systems for productive use of water. The MWRD2 objective, to improve coordinated management of water resources for socially, environmentally and economically sustainable development in the Senegal River Basin, reflects the triple bottom line development including emerging issues such as climate change in the Senegal River Basin.

D. Lessons Learned and Reflected in the Project Design

82. Important lessons have been learnt in implementation of MWRD1 and incorporated into the design of MWRD2 to strengthen implementation and achievement of the development objective.

Fiduciary Management and Procurement

83. There have been difficulties in mobilizing counterpart funds from some member states over the duration of implementation of MWRD1. During MWRD2, the counterpart funding will be maintained at the same level as recommended by OMVS; however dated covenants have been established for the annual payments of counterpart funds.

84. During MWRD1 auditing procedures met World Bank requirements. However there was only a single external auditor covering all four countries which led to some delays in producing audit reports. To improve auditing procedures, it is proposed to engage external auditors for each country program to evaluate the national executing agencies, national cellules and the regional project coordination unit. Auditors would be engaged for each country with additional support for the regional headquarters.

85. Bank supervision of financial management was also enhanced during implementation of MWRD1 to include two Financial Management specialists, each covering two countries. This approach will be retained during MWRD2.

86. The procurement capacity within SONADER *(Société Nationale de Développement Rural)* became a concern at the end of MWRD1 due to staff changes. A procurement assessment of SONADER has been carried out and recommendations have been made. Minimum staffing requirements includes recruitment of a procurement specialist before implementation by SONADER is to start. This requirement is included in the annual performance-management contract between OMVS and SONADER. .

Planning and Management

87. A key lesson in the overall management of MWRD1 was the difficulty in supervising a large number of dispersed activities, specifically the wide range of technical studies completed under the project. The activities under Component 1, while important, were time-consuming to manage and the final impacts difficult to aggregate and quantify. Under MWRD2, there is a significant consolidation of the number of activities and a much tighter focus. For example, during the preparation process the studies and planning processes initially proposed by OMVS were significantly rationalized, more than half the proposed activities were finally removed from the scope to ensure that the project was streamlined and focused on the key aims.

88. Inadequate supervision of field activities, specifically construction and rehabilitation of irrigation schemes, has meant that at times, problems were not identified and recommendations not implemented in a timely manner. For MWRD2, more regular field supervision is recommended and the budget has been provided under the project for this. In addition contract improvements will be made as described below.

89. Difficulties were encountered in maintaining the personnel needed in the executing agencies implementing the hydro-agricultural activities, to guarantee an adequate quality and rigor of implementation. For MWRD2, the performance management contracts for the executing agencies will be modified to include binding provisions related to the maintenance of the personnel. In addition, contractors were sometimes not able to mobilize the human and material resources needed For MWRD2, executing agencies and the project coordination unit need to improve the selection of suppliers by a rigorous evaluation of the technical and financial bids.

90. During the preparation of MWRD1, many of the budget allocations were underestimated, particularly for Component 3 and the dam studies. Under the hydro-agricultural component several activities in Mali had to be postponed due to lack of funds given the actual budget requirements. Changes were made at the mid-term review which restructured the project to cancel some of the secondary activities that had not yet started. For MWRD2, costs are based on actual contracts, wherever possible, or on more detailed market reviews. During project preparation this has led to a number of dam studies being taken out of the proposed project scope for OMVS to fund from other sources. All activities initially proposed by OMVS under Component 2 have also been refined and reduced in discussion with national cellules in order to fit within budget limitations.

Implementation Arrangements

91. During MWRD1, the skills within the regional Project Coordination Unit (PCU) at OMVS headquarters were significantly developed through on the job training and implementation support. However for MWRD2, the PCU will be strengthened with the following technical skills: civil engineering, hydrology, agroforestry and climate change adaptation.

92. OMVS has an internship program funded by the High Commission. MWRD1 has benefitted from the involvement of at least 2 of these interns which in turn contributes to institutional capacity. It is expected this approach will be continued in MWRD2.

93. The activities financed by IDA and by the Trust Funds were managed by separate project units in OMVS. To better facilitate coherence and coordination of activities, and to reduce overhead management costs, one PCU will be responsible for implementation of MWRD2, the GEF/LDCF and the Dutch Trust Fund.

94. The role of the national cellules is critical to the successful implementation of the project. In the first phase this role was well defined, however implementation was more difficult as cellules were not given a dedicated budget for supervision. During MWRD2, the national cellules will be given a budget for supervision of national activities on the basis of appropriate justification and accounting systems.

Safeguards

95. The safeguards capacity within OMVS improved significantly during implementation of MWRD1. However at the national level, capacity needs to the strengthened in MWRD2 to ensure that contractors respect the environmental and social terms of the contracts. Maintenance of safeguards personnel will be included in the performance management contracts of the executing agencies.

96. The control of rice eating birds is a challenge for the hydro-agricultural executing agencies. However, ultimately the problem appears to be mainly due to improper harvesting practices and there are mitigation measures referenced under the Pest and Pesticide Management Plan.

97. Consideration was given to using the fisheries component as both a livelihoods component and to reduce malaria transmission by fish which eat mosquito larvae in watercourses. However, it appears that mosquitos are most problematic in the irrigation channels where water level control would not be possible, therefore precluding fisheries development. This proposition was therefore dropped.

Monitoring and Evaluation (M&E)

98. The monitoring capacity within OMVS improved significantly throughout implementation of MWRD1. The main lesson learnt is that sufficient financing needs to be allocated for M&E. In addition it was noted that the majority of indicator tracking was based around implementation and immediate outcomes, for example irrigation areas serviced and fish sales. It has therefore been difficult to quantify the wider impacts of the project on household income and quality of life. Additional household surveys are proposed to identify the wider project impacts, as described in Section B of "Implementation" below.

99. During MWRD1, the results framework was substantially simplified during the mid-term review and project restructuring. The main lesson learnt from this process was that the results framework was too ambitious in terms of the number and type of indicators. For example, the indicator on yield was deleted because the project only focuses on supplying bulk water and rehabilitation of infrastructure, it does not include the other elements for commercialization, inputs, cropping patterns, which are equal determinants affecting yield.

Sustainability

100. Lessons, particularly related to sustainability are also drawn from the West Africa Regional Fisheries Program, the West Africa Agricultural Productivity Program (WAAPP) and the West Africa Power Pool (WAPP). These programs highlight the importance of continued investment in the public sector coupled with capacity building to support the development of an enabling environment and promote future private sector involvement.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

101. The project will be anchored at the regional level and implemented by OMVS. The Bank will enter into financing agreements with each of the four member countries and into a project agreement with OMVS. The proceeds of the IDA financing will be made available to OMVS under subsidiary agreements between each of the countries and OMVS. A brief summary of the implementation arrangement is provided here. Further details are given in Annex 3, including the legal and organizational framework of the institutions.

102. The High Commission is the executive branch of OMVS, reporting to the Council of Ministers, which has the mandate to regulate and monitor water-related development in the Senegal River Basin on behalf of the riparian states. At the national level, the OMVS constituency is based on the national cellules. Each national cellule assists in the implementation and monitoring of OMVS projects and the national cellule coordinator is a permanent member of the advisory body of OMVS.

103. OMVS will ensure the overall coordination and supervision of the project on behalf of the four riparian countries. A Regional Steering Committee, established by the Council of Ministers, will maintain oversight of all initiatives supported by the MWRD program. National cellules will coordinate and supervise activities implemented at a national level. OMVS will continue to have full autonomy and responsibility to conduct the review of the quality of all procurement processes for works, goods and consulting services irrespective of the cost estimate. OMVS will also continue to coordinate with executing agencies and will be responsible for overall fiduciary management.

104. The PCU established under MWRD1 will continue to support technical implementation, procurement, financial management, administrative arrangements as well as convening implementing partners for meetings, evaluations and exchange of ideas and lessons learned. This team will be strengthened with additional expertise, including a civil engineer, agroforestry specialist and climate change expert. Furthermore, the team previously responsible for the implementation of Dutch and GEF Trust funds will be merged with the PCU to ensure coherence of all the projects and to reduce overhead costs. See Annex 3 for the Organizational Chart. The recruitment of the full PCU incorporating the skills given in Figure 3.1 of Annex 3 is an effectiveness condition. The implementation manual from MWRD1 will be updated and disseminated. Completion of this implementation manual is an effectiveness condition.

105. At the national level, in addition to maintaining the staffing levels of MWRD1, a technical focal point will be appointed at each national cellule to improve accountability of monitoring of project implementation at the national level. The national cellules will also provide key input to the review process of activities undertaken at the regional level to ensure that national interests are being adequately taken into consideration.

106. Hydro-agricultural, agroforestry and water resources protection activities under MWRD2 will be implemented by the same executing agencies used in MWRD1, namely ADRS *(L'Agence de développement rural de la vallée du fleuve Sénégal)* in Mali, DNGR *(Direction Nationale du*

Génie Rural) in Guinea, SAED *(Société d'Aménagement des Terres du Delta)* in Senegal and SONADER *(Société Nationale de Développement Rural*) in Mauritania. The executing agencies selected are legally responsible for agricultural activities in the member states including the complementary actions (cropping techniques, land and market access, etc.) needed to ensure the efficacy and sustainability of the MWRD2 interventions. In addition, they have been heavily supported to improve their capacity during MWRD1 so it makes sense to continue working with them. OMVS will sign annual performance management contracts with these executing agencies to ensure satisfactory implementation of the concerned activities. The performance management contracts will be strengthened for MWRD2 based on the lessons learnt from MWRD1. Under MWRD1, remuneration was based only on disbursements. For MWRD2, the remuneration will take into consideration the following 2 criteria in addition to the disbursement level:

(a) environmental and social safeguards compliance monitoring
(b) maintenance of key personnel

107. The health sub-component will be implemented through national authorities with assistance from Community Implementing Agencies (CIAs) and OMVS technical experts. National and sub national steering committees, based around existing health structures where possible, will be reactivated or established to provide support and guidance to CIAs. The PCU will coordinate with the national NTD programs and the World Health Organization to ensure the supply of donated drugs for NTDs and with national malaria control programs to facilitate large-scale LLIN distribution campaigns within and across countries in the region. See Annex 3 for details on the Implementation Arrangements.

B. Results Monitoring and Evaluation

108. The Results Framework is provided in Annex 1 and further details on monitoring and evaluation are given in Annex 3. The scope and reach of this multi-sectoral regional project requires a monitoring and evaluation system which is robust and decentralized to facilitate systematic data collection in each of the four countries. Data will be tracked for each of the indicators identified in the Results Framework which will be aggregated at the national and regional level by OMVS. The Environmental Observatory of OMVS will have overall responsibility for M&E. All data collected under the project will be supplied to the Observatory in a form suitable for integration into the database of the Environmental Observatory and relevant data provided by the Environmental Observatory will be used to inform the Project M&E.

109. As under MWRD1, each of the executing agencies will have a key role in collecting data at the community level. For the health component data collection analysis and local utilization will be ensured at district and country level through the existing Health Management Information Systems. A range of monitoring techniques will be used, including sentinel surveillance sites, lot quality assurance sampling (LQAS) surveys and population-based surveys to assess intervention coverage.

110. An evaluation of MWRD1 will be financed to provide a detailed baseline for MWRD2; this evaluation will build upon the MWRD1 completion reporting and be carried out immediately following effectiveness. At the end of MWRD2 a full evaluation of the program

will also be completed to provide a detailed final analysis and quantify to the extent possible the impacts of the program.

C. Sustainability

111. The program is designed with features to build ownership, opportunities for scaling up and reliability to ensure long term sustainability for water resources development in the Senegal River Basin.

Institutional Sustainability

112. The project will build institutional sustainability through capacity building, provision of hardware and development of systems at the regional, national and local levels. Particular attention will be afforded at the local level and a decentralized and participatory approach to implementation inclusive of all relevant stakeholders will be used to build trust, empowerment and ownership. Regular consultations with affected communities have taken place throughout the preparation of the project.

113. National Project Planning Committees (NPPCs) were established in each riparian country and these committees participated actively in project preparation. National officials also provided continual assistance and participated in national and regional workshops, steering committees and other stakeholder consultations during project preparation. Thus, stakeholders at both the national and regional levels have combined ownership of the project, so as to promote uniformity of purpose. The institutional arrangements for MWRD2 will utilize to the extent possible the institutions in place and capitalize on those whose capabilities were previously developed under MWRD1. In addition, through MWRD1, a model to involve civil society in project preparation was introduced in the Senegal Basin. OMVS and the riparian countries supported this time-consuming but vital and important process at the technical and political levels. The commitment to a broad participatory process is maintained for MWRD2.

114. Community level organizations will be supported to implement and manage the local water resources development. For example, irrigation cooperatives and fisheries councils will be trained. Support will also be continued to those organizations formed or supported under MWRD1 in order to support the sustainability of the project and to build a wider base of capacity. In this aspect the project will link to the work under the Dutch Trust Fund which will train and support Water User Associations to maintain the channels supplying irrigation areas.

Economic and Financial Sustainability

115. At the regional level the project will support the finalization of the agreement for sharing of costs and benefits which will support equitable long term development among the member states. This work will support the financial and economic sustainability of the project outcomes as well as supporting shared decision making and sustained cooperation among the member states.

116. The economic sustainability of the small-scale infrastructure will be promoted through the development of user associations which mobilize community contributions for operation and maintenance. The water user associations and other cooperative groups which will be supported under the project, are governed by internal regulations that require users to take responsibility for: the full operation of the facilities, the payment of fees to maintain infrastructure and purchase the inputs and services necessary for the development of agricultural land, and other measures to ensure the sustainability of the facilities. Pricing levels are set taking into account the specificity and complexity of infrastructure, operation and maintenance requirements, as well as beneficiaries' ability to pay.

Environmental and Social Sustainability

117. Poverty reduction in the rural development context will be addressed through public health improvements, the protection and enhancement of sustainable community livelihoods in traditional recession and irrigated agriculture and through small scale fisheries. Women, often the most vulnerable group, are supported through targeted interventions for fish processing and small fields/gardens. Additional measures are taken, such as development of laundry areas and increased access to enhance the social impact of the project.

118. Environmental protection or sustainability is built into the project through water resources protection, including reforestation and river basin restoration as well as support to institutions to improve resource management, for example, enforcing controls to fishing during reproductive periods. Finally the implementation of the Bank's safeguards policies will further help to ensure environmental and social sustainability.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Table 4: Risk rating summary table

Risk	Rating
Stakeholder Risk	**Substantial**
Implementing Agency Risk	
- Capacity	Low
- Governance	Low
Project Risk	
- Design	Low
- Social and Environmental	Moderate
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Moderate
Other	
- Procurement	Substantial
Overall Implementation Risk	**Substantial**

B. Overall Risk Rating Explanation

119. The overall risk rating is **substantial** given the complex nature of the project and the difficult regional context. However there is a strong consensus and commitment among partners for the project's objective and activities, as evidenced in the successful implementation of MWRD1.

120. The key risk to the project is possible political instability at the national level and the resulting impacts at the regional level including implementation delays and disbursement lags. Most of the risks associated with the executing agencies have been considerably reduced through the successful execution of MWRD1 and the project has been specifically designed to reduce risks at national and local levels. For example, the 4 IDA credits are managed directly at the regional level by OMVS and the transfer of funds to the executing agencies at the national level is governed by performance-based management contracts which substantially increases governance oversight and helps to ensure delivery of the required quality and within the agreed timeframe. OMVS is based in Dakar, Senegal, which has been stable over the last decade and is expected to remain stable over the life of the project. This stable regional base mitigates many of the implementation risks. At the local level, risks are mitigated by the high levels of participation and consultation throughout the preparation and implementation of the project. The general assessment of the fiduciary risk at the regional level is low and to date, OMVS performance is globally satisfactory. Key risks are described in more detail below.

121. **Political Risk**: Stability of OMVS member states will clearly affect both their capacity to implement the project and the access to the project areas. For example, there were three coups during MWRD1 which impacted; supervision and oversight of the project, implementation of activities on the ground and also reduced the flow of funds to OMVS as per OP7.30. Although the disputed area in Mali is not part of the geographic area of the Senegal River Basin, this still poses a risk to overall implementation.

122. **Delivery Quality Risk**: Differences in implementation capacity among member states could hamper the timely achievement of project outcomes. Through MWRD1, significant steps have been taken to reduce this risk through capacity building. For example, a framework for Monitoring and Evaluation has been established and standardized templates and other tools developed for technical supervision and oversight. MWRD2 will build on what was achieved under MWRD1 and more resources will be dedicated to ensure full compliance with all Bank technical and fiduciary requirements. Enhanced supervision and implementation support will be provided for Mali and Guinea.

123. **Fiduciary Risk**: OMVS has adopted the Bank's guidelines as its standard for fiduciary management and MWRD2 will follow the same fiduciary guidelines as established for MWRD1. Overall, MWRD1 was successfully implemented without any procurement and/or major financial management problems. The auditing process will however be strengthened under MWRD2. In addition, the payment of counterpart funding from member states was a challenge under MWRD1 so for MWRD2, it is currently proposed to set a timetable and dated covenants in the financing agreements for the payment of the counterpart funds.

124. Further details, including component specific risks are provided in Annex 4.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

125. The full economic and financial analysis is given in Annex 8; a brief summary is given below.

126. Project Benefits. The project will generate a wide range of direct benefits including:

(a) Economic benefits: Regional economic benefits through effective cooperation in support of hydropower development; and community level economic benefits within and beyond project intervention sites; through increased agricultural productivity and enhanced fishing activities. Sustainable fisheries management and support will translate to reduction in post capture losses, increased processing quality and protected stocks leading to increased revenues.

(b) Health benefits: The proposed project will address water related diseases, in particular the reduction of the most common neglected tropical diseases and the vector-control aspects of malaria. The positive health impact of the project is expected to be considerable; the use of long-lasting insecticidal bed nets (LLINs) during MWRD1 has demonstrated a reduction of parasitaemia in target populations from 5.7 percent in 2008–09 to 2.9 percent in 2010–11. This has associated economic impacts. Malaria has a significant impact on the economic well-being of individual households and communities as well as aggregate economic output and growth. Leading economists have estimated that malaria is responsible for an 'economic growth penalty' of up to 1.3% per year in malaria endemic African countries[7]. A 2013 study by WHO on insecticide-treated nets in Sub Saharan Africa has revealed that use of LLINs is one of the most cost-effective interventions against malaria. It has been estimated that the annual rates of return on investment in control of neglected tropical diseases are about 14 to 30%[8]. .

(c) Nutritional benefits: The project will support fisheries, which are a main source of protein for the local area. In addition, the rehabilitation of irrigation schemes in the area will induce increased levels of crops production, in particular rice production, which is a major staple food for communities living along the Senegal River, and diversified nutrition from market gardens.

(d) Environmental benefits: including improved water resources management, and reduced erosion and siltation due to slope protection and reforestation.

Project Estimated Costs

[7]Sachs and Malaney 2002.The economic and social burden of malaria. *Nature,* 415(6872): 680-5

[8]Molyneux DH. (2004) "Neglected" diseases but unrecognized successes—challenges and opportunities for infectious disease control. *Lancet*; **364:** 380–83.

127. Project costs include total investment costs over the seven-year implementation period. Annual operation and maintenance (O&M) costs for water control structures and irrigation canals are also taken into account over the project life. They are estimated at 10 percent of total investment costs in perimeter rehabilitation. In the financial analysis only the direct investments on the productive activities are considered in the calculation of the O&M.

Financial Analysis

128. Results of the financial analysis over a period of 30 years at a 12 percent discount rate are summarized in the table below:

Table 5: Results of financial analysis

Country	**Financial Viability (Agriculture and Fisheries)**	
	Financial IRR (%)	NPV (US$)
Guinea	40.7%	28,591,000
Mali	42.6%	55,105,000
Mauritania	47.1%	90,695,000
Senegal	46.6%	49,728,000
Project	**44.9%**	**224,119,000**
Financial Attractiveness of Productive Investments		
Agriculture	30.8%	128,669,000
Fisheries	163.6%	95,450,000

129. MWRD2 agriculture, agroforestry, fisheries and aquaculture productive investments are financially attractive. The project productive investments yield a total NPV estimated at US$224million and an overall financial rate of return of about 44.9 percent. The fisheries sector is more highly profitable because of the low inputs and quicker returns. Hydro-agricultural investments take a longer period of time to generate profit and have a significant capital cost.

Economic Analysis

130. Several intangible benefits have not been taken into account in the determination of the project's economic rate of return. These include mainly health, environmental and nutritional benefits which represent returns of significant value for the project. If accounted for, they would enhance the overall economic viability of the proposed investment operation. The total benefits quantified in the cost-benefit analysis should thus be interpreted as a conservative lower bound estimate. Project viability is based on the economic rate of return and net present value of the measurable, incremental benefits and related costs of the project using the "without-project" and "with-project" criteria.

131. The table below presents the estimated economic life of the project' various activities, the beneficiaries and the projected associated benefits:

Table 6: Results of the economic analyses of fishery and agriculture productive investments

Overall Project Economic Viability					
			ERR	NPV (US$)	
Project			**37.7%**	**343,560,000**	
Guinea			29.5%	40,759,000	
Mali			33.8%	78,055,000	
Mauritania			44.9%	140,804,000	
Senegal			38.4%	83,942,000	
Estimated Economic Life, Number of Estimated Beneficiaries and Benefits					
Activities	Economic life	Number of Primary Beneficiaries	Beneficiaries including job creation	Average Annual Benefits (US$) per primary beneficiary	First Benefits Occurrence
Fisheries & aquaculture	30 years	8,024	40,260	3,515 (9.63 / day)	1st year of project implementation
Agriculture & Agroforestry	30 years	58,313	72,602	1,270 (3.47 / day)	2nd year of project implementation
TOTAL	30 years	66,337	112,862	1,542 (4.22 / day)	-

132. The analysis reveals that the proposed operation is economically viable at the regional level with a positive NPV of about US$ 344 million and an overall economic rate of return (ERR) estimated at 37.7 percent. Additional quantitative economic fallouts expected from MWRD2 project implementation are provided in the table below:

Table 7: Incremental Socioeconomic Benefits Generated by MWRD2

COUNTRY	**Number of Created**			**Annual Income Generation (US$, salary and sector net business income)**		
FISHERIES						
	Without MWRD2	With MWRD2	Incremental Per country	Without MWRD2	With MWRD2	Incremental per country
GUINEA	1,692	8,628	6,936	4,289,000	15,249,000	10,960,000
MALI	2,308	11,708	9,400	5,842,000	20,567,000	14,725,000
MAURITANIA	11,704	8,604	6,900	4,308,000	15,031,000	10,723,000
SENEGAL	2,209	11,209	9,000	5,596,000	19,703,000	14,107,000
Total	***7,913***	***40,149***	***32,236***	***20,035,000***	***70,550,000***	***50,515,000***

AGRICULTURE and AGROFORESTRY						
GUNEA	5,658	7,260	1,603	5,910,000	17,329,000	11,419,000
MALI	9,783	11,988	2,205	8,645,000	24,001,000	15,356,000
MAURITANIA	18,279	23,272	4,993	9,767,000	23,418,000	13,651,000
SENEGAL	24,593	30,082	5,489	12,641,000	28,321,000	15,860,000
Total	**58,313**	**72,602**	**14,289**	**36,963,000**	**93,069,000**	**56,106,000**
Total both Sub-sectors	**66,226**	**112,751**	**48,525**	**56,998,000**	**163,619,000**	**106,621,000**

Sensitivity and Risk Analysis

133. The project's ERR sensitivity to the following two key variables was tested: (i) productivity; (ii) costs of operation and maintenance caused either by insufficient benefits from bulk infrastructure to cover maintenance costs or lack of support from participating governments.

134. *Sensitivity to changes in productivity*. Results of the sensitivity analysis reveal that if the productivity of income generating activities were to decrease by 19.3 percent due for instance to unavailability of improved seeds, lack of fertilizers, endemic health problems or social conflicts in project interventions areas, the ERR of the project would decrease from 37.7 to 11.9 percent and the NPV from US$ 343,560,000 to US$ 1,911,000. For the project to remain economically viable, all else being equal, the maximum decrease in productivity of productive investments (agriculture, agroforestry and fisheries) is 19.1 percent; at this diminished production rate, the project's ERR falls from 37.7 percent to the minimum required rate of return of 12 percent and the project's NPV remains positive at US$ 1,099,000.

135. *Sensitivity to increase in maintenance costs*. The analysis has tested the change in project ERR due to a variation of maintenance costs from 10 percent to 20 percent. The analysis reveals that, if such a situation was to occur, the project overall ERR would decrease from 37.7 percent to 25.5 percent and the associated NPV from US$343,560,000 to US$198,273,000. The project would not remain economically viable if the maintenance costs were to increase by more than 33.7%. The NPV would become negative with an ERR less than the 12 percent cost of capital which is for this project, the minimum required rate of return.

136. In conclusion, results of the project ERR sensitivity to these main variables show that the risk tied to the implementation of the proposed operation is substantial, mostly due to the complex nature of the project and the difficult context of some participating countries. However, this risk is mitigated by the sound strategic decision to combine hydro-agricultural activities with limited profitability with fisheries and income generating agroforestry investments which have a high financial and economic profitability potential.

B. Technical

137. The project approach and design are technically sound and sustainable and align with best practice, in the region and globally. All new development within MWRD2 is completed within the structure of the SDAGE completed under MWRD1. Therefore it is fully integrated into the overall basin planning supported by OMVS and the riparian countries.

138. The majority of activities being implemented under Component 2 use basic and well established methods and materials which are in common use locally and regionally. Project areas have been identified through characterization studies and jointly agreed by regional and national stakeholders.

139. The selection of Balassa dam for development in the critical feasibility stage, under Component 3 is based upon a multi-criteria analysis and wide stakeholder consultation completed during MWRD1. The quality of technical assistance to prepare the studies for Balassa is critical; this will build upon the lessons learnt in MWRD1. In addition OMVS has highlighted their need to have a range of dam projects with comprehensive initial studies in order to attract private investment. The most complex work proposed on Diama dam is based upon studies completed and validated during MWRD1. The selection of micro-hydro sites to be studied further will be completed only following additional scoping studies incorporating social, environmental, economic and technical issues.

140. The GEF funded elements of the project will enhance technical capacities on climate change resilience development; including an updated climate change resilience study and Trans-boundary Diagnostic Analysis. This will support countries to address an important constraint to reliable and accurate climate data availability, thereby laying the foundation for systems that respond to national reporting needs as well as the interconnected landscape scope. Climate adaptation techniques will be tested under pilot projects to ensure that they are appropriate and robust. Activities under Component 3 will review and help quantify the impact of climate change on water resources in the basin which will support and inform the implementation of other activities under the project.

C. Institutional Aspects

141. As described in Implementation Arrangements and under Annex 3 this project has an institutional framework at three levels – regional, national and local. An Institutional assessment was completed at the beginning of MWRD1 and identified that OMVS and agencies at each level had the minimum implementation capacity required. Since this assessment was completed significant improvements have been made under MWRD1 as described under Institutional Context. Additional assessments were completed recently for Procurement and Financial Management and are also detailed in this document. These assessments made a number of recommendations for improvements which are described in Annex 3 and are currently ongoing.

142. The main change in implementation arrangements following the first phase of the project is the involvement of SOGENAV (Senegal River Navigation and Transport Holding Company) in the development of studies and other support works to develop navigation on the Senegal River. SOGENAV was formed in 2011 and is staffed with technical and support personnel to

support the preparation stage. A 'phase 2' organogram has been developed and approved for implementation once financing for works has been obtained. SOGENAV has the basic hardware to complete bathymetric surveys and inspections. The legal framework for SOGENAV is provided by the International Code (2006) and Rules of Application (2009 and 2011) for Navigation and Transport on the Senegal River (*Code International de la navigation et des transports sur le fleuve Sénégal et ses Règlements d'application*), in addition to the statutes described in Annex 3.

143. OMVS is one of the most advanced basin organizations in the region, with a long-standing, established track record spanning more than 40 years. The main areas of weakness, as detailed under the section on Lessons Learned, are at the local level.

144. Institutional development objectives under this project focus both on project management and implementation, and on longer-term institutional improvements. Project management and implementation will use the established systems set up in MWRD1. Components to be implemented at the regional level (Components 1 and 3) need little additional support to that provided by the proposed strengthened PCU. However, as outlined in the section on lessons learnt, the local level capacity for project implementation and supervision is relatively low. Some of the activities under Component 2 are in remote locations, far from capital cities, and strong field support will be needed to ensure that these activities are well implemented and results achieved. Support will be provided through technical assistance, training, equipment, small-infrastructures and so on. In addition Component 1 has a specific allocation to support OMVS and national cellules to provide regular supervision.

D. Financial Management

145. The Bank's financial management team conducted financial management assessments of DNGR in Guinea, ADRS in Mali, SONADER in Mauritania, and SAED in Senegal. Details of the assessments are included under Annex 3, including some internal control weaknesses and the related action plans that show the actions the institutions need to take to improve their financial management arrangements and reinforce the internal control system.Therefore, it was required that before negotiations all executing agencies agree the format of the Interim Financial Reports and the audit terms of reference with the Bank and complete preparation of the TOR for the recruitment of external auditors. The effectiveness conditions include: (i) recruitment of a Financial Management Officer for the PCU with competence and experience satisfactory to the Bank; (ii) recruitment of an accountant for the national cellule of Senegal.

146. The following finanacial management actions to be completed within four months after effectiveness are related to: (i) the recruitment of an external auditor for each member country of OMVS; (ii) the updating and harmonization of the Administrative and Accounting Procedures and sharing it with the four OMVS/NC and IAs and (iv) the upgrading of the accounting software at OMVS national cellules of Guinea and Mali and ADRS.

147. Dated covenants have been established for the payment of the counterpart funding. These covenants require equal amounts to be paid bi-annually over a period of four years (2015 - 2018) starting on April 30, 2015 and October 30, 2015.

148. The conclusion of the assessments is that the financial management arrangements in place meet the World Bank's minimum requirements under OP/BP10.00 and therefore are adequate to provide, with reasonable assurance, accurate and timely information on the status of the project required by the World Bank. The overall Financial Management residual risk rating of the project is deemed **moderate**.

E. Procurement

149. Procurement activities will be conducted in accordance with the following guidelines: "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006 and revised in January 2011; "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" dated January 2011; and "Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" dated January 2011.

150. Procurement activities will be conducted by the PCU and the executing agencies. At the Regional Level, the High Commission of OMVS is still operating with a Procurement Unit staffed with two procurement specialists and one procurement assistant, all, well versed in the IDA procedures. This existing Procurement Unit has both the technical expertise and the experience necessary to carry out the procurement activities and has a good record in working in close coordination with the executing Agencies (ADRS, DNGR, SAED and SONADER). In addition, the implementation support missions of MWRD1 revealed that procurement has been generally satisfactory.

151. At the national level (i.e. at the level of the executing agencies), Procurement Units responsible for quality control of bidding documents and Procurement Commissions responsible for bid opening, bid evaluations and contract awards, have been established and are fully operational with qualified staff for ADRS, DNGR and SAED. However, in SONADER, although the Procurement Commission of the Rural Development Sector is responsible for bid evaluation and contract awards, there is neither a procurement unit nor a procurement specialist. As highlighted under the lessons learnt an assessment has been completed and recommendations for minimum staffing levels have been made and agreed with SONADER. Hence SONADER will recruit a procurement specialist before project effectiveness.

F. Environment and Social (including Safeguards Policies Triggered)

152. The program (MWRD1 and MWRD2) is classified as category A in the Environmental Assessment classification of the World Bank, the main reason being that MWRD2 finances rehabilitation works on Diama dam and preparatory studies for: Balassa dam, potential micro-hydropower sites and for navigation on the Senegal River. Furthermore, MWRD2 covers a similar range of activities as MWRD1 over an extended geographical area, the Senegal River Basin in four countries, and therefore requires a substantive level of due diligence.

153. The following Table 9 summarizes the safeguard policies which are triggered and the explanation. Further details are given in Annex 3.

Table 8: Safeguards Triggered

Safeguard Policies	Triggered	Summary Explanation
Environmental Assessment OP/BP 4.01	**Yes**	The MWRD2 involves a significant number of construction and environmental and social management activities related to the subprojects. An evaluation will be carried out with regard to the environmental and social dimensions of the development of navigation on the Senegal River Basin and the development of micro-hydro sites.
Natural Habitats OP/BP 4.04	**Yes**	Stocking of natural water bodies with indigenous fish species might be one of the subproject activities. This activity could upset the natural balance in existing fish stocks if not done according ecological principles.
Forests OP/BP 4.36	**Yes**	Triggered by the reforestation activities carried out in the Fouta Djallon, a very sensitive ecological area in the headwaters of the Senegal River.
Pest Management OP/BP 4.09	**Yes**	Production in the rehabilitated irrigation systems will start during the implementation of MWRD2. Intensification of irrigated agricultural production might increase the use of pesticides and chemical fertilizers.
Physical Cultural Resources OP/BP 4.11	**Yes**	OP/BP 4.11 is triggered by the feasibility studies for the new Balassa dam and by the construction activities associated with the subprojects.
Indigenous Peoples OP/BP 4.10	**No**	There are no indigenous people in the Senegal River Basin as defined by OP/BP 4.10.
Involuntary Resettlement OP/BP 4.12	**Yes**	No physical resettlement is anticipated due to the nature of the intended rehabilitation works to be carried out under the various subprojects. There might be a need to compensate for the loss of crops, trees or property caused by the rehabilitation of the irrigation schemes. There may also be a restriction of access to certain fishing grounds or during certain periods of time.
Safety of Dams OP/BP 4.37	**Yes**	OP/BP 4.37 is triggered by the feasibility studies for the new Balassa dam and because some subprojects are dependent for their water from dams within the river basin. An independent Dam Advisory Panel will be established for MWRD2 if needed.
Projects on International Waterways OP/BP 7.50	**Yes**	The governments of the four riparian countries were notified of the Project through the OMVS, in which all four countries are represented. A letter regarding this notification has been sent to the Bank.
Projects in Disputed Areas OP/BP 7.60	**No**	There are no Disputed Areas in the Senegal River Basin. OMVS has the mandate to implement and manage subproject activities in the Senegal River Basin with the support of the four riparian countries.

154. The capacity of OMVS and the member states for environmental and social management has been strengthened under the Senegal River Basin Water and Environmental Management GEF Project and even more so under the MWRD1 project. This included building a core group of transboundary environmental management expertise. The Environmental and Social Impact Assessment (ESIA), Pest and Pesticide Management Plan (PPMP) and the Resettlement Policy Framework (RPF) will be implemented and monitored by the Safeguard Specialist, who is a full-time staff of the PCU. Executing agencies will also be responsible for implementing and monitoring safeguards for specific activities and for oversight of contractors.

155. During the preparation of MWRD1, OMVS prepared, consulted upon, and disclosed an Environmental and Social Management Framework (ESMF), an RPF and a PPMP in compliance with the requirements of the World Bank Safeguard Policies. For MWRD2, an ESIA, instead of an ESMF, has been prepared, consulted upon, and disclosed since most of the project activities and the locations are known. It is not expected that there will be any involuntary resettlement during the implementation of MWRD2, so an RPF has been prepared, consulted upon, and disclosed and if needed, a RAP will be prepared, consulted upon, and disclosed in-country and in the World Bank Infoshop. Construction at those concerned sites can only start after the Project Affected People (PAP) have been compensated in compliance with OP/BP 4.12. The ESIA and PPMP have been disclosed in-country and in the World Bank Infoshop on March 25, 2013. The RPF was disclosed in-country and in the World Bank Infoshop on June 17, 2013.

156. MWRD2 subprojects: rehabilitation of irrigation schemes, health activities and fisheries and aquaculture will have very limited environmental and social impacts, similar in nature to the impacts under MWRD1. The majority of sub-projects have been screened during project preparation and the majority of sub-projects are found to pose very low environmental and social risks, mostly related to environmental and social management during construction. One of the reasons for this low risk is that the majority of irrigated agriculture subprojects involve rehabilitation of irrigation systems rather than new construction.

157. Following the initial project preparation and the disclosure of the ESIA, PPMP and RPF, additional activities were identified for financing. An addendum to the ESIA covering these new activities was prepared, consulted upon, and disclosed in the Infoshop on November 7, 2013. The new activities are a scale-up of existing activities and based upon previous experience, they are not expected to pose significant environmental and social risks. The PPMP and RPF did not require updating.

158. The main area of institutional support, which OMVS will require during the implementation of MWRD2, is in advancing the feasibility studies of the new Balassa dam and the evaluation of the environmental and social dimensions of the micro-hydro development and the navigation. It has been agreed with OMVS that a Dam Safety and an Environmental and Social Advisory panel will be established as needed to provide advice on the terms of reference for the feasibility studies and the environmental and social studies and on these studies themselves.

Annex 1: Results Framework and Monitoring

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2

Project Development Objectives

The Program Development Objective of MWRD2 is to enhance regional integration among the riparian countries of the Senegal River Basin through OMVS for multi-purpose water resources development to improve community livelihoods.

The MWRD2 Project Development Objective is to improve coordinated management of water resources for socially, environmentally and economically sustainable development in the Senegal River Basin.

The Global Environmental Objective is to strengthen trans-boundary water resources management in the Senegal River Basin including climate change adaptation and implementation of priority actions of the Strategic Action Plan.

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Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values							Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	YR5	YR6	End Target			
Direct project beneficiaries	☒	Number	0.00	2260	2108620	3110160	3440000	3440000	4500000	4500000	6 monthly	Progress monitoring and reports	OMVS
Female beneficiaries	☒	Percentage	0.00	51	51	51	51	51	51	51	6 monthly	Progress monitoring and reports	OMVS
Direct project beneficiaries benefiting from the pilot activities to build climate resilience	☐	Number Sub-Type Supplemental	0.00	0.00	0.00	3000	5000	5000	5000	5000	6 monthly	Beneficiary records	OMVS

New framework for partition of costs and benefits in the river basin is finalized, validated at country level and presented to the CoM	☐	Yes/No	No	No	No	No	Yes	Yes	Yes	Yes	6 monthly	CoM records	OMVS
Area provided with irrigation and drainage services (ha)	☒	Hectare (Ha)	0.00	0	700	4600	7350	10000	13680	13680	3 monthly	Site visit records	OMVS
Long-lasting insecticide-treated malaria nets purchased and/or distributed (number)	☒	Number	0.00	1600000	1600000	3200000	3200000	3200000	4500000	4500000	Annual	Reception records / Distribution records	OMVS
Proportion of children 6-59 months having slept under LLINs the night before the survey	☐	Percentage Sub-Type Supplemental	74 2011 MIS+	74	75	78	79	80	80	80	Annual	LQAS surveys / Final MIS	OMVS
Proportion of women 15-49 years old sleeping under an LLIN the night before the survey	☐	Percentage Sub-Type Supplemental	65.2 2011 MIS +	65	65	70	75	80	80	80	Mid term and EOP	MIS	OMVS
Improved tools are used in decision making on water allocation during the meetings of the Permanent Water	☐	Yes/No	No	No	No	No	Yes	Yes	Yes	Yes	6 monthly	PWC meeting records	OMVS

Commission												

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Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Base line	Cumulative Target Values							Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	YR5	YR6	End Target			
Component 1: Institutional Development													
Climate change adaptation/resilience training program delivered to staff in OMVS National Cellules and National Agencies and to beneficiaries of the pilot programs	☐	Number	0	0	500	1500	2000	2000	2000	2000	6 monthly	Training reports	OMVS
New framework for partition of costs and benefits tested and validated at a technical level	☐	Yes/No	No	No	No	Yes	Yes	Yes	Yes	Yes	6 monthly	Meeting minutes	OMVS
Component 2: Multi-Purpose Water Resources Development													
Operational water user associations created and/or strengthened	☒	Number	0.00	0	15	20	50	50	50	50	6 monthly	Training records / Meeting minutes	OMVS
Hydraulic axes - canals supplying	☐	Kilometers	0.00	0	8	20	30	50	65.5	65.5	3 monthly	Site visit records	OMVS

irrigation areas - rehabilitated													
Slope stabilization through agroforestry development or reforestation	☐	Hectare (Ha)	0.00	0	500	2400	2900	3400	3527	3527	3 monthly	Site visit records	OMVS
Sales of fresh and processed fish in project sites	☐	Percentage	0	0	3	5	10	15	18	20	Baseline, 6 monthly	Surveys with local actors and fish center accounts.	OMVS
Proportion of target beneficiaries having received mass treatment locally occurring NTDs	☐	Percentage	75	75	77	78	79	80	80	80	Annual	Campaign reports / Surveys of therapeutic coverage	OMVS
Component 3: Infrastructure Management and Planning													
Mapping, modeling and other analytical tools for water resources management are developed or updated	☐	Yes / No	No	No	No	Yes	Yes	Yes	Yes	Yes	6 monthly	Issued reports.	OMVS
A financing system for the long term maintenance of Diama dam is put into place.	☐	Yes/No	No	No	No	Yes	Yes	Yes	Yes	Yes	6 monthly	CoM records	OMVS

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Project Development Objective Indicators	
Indicator Name	Description (indicator definition etc.)
Direct project beneficiaries	Direct beneficiaries are people or groups who directly derive benefits from an intervention (i.e., children who benefit from an immunization program; families that have a new piped water connection). Please note that this indicator requires supplemental information. Supplemental Value: Female beneficiaries (percentage). Based on the assessment and definition of direct project beneficiaries, specify what proportion of the direct project beneficiaries are female. This indicator is calculated as a percentage.
Female beneficiaries	Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.
New framework for partition of costs and benefits in the river basin is finalized and presented to the CoM	The partition of benefits among Mali, Mauritania and Senegal was formally agreed by the Council of Ministers in 1981, and although some aspects have been adjusted and updated in line with basin developments they have never been formally adopted. Differences between the new and old partition of benefits were too large to be politically acceptable and finally no revisions were ever made to the 1981 partition. The framework for the partition of costs and benefits will be updated to include; Guinea, developments since 1981 and additional sectors such as environment and health, this will require data collection, updating the existing model and analyzing a number of different scenarios
Area provided with irrigation and drainage services (ha)	This indicator measures the total area of land provided with irrigation and drainage services under the project, including (i) the area provided with new or improved irrigation and drainage services, including small market gardens and low land development, (ii) areas provided with improved flow control structures to enable agricultural development, including flood agriculture and low land development. The indicator is expressed in hectare (ha).
Long-lasting insecticide-treated malaria nets purchased and/or distributed (number)	This indicator measures the cumulative number of long-lasting insecticidal nets (LLINs) effective against local malaria transmitting mosquitoes that have been purchased with Bank-financed project funds, as well as the number of LLINs purchased with other resources that are distributed through a Bank-supported program.
Proportion of children 6-59 months having slept under LLINs the night before the survey	This indicator intends to verify whether the LLINs distributed are used to protect the most vulnerable.

Proportion of women 15-49 years sleeping under an LLIN the night before the survey	This indicator intends to verify whether pregnant women are protected. Due to the sensitive nature of verifying this directly, women within the reproductive age range are taken as a proxy indicator. This indicator will be measured through MIS.
Improved tools used in decision making on water allocation during the meetings of the Permanent Water Commission	Regional planning for water resources development. The tools referenced include the following: water resources management models for management of the Diama and Manantali dams, the rainfall runoff model for the catchment upstream of Manantali, climate risk models and updated critical environmental issues from the TDA. 'Use' of these tools implies informed decisions on approval of projects and on operational procedures for the dams.

Intermediate Results Indicators

Indicator Name	Description (indicator definition etc.)
Climate change adaptation/resilience training program delivered to staff in OMVS National Cellules and National Agencies and to beneficiaries of the pilot programs	At least 150 staff are trained across all organizations. In addition beneficiaries are trained as part of the development and implementation of pilot programs for building climate resilience.
Operational water user associations created and/or strengthened	This indicator measures the number of water user associations created and/or strengthened under the project that are operational. These water user associations are primarily irrigation cooperatives – including groups from both MWRD1 and MWRD2
Hydraulic axes - canals supplying irrigation areas - rehabilitated	Rehabilitation includes works to enable a 50% increase in flow rate
Slope stabilization through agroforestry development	This indicator measures the area of land planted with vegetation to help reduce soil erosion and improve slope stability.

Sales of fresh and processed fish in project sites	This indicator measures the increase of the value of sales of fresh and processed fish by beneficiaries of the project. Project investments for fish landing, transport, processing, and conservation will increase the quality of fish products, which will generate higher sales and revenues for fishers, traders and processors. Collection of fisheries data in the river basin is poor, therefore a basic and easy to measure indicator has been chosen. The project will enable fishermen and local Government to collaboratively collect and manage data. Data would be collected directly from fishermen (what they land, the size, how much they sell and for what price) where the project intervenes. The baseline is to be completed at the start of the project as these are new areas of intervention. In parallel with measuring this indicator OMVS will also monitor the % change in average size of characteristic of fish species at unloading points included within the project in order to ensure that sustainable fishing practices are followed and to check that there are no negative impacts of stimulating the fishing industry in the Senegal River Basin.
Proportion of target beneficiaries having received mass treatment for locally occurring NTDs	Only schistosomiasis and STH occur in all regions across the entire river basin. Other NTDs are co-endemic, but restricted to specific districts. Treatment will be based on local needs.
Mapping, modeling and analytical tools developed or updated	These analytical tools include: Transboundary Diagnostic Analysis, mapping, water resources management models, climate model, plus outputs from the improved hydrometric network
Dam packages finalized, validated at the country level and approved	The complete dam packages include preparation of feasibility studies for Balassa dam and complementary studies for Koukoutamba dam.
A financing system for the long term maintenance of Diama dam is put into place.	This indicator supports the sustainability of the maintenance works on Diama being completed under MWRD2.

Annex 2: Detailed Project Description

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2

Sector Context

Water Resources Development

1. Within the Senegal River Basin, under–developed hydropower potential and irrigable lands are leading to increased energy costs and food insecurity. The lack of development of these valuable assets limits sustainable growth and the welfare of the people living in the Basin. The Basin has seen considerable migration of people due to worsening droughts and desertification since the early 1970s. Annual rainfall has a high variability between wet and dry seasons and also from year to year. Generally, decreasing mean annual rainfall levels have been the trend in West Africa over the last two decades illustrating the effects of climate change. Furthermore, with world crude oil prices averaging more than US$80 a barrel, economies across Africa are struggling under the burden of soaring energy costs. For example, in Dakar the cost of taxis has almost doubled since 2005, blackouts occur every day and 10-hour power cuts several times a week are not uncommon. Senegal is paying nearly twice what it was a few years ago to import the same amount of oil. The increased cost alone is more than seven times as much as the country is gaining through multilateral debt relief programs. The government has responded to the energy crisis by providing direct subsidies to consumers. Since the rise in world oil prices began in 2002, these subsidies have increased five-fold, creating yet another incredible burden on the national budget.

2. Currently, irrigation farming remains limited in the middle and lower river valley between Mauritania and Senegal, with 42,000 ha and 95,000 ha respectively developed. In the upper basin, the Tolo and Mafevol dams on the Bafing enable irrigated farming on about 1000 ha in Guinea. Downstream from Manantali in Mali, just over an estimated 800 ha of land is serviced for irrigation. Thus, less than half of the irrigation potential for the basin, estimated at 375,000 ha, is currently developed. Of the 130,000 ha to 140,000 ha that are serviced, only 90,000 ha are really usable, including 60,000 actually cultivated in the rainy season and between 10,000 ha and 15,000 ha cultivated in the off-season. Implementation of the national programs is somewhat ineffectivesdue to low capacity at the central Government level; this is especially true for Mauritania where the Government has had difficulties in mobilizing the financing needed for the PDRI.

3. Hydropower potential is estimated at 1,200 MW of which less than 30 percent is currently exploited. The ECOWAS Water Resources Coordination Unit launched a Multi-stakeholder Dialogue on Large Hydraulic Infrastructure in West Africa in 2009. This dialogue, which included OMVS, led to a prioritization exercise, based on a multi criteria analysis, of 39 dam projects in West Africa, five of which are in the Senegal River Basin, Badoumbé, Balassa, Boureya, Gourbassi and Koukoutamba, and four of which have been advanced under this program; Balassa, Boureya, Gourbassi and Koukoutamba. The dialogue also led to specific recommendations for the sustainable development of water infrastructure in West Africa which ECOWAS envisions to use in the preparation of a framework directive. These moves indicate increased regional support for water resources development and a clear pipeline of hydropower

infrastructure. Felou Dam is soon to come on-line following delays due to adverse weather conditions and security problems in Mali. Commissioning of the 60 MW facilities is expected before end 2013. The Gouina dam is also ready for construction since feasibility, detailed design, environmental and social assessments and the bidding documents are complete.

The area within the Guinean highlands has a large potential for micro-hydro development to support rural electrification. A study of potential sites was completed in 2007 with the support of the GEF financed Senegal River Basin Water and Environmental Management Project. This study completed an inventory of potential micro-hydro sites in Guinea and an overall assessment of sizing and cost. This study needs to be further developed to assess the environmental and social costs and benefits as well as the economic and technical viability of different sites and select priority schemes to be developed further.

Impacts of Large Hydraulic Infrastructure

4. In trying to meet the needs of energy and food security, the previous construction of large dams for irrigation and hydropower has contributed to negative impacts on the basin population. The key impacts identified, specifically related to Diama and Manantali dams, are environmental impacts, damage to fishing communities and increased public health risks. The increased regulation of the Senegal River and associated infrastructure have been widely linked to altered estuarine and freshwater system dynamics which have led to; losses of flood-recession agriculture, reduced pasture lands, degradation of fish populations, changes in forests downstream of Diama dam and river bank erosion in the upper valley. Malaria and schistosomiasis became endemic following the construction of the Diama dam.

5. Reduced productivity of the fishing sector and environmental degradation have negatively impacted the basin population. Large areas of floodplain, used for recessional agriculture the basic means of livelihood for the majority of the population, have been lost. Fishing is the largest economic activity in the basin after agriculture. In addition to being a regionally shared resource there is also regional trade in fresh and processed fish, particularly inland towards Mali. However fish catches have declined across the basin, in part due to changes in hydrology and disruption of fish migrations from dams. Additionally fish resources have suffered from excess fishing pressure and poor fishing practices. This has resulted in a decrease in household revenues and fish consumption.

6. Water-related diseases associated with large water infrastructure are still prevalent, negatively affecting the Basin population's health and economic productivity. According to a recent malaria indicator survey[9], malaria prevalence rates in the Senegal River Basin at the end of Phase 1 implementation were estimated at 14.3% among children under 5 and 9.0% among pregnant women, the most vulnerable groups. The same survey shows that for malaria prevalence among children under 5 years, Guinea[10] has recorded the highest prevalence (54.7%) while Mauritania has the lowest prevalence rates (1.2%), Mali and Senegal have reported a prevalence rate of 3.1% and 2.1%, respectively. The prevalence of malaria among pregnant

[9] carried out by OMVS between November 2011 and January 2012

[10] Guinea may be an outlier due to partial collapse of health service delivery resulting from political instability in the period prior to the survey.

women is highest in Guinea (53.6%), lowest in Senegal (0.2%); the data presents a prevalence rate of 1% in Mali and 0.5% in Mauritania for pregnant women. However in large parts of the river basin all fevers are treated as malaria due to the absence of microscopy or rapid diagnostic tests. As such suspected malaria is still reported as the first cause for clinical consultation within the Senegal River Basin. Studies emerging from member states indicate that only a proportion of fevers treated as malaria are actually caused by malaria resulting in significant inefficiencies in health spending on unnecessary treatment and misdiagnosed fevers. Countries are in the process of scaling-up access to biological diagnosis of malaria, however adequate funding is not available in all four riparian countries. Nonetheless, malaria transmission is still endemic throughout the basin and the potential for re-emergence and epidemics is high if current levels of LLIN coverage are not maintained.

7. Epidemiological mapping done in these countries shows that schistosomiasis, soil transmitted helminthes/geohelminths, trachoma, lymphatic filariasis and onchocerciasis affect almost all districts of the countries along the Senegal River Basin. The above mentioned NTDs found in all four countries (except for Mauritania which does not have onchocerciasis or documentation of lymphatic filariasis), have different levels of endemnicity as illustrated in Table 2.1 below. Overall, this constitutes a heavy burden to public health that varies from country to country.

Table 2.1: Neglected tropical diseases and Malaria prevalence in OMVS countries[11]

Country	Schistosomiasis * (%)		Trachoma ** (%)		Lymphatic filariasis ** (%)	Geohelminthes* (%)	Malaria in young children*** (%)
	Urinary	Intestinal	TF	TT			
Guinea	1.9	9.9	33	2.7	3	4.2	54.7
Mali	51.8	0.6	34.9	2.5	7.07	0.1	3.1
Mauritania	34.7	3.1	-	-	-	1.2	1.2
Senegal	33.5	14.3	10.8	2.6	0 - 24	3.3	2.1

8. Information gathered from different country NTD control strategy documents as well as in the surveys mentioned above show massive infestations of schistosomiasis in some districts such as Diema and Kayes in Mali where the prevalence rates are as high as 83.3% and 73.3% respectively. In Senegal, the district of Richard-Toll has reported 13.1% prevalence rates of high intensity infestations while in Guinea, the highest intensity infestations prevalence rates were reported in Mamou district at around 4.3%.

9. Mauritania is the only country that has not reported onchocerciasis and lymphatic filariasis (LF). As concerns lymphatic filariasis, the non-existence of any report of filariasis in Mauritania may either represent a true absence of lymphatic filariasis or arise from the inability to detect the parasites. Mauritania appears to have the characteristics necessary for propagation of lymphatic

[11] Sources : *Etude de base sur la prevalence et les infestations fortes des schistosomiases et des géohelminthes dans le basin du fleuve Sénegal – Juin 2010, ** National strategic plans on Neglected tropical Diseases for Guinea (2008 -2012), Mali (2007 – 2011) and Senegal (2011 – 2015) (no information form Mauritania), *** MIS surveys (2012)

filariasis, including population density and climate. Onchocerciasis has a high risk of infection for populations near to rivers and is present in districts just across the Senegal River from Mauritania.

10. Studies have shown that integrated disease control measures, coupled with sound water management, are essential to mitigate the burden of malaria and NTDs in locations near irrigation or dam sites.

11. In early 2012, the pharmaceutical industries donated free drugs through WHO to low income countries for all of the preventive chemotherapy NTDs. Sufficient treatments have been made available to address all the targeted NTDs in Africa using community-based approaches. Integrated treatment using the donated drugs would be one of the most effective strategies to overcome the public health burden of NTDs.

Dam Management

12. Following the studies completed on Diama dam under MWRD1 it has been identified that emergency maintenance is required to ensure that the life of the structure is extended. Diama dam, built in 1986, prevents ingress of saltwater and protects a 107km length of the river from flooding. Upstream impacts extend into Mali, along an upstream length of 350km. The dam ensures upstream access to freshwater and is also used to raise the upstream level, therefore both protecting and facilitating the majority of investments in irrigation and fisheries in both Mauritania and Senegal. In addition the dam facilitates fresh water supplies for both Nouakchott and Dakar. Diama dam is in an aggressive saltwater environment which has been aggravated over recent years due to the breach in the Langue de Barberie, a sandy peninsula at Saint Louis, in 2003. The dam is protected by a combination of cathodic protection and passive protection from coating. The maintenance of this dam has not been completed to the required specifications, and following almost 30 years of operation in a highly corrosive environment some elements, including control systems and gates, are in a critical condition.

13. In parallel with the support provided under MWRD2 for urgent maintenance works OMVS are working to develop sustainable financing systems which will support the effective long term maintenance of the Diama dam.

Navigation

14. The development of seasonal navigation in the Basin began during the 1860's and commercial navigation on the Senegal River was practiced until the 1970s. The installation of river navigation aids and the drafting of inland water navigation regulations at the start of the 20th Century enabled the navigation of the river, for vessels with a draft of 1.8m, as far as Kayes in Mali for four months of the year. During this period, river ports were constructed and river navigation was subject to official regulations. The construction of the port of Dakar, the Dakar-Bamako railway line and the development of road network, combined to cause the decline in Inland Water Transport (IWT) on the Senegal River.

15. The Diama Dam and the Manantali Dam were designed and constructed to also cater for the requirements of navigation and river transport. Part of the Manantali Dam cost was initially justified by prospective navigation activities. The size of the navigational lock at Diama dam was dictated by the requirements for the commercial navigation of large boats.

16. Preliminary scoping of the project was completed under the Senegal River Basin Integrated multi modal Transport Project. However this project was dropped in 2011 and OMVS has highlighted this again as one of the key priorities, particularly for Mali, within the basin. OMVS have completed preliminary discussions with development partners and have potential funding for a large number of the works, particularly navigation; however this financing will not be realized unless the studies can be advanced to show a high level of preparedness. The rationale of OMVS and its member states to now develop the navigation potential of the Basin is the following: (i) in several areas the valley population is de facto landlocked, and the agricultural potential of the valley cannot be realized due to poor access for both inputs and markets; and (ii) key agribusiness and mining projects can be developed only with the support of a low cost IWT transport infrastructure.

17. OMVS has advanced some sections of this work through SOGENAV using in house financing and with support from other development partners, including studies on road networks and dredging access channels to existing ports. OMVS completed the construction of roads between Rosso (in Mauritania) and Saint Louis (in Senegal), providing the only land link between Senegal and Mauritania through the road located along the Diama Dam. OMVS has also completed some works to improve access to Manantali dam.

Climate and Environmental Risks

18. The 2007 TDA developed under the GEF-financed Senegal River Basin Water and Environmental Management Project identified, among the myriad of environmental concerns confronting the river basin, five particularly urgent problems including: (a) land degradation and desertification; (b) decreased water supply and degradation of water quality; (c) proliferation of invasive species; (d) prevalence of water related diseases; and (e) threats to biological diversity. The Strategic Action Plan (SAP) completed in 2009 focused on the following:

(a) An in-depth consolidation of identified national priorities;
(b) The description of public perceptions towards proposed development actions in the basin and perceptions on transboundary environmental management issues;
(c) The prioritization of transboundary and national actions as reflected in the diagnostic analysis;
(d) The identification and definition of priority interventions;
(e) The identification of necessary additional policy and institutional reforms to facilitate enhanced transboundary management actions.

19. As across Africa, the Senegal River Basin is being affected by climate change. Annual rainfall has a high variability between wet and dry seasons and also between years. Generally, declining mean annual rainfall levels have been the trend in West Africa over the last two decades demonstrating the impacts of climate change. The Basin is influenced by the north-south migration of the Inter-Tropical Convergence Zone (ITCZ), and by inter-annual variation

(coefficient of irregularity: k=1.5 to 2). The highest rainfall is in the Fouta-Djalon area (up to 2,000 mm/yr) and the lowest towards the extreme north (less than 200 mm/yr)[12]. Since the 1970s, the 400 mm isohyet has shifted southward over a distance of ~100 km, thereby jeopardizing rain-fed agriculture over large areas. Aridity was prevalent throughout the whole period between 1960 and 1996 and was highest (lowest ratio) in Podor in 1983.

20. Climate change in the basin is predicted to be accompanied by increased variability in rainfall and temperatures, thus forming a tentative situation that needs multifaceted analysis for diagnoses. High variability in precipitation and temperature would give rise to frequent changes in agro climatic characteristics and increase variability in yields of crops in the different ecological zones. Consequently, this situation will seriously impact on GDP of the countries within the basin. Climate change will also have considerable impacts on agricultural systems and ultimately affecting crop calendar and lengths of growing periods. Extreme events such as heavy downpours and droughts will reduce crop yields within the basin because excesses or deficits of water will have negative impacts on plant growth. The Senegal River basin provides an illustration of sensitivity to climatic variations and opportunities for adaptation. These changes in precipitation will have wide-ranging secondary impacts on livelihoods, hydroelectric power generation and domestic water supply in the Basin.

21. The understanding of the local impacts of climate change is low. The challenges of analyzing climate change impacts on water resources for the Senegal River Basin range from high level of uncertainty to lack of knowledge of predicting the future climate changes and their impacts within the basin region, which is hindering climate-smart water resource management planning. No comprehensive studies on climate change vulnerability have been conducted on the river basin. The majority of the limited assessments completed (contained in broader subject documents) are outdated[13]. Furthermore, transboundary issues are not discussed in the Water chapter of the Intergovernmental Panel on Climate Change 4th Assessment Report and appears only briefly in the Africa chapter in relation to cross-border management of floods in Mozambique and there was also a small mention of the international nature of water management in West Africa and for the Okavango. Present water resource management systems in most river basins assume that the climate is stationary and that hydrologic variables can be projected from the long term records. However, it is progressively being recognized that this assumption is no longer valid with the changes in climate that are ongoing and expected. For the Basin, the last publicly available, comprehensive, peer-reviewed, climate change study was conducted in 1997. Several other smaller studies, which have not been at the scale needed, have been conducted on the Basin and there is an urgent need to conduct a stocktaking of these studies to identify the knowledge gaps.

22. Currently water allocation is not a critical issue in the Senegal River Basin as the water resources are significantly under-developed. However climate variability and increased pressure

[12] Oyebande, Lekan, and Shakirudeen Odunuga. "Climate change impact on water resources at the transboundary level in West Africa: the cases of the Senegal, Niger and Volta Basins." Open Hydrology Journal 4.1 (2010): 163-172.

[13] For example: L'Etude de la gestion des ouvrages communs de l'OMVS (Gibbs et al 1987); West African Water Vision (WATAC 2000); and Water, Drought and Desertification in Africa in: Sustainability of Water Resources under Increasing Uncertainty (April 1997)

on existing water resources will necessitate adaptation on the part of water resource management institutions and water users in the future. The knowledge base and tools for adaptation are not adequate, namely:

(a) The flow gauging network, largely complete in Senegal and Mauritania, is incomplete in Mali and almost non-existent in Guinea;
(b) Cartography of the Senegal River Basin was last updated in the 1970s for most of the basin;
(c) The Trans-boundary Diagnostic Environmental Analysis (TDA) completed in 2008 did not include a comprehensive assessment of the impacts of climate change.

23. Where water resource management decisions are taken without proper information on possible future climate change impacts, sub-optimal adaptation may exacerbate vulnerabilities to future climate change. An improved knowledge base with which to plan for climate risk adaptation needs to be developed.

24. Climate change predictions and new infrastructure will also have a significant impact on the management of the dams. OMVS has a number of models in place, with varying levels of utilization, including;

(a) COREDIAM: Modeling the backwater effect from the Diama dam;
(b) GESDIAM: Model of flows through gates at Diama dam and estimation of critical limits to protect against scour – additional studies have been completed which indicated that a higher energy level could be safely allowed;
(c) SIMULSEN: simulation model for Manantali dam including: forecast retained levels, hydropower production, irrigation allocations and potential flooded areas;
(d) PROGEMAN: model for predicting the flow at Bakel, a key hydrometric station on the Senegal River;
(e) A rainfall runoff model for the upper basin was developed under the first phase of the GEF trust fund, but never consolidated and put into use. The aim of this model is to improve how the level of Manantali reservoir is regulated to mitigate flood risk
(f) Additional models are used by the dam operator contracted by SOGEM.

Institutional Context

25. The Senegal River Basin Organization (OMVS) was established in 1972 with the mandate of securing countries' economies and reducing the vulnerability of peoples' livelihoods through coordinated water resources and energy development. Since 1978, OMVS has formally adopted of the principles of equality and equity, with the allocation of benefits and costs based on the needs of the member states, their capacity to put to use the benefits provided by the river, and the actual uses derived from the river (Nguyen, 1982). The current OMVS structure includes four countries: Guinea, Mali, Mauritania and Senegal. The river basin integrated development program has three pillars: (i) Water resources management; (ii) Hydro-power dams development; and (iii) Inland water transport as a "dorsal spine" of an intermodal/multimodal transport system. It is the product of a long process of cooperation among riparian states along the Senegal River which commenced during the colonial era to jointly develop shared resources. Over this period OMVS has become a key river basin association in the region, with influence beyond the basin

boundaries; for example it has hosted the African Network of Basin Organizations since its formation in 2002.

26. The partition of benefits among Mali, Mauritania and Senegal was formally agreed by the Council of Ministers in 1981, and although some aspects have been adjusted and updated in line with basin developments they have never been formally adopted. The original key included the three key sectors of; navigation, irrigation and energy. Differences between the new and old partition of benefits were too large to be politically acceptable and finally no revisions were ever made to the 1981 partition. Recent studies by the World Bank on OMVS have highlighted inequalities in how the benefits and costs of development are shared with the population at large. Some segments of the population have benefited from the developments facilitated by OMVS (for example urban populations) while others have not – and in some cases, have been negatively impacted (for example traditional recessional farmers).

27. The Water Charter of May 2002 is an innovative instrument based on four pillars: (i) sustained and structured cooperation among member states to secure equity, solidarity, and equal treatment of all use sectors; (ii) joint and indivisible ownership of all infrastructures in the basin; (iii) equal access to the resources, and (iv) equitable allocation of costs and charges. It also determines the rules for preserving and protecting the environment, particularly concerning fauna, flora and the ecosystems of the flood plains and wetlands. For the domains that it covers, the Water Charter takes precedence over national legislation. This places OMVS in an advantageous position that is still unrealizable for most of the basin organizations in Africa. The Charter can be seen as a pledge to a communal vision for sustainable development of the Basin. The Charter represents all fundamental emerging principles on equity, IWRM and the need to protect the environment. For example, there are requirements on water allocations in the Charter that mandates how the dams in the Basin are to be managed so as to guarantee an 'environmental flow' whenever climatic conditions allow. The Charter requires the Manantali Dam to generate releases to produce an annual flood to respond to needs of recession agriculture and of the biodiversity of the floodplain. All OMVS member states recognize that the Senegal River Basin is governed primarily by agreed OMVS conventions when it comes to water resources management. For example, the 2005 Mauritanian Water Code defers to the OMVS Water Charter for the management of all its water resources located in the Senegal River Basin.

28. In March 2006, with the support of the World Bank, OMVS completed the Inclusive Framework to integrate the fourth riparian country - Guinea - into its joint Senegal River Basin Development Program. The OMVS treaty was signed to integrate Guinea as the fourth riparian country and the four Heads of State approved the implementation of the joint Senegal River Basin Development Program.

29. The inclusion of Guinea within OMVS was a critical step for regional development and economic integration. This is only the second time the Bank has brokered such an agreement on international waters (the first time being the Indus Treaty). By joining OMVS, Guinea has benefited from the lifting of financial constraints to developing its significant hydropower potential, thereby strategically positioning itself in the West Africa Power Pool market. In return, Guinea's contributions to the joint development and protection of the headwaters of the Senegal River will benefit the other riparian countries. However the inclusion of Guinea also introduces a

number of risks into the operations of OMVS due to the country's much lower capacity and critical position at the source of the Senegal River.

30. Furthermore, the inclusion of Guinea provided an opportunity for OMVS to embark on a comprehensive program of legal and institutional reforms, incorporating environmental and social issues, among other aspects which were not fully considered at the initial establishment of the organization. The institutional reform of OMVS was completed with the implementation of a new organizational structure. This new structure better positions the organization for the current and future challenges as well as strengthens the involvement of all stakeholders in the decision-making processes. This is important as other development issues come to the forefront of water resources management (e.g. health and climate change adaption) and more participation from civil society is demanded.

31. As one of the most advanced basin organization in the region, OMVS ensures an environment conducive to investments. With a long-standing, established track record spanning more than 40 years, OMVS is well-positioned to undertake the multi-purpose and multi-sectoral investments proposed in the MWRD program.

Overview of Project Design

32. The project design aims to simultaneously increase the productive uses of water while safeguarding the health and livelihoods of vulnerable communities in the river basin. The regional integration process establishes the inter-related parameters for sustainable water resources development across all sectors and the project components provide mutually reinforcing interventions at regional, local and national levels. Constant themes running through the project design include: (i) increasing resilience to climate risks and (ii) supporting the inclusion of Guinea in OMVS.

33. The reason for increasing resilience to climate risks stems from the need to improve the knowledge base and future planning; while Guinea as a newcomer to OMVS needs to quickly learn to play an equal role as the other member states and realize some of the benefits of regional cooperation.

34. Under MWRD1, components covered institutional modernization, local level water resources activities and regional water resources development planning. As described above the needs in these key areas continue to exceed the budget envelopes, therefore the activities planned for MWRD2 scale up similar interventions to MWRD1, incorporating lessons learnt to improve technical quality.

35. As such, MWRD2 will first provide targeted institutional and technical support to update the partition of benefits and advance dam design, continue hydro-agricultural and water resources protection work in new areas, initiate fisheries activities in Guinea and continue support in the remaining states, also incorporating new activities for fish farming. Second, the treatment of the five critical NTDs will be incorporated into the health sub-component of the project, in parallel with continued LLINs distribution aiming to contribute to achievement of universal LLIN coverage and improved malaria control in the river basin. Third, in parallel with the planning of

new dam infrastructure to harness the hydropower potential in the basin, MWRD2 includes measures to safeguard and mitigate impacts of the existing supply through essential maintenance works.

36. Fourth, following the increased and visible impacts of climate change, through the GEF financing, MWRD2 incorporates additional measures to improve planning for climate resilience in the future and builds on 3 of the 4 components of the Special Initiative on Climate Change in the SAP. The related components are: (i) to improve the quality of climate information, particularly as it relates to predicting future climate and its impacts on water resources (the design of the vulnerability studies was guided by this component); (ii) to promote adaptation measures to reduce the vulnerability of production systems for basin communities (the design of the piloting activities is in line with this component); and (iii) to ensure climate proofing for the basin's hydraulic and hydro-agricultural infrastructure in the face of risks related to climate change (the decision to strengthen the hydrometric network is prompted by this component).

37. Finally, under MWRD2, OMVS will take on key elements of planning and communications under their internal financing. This is proposed as part of the exit strategy for the project, to transition to OMVS taking complete ownership of the project at the end of MWRD2.

G. Project Components

38. The project will have three inter-related components supporting the project development objective: (1) institutional development; (2) multipurpose water resources development (3) infrastructure management and planning. The funding envelopes for each component and sub-component are summarized in the cost tables at the end of this Annex, showing funding type and the breakdown for each country. The GEF datasheet references are inserted to facilitate cross referencing the separate proposal for these activities.

Component 1: Institutional Development (US$19.11 million)

39. The overall objective of Component 1 is to build capacity for participative engagement. This first component will support both regional institutional development and the successful implementation of the project through the following main elements:

(a) 1.1 - Updating the Inclusive Framework and strengthening the role of Guinea within OMVS [sub activities GEF funded; Component 1a- GEF datasheet]
(b) 1.2 - Modernizing and reinforcing the institutional capacities of OMVS and related agencies
(c) 1.3 - Strengthening the capacity of OMVS and national agencies to lead climate adaptation efforts in the region [GEF funded; Component 1b- GEF datasheet]
(d) 1.4 - Strategic management of the project

Sub-component 1.1 - Updating the Inclusive Framework and strengthening the role of Guinea within OMVS

40. This sub-component is a critical element of the project which supports the long term sustainability of the project. This sub-component would support finalization and implementation of the Inclusive Framework and capacity building for Guinea through:

(i) Updating the partition of costs and benefits including; a revision of the calculation method and obtaining consensus on the revised approach, as necessary, collection and treatment of additional data, presentation of key scenarios to the technical Committee and ultimately presentation of the revised key to the Council of Ministers. The key would also include new sectors as necessary, such as urban or industrial water use;

(ii) Improving data management, including digitizing and centralizing data at the Documentation Center;

(iii) The implementation of the Water Charter through; a gap analysis that identifies the aspects at the national level which are needed to fully implement the Water Charter, and, the drafting of national legislation/regulations for the application of the Water Charter in each country. This activity will ensure that each riparian country's national legislation contains provisions for the effective implementation of the Charter. [GEF funded; Component 1a- GEF datasheet];

(iv) Sensitizing stakeholders and building their understanding of the importance and impacts of the application of the Charter. This activity will have a specific focus on Guinea. Capacity building for Guinea would be completed through continued dissemination and training on the basic texts of the OMVS including distributing the documents to all relevant agencies and training key stakeholders in Guinea, these activities would include Government, academic institutions and NGOs [GEF funded; Component 1a- GEF datasheet].

Sub-component 1.2 - Modernizing and reinforcing the institutional capacities of OMVS

41. This sub-component aims to build upon the extensive studies and support provided under MWRD1 through targeted and practical actions which will support or improve the future operation of OMVS. Key activities identified and areas of support include; (i) supporting OMVS strategic coordination and collaboration among national water and agricultural technical bodies, including exchange of experiences and best practices; (ii) reinforcing the technical capacity of the national cellules of OMVS including recruitment of technical staff, IT hardware, support for supervision missions and ongoing monitoring; (iii) reinforcing the capacity within the national cellules and agencies to plan, implement and monitor safeguards, including an extension of the training carried out under MWRD1; (iv) continued information and publicity on the activities of the project within the river basin, to raise the profile of OMVS and mobilize local support; (v) reinforcing local level consultation with communities and civil society representatives; and (vi) support to improve OMVS' communication with actors outside of the basin.

Sub-component 1.3 - Strengthening the capacity of OMVS and national agencies to lead climate adaptation efforts in the region and the capacity of pilot program beneficiaries on adaptation techniques [GEF funded; Component 1b- GEF datasheet]

42. This sub-component will support the institutional capacity building of OMVS, national Ministries of Environment, and other relevant agencies of the member states to improve their management and technical capacities to lead climate change adaptation efforts in the region. With this enhanced capacity, OMVS and member states can thereafter design and implement climate resilience plans, including preventive actions aimed at minimizing the harmful effects of critical events, among other climate risks. This sub-component will also support training efforts (national agencies serving as trained trainers) of pilot program beneficiaries to understand climate risks to their livelihoods and to implement relevant adaptation options.

Sub-component 1.4 - Strategic management of the project

43. This final sub-component covers the management of MWRD2 by the PCU. The subcomponent includes the following:

(a) Operating costs for the project; the bulk of this component relates to training, salaries, field supervision, transport and IT support for the PCU.
(b) Financial management; including external auditors and updating the accounting software currently in use.
(c) Project wide monitoring and evaluation, including improved data management, evaluations for MWRD1 and MWRD2.
(d) Following lessons learnt during the first phase of the project, the monitoring and evaluation for MWRD2 has been expanded to include annual household surveys as well as training local community members to complete these household surveys to identify impacts on beneficiaries throughout the life of the project life. [GEF-funded]
(e) This sub-component also includes additional support to reinforce the monitoring of safeguards, including the dam safety panel to review dam designs and give expert advice for the Diama rehabilitation and the dissemination of the pesticide management plan at the community level, among other measures.

Component 2: Multi-Purpose Water Resources Development (US$174.23 million)

44. The overall objective of this sub-component to promote income-generating activities to improve livelihoods for the basin population and builds strongly upon activities carried out in MWRD1. Planned activities and targeted areas have been developed through MWRD1 which facilitates a more effective start to MWRD2 and faster achievement of results on the ground. This component includes a number of core multi-sectoral activities related to the development of water resources in some sub-basins.

45. Sub-components are:

(a) 2.1 - Hydro-agricultural development and water resources protection
(b) 2.2 - Sustainable fisheries management and aquaculture
(c) 2.3 - Increase the coverage of interventions to address water-related diseases

(d) 2.4 - Pilot approaches to improve climate resilience [GEF Funded; Component 3a GEF Datasheet]

46. Following discussions with OMVS and member states, hydro-agricultural development has been identified as the priority in the Basin.

Sub-component 2.1 - Hydro-Agricultural development and water resources protection

47. This sub-component will support both:

(a) Extension of agriculture development or intensification through (i) recalibration, reshaping and compacting principal canals and intakes supplying irrigated areas; (ii) rehabilitation and development of rice irrigation schemes; (iii) development of low lands and flood plain agriculture (iv) development of small irrigated fields/gardens; (v) work to install or improve main pumping stations and (vi) including the capacity building of water user associations and farmers to ensure that water resources are managed properly and the systems are well operated and maintained; and

(b) planning and management of land and water resources at the community and sub-basin levels to ensure sustainable development of the resource, including activities to reduce soil erosion in critical areas, increase income opportunities for local communities and provide community stakeholders with tools and mechanisms for appropriate development through (i) slope stabilization works and reforestation of river banks and (ii) agroforestry on slopes adjacent to low-land agricultural areas.

(c) Improved water resources management and operation and maintenance of systems installed through training and support to relevant agencies.

48. The overall zones of intervention for MWRD2 of the project have been identified and prioritized according to their production potential, the level of degradation, the needs expressed by the beneficiaries and their commitment to ensure the full operation and maintenance of infrastructure in the future – including the existence of community structures and clear land tenure. In addition, activities in MWRD2 have been developed to consolidate the achievements under MWRD1 and to scale-up the activities initiated under MWRD1 in a coherent fashion. For example MWRD2 will implement the studies and designs developed during MWRD1, and also implement related investments which will increase the impact of the achievements to date and assure their sustainability. Areas for implementation for each activity are detailed in the cost table provided at the end of this section.

49. Activities are targeted to the needs of the countries and to the pertinence of the issues in the respective zones of the Basin. As such, protection of the watershed coupled with income-generation is the focus in Guinea and Mali and more sustainable exploitation is the focus in Mauritania and Senegal. Activities can be grouped as follows:

(a) Guinea and Mali:
  (i) Development of low lands;
  (ii) Development of irrigated perimeters and associated infrastructure;
  (iii) Development of small gardens for women's cooperatives and support to processing;

(iv) Agroforestry along upstream slopes;
(v) River bank stabilization including access points and footbridges;
(vi) Pre-feasibility studies for slope protection and low land development.

(b) Mauritania and Senegal:
(i) Rehabilitation of key irrigation infrastructure and associated perimeters, 4694ha;
(ii) Flood defense and flow control structures to facilitate or protect 18000ha of flood plain agriculture;
(iii) Development of small gardens for women's cooperatives and support to processing;
(iv) Slope protection and stabilization works, including 1000ha of reforestation.

50. Support for small gardens which are cultivated exclusively by women is planned across all countries. These activities targeting women cooperatives have been identified to ensure women have a continued role in agriculture and can feed their families. Sensitization will be ongoing in these communities to support women to have a role in local decision-making structures. However this will be a long process due to a local culture which tends to consecrate land rights and power almost exclusively with men.

51. Reforestation and agroforestry are included in Mali and Guinea to protect upstream areas of the river and productive low lands from sedimentation and as a source of revenue for local communities. Community mobilization and participation will be a major section of this activity.

52. As per its mandate, OMVS is focusing on bulk water supply. The project will phase the rehabilitation of adjacent irrigation areas to ensure that the benefits from bulk infrastructure are realized and result in sustainable maintenance of the whole system. The irrigation areas identified below include shared infrastructure for bulk water supply into the area and to household level plots.

53. Across all member states, measures will be taken to support the long term sustainability of the project interventions. Improved water resources management and operation and maintenance of systems through training and support to water user associations (WUAs) and irrigation cooperatives will be included. These local level organizations are already in place for a large part of the Basin, put in place either by the national implementing agencies or under previous project funding completed by the Dutch Trust Fund. Support is based upon the national level capacity, for example additional investment is being provided in Guinea to improve access and support development of the agricultural sector locally following specific requests from DNGR.

54. The motivation for including support for the local level organizations is to take responsibility for operation and maintenance of secondary and tertiary irrigation canals. The management of the transfer of operation and maintenance would be managed by the national agencies following construction, based upon national procedures and norms.

55. The areas and activities targeted by this sub-component are summarized in table 2.2 below.

Table 2.2: Summary of Activities for Hydro-agricultural and Water Resources Protection

Activity	Area	Units	No. units
All Countries			
Capacity building: Support to irrigation cooperatives – technical (irrigation methods, crop diversification, operation and maintenance) and organizational. Including cooperatives from areas covered under both MWRD1 and MWRD2.		-	-
Capacity building: support to women's cooperatives in processing agricultural products		-	-
Development of market gardens with women's cooperatives, including installation of wells where necessary		ha	350
Guinea			
Slope stabilization* including gabions, access ramps for livestock, washing areas and footbridges	Dounet and Kaalan	km	41
Rehabilitation of irrigation schemes, including intakes, drainage, flood defense embankments and water diversions	Kanka Labé, Dounkimagna (Dalaba) and Parawol/Konah (Tougué)	ha	754
Development of irrigation schemes	Labé, Dalaba and Tougué	ha	300
Prefeasibility studies for low land development (4000ha) and agroforestry development (12000ha) on adjacent slopes – developing investment pipeline for national development	To be determined	ha	16000
Development of low lands*	Mamou	ha	88
Development of low lands, sites of 4-175 ha spread across 20+ villages	Mamou et Labé	ha	20
Construction of wells adjacent to low lands		Unit	31
Agroforestry development and slope stabilization; cashew plantations and stone bunds or terracing* including community mobilization and technical support	Dounet (9km length)	ha	527
Construction of access roads for agricultural areas developed under MWRD1 and MWRD2	Labé et Tougué	km	113
Measures to support development of the agricultural sector and consolidate completion of MWRD1; improving access to markets and storage of produce sensitization on environmental issues	-	-	-
Mali			

Activity	Area	Units	No. units
Agroforestry development to stabilize adjacent slopes* including community mobilization	Areas planned but not achieved under MWRD1 and an extension around the Kayes circle	ha	2000
Slope stabilization at spot locations, including gabions, access routes and footbridges*	To be determined	km	10
Development of irrigation schemes – five village perimeters, including pumping station, ancillary structures, a network of primary, secondary and tertiary channels, drainage and flood protection – and low land areas including channels and flow control structures	Kayes and Bafoulabé	ha	160
Development of low lands* including channels and flow control structures	Areas planned but not achieved under MWRD1 and extension at Bafoulabé	ha	451
Development of low lands including channels and flow control structures	Bafoulabé, Kayes et Yelimané	ha	2230
Measures to support development of the agricultural sector and consolidate completion of MWRD1; ancillary structures	-	-	-
Mauritania			
Complementary works for the electrical connection to ensure electrical supply for the SP/PPG2 pumping station			1
Rehabilitation of irrigation schemes*, including flood protection, the network of irrigation channels and drainage, pumps and ancillary structures	Trarza (330ha), Brakna (280)	ha	610
Development of irrigation schemes, including flood protection for schemes of Garak basin, the network of irrigation channels and drainage, pumps and ancillary structures	Chechiya(600 ha), Ten-Yedr (175 ha) and N'Kik(350 ha) in the Garak basin** and M'Bakh in the Gouère basin (680 ha) in Trarza Region	ha	1805
Clearing, calibrating and compacting hydraulic axes supplying irrigation areas	Tambass/Garak (9 km), Mbleil/Garak (7 km), Mbimani/Ndiavane (3,5 km), Sokam (17 km) and Bourguiba (3 km)	km	41
Study of (i) the Gorgol flood spillway and an integrated drainage system for PPG1/PPG2 and (ii) development of irrigation at Dieuk (160 ha)			1
Rehabilitation of irrigation scheme, including flood defense embankments, the network of irrigation canals	Boghé	ha	779

Activity	Area	Units	No. units
and drainage, flow control structures for adjacent recessional agricultural and ancillary structures*			
Consolidation works at the valve at Kaedi and slope stabilization – which will facilitate 14000ha of flood agriculture	Along the PPG1 and PPG3 embankments	unit	1
Clearing, calibrating and compacting hydraulic axes supplying irrigation areas	Gouère Est	km	10
Construction of a main irrigation canal and pumping station (PS) to facilitate the development of irrigated agriculture	Mpourié and Dieuk (future development facilitated : 826 ha)	Km PS	6 1
Additional capacity building to support the implementation of PDRI	-	-	-
Senegal			
Slope stabilization – toe protection and surfacing with laterite*	Krankaye canal	km	9
Rehabilitation of village irrigation schemes*	Ndombo Thiago	ha	630
Rehabilitation of village irrigation schemes**	Tellel	ha	1550
Rehabilitation of the Grand Tellel pumping station (supporting an area of 3600ha)	Tellel	unit	1
Connection of private irrigation developers (Autonomous Irrigation Units - UIA) to bulk water system	Matam	ha	148
Slope stabilization in the Dioulol basin to protect irrigation investments – including reforestation	Matam	ha	1000
Clearing, calibrating and compacting hydraulic axes supplying irrigation areas*	Diawel – at critical areas along this Axis	km	10
Construction of infrastructure to secure flood agriculture; including flow control structures and erosion protection*	Yédia basin	ha	4000

*Studies have been completed for these investments
** Preliminary studies only have been completed for these investments

Sub-component 2.2 - Sustainable fisheries management and aquaculture

56. This sub-component will continue to contribute to the development of sustainable livelihoods from fisheries along the Senegal River. There are four complementary activities in this sub-component to support the development of inland fisheries and aquaculture in selected areas of the river basin. The activities include; (i) institutional support; (ii) support to develop sustainable fisheries management; (iii) support to enhance the value of fish catches; and (iv) support to develop aquaculture and related activities.

57. The fisheries sub-component will aim at promoting the sustainable use of fish resources within selected fisheries of the Senegal River Basin, and at developing small-scale aquaculture in selected locations in the four participating countries. In addition to consolidating the results from

MWRD1 in Senegal, Mali and Mauritania, Guinea will be added under MWRD2. This sub-component will contribute to improving the livelihoods of the fishermen and small-scale aquaculture operators in areas defined by the countries. The same principles of intervention as MWRD1 will be kept: (i) promote efficient and sustainable practices for the exploitation and management of inland fisheries; (ii) increase the value of captures with improved techniques and infrastructures for handling, stocking, conserving and processing fish; and (iii) stimulate fish production from small-scale fish farming. Revenue generating activities will be developed along with appropriate fishing restriction measures.

58. Support to sustainable fisheries management will help local fisheries actors get organized and develop a sustainable fisheries management system in areas targeted by the project. Following studies at the beginning of MWRD2 implementation, measures will be taken by local actors to manage their resources and capture fish efficiently. Plans for information, education and communication will be prepared to ensure ownership and lasting engagement of local communities. The fisheries management measures will be institutionalized through the preparation and adoption of local conventions signed by the fishermen associations and the local administration. Community monitoring and surveillance is fundamental to accompany resources management measures and ensure sustainability of efforts.

59. Increasing the value of captures with improved techniques and infrastructures for handling, stocking, conserving and processing fish is a critical element of the fisheries sub-component. The project will build or rehabilitate small infrastructures that will improve fish landing, fresh fish conservation, and fish handling and trading. The project will also enhance fish processing with acquisition of equipment and provision of training to women who typically engage in this activity. These activities will aim at improving sanitary conditions and the overall quality of captured fish (and produced fish from aquaculture) throughout the fish chain, in order to allow beneficiaries to sell their fish at a higher value and possibly access new markets (such as larger cities). Sustainability of these investments will be ensured by a parallel capacity building of local actors to handle the operation of these new infrastructures.

60. MWRD2 will also support the development of small-scale fish farming and related activities. This activity's main objective is to add value to existing water bodies/reservoirs and ponds created by dams and small irrigation structures where the program has intervened. This will create synergies with other sectors to provide beneficiaries with additional nutrition and revenues from fish farming. This support will also act in complement to fisheries management in natural waterways, to reduce fishing efforts where the natural resources is depleting and support local fishers create artificial ponds to produce fish in small ponds, dam reservoirs and in the irrigation infrastructure described in the previous sub-component. The selection of sites where the project will finance fish farming will be based on preliminary studies to be conducted at start of project implementation. Small-scale hatcheries will be built or rehabilitated, to supply small ponds and selected water bodies in the project sites. In the same manner as for the other activities, significant training and equipment for local operators will be provided to ensure good practices and sustainability. Further details are given in the budget breakdown.

Sub-component 2.3 - Reduction of the incidence of water-related diseases

61. This sub-component will contribute to the reduction of morbidity and mortality due to diseases linked to the development of water resources in the river basin through improved access to prevention and control interventions for malaria and high priority NTDs. Building on the strengths observed during MWRD1, such as authorities' high level of commitment and community participation, MWRD2 will sustain gains achieved in the control of malaria, schistosomiasis, and soil transmitted Helminthes. In addition MWRD2 will support the control and/or elimination of three additional water–related Neglected Tropical Diseases (lymphatic filariasis, onchocerciasis and trachoma). There is extensive geographic overlap and co-endemnicity among these diseases and therefore simultaneous treatment results in significant efficiencies.

62. This sub-component will support the following activities to reduce malaria and the NTDs among local populations:

(a) Distribute long-lasting insecticide treated bed nets (LLINs) to the population through a contribution to mass distribution campaigns which aim to achieve universal coverage in the target areas to maintain high coverage;
(b) Complete the geographic mapping of NTDs in collaboration with other partners, and integrated mass treatment (distribute) of NTDs with Praziquantel, Ivermectin, Albendazole, Mebendazole and Azythromycin;
(c) Health promotion in communities through information, education and communication, with an emphasis on the prevention of malaria and NTDs, and social mobilization in support of the periodic distribution of LLINs and integrated treatment of NTDs; and
(d) Capacity building, coordination and trans-border collaboration to control malaria and NTDs, including; improving diseases surveillance, monitoring and evaluation, strengthening technical capacities of national and local authorities and other implementing partners, improvement of coordination mechanisms at all levels and strengthening collaboration through harmonization of control/elimination methods, synchronization of activities, and sharing information.

63. The use of executing agencies through contractualization will play a crucial role in the smooth and efficient execution of this sub-component in MWRD2. An executing agency will be contracted in each of the member states under a 3-year renewable contract. Contract renewal will be based on an assessment of performance by the OMVS and national steering committees. Executing agencies will assist the national authorities in the planning, implementation and evaluation of project activities, particularly at the community level. Technical oversight of executing agencies will be facilitated by the national steering committee in each country. This sub-component will tap the distribution networks associated with current NTD control as well as those established under MWRD1 for mass distribution of LLINs and integrated mass treatment of NTDs. The sub-component will leverage free drugs donated by the pharmaceutical industry for the treatment of NTDs through national programs and the WHO.

Sub-component 2.4 - Pilot approaches to improve climate resilience [GEF funded; Component 3a - GEF datasheet]

64. Climate change predictions based on Global Climate Models (GCMs) for the Senegal River Basin diverge widely, ranging from severe reductions in rainfall to modest increases, yet it

appears that greater extremes in rainfall, as well as higher probability for drought periods affecting crop yields negatively, may be expected[14]. By utilizing climate change scenarios, derived from GCMs, pilot activities that are consistent with potential climate futures for the agricultural population in the Basin will be implemented.

65. This sub-component will therefore focus on the demonstration of climate change adaptation measures, based on the knowledge generated in sub-components 1.3 and 3.2. The pilot projects will be selected using a process articulated by OMVS in an operations manual. The process broadly includes (Steps I and II are part of the vulnerability assessments in sub-component 3.2):

I. **OMVS will characterize the current climate variability including short-term events (extreme weather events) and long-term events (trends in seasonal and annual variations)**.

II. For the relevant MWRD2 development sectors, **OMVS will determine and prioritize which of these sectors is or would likely be impacted by the various climate variability events based on the analysis from Step I**. In this step, OMVS would describe the nature and magnitude of the impact of climate change to each sector in MWRD2 project areas, even if only in relative (e.g., high, medium, or low) qualitative terms. The main aim of this step is to prioritize and identify options for designing pilot projects in response to vulnerabilities identified in Step I.

III. In this step, OMVS will **identify current or proposed adaptation strategies** in the pilot sectors of interest. Important questions include: Are adaptation strategies already in place, in the Basin, to address issues in this sector? Is there a national/local commitment to develop adaptation strategies? If not, how will this affect the sustainability of the proposed strategies?

IV. **OMVS will discuss the screening results with implementing partners and stakeholders** to determine if there are gaps in the analysis.

V. **OMVS will gauge the level of concern among stakeholders** about the impacts of the proposed projects, through the following participatory activities:

a) Hold meetings with decision-makers and stakeholders to discuss climate impacts and adaptation options. These may involve workshops, smaller focus group interviews or field interviews.

b) Consult with national and international experts on climate change adaptations. The list of adaptations developed from stakeholder meetings should be compiled and shared with experts to obtain their help in reviewing stakeholder adaptations and to identify gaps in the list. Experts may also be able to share information on adaptation assessments conducted in other countries or regions that could be germane to Step III.

[14] Rasmussen, Kjeld, et al. "Climate change and water resource management in the Senegal River basin." IOP Conference Series: Earth and Environmental Science. Vol. 6. 2009.

VI. **Finalize the pilot activity list** once the list of adaptation options has been compiled and after the aforementioned analysis, screening and consultation. A final workshop will be convened with the local stakeholders to finalize the list of adaptation options.

66. Pilot projects would link closely to the activities in the rest of component 2 – they would be in the same geographic regions and build upon the existing community livelihoods. The tentative pilot activities will likely include the following (based on NAPA priorities of the riparian countries): (i) the demonstration of small-scale agronomic water-saving measures, including drip irrigation; (ii) training for water user associations and farmers' professional cooperatives; (iii) Training on income diversification (income-generating activities: gardening, fish farming etc.); (iv) the preparation and implementation of community watershed management plans; and (v) the promotion of proven indigenous adaptation practices, where possible. The analysis from the vulnerability studies will add to the current climate risk knowledge base and will be essential in determining which pilots are most appropriate for the different geographic zones in Senegal River Basin.

Component 3: Infrastructure management and planning (US$29.62 million)

67. The overall objective of Component 3 is to advance climate resilient water resources planning and management in the Senegal River Basin. There are three main sub-components:

(a) 3.1 - Dam management and hydropower development
(b) 3.2 - Planning for climate resilience [GEF funded; Component 3a - GEF Datasheet]
(c) 3.3 – Development of navigation along the Senegal River Basin

Sub-component 3.1 - Dam management and hydropower development

68. This sub-component builds upon the studies completed under MWRD1 to advance the development of high priority multipurpose dams and complete essential maintenance works at Diama dam. Specifically this sub-component will support:

(a) Complementary studies for Koukoutamba dam including access roads and transmission lines to connect to the West Africa Power Pool. The detailed design for Koukoutamba dam and the environmental and social assessments have been prepared under MWRD1. Koukoutamba dam is located in Guinea on the Bafing tributary and was first highlighted as a priority regional project in 1981; this project is also prioritized in the ECOWAS energy portfolio due to its important contribution to regional hydropower generation (294 MW) and relatively low environmental impact. The dam height is approximately 77m and the reservoir volume 3600hm^3.
(b) Feasibility studies, the environmental and social impact studies, the detailed design and tender documents for Balassa dam (180 MW). This dam is also in Guinea on the Bafing tributary. The dam height is approximately 29m with a reservoir storage volume of 1265hm^3.
(c) Scoping study on micro-hydro development for rural electrification in Guinea, building upon previous studies, to identify priority sites based upon environmental, social,

economic and technical criteria. Support the development of feasibility studies for agreed priority sites.

(d) Urgent maintenance at Diama dam comprising; (i) renovation of electrical and electronic installations and systems for monitoring and control; (ii) maintenance of the cathodic protection system – sacrificial anode replacement; (iii) rehabilitation of the passive protection system of the dam, including cleaning, spot repairs and resurfacing for the structure and equipment upstream of the spillway gates, lock; and on upstream and downstream faces of the segment valves; (iv) rehabilitation of the water treatment system and potable water supply network, for the dam site, workers accommodation and adjacent villages (v) electrical and mechanical rehabilitation of the upstream and downstream gantry cranes (vi) acquisition of spare parts, and equipment and materials for maintenance; and (vii) a diagnostic study and inspection of the dam and adjacent sites.

Sub-component 3.2 - Planning for climate resilience [GEF funded Components 2a, 2b & 3b - GEF Datasheet]

69. This sub-component will support development of the knowledge base to identify climate change impacts and support inclusion of climate resilience into water resources planning. The tools developed under this sub component would inform the Permanent Water Commission to improve decision making on the overall future development in the basin as well as for six monthly planning for water allocation and artificial flood releases. The sub-component will also inform the pilot activities planned under sub-component 2.4. The main activities are as follows:

(a) Review existing water resources models and determine the requirements for updates, development or potentially replacement. Development or update water resources models as required and provide capacity building to support their use in decision making. This activity builds upon on previous optimization and hydrological simulations in the river basin. In consultation with stakeholders, new operational rules will be proposed if needed. In addition the modeling of different scenarios will facilitate an assessment of the impacts of floods and droughts on the ecology in the river basin. Findings and recommendations would be submitted to the Permanent Water Commission for review. The use of the models would be supported by training, hardware and software, for example model licenses, as required. [Component 3b- GEF datasheet]

(b) Update the mapping of the river basin including acquisition of high resolution satellite images to identify land use, erosion, extent of invasive species such as typha etc. and associated capacity building to support its use in decision making. Mapping work would be completed on two levels, finalizing the overall cartography of the basin and detailed images to allow monitoring of critical sites and issues.
    (i) Purchase of detailed satellite imagery for mapping the basin;
    (ii) Detailed mapping of critical areas and capacity building in the use of the tools. [Component 3b- GEF datasheet]

(c) Knowledge generation and dissemination on climate variability and change, focusing on Mali and Guinea including [Component 2b- GEF datasheet];
    (i) the update of the TDA to include climate change aspects, and an update of the SAP if needed;
    (ii) participation in the International Water Learning Exchange and Resource Network (IW-Learn) activities;
    (iii) Additional knowledge dissemination activities will which will include disseminating the results from the GEF funded aspects of the program and also support OMVS to become a 'Knowledge Institution' outside of their immediate services to the riparian countries;

(d) Climate variability and change improvements including improving the hydro-meteorological network; climate risk and vulnerability assessments.

70. It is important to note that the TDA relies on the best scientific knowledge available for the Basin. Despite numerous studies conducted on the Senegal River Basin, serious knowledge gaps still exist. It was anticipated, in the formulation of the 2007 SAP, that resident universities and researchers would provide the information to periodically update the TDA-SAP; so far, this has not occurred. The update of the TDA will include emerging knowledge related to climate change and review the status of the critical problems identified and suggest new strategies for addressing: (i) land degradation and desertification; (ii) decreased water supply and degradation of water quality; (iii) proliferation of invasive species; (iv) prevalence of water related diseases; and (v) threats to biological diversity. The approach to updating the TDA will be highly participatory and include the following steps: (i) identification and classification of the current status of environmental problems identified in the aforementioned review, and the emerging issues to be addressed; (ii) classification of issues by order of priority; (iii) analysis of the causal chain. Workshops and consultations with relevant government agencies producer associations, the academic community, and NGOs will be held.

71. Moreover, it is anticipated that all activities under sub-component 3.2 will enhance sustainability of the project interventions by engaging a broader range of the scientific community in the Basin, thereby improving their long-term interest in data and knowledge production needed for addressing future climate risks in the Basin.

72. Finally, the activities under sub-component 3.2 will also be completed before the commencement of the pilot activities planned under sub-component 2.4.

Sub-component 3.3: Development of navigation along the Senegal River

73. This subcomponent will prepare the upstream studies to assess the feasibility and advance the design of navigation on the Senegal River including the following:
(a) Studies on the renovation and modernization of the lock in Diama dam;
(b) Environmental impact assessment for dredging access channel and rehabilitation of existing landing points (Design studies already existing);
(c) Environmental impact assessment, design studies and tender document development for ports, jetties and channel dredging specifically;

(i) Development of the navigable channel of the Senegal River
(ii) Sea-river port at Saint-Louis
(iii) Port terminal at Ambidédi and stop over points

(d) Support to putting in place a monitoring system; design and tender documents for the establishment of a system of technical monitoring of navigable waters.

Overall Project Cost

74. The detailed costing for the project is presented in Table 2.3 below.

Table 2.3: Detailed Project Costs

Item	Total Cost IDA ($k)	Total Cost OMVS ($k)	Total Cost GEF ($k)		Total ($k)
			IW-Learn	LDCF	
1: Institutional Development for Water Resources	***15148***	***986***	***1050***	***1930***	***19114***
1.1 Updating the Inclusive Framework and strengthening the role of Guinea within OMVS	**1575**	**0**	**840**	**0**	**2415**
Improved data management	75				75
Updating the partition of benefits	1500				1500
Support to the implementation of the Water Charter			580		580
Harmonization of Guinea's legislation to correspond with the framework of OMVS.			135		135
Continued dissemination and training on the basic texts of the OMVS			125		125
1.2 Modernizing and reinforcing the institutional capacities of OMVS and related agencies	**2441**	**500**	**0**	**0**	**2941**
Regional coordination (ADRS, DNGR, SAED, SONADER)	100	500			600
Improved communication facilities between regional and national offices	600				600
Modernization of National Cellules	899				899
Communication of project activities and role of OMVS – community engagement and external	742				742
Strengthening capacity for safeguards implementation/ monitoring	100				100
1.3 Capacity building on climate change	**0**	**0**	**0**	**1400**	**1400**
Capacity development on climate change for National Cellules and Agencies				1400	1400
1.4 Strategic management of the project	**11132**	**486**	**210**	**530**	**12358**
Supporting the PCU	**8426**	**486**			**8912**
Equipment and hardware	428				
Financial management	780				
Salaries – support staff		486			
Salaries – specialists	5978				
Training	700				
Supervision costs	540				

Item	Total Cost IDA ($k)	Total Cost OMVS ($k)	Total Cost GEF ($k)		Total ($k)
			IW-Learn	LDCF	
Project monitoring and evaluation	**1034**		**210**	**510**	**1754**
Base and end line evaluations	600				
Household surveys and training on local survey teams			210	510	
Data collection and management	434				
Safeguard implementation and monitoring	**665**				**665**
Dam safety panel	180				
Dissemination of the PPMP	125				
Support to safeguard implementation	360				
Retroactive financing	**1007**				**1007**
2: Multi-Purpose Water Resources Development	***156220***	***11014***	***0***	***7000***	***174234***
2.1 Hydro agricultural development / Water resources protection	**114532**	**2200**	**0**	**0**	**116733**
Mali	**27495**	**750**	**0**	**0**	**28245**
Capacity building		750			
Development of small fields/gardens	1180				
Development or rehabilitation of irrigated areas	2040				
Development of low lands	11550				
Support to women's groups to process agricultural products	600				
Slope stabilization	7150				
Agroforestry, areas not achieved in MWRD1 and extension in the circle of Kayes	2750				
Consolidation of works completed under MWRD1	880				
ADRS Performance contract	1345				
Senegal	**31660**	**500**	**0**	**0**	**32160**
Capacity building		500			
Development of small fields/gardens at Bardial (Dagana) and Dioulol (Matam)	833				
Support to women's groups to process agricultural products	735				
Flood control structures at Yédia (4 000 ha)	632				
Rehabilitation, improvements and extensions to hydraulic axes / canals	7660				
Connection of independent irrigation units	799				
Rehabilitation of irrigated areas	11364				
Slope stabilization along the Krankaye canal	2,187				
Slope stabilization including reforestation	2000				
Rehabilitation of the pumping station	3918				
SAED performance contract	1532				
Mauritania	**42174**	**650**	**0**	**0**	**42824**
Capacity building	375	650			
Institutional support for the implementation of PDRI	722				

Item	Total Cost IDA ($k)	Total Cost OMVS ($k)	Total Cost GEF ($k)		Total ($k)
			IW-Learn	LDCF	
Consolidating work on the Kaedi valve and stabilizing adjacent river banks at PPG1	2040				
Support to women's groups to process agricultural products	600				
Development of small fields/gardens	880				
Irrigation development and protection of flood agriculture	12178				
Study of flood and drainage systems and new irrigation development	210				
Rehabilitation, improvements and extensions to hydraulic axes / canals;	5913				
Pumping station construction	1100				
Main irrigation channel construction	1200				
Rehabilitation and development of irrigated areas	14647				
Electrical works: SP/PPG2	170				
Studies to support improved operation and maintenance processes	100				
SONADER performance contracts	2039				
Guinea	**13203**	**300**	**0**	**0**	**13503**
Capacity building for irrigation cooperatives		300			
Capacity building to support agroforestry and improved environmental practices	149				
Agroforestry	791				
Development of low lands	472				
Development of small fields/gardens	410				
Support to women's groups - protection of market garden sites	85				
Rehabilitation or development of irrigated areas	5495				
Design studies for lowlands and associated drainage basins	520				
Construction of wells to protect low land areas	246				
Slope stabilization	3408				
Works to support the development of the agricultural sector – access improvements, stockage of produce	984				
DNGR performance contract	643				
2.2 Sustainable fisheries development	**7775**	**2725**	**0**	**0**	**10500**
Institutional support	**1785**				
Local consultation	405				
Capacity building for local and national fisheries bodies	740				
Supporting local monitoring of sector	640				
Support to sustainable management of fisheries	**2505**				
Support to developing agreements and other instruments to support sustainable fisheries practices	690				
Studies and evaluation	260				

Item	Total Cost IDA ($k)	Total Cost OMVS ($k)	Total Cost GEF ($k)		Total ($k)
			IW-Learn	LDCF	
Supporting fisheries associations – training and equipment	1555				
Support to improve the value of fish catches	**3485**				
Construction / rehabilitation of halls. Markets and equipment/infrastructure for processing	800				
Construction / rehabilitation of landing points and storage / conservation	1135				
Studies and works supervision	320				
Capacity building of fisheries actors – training and equipment	1230				
Support to the development of aquaculture and supported activities		**2725**			
2.3 Increase the coverage of interventions to address water-related diseases	**33911**	**6089**	**0**	**0**	**40000**
Institutional capacity building (OMVS)	250				250
National health system strengthening	440				440
Procurement of Commodities – drugs and LLINs	19081	6089			25170
Community Executing (Implementing) agencies contracts	11950				11950
Monitoring and evaluation	1240				1240
Operational research and surveillance	950				950
2.4 Pilot climate adaptation measures	**0**	**0**		**7000**	**7000**
Pilot approaches to improve climate resilience				7000	7000
3: Regional Multi-purpose and Multi-sectoral Planning	***23600***	***0***	***2950***	***3070***	***29620***
3.1 Water resources management	**14600**		**0**		**14600**
Essential maintenance and planning works to strengthen the management of shared infrastructure at Diama dam	**10000**	**0**	**0**		**10000**
Renovation of electrical and electronic installations and systems for monitoring and control	1940				
Maintenance of the cathodic protection system – sacrificial anode replacement	1410				
Rehabilitation of the passive protection system of the dam, including cleaning, spot repairs and resurfacing for the structure and equipment upstream of the spillway gates, lock; and on upstream and downstream faces of the segment valves;	1950				
Rehabilitation of the water treatment system and potable water supply network, for the dam site, workers accommodation and adjacent villages	1600				
Electrical and mechanical rehabilitation of the upstream and downstream gantry cranes	1500				
Acquisition of spare parts, and equipment and materials for maintenance	600				

Item	Total Cost IDA ($k)	Total Cost OMVS ($k)	Total Cost GEF ($k)		Total ($k)
			IW-Learn	LDCF	
Diagnostic study and inspection of the dam and adjacent sites	500				
Supervision and control of works	500				
Advance the development of high priority multipurpose dams	**4600**	**0**	**0**		**4600**
Completion of feasibility studies for Balassa dam	1200				
Complementary supporting studies for access roads and transmission lines for Koukoutamba dam	1000				
Studies of micro hydro sites	2400				
3.2 Planning for Climate Resilience	**4000**		**2950**	**3070**	**10020**
Updating the water resources models of the river basin, capacity building			1150		1150
Updating the mapping of the basin	4000		1000		5000
Update of TDA (and SAP if required) and IW learning			800		800
Climate vulnerability assessments, capacity building in the use of tools				1865	1865
Hydrometric network upgrades				1205	1205
3.3 Development of Navigation	**5000**				**5000**
Studies on the renovation and modernization of the lock in Diama dam	337				
Environmental impact assessment for dredging access channel and rehabilitation of existing landing points	80				
Environmental impact assessment, design studies and tender document development for ports, jetties and channel dredging	4000				
Support to putting in place a monitoring system	583				
Contingencies	**17531**	**0**	**0**	**0**	**17531**
3% price contingency	6375				
10% physical contingency on community investments	9896				
15% physical contingency on Diama dam	1260				
Grand Total	**212500**	**12000**	**4000**	**12000**	**240500**

Annex 3: Implementation Arrangements

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2

Project Institutional and Implementation Arrangements

Project administration mechanisms

1. The project will be anchored at the regional level and implemented by OMVS, a regional organization which serves as a river basin authority for the Senegal River Basin. The Bank will enter into financing agreements with each of the four member countries and into a project agreement with OMVS. The proceeds of the IDA financing will be made available to OMVS under subsidiary agreements between each of the countries and OMVS.

2. The institution is grounded within an innovative, sound legal framework:
   (a) The Convention of 11 March 1972 proclaims the international status of the Senegal River through the territories of member countries with freedom of navigation and guarantee of equal treatment as concerns ports duties and taxes;
   (b) The Convention of 11 March 1972 on the establishment of OMVS;
   (c) The Convention of December 1978 on the legal status of the jointly-owned infrastructure;
   (d) The Convention of May 1982 on the financing modalities of the jointly-owned infrastructure;
   (e) The Water Charter of May 2002, an innovative instrument based on four pillars: (i) sustained and structured cooperation among member states to secure equity, solidarity, and equal treatment of all use sectors; (ii) joint and indivisible ownership of all infrastructures in the basin; (iii) equal access to the resources, and (iv) equitable allocation of costs and charges.

3. The key institutions are described below:
   (a) The Conference of Heads of State and Government (CHSG). This is the supreme body of OMVS with a two-year term and a rotating chairmanship. Steering, definition of the terms of cooperation, and all economic development decisions are vested in the Conference of Heads of States and Government.
   (b) The Council of Ministers (COM) is presided over in succession by each of the member states and elaborates general policy for the development of the Senegal River, the exploitation of its resources, and cooperation among states. Decisions must be taken unanimously. The COM defines the projects to be undertaken and their order of priority, and determines the contribution of each member state for financing the operations, research, and administration of the organization.
   (c) The High Commission of OMVS is the executive branch of the organization. It applies the decisions taken by the COM, and executes initiatives based on directives received and within the limits of its powers. The High Commission must also regularly report on implementation. The amendment of December 11, 1979 empowers the High Commission to regulate and monitor water-related development in the Basin on behalf of one or more of the riparian states.
   (d) The Permanent Water Commission (PWC) consists of representatives from the water-using sectors across the Basin. The Water Charter principles of May 2002 extended the

membership from only government agencies to include other stakeholders in the Basin (e.g. farmers, fishermen associations, NGOs) and national cellule coordinators (see below), in the overall decision-making process. The PWC's task is to determine the basis and means for water allocation from the Senegal River among sectors, using sound modeling and information on the water availability in the storage facilities, rainfall forecasting, and other related data. The PWC meets three times a year: (i) at the beginning of the dry season (January-February) to assess the overall water needs; (ii) at the beginning of the rainy season (May-June) to assess the quantity of water to be stored; and (iii) at the end of the rainy season (October-November) to assess the available water storage. It is a consultative body which advises and reports directly to the COM.

(e) The Diama Dam Holding Company (SOGED) and Manantali Dam Holding Company (SOGEM) have overall responsibility for managing the dam assets which are jointly-owned by the member countries. This arrangement represents a unique case of cooperation in Africa.

(f) The Senegal River Navigation and Transport Holding Company (SOGENAV), formed in 2011, has overall responsibility to manage and administer navigation and river transport on the Senegal River, as well as the maintenance and development of related worksites.

(g) OMVS National Coordinating Cellules (CNC): At the national level, the OMVS constituency is based on the national cellules. These are directly linked to the Committee of Experts of member-states, established by the Council of Ministers (COM) to advise the Council. The CNCs bring together representatives of Ministries involved in or affected by water management in the Senegal River and also representatives of civil society organizations. Each CNC has a Secretariat with permanent staff and logistical equipment provided by OMVS. Each national cellule assists in the implementation of OMVS projects and the national cellule coordinator is a permanent member of the advisory body of OMVS. Furthermore, the national cellule coordinators are also key members of the PWC. The objectives of the national cellule are closely tied to the OMVS program although they can vary slightly from one country to another. The national cellules will also provide key input to the review process of activities undertaken at the regional level to ensure that national interests are being adequately taken into consideration.

(h) Local Coordination Committees are also established at each of the 28 administrative districts in the basin.

(i) A Regional Steering Committee, established by the OMVS Council of Ministers, will maintain oversight of all initiatives supported by the MWRD program. The RSC meets twice a year and will give overall guidance to OMVS and its national cellules and formerly review and approve activities to be implemented under MWRD2.

4. OMVS and its national cellules will ensure the overall coordination and supervision of the Project on behalf of the four riparian countries. The Project Coordination Unit (PCU) established under MWRD1 will continue to support project implementation of MWRD2. The PCU, working with the High Commission, will also be responsible for convening executing agencies and other implementing partners for the purpose of consensus building, planning, evaluation and exchange

of ideas and lessons learned. This team will be strengthened with additional expertise including experts in agroforestry, water resources management and civil engineering.

5. OMVS will continue to have full autonomy and responsibility to review the quality of procurement processes for all contracts irrespective of the amount. OMVS will continue to coordinate with participating executing agencies and will be responsible for monitoring and evaluating the procurement activities and for all financial management and disbursement aspects.

6. In the past, the Project Coordination Unit for MWRD1 was not responsible for implementation of the Trust-funded (i.e. GEF and Dutch) projects. During MWRD2, the same PCU will be responsible for the implementation of the IDA and Trust-funded projects. The PCU will have an overall Project Coordinator and an Assistant Coordinator. The Project Coordinator will be specifically responsible for the IDA project while the Assistant Coordinator will be responsible for the GEF and Dutch Trust Fund projects. National cellules will assist in monitoring, coordination, and supervision of activities implemented at a national and local levels. In addition to staffing provided under MWRD1, a technical focal point will be appointed at each National cellule to ensure better monitoring and supervision of the work.

7. Hydro agricultural, agroforestry and water resources protection activities within the project will be implemented through performance-based contracts between OMVS and the executing agencies identified under MWRD1. The executing agencies selected are legally responsible for agricultural activities in the member states including the complementary actions (cropping techniques, land and market access, etc.) needed to ensure the efficacy and sustainability of the MWRD2 interventions. In addition, they have been heavily supported to improve their capacity during MWRD1 so it makes sense to continue working with them. The executing agencies are:

(i) *Société d'Aménagement des Terres du Delta* (SAED), Senegal
(ii) *Direction Nationale du Génie Rural* (DNGR), Guinea
(iii) *Société Nationale de Développement Rural* (SONADER), Mauritania
(iv) *L'Agence de Developpement Rural de la Vallée du fleuve Sénégal* (ADRS), Mali

8. The performance contracts for these executing agencies will be strengthened in MWRD2. Remuneration will no longer be based only on disbursement but will be expanded to include 2 additional criteria as follows:

(a) environmental and social safeguards compliance monitoring
(b) maintenance of key personnel

9. Fisheries activities will be implemented by the PCU in collaboration with the national ministries and supported by local fishing councils.

10. The health component will be implemented by the PCU in collaboration with the national authorities and with assistance from Community Implementing Agencies (CIAs). CIAs will ensure the distribution and use of drugs and LLINs. Support will be in accordance with the regional norms and standards defined by the Ministries of Health (MoHs) and in strong coordination with the MoHs intermediate level agents (such as District Inspectors, Regional Inspectors). CIAs will engage local NGOs to support community mobilization. National steering committees will be reactivated or established to provide support and guidance to CIAs and

NGOs. Sub-national coordinating committees will be established if required. These committees will draw on existing structures where possible, such as national coordination committees for malaria, health authorities and implementing partners. The PCU will coordinate with the national NTD programs and the WHO to ensure the supply of donated drugs for NTDs and with PNLP to facilitate large-scale distribution campaigns within and across countries. Albendazole for Lymphatic Filariasis (LF), Albendazole and/or Mebendazole for Soil Transmitted Helminthes (STH) are donated through the WHO and managed through the country and regional WHO offices. Ivermectin (for LF and oncho) and azithromycin (for Trachoma) will be requested by member states directly from the Mectizan Donation Program (MDP) and International Trachoma Initiative (ITI) respectively. CIAs will ensure the distribution (from warehouse to beneficiaries) of both NTD drugs and LLINs. In addition, CIA will actively promote and support the use LLINs by households.

11. The organizational chart for the coordination of the project at the regional level at the High Commission of OMVS is shown in Figure 3.1 and the overall implementation arrangements are shown in Figure 3.2 below.

12. The recruitment of the full PCU incorporating the skills given in Figure 3.1 is an effectiveness condition.

Figure 3.1: Organizational Chart for Regional Project Coordination

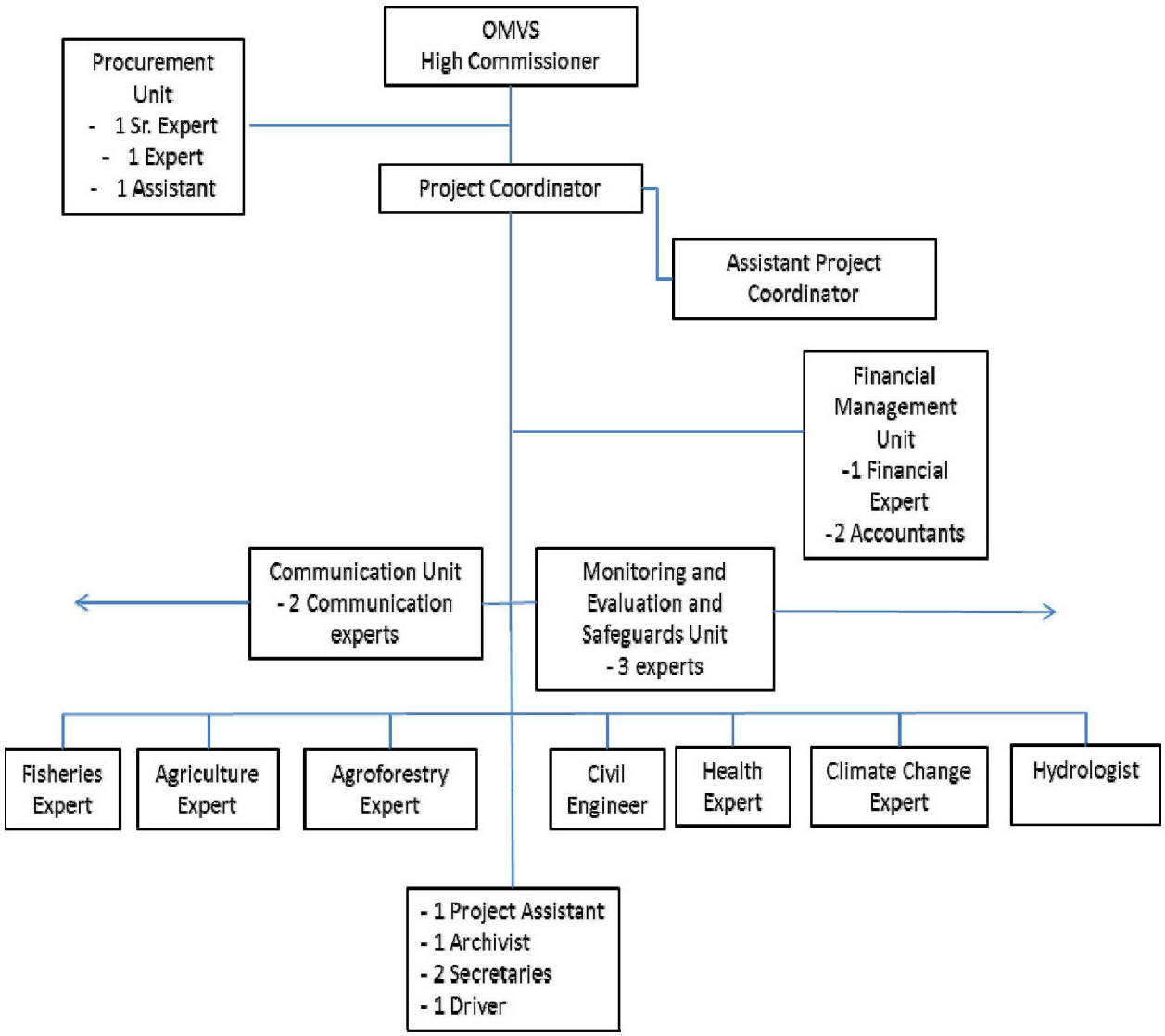
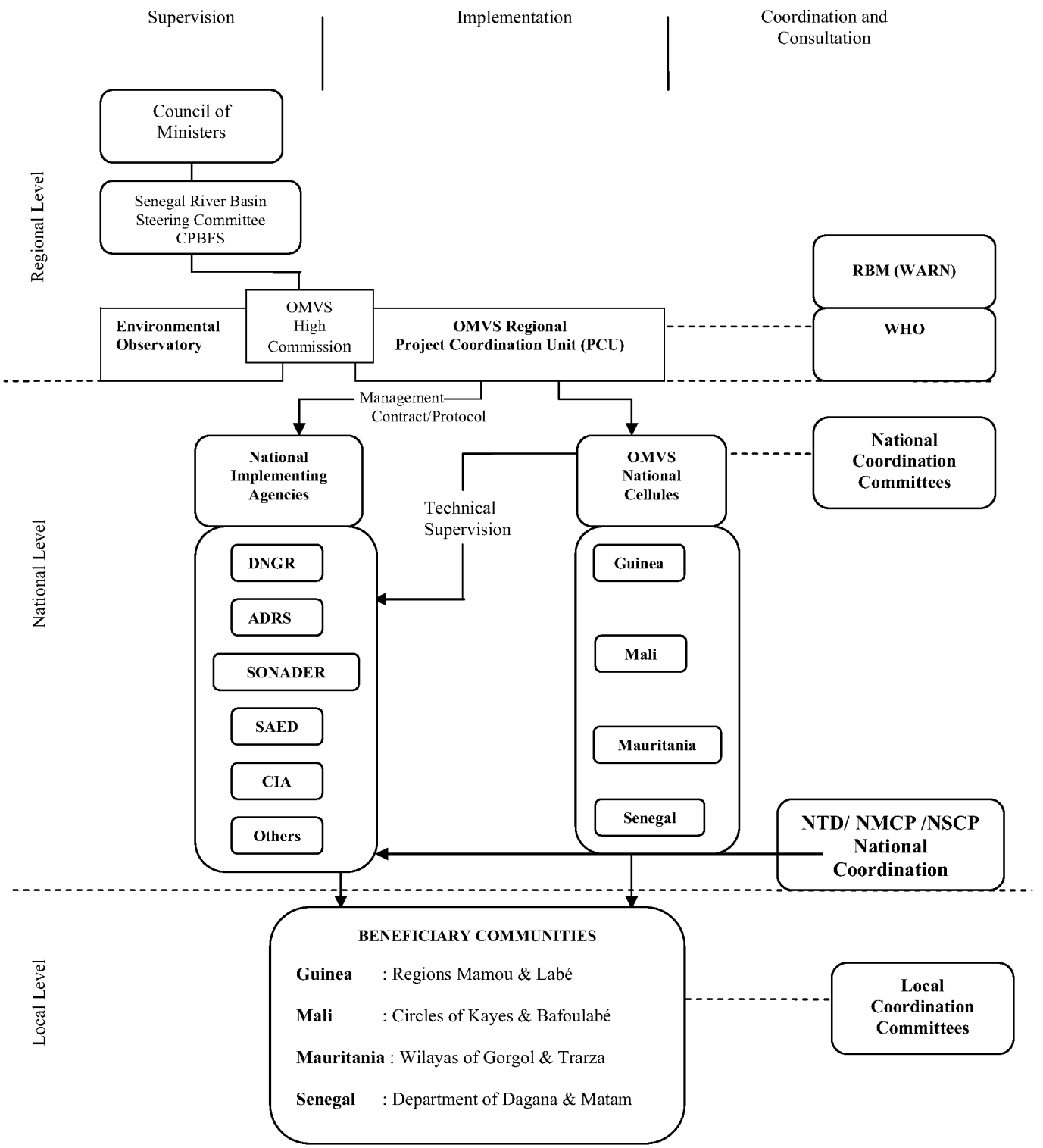


Figure 3.2: Implementation Arrangements for MWRD2



Financial Management, Disbursements and Procurement

Financial Management

13. **Budgeting:** Each Implementing Agency (IA) and national cellule will prepare an annual budget based on agreed annual work program and annual procurement plan and will submit it to the PCU. Before the beginning of the year, the PCU will prepare a consolidated annual budget and will submit it to the Steering Committee for approval and World Bank for IDA no objection. The budget will be prepared and monitored through the accounting software at the regional and national level. The project's budget at the national level will be incorporated in the Global Project budget.

14. **Accounting:** With the exception of the national cellule of Senegal and PCU, the Implementing Agencies and others national cellule are well staffed. The accountant in the national cellule of Senegal and the financial officer of the PCU will recruited in a competitive basis. The current Accounting Standards in use from MWRD1 will be applicable. The project's accounts will follow the accounting policies of the SYSCOA (West African Accounting Standards/Plan). Project accounts will be maintained on an accrual basis, supported with appropriate records and procedures to track commitments and to safeguard assets. The PCU, the Implementing Agencies and the national cellule of OMVS in Mauritania and Senegal will use the existing accounting information system to post all the transaction, and produce financial reports. This software will be adapted to accommodate MWRD2 and the new GEF project. In Guinea the multi projects accounting software used by DNGR will be customized to handle MWRD2. ADRS in Mali and the national cellule in Mali and Guinea which are currently use the mono site version of the software will need to upgrade to a multi-project version. The manual of procedures (i.e. administrative manual covering the fiduciary aspects) used during MWRD1 has been updated for MWRD2 and distributed to all national cellules. The completion of this manual of procedures was a negotiations condition.

15. **Internal Control:** The financial management section of the manual of procedures applicable for the existing PCU provides a clear description of the approval and authorization processes in respect of the rule of segregation of duties and remains adequate for the management of MWRD2. However the said manual has been updated and harmonized to take into account the proposed coordination activities, reporting and auditing arrangements especially at the level of executing agencies and shared with all involves entities. The Bank will pay attention to the adequacy of internal control during its supervision missions. OMVS internal audit unit will carry out ex-posts review of the project transaction at each of the executing agencies and the national cellules.

16. **Reporting:** The PCU and the executing agencies will prepare separately quarterly un-audited Interim Financial Reports (IFRs) for the Project in form and content satisfactory to the Bank, which will be submitted to the Bank within 45 days after the end of the quarter to which they relate. The IFR prepared by the PCU will contain information from IDA and GEF funds. The PCU and the executing agencies have agreed with the Bank on the format of the IFRs during

negotiations. The PCU and the executing agencies will also prepare the Project Financial Statements (PFS) in compliance with International Accounting Standards (IAS) and World Bank requirements. The Project Financial Statements will be composed of:

(a) A statement of sources and uses of funds;
(b) A statement of commitments;
(c) The accounting policies adopted with appropriates notes and disclosures;
(d) A management assertion that Project funds have been expended for the intended purposes as specified in the relevant credit agreement.

17. In order to receive funds from OMVS's pooled accounts (PAs), the national cellules will prepare quarterly reports, which will be submitted to the PCU within 15 days after the end of the quarter to which they relate. The format will also be discussed during the Project negotiations.

18. **External Auditing:** The Financial Agreements will require the submission of Audited Financial Statements for the Project to IDA within six months after the end of each fiscal year end. The audit report should reflect all the activities of the project (at regional and national levels) for IDA and GEF financing and national contributions. External auditors with qualifications and experience satisfactory to the World Bank will be appointed to conduct an annual audit of the PFS for the PCU, the executing agencies and the national cellules. Appropriate terms of reference (TOR) for the external auditors for each country will be provided to the project team and discussed during negotiations. A single opinion on the Audited PFS at the national and regional level in compliance with International Standards on Auditing (ISA) will be required. The external auditors will prepare a Management Letter giving observations and comments, providing recommendations for improvements in accounting records, systems, controls and compliance with financial covenants in the Financial Agreements

Table 3.1: External auditing responsibilities

N°	Audit Report	Entity	Country	Due Date
1	Project's financial statements	OMVS	Senegal	June 30
	Project's financial statements	SAED	Senegal	June 30
	Project's financial statements	NC	Senegal	June 30
2	Project's financial statements	ADRS	Mali	June 30
	Project's financial statements	NC	Mali	June 30
3	Project's financial statements	SONADER	Mauritania	June 30
	Project's financial statements	NC	Mauritania	June 30
4	Project's financial statements	DNGR	Guinea	June 30
	Project's financial statements	NC	Guinea	June 30

Disbursement Arrangements

19. Disbursements will be made in accordance with procedures outlined in the Disbursement Handbook for World Bank Clients. The funds will be disbursed over a seven year period or less depending on the implementation speed. On project closure, a period of four (4) months (grace

period) after the closing date, as agreed with the Bank, will be allowed to complete processing of disbursement for eligible expenditures incurred prior to the closing date of the financing agreements.

Disbursement Methods

20. **Regional Level:** Disbursements will be managed by the PCU at the OMVS High Commission in Dakar, Senegal on behalf of the four recipient countries. Separate Financing Agreements will be signed between IDA and the respective countries: Guinea, Mali Mauritania and Senegal. Governments will retrocede the funds to the OMVS, High Commission, who will be responsible for the financial management of the overall Project. The Project is expected to use the report-based disbursement method for IDA-related disbursements. All replenishments or reimbursement applications will be report based, with a summary record for contract above the prior review threshold as documented by the procurement assessment. Documentation will be retained at the PCU for review by Bank staff and external auditors. The Disbursement Letter, which will form an integral part of each Financing Agreement, will provide details of the disbursement methods, required documentation, and minimum application size. These were discussed and agreed during Project negotiations.

21. **National Level:** The **Executing agencies** are also expected to use the report-based disbursement method for IDA and GEF related disbursements. All replenishments or reimbursement applications will be report based, with a summary record for contract above the prior review threshold as determined by the procurement assessment. Documentation will be retained by the respective executing agencies for review by Bank staff and external auditors. The Disbursement Letter, which will form an integral part of each of the Financing Agreements, will provide details of the disbursement methods, required documentation, and minimum application size. These will also be discussed and agreed during negotiations. However, disbursements from the PCU to the national cellules will be made according to presentation of quarterly financial reports. Documentation will be retained at the respective national cellules for review by Bank staffs and external auditors. As previously stated, the Disbursement Letter will provide details of the disbursement methods, required documentation, and sub-account ceiling. These were discussed and agreed during Project negotiations.

22. **Allocation of Grant/Credit proceeds:**

23. The table below sets out the expenditure categories to be financed out of the credit proceeds for the respective countries. The allocations for each disbursement category are the following:

(a) Guinea

	Categories	**Credit Allocated in ,000 US$**	**% of expenditures to be financed**
(1)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component 1.1(a) and (b), 1.2 and 1.4(a) of the Project	**2,071**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;

(2)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Component 2.1 of the Project	**8,825**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(3)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Components 2.2, 2.3, 3.1 and 3.3 of the Project	**13,203**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(4)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Part 3.2(b) of the Project	**1,000**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(5)	Unallocated	**3,401**	
Total		**28,500**	

(b) Mali:

	Categories	**Credit Allocated in ,000 US$**	**% of expenditures to be financed**
(1)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component 1.1(a) and (b), 1.2 and 1.4(a) of the Project	**3,960**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(2)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Component 2.1 of the Project	**16,702**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(3)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Components 2.2, 2.3, 3.1 and 3.3 of the Project	**27,495**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(4)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Part 3.2(b) of the Project	**1,000**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(5)	Unallocated	**5,343**	
Total		**54,500**	

(c) Mauritania:

	Categories	**Credit Allocated in ,000 US$**	**% of expenditures to be financed**
(1)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component 1.1(a) and (b), 1.2 and 1.4(a) of the Project	**4,866**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(2)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Component 2.1 of the Project	**17,827**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(3)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Components 2.2, 2.3, 3.1 and 3.3 of the	**42,174**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;

	Project		
(4)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Part 3.2(b) of the Project	**1,000**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(5)	Unallocated	**5,133**	
Total		**71,000**	

(d) Senegal:

	Categories	**Credit allocated in ,000 US$**	**% of expenditures to be financed**
(1)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component 1.1(a) and (b), 1.2 and 1.4(a) of the Project	**4,251**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(2)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Component 2.1 of the Project	**17,932**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(3)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Components 2.2, 2.3, 3.1 and 3.3 of the Project	**31,660**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(4)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Part 3.2(b) of the Project	**1,000**	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(5)	Unallocated	**3,657**	
Total		**58,500**	

(e) GEF/LDCF

	Categories	**GEF Grant Allocated in ,000 US$**	**LDCF Grant Allocated in ,000 US$**	**% of expenditures to be financed**
(1)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component 1.1(c) of the Project	840,000	0	100% of foreign expenditures and 100% of local expenditures inclusive of taxes;
(2)	Goods, works, non-consulting services, consultants' services, Training and Operating Costs for Components 1.3 and 1.4 of the Project	0	8,400,000	100% of foreign expenditures and 100% of local expenditures all taxes excluded;
(3)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component 1.4(b) of the Project	210,000	530,000	28% GEF Grant 72% LDCF Grant
(4)	Goods, non-consulting services, consultants' services, Training and Operating Costs for	1,000,000	0	20%

	Component 2.2(b) of the Project			
(5)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component C.2(a) and C.2(c) of the Project	1,950,000	0	100%
(6)	Goods, non-consulting services, consultants' services, Training and Operating Costs for Component C.2(d) of the Project	0	3,070,000	100%
Total		**4,000,000**	**12,000,000**	

Banking Arrangements

24. **Regional Level:** Two separate designated pooled accounts (PAs) in EURO (one for IDA financing and one for GEF grant) will be opened in a commercial bank in Dakar on terms and conditions acceptable to the Bank. Those PAs will be managed by the PCU. The PAs will be used to finance activities of the OMVS national cellules and suppliers as indicated in the specific terms and conditions of the Financing Agreements. Each regional PAs will also have four sub-accounts at the national level (one for each participant country).

25. **National Level:** OMVS will open for each executing agency a separate designated account DA - in FCFA for Mali and Senegal and in Euro for Guinea and Mauritania – in a commercial bank on terms and conditions acceptable to the Bank. OMVS will open in each participant country two sub accounts (one for IDA financing and one for GEF grant) as mentioned above in commercial banks on conditions acceptable to the bank. Those sub-accounts will be denominated respectively in the national currency of each participant country.

26. **Counterpart Funding:** The member states of OMVS will provide co-financing towards achieveing the Project development objective. They will make all arrangements necessary to ensure timely mobilization and payment of the counterpart funds. Counterpart funds will be pooled in a separate account at the OMVS High Commission. This account will be opened in a commercial bank on terms and conditions acceptable to the Bank. Funds will be utilized to finance identified discrete activities. These contributions will also be subject to scope of auditor's reviews. The national contributions will be made to OMVS High Commission bi-annually according the table 3.2 below:

Table 3.2: Estimated Counterpart Disbursement (US$)

	FY	2015	2016	2017	2018
Annual Contribution (US$)	**Country**				
	Guinea	546,000	546,000	546,000	546,000
	Mali	818,000	818,000	818,000	818,000
	Mauritania	818,000	818,000	818,000	818,000
	Senegal	818,000	818,000	818,000	818,000
Cumulative Amounts		3,000,000	6,000,000	9,000,000	12,000,000

27. Dated Covenants will be set for the annual payments of counterpart funding. These will require a fixed percentage of the counterpart funding to be paid by a given date each year.

28. **Retroactive financing:** The IDA credits will provide for retroactive financing not exceeding US$1.1 million, to finance expenditures, which were incurred after June 1, 2013.

Flow of Funds Arrangements

29. **Regional Level:** The PCU will submit a withdrawal application to the Bank with six month cash flow projection based on agreed project work plans and budgets. The Bank will process the withdrawal application and deposit funds into the PAs. The project will pay all the suppliers through the PAs.

30. **National Level:** The Executing agencies will submit withdrawal applications to the Bank with six month cash flow projection based on agreed project work plans and budgets included in the respective performance-based contracts. The Bank will process the withdrawal application and deposit funds into the DAs. The authorized allocation of the two sub-advance accounts to the national cellules will be determined according a cash flow. Each national cellule will prepare and submit to the PCU a four months cash flow projection for IDA and GEF based on agreed national project work plans and budgets of expenditures.

31. The financial management action plan in Table 3.3 has been agreed. Figure 3.3 shows the flow of funds.

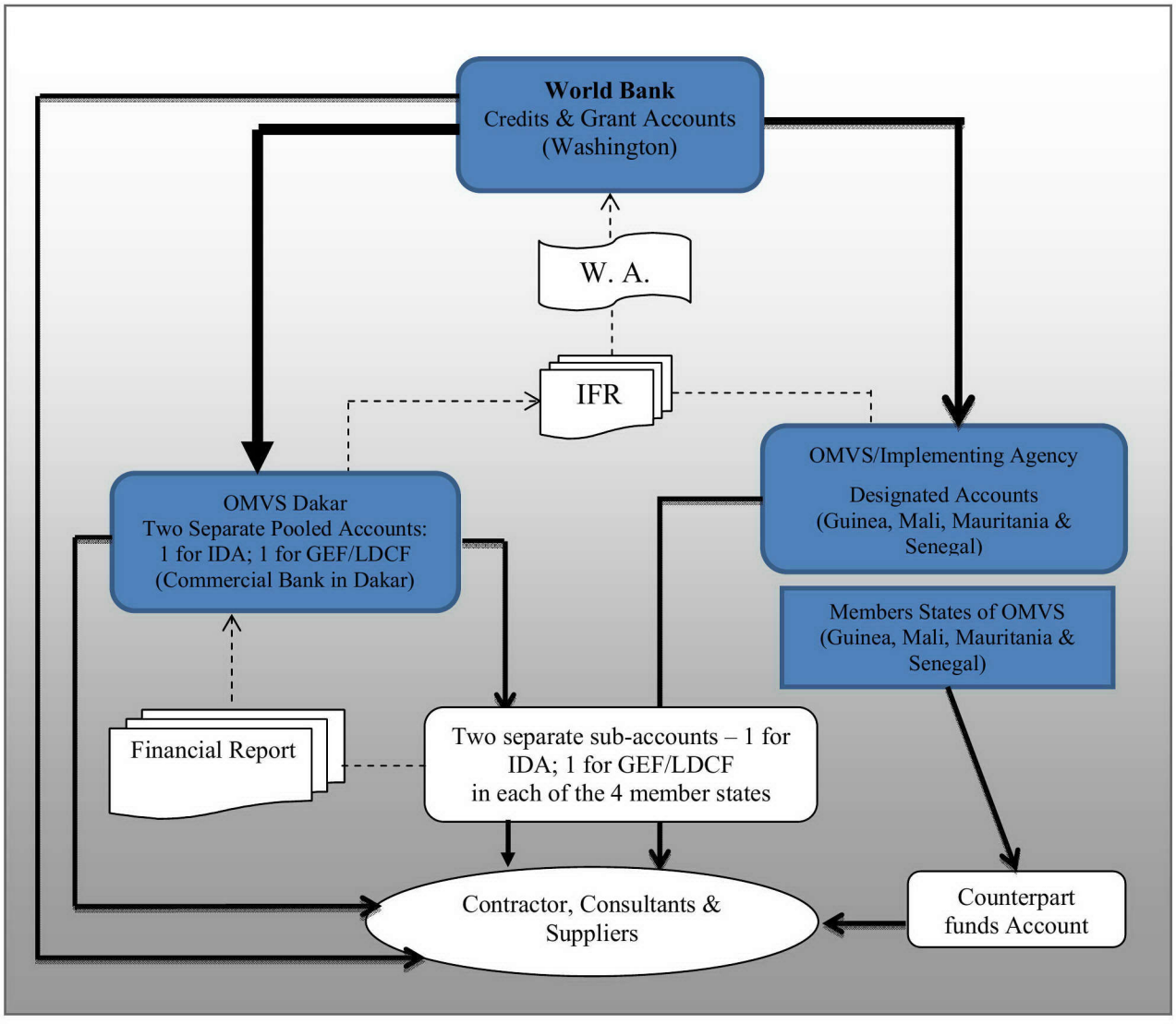
Table 3.3: Financial Management Action Plan

N°	Action	Due Date	Responsible Entity
1.	Draft the ToRs for financial audits of the Project	Complete	PCU
2.	Complete recruitment of PCU, including the Financial Officer Recruit the accountant in the National Cellule of Senegal	Effectiveness	OMVS
3.	Recruit an external auditor for each country Update and harmonize the Administrative and Accounting Procedures and share with the four OMVS/NC and IAs Upgrade the accounting software at OMVS national cellules	No later than 4 months after effectiveness	PCU OMVS PCU

Conclusion of the Assessment

32. The conclusion of the assessment is that the existing financial management arrangements put in place under MWRD1 meet the World Bank's minimum requirements under OP/BP10.00, and therefore are adequate to provide, with reasonable assurance, accurate and timely information on the status of MWRD2 required by the World Bank. However taking into account lessons learned, additional measures are proposed that would be implemented to reinforce the efficiency of MWRD2 implementation. The overall Financial Management residual risk rating of the Project is **moderate.**

Figure 3.3: Flow of Funds and Information



Procurement

General

33. Procurement for the proposed Project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", dated January 2011; and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", dated January 2011, and the provisions stipulated in the Financing Agreements. The general descriptions of various items under different expenditure categories are described below. For each contract to be financed by the Project, the procurement method or consultant selection method, the need for prequalification, the estimated cost, the prior review requirements, and the time frame are agreed between the counterparts and the Bank project team in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

National Procurement System and Procurement Reforms

34. **Guinea:** A Country Procurement Assessment Review (CPAR), carried out in Guinea in February 2002 flagged the main issues such as the lack of capacity, the absence of standard bidding documents at the national level, the insufficient capacity of local contractors for contracts subject to ICB, and corruption. Recommendations were made to address these issues. The Bank, through an Institutional Development Fund (TF 55853) signed in November 2005, provided support to the public procurement reform. The main objectives were to : i) enhance transparency of the procurement system, ii) put in place the new institutional framework (Public Procurement Directorate controlling procurement transactions, Public Procurement Regulatory Body including an appeal committee for complaints, iii) update the procurement code, iv) design standard bidding documents. In March 2009, the legal framework has been revisited and the procurement law and the new procurement code has been adopted and approved respectively on October 11, 2012 for the law and December 03, 2012 for the code. However, the national procurement system will continue to be governed by the Act L/97/016/AN passed on June 03, 1997 for six months after the official publication of the new legislative texts.

35. **Mali:** Mali adopted a new Public Procurement Code in August 2008, as part of the action plan of the update of the Country Procurement Assessment Report (CPAR) for Mali carried out in FY04. The Bank has assessed the country procurement regulations and found the principles and most of the procedures in compliance with Bank standards for procurement. Nevertheless, further strengthening of public procurement continues. The focus has progressively shifted from reforming the legal and regulatory framework to focusing on strengthening the procurement capacity and the transparency of the procurement system. The legal framework is in line with the WAEMU's guidelines. The reform has led to the (i) adoption of a Procurement Code in line with the WAEMU Guidelines; (ii) the setting up of an Independent Regulatory Body (ARMDS) responsible for policy formulation and handling complaints, and a Procurement Control Department (DGMPDS) responsible for controls at central and decentralized levels of procurements transactions; (iii) the design of a capacity building program towards the public sector, the private sector and the civil society; and (iv) the issuance of procurement audits. Procurement units have been established in some regions and ministries. Legislation was revised in 2011 to clarify some provisions that could create conflicts of competence between the two

institutions. However, despite obvious efforts to improve the procurement system, challenges remain as revealed by the assessment of the national procurement system completed in September 2011, with the support of European Union. The evaluation of the quality of national procurement system was done based on the OECD DAC "Methodology of national procurement systems assessment". The recommended actions include: (i) strengthening of the legislative and regulatory framework; (ii) strengthening of the institutional and management capacity; and (iii) reinforcing the integrity and transparency of procurement.

36. **Mauritania:** The procurement environment in Mauritania has recently been improved (i) with a Public Procurement Code in July 2010, effective in February 2012 and (ii) with the establishment of (1) an independent procurement regulatory body ("Autorité de Régulation des Marchés Publics - ARMP") responsible for policy and handling complaints, (2) a procurement control body ("Commission Nationale de Contrôle des Marchés Publics - CNCMP") responsible for the control of procurement transactions, and (3) seven Procurement Committees for specific Sectors (Commission de Passation des Marchés par Secteur). These bodies are operational and in addition, the control body has been decentralized at regional level inside the country. The project will benefit from the existence of these bodies which are expected to improve the procurement function in the country.

37. Mauritania's procurement laws and regulations do not conflict with IDA guidelines since IDA procedures take precedence over those laws and regulations.

38. **Senegal:** The Government substantially improved the country's public procurement system to comply with the West African Economic and Monetary Union (WAEMU) Procurement Guidelines and international standards including: (i) the setting up of an Independent Regulatory Body (ARMP) responsible for policy and handling complaints from bidders, and a Procurement Control Department responsible for controls of procurements transactions, which are both fully operational and appropriately dealing with their respective missions (controls within the contracting authorities are effective through their respective Procurement Commission and Procurement Units; and (ii) an electronic system - International Conference on Signal Processing and Multimedia Applications (SIGMAP) for collecting, disseminating, managing procurement information and monitoring procurement statistics and procurement complaints. The Government has enforced a set of necessary documentation which includes national standard bidding documents prepared on the basis of the Bank's standard bidding documents (SBDs). It has also enforced different measures which have contributed to the private sector's trust in the system, and which show a clear commitment from the Government to modernize and ensure the transparency of procurement transactions. In general, Senegal's procurement laws and regulations do not conflict with IDA's Guidelines on procurement. No special exceptions, permits, or licenses need to be specified in Financing Agreements since IDA procedures take precedence over these laws and regulations.

39. **Procurement Documents:** Procurement will be carried out using the Bank's Standard Bidding Documents or standard Request for Proposal (RFP) respectively for all ICB, for goods and selection of consultants. For National Competition Bidding (NCB), the borrowers should ensure that the following special requirements are taken into account : (i) four weeks will be provided for preparation and submission of bids, after the issuance of the Invitation for Bids or

availability of the bidding documents, whichever is later; (ii) for all procurement of goods and works, the SBD published by the Bank for ICB will be used and modified in order to adapt it to the current situation; (iii) bids will be advertised in national newspapers with wide circulation; (iv) bids will be presented and submitted only in one internal envelope (no system with two envelopes will be used); (v) bid evaluation, bidder qualifications criteria, and the contract award criteria will be clearly specified in the bidding documents; (vi) no preference margin will be granted to domestic bidders; (vii) eligible firms, including foreign firms, will not be excluded from the competition; (viii) the procedures will include the publication of the results of evaluation and of the award of the contract, and provisions for bidders to protest; (ix) procurement audit will be included in the terms of reference of financial audits of the project; and (x) if the procurement Code does not apply to small contracts, the procedures will require that for such contracts, a competitive method be used (reference for example to the shopping method). In addition, any other adjustment will be taken into account when the Bank determines during the project execution as necessary in order to assure economy, efficiency, transparency, and broad consistency with the provision included in the Section I of the Procurement Guidelines.

40. National Competitive Bidding (NCB) procedures may be used for work contracts with a cost estimate less than US$5,000,000 and for goods contracts less than US$500,000.

41. Furthermore, in accordance with para.1.16 (e) of the Procurement Guidelines, each bidding document and contract financed out of the proceeds of the IDA Financing shall provide that: (i) the bidders, suppliers, contractors and subcontractors shall permit IDA, at its request, to inspect their accounts and records relating to the bid submission and performance of the contract, and to have said accounts and records audited by auditors appointed by IDA; and (ii) the deliberate and material violation by the bidder, supplier, contractor or subcontractor of such provision may amount to an obstructive practice as defined in paragraph 1.16(a)(v) of the Procurement Guidelines.

42. IDA may recognize, at the request of the borrowers, any exclusion from participation as a result of debarment under the national system, provided that the debarment is for offenses involving fraud, corruption or similar misconduct, and further provided that IDA confirms that the particular debarment procedure afforded due process and that the debarment decision is final

Assessment of the agency's capacity to implement procurement

43. Procurement activities will be conducted by the PCU at the OMVS High Commission and the executing agencies. An assessment of the capacity of OMVS and the executing agencies to implement procurement actions for the project was carried out in February, 2013. The assessment reviewed the organizational structure for project implementation and the interaction between the project staff responsible for procurement and the technical staff and other stakeholders in the project implementation.

44. **At the Regional Level**, the High Commission of OMVS is still operating with a Procurement Unit staffed with two procurement specialists and one procurement assistant. All, of whom are well versed in the IDA procedures. The OMVS procurement team has both the

technical expertise and the experience necessary to carry out the procurement activities and has a good record in working in close coordination with the executing agencies. In addition, the supervision missions of MWRD1 revealed that procurement has been generally satisfactory. Due to this higher level of capacity, compared to national agencies, and to facilitate management of the project, all procurement no objection requests will be centralized at the PCU at OMVS High Commission. The High Commission of OMVS will carry out close monitoring of the implementation of the procurement plan on a monthly basis and closely monitor and exercise the overall quality control on all aspects of the procurement process, including bid evaluation, selection and contract award.

45. **At National Level**, executing agencies – ADRS, DNGR and SAED - , Procurement Units responsible for quality control of bidding documents and Procurement Commissions responsible for bid opening, bid evaluations and contract awards, have been established and are fully operational with qualified staff. However in SONADER, although the Procurement Commission of the Rural Development Sector is currently entrusted the responsibility for bid evaluation and contract awards, there is neither a procurement unit nor a procurement specialist. During Appraisal it was agreed that SONADER will recruit a qualified procurement specialist before Project effectiveness in addition to the re-establishment of the Procurement Commission that has been lifted at the last "Contrat Programme".

46. **Issues, risks** and related mitigation measures have been identified and are included in the ORAF in Annex 4.

47. Most of the issues/risks concerning procurement in project implementation have been identified and include: i) Possible delays in taking procurement actions like preparation of Bidding Documents, Request For Proposals, Bid Evaluation Reports, etc. due to the workload of the Procurement Units in SAED, ADRS and DNGR, ii) Absence of a procurement specialist and procurement unit at SONADER, iii) Inadequate contracts administration/management may create delays in services delivery and possible unjustified contract amendments, iv) Lack of coordination in the flow of information relating to procurement between the Bank and Executing Agencies.

48. The agreed mitigation measures include: i) OMVS High Commission will monitor closely the implementation of the procurement plan, on a monthly basis and will exercise quality control on all aspects of the procurement process, including evaluation, and contract awards, ii) a qualified procurement specialist be recruited in SONADER, iii) the executing agencies will monitor closely contracts execution so as to avoid any unjustified contract amendment, iv) all procurement no objection requests will be centralized at the OMVS High Commission.

49. The overall project risk for procurement is currently assessed as substantial.

Procurement Plan

50. OMVS has developed a Procurement Plan for project implementation, which provides the basis for the procurement methods. This plan has been agreed between OMVS and the Bank

prior to negotiations. The approved plan will be available on UNDB online, at the respective offices of OMVS and executing agencies.

51. It will also be available in the Project's database and on the Bank's external website. The Procurement Plan will be updated in agreement with the Bank Team at least annually or as required to reflect actual project implementation needs and improvements in institutional capacity.

Procurement of Goods, Works, and Non-Consulting Services

52. Procurement subject to prior-review by IDA, as considered in Appendix 1 of the Procurement Guidelines.

	Procurement methods	**Threshold for Prior-review (US$)**	**Comments**
1.	ICB and LIB(Goods)	= or > US$500,000	ICB and LIB can be used for all contracts for goods equal or more than US$500,000
2.	NCB (Goods)	On a case by case basis. And the first contract of each executing agency irrespective of the cost estimate.	NCB can be used for goods less than US$500,000
3.	ICB (Works)	= or >US$ 5,000,000	ICB can be used for all contracts for works equal or more than US$5,000,000
4.	NCB (Works)	On a case by case basis and the first contract of each executing agency irrespective of the cost estimate	NCB can be used for works less than US$5,000,000
5.	ICB (Non consulting services), if any	= or >US$500,000	ICB and LIB can be used for all non-consulting contracts equal or more than US$500,000
6.	NCB (Non consulting services), if any	On a case by case basis and the first contract of each executing agency irrespective of the cost estimate	NCB can be used for non-consulting contracts less than US$500,000
7.	Shopping (goods) Shopping (works) Shopping (Non consulting services)	Normally, such contracts are not subject to prior review	Shopping can be used for contract with estimated value below or equal to US$100,000
8.	Direct Contracting	All contracts are subject to IDA prior-review	

53. List of contracts, including associated procurement method and key milestones for goods and works:

Goods and Non-consulting Services:

Ref No.	Contract (Description)	Estimated cost US$	Procurement Method	Pre-qualification (Y/N)	Domestic Preference (Y/N)	Review by Bank (Prior/ Post)	Expected Bid-Opening Date
	OMVS						
HC-F1	Purchase of 3000000 long lasting insecticide treated mosquito nets (lot 1)	17 365 000	ICB	No	No	Prior	3/25/2014
HC-F2	Purchase of six (6) vehicles for project monitoring	375 000	NCB	No	No	Prior	3/20/2014
HC-F3	Actualization of the basin map at scale of 1/200000 and 1/50000 in part of the OMVS current acquisitions	6 000 000	ICB	Non	Non	Prior	20/03/2014
HC-F4	Supply of spare parts, and maintenance equipment for the Diama dam, and works and annex installations	600 000	ICB	Non	Non	Prior	10/04/2014
HC-F5	Purchase of office supplies and equipment, and technical equipment for the national fishing and psiciculture directorates of Guinea	40 000	Shopping	Non	Non	Post	15/03/2014
HC-F6	Purchase of office Supplies and equipment, and technical equipment for the Mali national fishing directorate	100 000	NCB	Non	Non	Post	15/03/12014
HC-F7	Purchase of office supplies and equipment, and technical equipment for the Direction de la Pêche artisanale et côtière of Mauritania	100 000	NCB	Non	Non	Post	15/03/12014
HC-F8	Purchase of office supplies and equipment, and technical equipment for the Direction de la Pêche continentale of Senegal	100 000	NCB	Non	Non	Post	15/03/12014
	Mauritania						
RIM-F1	Supply and installation of a transformer for the electrical connection of the PPG2 pumping station	170,000	NCB	No	No	Post	6/3/2014
RIM-F2	Purchase of equipment for PDRI	150,000	NCB	No	No	Post	5/3/2014
	GEF						
HC-F1	Purchase and installation of hydrometric stations in the Basin and training of users	1,000,000	ICB	No	No	Prior	4/18/2014

Works:

Ref No.	Contract (Description)	Estimated cost US$	Procurement Method	Pre-qualification (Y/N)	Domestic Preference (Y/N)	Review by Bank (Prior/ Post)	Expected Bid-Opening Date
	OMVS						
HC-T1	Execution of works; fisheries infrastructure in Guinea ; (lot 1 : 2 Fish markets + 2 landing points at Tougué and Labé; lot 2 : Pisciculture Infrastructure at Tolo and Kankalabé).	475,000	NCB	No	No	Post	01/18/2014
HC-T2	Execution of works; fisheries infrastructure in Mali. Lot 1: Consolidation works at Manantali (landing point and fish center) and Kayes (fish market). Lot 2 : Construction of ferry piers at Kayes, Mahina, and Walia; Construction of small fishing ponds at Kayes and development of the Doro pool	680,000	NCB	No	No	Post	10/8/2014
HC-T3	Execution of works; fisheries infrastructure in Mauritania. Lot 1: Consolidation of MWRD1 works; Ntekane landing point and fish center; Mbout fish center rehabilitation. Lot 2 : construction of warehouses and landing points at SYNTHIANE Magama)	960,000	NCB	No	No	Post	11/21/2014
HC-T4	Execution of works; fisheries infrastructure in Senegal, Lot 1 Consolidation of MWRD1 works, processing areas at Sadel and Odobere. Landing points and embankments at Matam. Lot 2 Fish center at Richard Toll. Processing area at Thiago. Community enclosures for pisciculture at Matam and Richard Toll	580,000	NCB	No	No	Post	01/18/2015
HC-T5	Renovation works for electrical and electronic installations of the automatisms et and system of command and measurement of the Diama dam	550 000	NCB	Non	Non	Post	05/12/2014

HC-T6	Electronic and mechanical Renovation works of upstream and downstream porticos of the Diama dam	1 250 000	NCB	Non	Non	Post	05/01/2015
HC-T7	Rehabilitation works of the production network, treatment, and distribution of drinking water for the dam and communities living in in vicinity of the dam	1 250 000	NCB	Non	Non	Post	05/06/2015
HC-T8	Repair works of the metallic passive protecting structures of the dam, upstream side of the flood water draining system	2 250 000	NCB	Non	Non	Post	04/05/2014
HC-T9	Repair works of the cathodic protection devices of the dam and the passive protection of the flood-gates and the tide-gate of the dam	2 400 000	ICB	Non	Non	Prior	03/05/2015
	Guinea – DNGR						
G-T1	Arrangement works of low-lying ground of 88 ha in the CR of Dounet (Mamou)	352, 000	NCB	Non	Non	Post	03/18/2014
G-T2	Execution of works for the protection of banks including gabion, ramps, and watering devices, 1.20 Km over passes in the CR of Dounet in Mamou	2,775,753	NCB	Non	Non	Post	03/20/2014
	Mali – ADRS						
ML-T1	Execution of works for : (i) protection of 10 km banks (lot 1);and (ii)Arrangement and extension of the low-lying grounds of PGIRE1 in Bafoulabe (lot 2); and (iii) consolidation of hydro agricultural infrastructures (PPM et PIV) of Phase 1 of PGIRE (lot 3)	9,313,800	NCB	Non	Non	Prior	04/15/2014
	Mauritania – SONADER						
RIM-T1	Execution of work: rehabilitation of 330 ha of village level irrigated areas at Trarza (Lot 1) ; clearing and calibration of channels at Sokam and Bourgueiba (Lot 2)	4,575,000	ICB	No	No	Prior	4/20/2014

RIM -T2	Execution of works; the rehabilitation of 779ha of irrigated perimeters and associated flood defenses at the Pilot Site at Boghe	6,232,000	ICB	No	No	Prior	7/12/2014
RIM -T3	Execution of works; rehabilitation of 280 ha of village level irrigated areas in Brakna West 280 ha	2,100,000	NCB	No	No	Post	6/3/2014
	Senegal – SAED						
SE-T1	Execution of works: slope protection and surfacing with laterite along the Krankaye canal, (Lot 1) ; clearing and recalibrating the Diawel embankment and construction of intake works for developed irrigation areas along the length of the axis (Lot 2)	9,072,200	ICB	No	No	Prior	3/18/2014
SE-T2	Execution of works: the connection of independent autonomous irrigation units at Matam (148 ha) and flood control structures for recessional agriculture at the basin of Yédia (4000 ha)	1,309,200	NCB	No	No	Post	11/18/2014
SE-T3	Execution of works: Rehabilitation of 630ha of irrigated areas at Ndombo Thiago	4,309,200	NCB	No	No	Prior	3/15/2014
SE-T4	Execution of arrangement works, and supply of equipment for 100 ha of small farmer perimeters in favor of Dagana Women(50 ha)(lot 1) and Matam women (50 ha)(lot2)	733,400	NCB	Non	Non		

Selection and Employment of Consultants

54. Selection and Employment of Consultants, subject to prior-review by the Bank as considered in Appendix 1 of the Procurement Guidelines for the Selection and Employment of Consultants.

	Procurement Method	**Threshold for prior-review (US$)**	**Comments (optional)**
1.	Competitive selection methods (firms)	= or >US$300,000	
2.	Single Source Selection (firms)	All contracts	
3.	Competitive selection methods (individual consultants)	= or >US$100,000	
4.	Single Source Selection (individual consultants)	All contracts	
	Contracts for specific tasks such as development or update of the project implementation manual, supervision contract, monitoring and evaluation contract, financial audit, technical audit	All contracts could be subject to prior-review	Although not specifically linked with any procurement methods, the importance of those contracts could require Bank's prior-review based on

			case-by-case consideration.

55. List of contracts, including associated procurement method and key milestones for consultant services: Short list of consultants for services, estimated to cost less than US$ 300,000 equivalent per contract, may comprise entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

56. List of contracts, including associated procurement method and key milestones for consultant services:

Ref No	Contract (Description)	Estimated Cost US$	Selection method	Review by Bank (Prior /Post)	Expected Proposals Submission Date
	OMVS High Commission				
HC-C1	Recruitment of a consultant to complete the impact assessment of MWRD1	300,000	QCBS	Prior	3/26/2014
HC-C2	Recruitment of a consultant to complete the complementary studies for Koukoutamba dam – access routes and power transmission lines	700,000	QCBS	Prior	3/26/2014
HC-C3	Recruitment of a consultant to complete the Environmental and Social Impact Assessment for Koukoutamba dam	300,000	QCBS	Prior	3/26/2014
HC-C4	Recruitment of a consultant to complete feasibility studies for Balassa dam	1,200,000	QCBS	Prior	11/18/2014
HC-C5	Selection one auditor to complete annual audits of PGIRE and GEF projects 2014, 2015 and 2016 (Sénégal	120 000	QCBS	Prior	6/25/2014
HC-C6	Selection one auditor to complete annual audits of PGIRE and GEF projects 2014, 2015 and 2016 (Mali)	120 000	QCBS	Prior	6/25/2014
HC-C7	Selection one auditor to complete annual audits of PGIRE and GEF projects 2014, 2015 and 2016 (Maurnitanie)	120 000	QCBS	Prior	6/25/2014
HC-C8	Selection one auditor to complete annual audits of PGIRE and GEF projects 2014, 2015 and 2016 (Guinée)	120 000	QCBS	Prior	6/25/2014
HC-C9	Recruitment of an individual consultant to quantify the medication required and prepare strategic meetings for the allocation and distribution of medication	34,000	IC	Post	2/25/2014
HC-C10	Recruitment of an individual consultant to reinforce the capacity of implementing agencies in the reduction of malaria	33,000	IC	Post	2/25/2015
HC-C11	Selection one Community executing agencies (CEA) at the national level Guinéa)	2 500 000	QCBS	Prior	4/30/2014

HC-C12	Selection one Community executing agencies (CEA) at the national level (Mali)	2 500 000	QCBS	Prior	4/30/2014
HC-C13	Selection one Community executing agencies (CEA) at the national level (Mauritania)	2 500 000	QCBS	Prior	4/30/2014
HC-C14	Selection one Community executing agencies (CEA) at the national level (Senegal)	2 500 000	QCBS	Prior	4/30/2014
HC-C15	Recruitment of an individual consultant to organize and manage the LQAS 1 surveys	25,000	IC	Post	11/30/2014
HC-C16	Selection of a Consultant to complete the first survey at sentinel sites	120,000	QCBS	Post	8/30/2014
HC-C17	Recruitment of an individual consultant to organize and manage the LQAS 2 surveys	25,000	IC	Post	2/15/2015
HC-C18	Recruitment one research institution to ensure the completion of operational research projects on malaria (Guinea)	20 625	QCBS	Prior	2/30/2015
HC-C19	Recruitment one research institution to ensure the completion of operational research projects on malaria (Mali)	20 625	QCBS	Prior	2/30/2015
HC-C20	Recruitment one research institution to ensure the completion of operational research projects on malaria (Mauritania)	20 625	QCBS	Prior	2/30/2015
HC-C21	Recruitment one research institution to ensure the completion of operational research projects on malaria (Senegal)	20 625	QCBS	Prior	2/30/2015
HC-C22	Recruitment of a Consultant for the evaluation of the geographic coverage and therapeutic treatment of NTDs	143,000	QCBS	Post	10/20/2014
HC-C23	Selection of a Consultant for the completion of characterization studies of fisheries and aquaculture (Guinea)	60,000	QCBS	Post	4/30/2014
HC-C24	Selection of a Consultant to complete design studies, tender documents and supervision of works for aquaculture and fisheries works (Guinea)	160,000	QCBS	Post	4/30/2014
HC-C25	Selection of a Consultant for the completion of characterization studies of fisheries and aquaculture in the circle de Kita (Mali)	40,000	CQS	Post	5/30/2014
HC-C26	Selection of a Consultant to complete design studies, tender documents and supervision of works for aquaculture and fisheries works (Mali)	220,000	QCBS	Post	5/30/2014
HC-C27	Selection of a Consultant for the completion of characterization studies of fisheries in new project sites in Mauritania	80,000	CQS	Post	5/15/2014
HC-C28	Selection of a Consultant to complete design studies, tender documents and supervision of works for aquaculture and fisheries works in Mauritania	230,000	QCBS	Post	5/15/2014
HC-C29	Selection of a Consultant for the completion of characterization studies of fisheries in new project sites of Dagana / Studies of fisheries reserve areas, Senegal	100,000	CQS	Post	4/17/2014

HC-C30	Selection of a Consultant to complete design studies, tender documents and supervision of works for aquaculture and fisheries works in Senegal.	130,000	QCBS	Post	4/17/2014
HC-C31	Selection of a Consultant to prepare and deliver training for technical staff and fisheries stakeholders in Guinea	300,000	QCBS	Prior	4/15/2014
HC-C32	Selection of a Consultant to prepare and deliver training for technical staff and fisheries stakeholders in Mali	480,000	QCBS	Prior	6/15/2014
HC-C33	Selection of a Consultant to prepare and deliver training for technical staff and fisheries stakeholders in Mauritania	380,000	QCBS	Prior	6/15/2014
HC-C34	Selection of a Consultant to prepare and deliver training for technical staff and fisheries stakeholders in Senegal	335,000	QCBS	Prior	6/15/2014
HC-C 35	Selection of a consultant to study the renovation of the apparatus of the cathodic protection of the dam, the passive protection of the flood-gates, and the screen of the lock-gate of the Diama dam	350 000	QCBS	Prior	28/03/2014
HC-C36	Selection of a consultant to study the rehabilitation of the production network, the treatment and the distribution of drinking water for the dam and the communities living in the vicinity of the Diama dam	350 000	QCBS	Prior	30/05/2014
HC-C37	Selection of a consulting Firm for the Study of the Detailed Preliminary Plan/Tender Documents relative to the fluvial port at Saint Louis	1 225 000	QCBS	Prior	02/06/2014
HC-C38	Selection of a consulting Firm for the study of the Detailed Preliminary Plan/Tender documents relative to the Ambidédi terminus port, stops and emoluments.	1 000 000	QCBS	Prior	15/06/2014
HC-C39	Selection of consulting firm for the study of the Detailed Preliminary Plan/Tender Documents relative to the arrangement of the navigable channel of the Senegal river	1 225 000	QCBS	Prior	05/09/2014
HC-C40	Selection of a consulting Firm for the study of the renovation and modernization of the DIAMA tide-gate	337 000	QCBS	Prior	05/09/2014
HC-C41	Selection of a Firm for the study of the Detailed Preliminary Plan/Tender documents relative to the setting of a technical monitoring system of the navigable areas of the Senegal river	583 000	QCBS	Prior	30/09/2014
HC-C42	Selection of a consultant to study the brief Preliminary Plan/Detailed Preliminary Plan/Tender Documents/Environmental Impact and Social study of three micro central power stations in the basin of Senegal river in Guinea	2 280 000	QCBS	Prior	20/03/2014
HC-C43	Selection of a consultant to study the electrical and mechanical renovation of the downstream and upstream porticos of the Diama dam	250 000	QCBS	Post	20/03/2014
HC-C44	Selection of a consultant to study the renovation of the electrical and electronic installations of the automatism, commend and measurements systems of the Diama dam	250 000	QCBS	Post	20/03/2014

HC-C45	Selection of a Consulting Firm to study the environmental and social impacts of the dredging of the access channels, berthing zones on the embankment of fluvial port at Saint Louis, the terminus port at Ambidédi, stops and landing stages, and the navigable channel of the Senegal river	280 000	QCBS	Post	20/03/2014
HC-C46	Selection of an individual consultant for the environmental and social impact evaluation for the PGIRE 2 additional activities	34 000	SSS	Prior	02/10/2013
HC-C47	Selection of consulting firm for the finalization of the OMVS institutional reform study	105 000	SSS	Prior	10/12/2013
	Guinea – DNGR				
G-C1	Selection of a Consultant for preparation of design studies, tender documents and supervision of works for the rehabilitation of 754ha of small irrigated perimeters in the CRD of Kanka Labé and Dounkimagna (préfecture of Dalaba) and Parawol/Konah (préfecture de Tougué)	368 580	QCBS	Prior	3/25/2014
G-C2	Selection of a Consultant for preparation of design studies, tender documents and supervision of works for: development of 310ha of low lands and small plains at Mamou and Labé	1 328 000	QCBS	Prior	6/4/2014
G-C3	Selection of a Consultant for preparation of feasibility studies for 1000 ha of low lands and small plains and the protection of 4000 ha of adjacent slopes, in Guinea	396 640	QCBS	Post	2/6/2014
G-C4	Selection of a Consultant for Supervision of works ; 1475m slope stabilization at Dounet and Kaalan	146 092	QCBS	Post	2/15/2014
G-C5	Recruitment of an NGO to implement agroforestry works, working with local communities	239 831	QCBS	Post	3/28/2014
G-C6	Selection of a Consultant preparation of design studies, tender documents and supervision of works; 50ha of market gardens Selection of a Consultant for Supervision of works; development of 88ha of low lands in the Mamou area	44 200	CQS	Post	3/20/2014
	Mali – ADRS				
ML-C1	Selection of a Consultant for preparation of design studies, tender documents and supervision of the development of (i) 200ha of new village level irrigated areas in the circle of Kayes and Bafoulabe; (ii) 52ha of market gardens and (iii) development of 700 ha of new low land areas , at Bafoulabé, Kayes and Yelimane,	1 415 000	QCBS	Prior	5/4/2014
ML-C2	Selection of a Consultant for Supervision of works for the development and extension of 549 ha of low lands in the circle of Bafoulabé and slope protection works including gabion, access ramps along a 2km length.	565 300	QCBS	Prior	4/18/2014
ML-C3	Recruitment of an NGO to implement agroforestry works, working with local communities	450 000	QCBS	Prior	4/20/2014
	Mauritania – SONADER		QCBS		

RIM-C1	Selection of a consultant for the control of the PIV rehabilitation works at Traza 330 ha, and the clearance of weeds works/dredging of the Sokam river(17 km) et Bourguiba (3 km)	354 500	QCBS	Prior	15/04/2014
RIM-C2	Selection of a consultant for the control of the rehabilitation works of 779 ha of the irrigated perimeters and the embanking works of the Casier Pilote of Boghe	467 400	QCBS	Prior	05/04/2014
RIM-C3	Selection of a consultant to realize the studies and control of the following: (i)the studies and control of the fixtures of 100 ha of small farmer perimeters in favor of the women, and (ii) fixtures of irrigated perimeters of Chechiya (600 ha), Ten-Yedr (175 ha) et N'kik (350 ha) in the basin of Garak	805 000	QCBS	Prior	25/05/2014
RIM-C4	Studies and control of works : (i)consolidation of the flood-gate bridge of Kaédi et de security of the bank of the Senegal river along the PPG1 dam;(ii) studies of a flood drain off device at Gorgol, and (iii) integrated drainage system PPG1/PPG2 toward a natural emissary	370 000	QCBS	Prior	15/05/2014
RIM-C5	Selection of a consultant to realize the studies and control of the following: (i)the studies and control of the arrangement of 100 ha of small farmer perimeters in favor of the women, and (ii) Arrangement of irrigated perimeters of Chechiya (600 ha), Ten-Yedr (175 ha) et N'kik (350 ha) in the basin of Garak	805 000	QCBS	Prior	25/05/2014
RIM-C6	Selection of a consultant for the control of the rehabilitation works of the Brakna PIV west 280 ha	182 000	QCBS	Post	27/04/2014
RIM-C7	Selection of a consultant for the realization of studies and control of works for clearance of weeds/cleansing of hydraulic axles at Tambass/Garak(9 km),Mbeil/Garak(7km) and Mbimani/Ndiavane (3.5)	282 750	QCBS	Post	15/05/2014
RIM-C8	Selection of a consultant for the realization of a study for the setting of management mechanisms and the durable maintenance of the hydraulic axels and the hydro agricultural infrastructures and equipment	100 000	QCBS	Post	25/04/2014
	Senegal – SAED		QCBS		
SE-C1	Control of works for :Protection of embankments and laterite covering of the cavaliers at Krankaye, and calibration and embanking of Diawel (10 km), realization of works of offtake for the perimeters prepared along the axel	774 800	QCBS	Prior	15/03/2014
SE-C2	Selection of a consultant for: (i) control of rehabilitation works for irrigated perimeters of Ndombo Thiago 630 ha, and(ii) the studies and the control of arrangement works and equipment supplies for 50 ha of the small farmer perimeters in favor Dagana women	324 050	QCBS	Prior	10/03/2014

SE-C3	Selection of a consultant for the study and control of works for : (i) Rehabilitation of the pump station of large embankments Telel (3 600 ha) and arrangement of the perimeter of Tellel (1550 ha)	1 065 800	QCBS	Prior	10/03/2014
SE-C4	Selection for a consultant for the studies and control of works: (i) coupling of independent UAI at Matam (148 ha); Construction of the water fall devices of the Yedia basin (4000 ha), and (iii) arrangement and equipment supply for 50 ha of the small farmer perimeters in favor of the Matam women.	172 000	QCBS	Post	10/02/2014
SE-C5	Selection of a consultant for the realization of studies and the control of arrangement works and supply of equipment of the versant basins of Dioulol and Diamal at Matam, construction of works, reforestation and so forth)	250 000	QCBS	Post	10/03/2014
	GEF				
HC-C1	Recruitment of an individual consultant to ; update the 2007 Trans Diagnostic Analysis, and review the current level of knowledge of climate change and adaptation measures used in the Senegal River Basin	80,000	IC	Post	3/26/2014
HC-C2	Recruitment of one Individual Consultant to complete a diagnostic analysis of national regulatory and legislative texts and support the Governments to harmonize these texts with the OMVS framework to take into account the measures needed to apply the Basin Water Charter (Guinea)	30 000	IC	Post	4/30/2014
HC-C3	Recruitment of one Individual Consultant to complete a diagnostic analysis of national regulatory and legislative texts and support the Governments to harmonize these texts with the OMVS framework to take into account the measures needed to apply the Basin Water Charter (Mali)	30 000	IC	Post	4/30/2014
HC-C4	Recruitment of one Individual Consultant to complete a diagnostic analysis of national regulatory and legislative texts and support the Governments to harmonize these texts with the OMVS framework to take into account the measures needed to apply the Basin Water Charter (Mauritania)	30 000	IC	Post	4/30/2014
HC-C5	Recruitment of one Individual Consultant to complete a diagnostic analysis of national regulatory and legislative texts and support the Governments to harmonize these texts with the OMVS framework to take into account the measures needed to apply the Basin Water Charter (Senegal)	30 000	IC	Post	4/30/2014
HC-C6	Recruitment of a specialist consultant firm to update the water resources management models used by OMVS, taking into account climate change, and develop a plan for adaptation and increasing resilience on the basis of an evaluation of the vulnerability of the basin	400,000	QCBS	Prior	5/15/2014
HC-C7	Recruitment of a specialist consultant firm to develop training modules and train experts from national agencies, national cellules and OMVS on adaptation / resilience to climate change	600,000	QCBS	Prior	10/15/2014

Frequency of Procurement Implementation Support

57. In addition to the prior review supervision to be carried out from Bank offices, the capacity assessment of the executing agencies has recommended one implementation support mission every six months, to carry out post review of procurement actions.

Environmental and Social (including safeguards)

58. The program (MWRD1 and MWRD2) is classified as category A in the Environmental Assessment classification of the World Bank, the main reason being that MWRD2 finances preparatory studies for Balassa dam and rehabilitation for Diama dam in the Senegal River Basin. MWRD2 covers a similar range of activities as MWRD1 over an extended geographical area, the Senegal River Basin in four countries, and therefore requires a substantive level of due diligence. The following table indicates the safeguard policies, which are triggered and the justifications:

Safeguard Policies	Triggered	Explanation
Environmental Assessment OP/BP 4.01	**Yes**	The MWRD2 involves a significant number of construction and environmental and social management activities related to the sub-projects. These subprojects cover rehabilitation of irrigated areas for rice production and vegetable farming for women groups, a health component financing pesticide impregnated mosquito nets and medicines to control 5 neglected tropical diseases, including Schistosomiasis and an inland small-scale fisheries component. The environmental and social management activities of the fisheries and irrigation sub-components include environmental and social management actions, which also would trigger OP/BP 4.01. An evaluation will be carried out with regard to the environmental and social dimensions of the Balassa dam. An Environmental and Social Advisory Panel will be established to provide advice on the TORs and environmental and social studies to be carried out. MWRD2 has prepared an ESIA, instead of an ESMF, since most sub-projects have already been identified.
Natural Habitats OP/BP 4.04	**Yes**	Stocking of natural water bodies with indigenous fish species might be one of the sub-project activities.

		This activity could upset the natural balance in existing fish stocks if not done according ecological principles. This potential activity triggers OP/BP 4.04 and is addressed in the ESIA.
Forests OP/BP 4.36	**Yes**	OP/BP 4.36 is triggered by the reforestation activities carried out in the Fouta Djallon, a very sensitive ecological area in the headwaters of the Senegal River, which has been and is subject to significant deforestation as a consequence of agricultural expansion. The ESIA includes measures for addressing the reforestation activities.
Pest Management OP/BP 4.09	**Yes**	The Pest and Pesticide Management Plan (PPMP) was not implemented under MWRD1, since there was no production in the rehabilitated irrigation systems. Presently the rehabilitation is being finalized and production will start during the implementation of MWRD2. The updated PPMP will be implemented during MWRD2. Intensification of irrigated agricultural production, as envisaged during MWRD2 might increase the use of pesticides and chemical fertilizers. The implementation of the updated PPMP will mitigate the health and environmental impacts of the increased use of pesticides and chemical fertilizers. MWRD2 will not finance the procurement of pesticides.
Physical Cultural Resources OP/BP 4.11	**Yes**	OP/BP 4.11 is triggered by the feasibility studies for the new Balassa dam and by the construction activities associated with the sub-projects. An archaeological survey will be carried out in the reservoir and dam areas for the new dam. This is addressed in the ESIA; a Chance Find Procedure will be included in all Contractor Contracts.
Indigenous Peoples OP/BP 4.10	**No**	There are no indigenous people in the Senegal River Basin as defined by OP/BP 4.10.
Involuntary Resettlement OP/BP 4.12	**Yes**	No physical resettlement is anticipated due to the nature of the intended rehabilitation works to be carried out under the various sub-projects. There might be a need to compensate for the loss of crops, trees or property caused by the rehabilitation of the irrigation schemes. The lack of definition around specific subprojects will be addressed through the preparation and disclosure of the updated Resettlement Policy Framework (RPF).

		OP/BP 4.12 might be potentially triggered as a consequence of the restriction of access to certain fishing grounds needed as spawning areas, temporary closure of fishing areas for biological recovery of fish stocks. It is not yet certain that these activities will be carried out. In case OP/BP 4.12 will be triggered a Process Framework (PF) will be prepared, disclosed and implemented. Any sub-project, including construction, can only start if Project Affected People (PAPs) have been compensated in compliance with OP/BP 4.12. The eventual RAPs or PFs prepared for subprojects will need to be cleared by the Bank and consulted upon with stakeholders. These RAPs and PFs also will be disclosed in-country and in the World Bank's Infoshop prior to the start of any subproject construction activity.
Safety of Dams OP/BP 4.37	**Yes**	OP/BP 4.37 is triggered by the feasibility and environmental and social studies for the new Balassa dam. This policy is also triggered by the fact that the irrigated agricultural subprojects are dependent for their water from the Manantali and Diama Dams. The dam safety reports for the Manantali and Diama Dams have been recently reviewed by the World Bank and no dam safety issues have been identified. A Dam Safety Advisory Panel will be established to manage the dam safety aspects of the MWRD2.
Projects on International Waterways OP/BP 7.50	**Yes**	The governments of the four riparian countries were notified of the Project through the OMVS, in which all four countries are represented. A letter regarding this notification has been sent to the Bank.
Projects in Disputed Areas OP/BP 7.60	**No**	There are no Disputed Areas in the Senegal River Basin. Therefore OP/BP 7.60 is not triggered. OMVS has the mandate to implement and manage sub-projects in the Senegal River Basin with the support of the four riparian countries.

59. The capacity of OMVS and the member states for environmental and social management has been strengthened under the Senegal River Basin Water and Environmental Management GEF

Project and even more so under the MWRD1 project. This included building a core group of transboundary environmental management expertise.

60. During the preparation of MWRD1, OMVS prepared an Environmental and Social Management Framework (ESMF), a Resettlement Policy Framework (RPF) and a Pest and Pesticide Management Plan (PPMP) in compliance with the requirements of the World Bank Safeguard Policies. These instruments have been reviewed and updated for use in MWRD2. MWRD2 has prepared an ESIA, instead of an ESMF, since the most of the project activities to be financed are known. The RPF and PPMP have been updated. The update of the safeguards instruments developed under MWRD1 has been completed.

61. At the start of the implementation of MWRD1, the ESMF was used to screen all sub-projects. The majority of sub-projects were found to pose very low environmental and social risks, mostly related to environmental and social management during construction. One of the reasons for this low risk was that irrigated agriculture sub-projects involved rehabilitation of irrigation systems rather than new construction. For these low risk sub-projects only an Environmental and Social Management Plan (ESMP) was prepared and implemented, which was based on the ESMP in the ESMF. An Environmental and Social Impact Assessment (ESIA) was only prepared and implemented for those sub-projects with potentially high impacts. The only sub-project for which a specific ESIA and associated ESMP and a Resettlement Action Plan (RAP) were prepared and implemented was the construction of the Krankaye canal, a new main irrigation water supply canal, in the Senegal River Delta. The Krankaye sub-project did not physically displace any households, but did impact on property. Project Affected People (PAP) have been compensated in compliance with OP/BP 4.12. Community level measures taken to mitigate or compensate for impacts in the Krankaye sub-project included flood protection, foot bridges for continued access to irrigation schemes at the other side of the canal and a siphon to continue to supply water to private irrigated areas. All the ESMPs, the ESIA and the RAP have been disclosed in-country and in the World Bank Infoshop. None of the other sub-projects triggered OP 4.12.

62. The various ESMPs for sub-projects included a wide range of mitigation measures. These mitigation measures included among others social compensation measures, for example the construction of laundry and bathing areas, ramps for cattle to have access to water, foot bridges to provide access to irrigation areas and so on. All the ESMPs included construction related environmental and social management measures, including prevention and management of hydrocarbon spills and health and safety measures during construction. Component specific measures were also taken, for example improving hygiene and solid waste management at the new fish markets financed under MWRD1.

63. MWRD2 sub-projects: rehabilitation of irrigation schemes, health component and fisheries and aquaculture component will have very limited environmental and social impacts, similar in nature as the impacts under MWRD1. These impacts and mitigation measures have been described in the ESIA prepared for MWRD2.

64. The Pest and Pesticide Management Plan (PPMP) was not implemented during MWRD1, since the rehabilitation of all the irrigation systems financed under MWRD1 is only now being

finalized. There was no increased agricultural production under MWRD1. The updated PPMP will be implemented under MWRD2.

65. Fisheries management actions were prepared under MWRD1, but will be further developed and implemented under MWRD2. Fisheries management will be strengthened under MWRD2. MWRD2 will also finance the rehabilitation of existing or development of new small-scale fish farms and hatcheries for the production of juvenile fish, which will be used to stock natural water bodies.

66. MWRD2 has prepared an ESIA, since most sub-projects have already been defined, and updated the RPF and the PPMP from MWRD1. It is not expected that OP 4.12 will be triggered during the implementation of MWRD2, but if there is any involuntary resettlement, a RAP will be prepared and disclosed in-country and in the World Bank Infoshop. RAPs will need to be cleared by the Bank's Regional Safeguard Coordinator for the Africa Region. Construction can only start after Project Affected People (PAP) have been compensated in compliance with OP/BP 4.12. The three safeguard instruments mentioned above have been disclosed in-country and in the World Bank Infoshop at least 120 days before Board. These instruments will be implemented and monitored by the Safeguard Specialist at the PCU as was done for MWRD1.

67. Following the initial project preparation and the disclosure of the ESIA, PPMP and RPF, additional activities were identified for financing. These include the following;

(a) An extension of existing fisheries activities, construction of small fish ponds and additional distribution of equipment
(b) An extension of existing agricultural and water resources protection activities, including approximately 2500ha of irrigation rehabilitation or development, 2,000ha of low land development, 20km of channel clearance and 1000ha of slope stabilization using biological techniques.
(c) Additional urgent maintenance works on Diama dam
(d) Studies on navigation and micro hydro development

68. An addendum to the ESIA covering these new activities has been prepared. All sub projects have been screened. However they are all low-impact activities and based upon previous experience are expected to pose very low environmental and social risk. The addendum to the ESIA and the screening of the subprojects has been sent to the Bank and cleared. It was disclosed in the Infoshop on November 7, 2013. The PPMP and RPF did not require updating.

69. The main area of institutional support, which OMVS will require during the implementation of MWRD2 is in advancing the feasibility studies of the new Balassa dam and the evaluation of the environmental and social dimensions of this new dam. It has been agreed with OMVS that a Dam Safety and an Environmental and Social Advisory panel will be established as needed, so that the panel can provide advice on the TORs for the feasibility studies and the environmental and social studies and on these studies themselves. The TOR for the ESIA of the new dam will need to be cleared by the Bank, consulted upon, and disclosed.

Monitoring & Evaluation

70. The Results Framework is provided in Annex 1. The scope and reach of this multi-sectoral regional project requires a monitoring and evaluation system which is robust and decentralized to facilitate systematic data collection in each of the four countries. Data will be tracked for each of the indicators identified in the Results Framework which will be aggregated at the national and regional level by OMVS. The Environmental Observatory of OMVS will have overall responsibility for M&E. All data collected under the project will be supplied to the Observatory in a form suitable for integration into the database of the Observatory and relevant data provided by the Observatory will be used to inform the Project M&E. Additional indicators will be monitored and tracked by OMVS to verify the impacts of the program and to ensure sustainability. For example, in parallel with verifying the sales of fish at project sites, OMVS will also measure the percentage change in average size of characteristic of fish species at unloading points included within the project, to ensure that there is no negative impact of stimulating the local fisheries sector and increasing sales.

71. As under MWRD1, each of the executing agencies will have a key role in collecting data at the community level. Data collection mechanisms and information management will continue to be reinforced throughout the implementation of this project. For the hydro-agriculture and agro forestry activities, regular monitoring will be completed by national agencies and their local offices. For the fisheries activities, the national fisheries departments, in collaboration with fishermen, will be active in monitoring project implementation progress and collecting data at the community level. Targeted surveys or interviews may be conducted during the project to evaluate project indicators. For the health component data collection analysis and local utilization will be ensured at district and country level through the existing information systems. Sentinel surveillance sites will be created and well equipped to provide quarterly reports on the target diseases. Malaria indicator survey (MIS) and lot quality assurance sampling (LQAS) surveys will be carried out to assess progress made with respect to intervention coverage and utilization and better target malaria control activities. A mapping of filariasis will be done in Mauritania to generate baseline information. For schistosomiasis, selected sentinel sites surveys will be completed in the middle of the project and towards the end of the project. The PCU will complete monitoring missions every three months, or more frequently as required.

72. An evaluation of MWRD1 will be financed to provide a detailed baseline for MWRD2. This activity is already in preparation and will be completed immediately following effectiveness of MWRD2. At the end of MWRD2 a full evaluation of the program will also be completed to provide a detailed final analysis and try to quantify to the extent possible the impacts of the program.

73. Data collected and progress against indicators will be included in the bi-annual progress reports completed by the PCU. This information will be used by OMVS and the Bank to assess the project effectiveness during implementation.

Role of Partners

74. The MWRD2 is fully blended with GEF financing. The Bank team will coordinate closely with the Government of Netherlands on the implementation of the Dutch Trust Fund. When

possible, joint implementation support missions with partners will be conducted to help maximize cost-effectiveness and support a consistent, common approach around a shared vision for implementation of MWRD2.

Annex 4: Operational Risk Assessment Framework (ORAF)

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2

Stage: Board

<table>
<tr><th colspan="7">Project Stakeholder Risks</th></tr>
<tr><td>Stakeholder Risk</td><td>Rating</td><td colspan="5">Substantial</td></tr>
<tr><td rowspan="4">Description :
National political instability impacts on regional level bodies, hampering or stopping project implementation

Inadequate methods and modalities by which OMVS can link to the national and local community levels

Donors' commitment and willingness to cooperate with the Bank and harmonize actions at national and regional level in support of OMVS.</td><td colspan="6">Risk Management:
Political situation will be monitored closely throughout implementation</td></tr>
<tr><td>Resp: Bank</td><td>Stage:</td><td>Recurrent: ☑</td><td>Due Date:</td><td>Frequency: Quarterly</td><td>Status:</td></tr>
<tr><td colspan="6">Risk Management:
Extensive community engagement and increased transparency through better access to information. This project will further develop OMVS' vertical integration capacity, this will include, but is not limited to, defining and responding to local level accountability, defining mechanisms and means of communication and outreach.</td></tr>
<tr><td>Resp: Both</td><td>Stage:</td><td>Recurrent: ☐</td><td>Due Date:</td><td>Frequency:</td><td>Status:</td></tr>
<tr><td colspan="6">Risk Management:
The Project is designed to be implemented in parallel to other donor programs based on the existing OMVS donors' framework. Throughout the project preparation and implementation processes, efforts will be made to maintain collaboration and coordination with the donor partners to ensure complementarity and a cohesive program.</td></tr>
<tr><td>Resp: Both</td><td>Stage:</td><td>Recurrent: ☐</td><td>Due Date:</td><td>Frequency:</td><td>Status:</td></tr>
<tr><th colspan="7">Implementing Agency (IA) Risks (including Fiduciary Risks)</th></tr>
<tr><td>Capacity</td><td>Rating</td><td colspan="5">Low</td></tr>
</table>

Description : Low implementation capacity in some member states could hamper the timely achievement of program outcomes. Lack of support to OMVS at the national level impedes progress	**Risk Management:** The majority of the implementing agency risks have been considerably reduced through the successful execution of MWRD1 with significant capacity building which will be continued where needed under MWRD2 - in particular for national cellules and agencies. Increased focus and support, including enhanced implementation support, will be provided in particular to Mali and Guinea.					
	Resp: Both	Stage:	Recurrent: ☐	Due Date:	Frequency:	Status:
Governance	Rating	Low				
Description : During MWRD1 of the project the project was successfully implemented with no problems in procurement or financial management. However expanding the implementation and mandate of the organization increases the risk of poor Governance impacting on project results. Poor financial and quality management of implementation agencies and local organizations	**Risk Management:** The governance risks at the national level are avoided by implementing through a stable regional body. The OMVS now applies Bank guidelines for all its fiduciary management. Financial statements will be audited by independent and competent auditing firms. The control of OMVS over national executing agencies is substantially increased by the use of performance management contracts to ensure delivery of the required quality and within the agreed timeframe. At the local level support is provided in kind.					
	Resp:	Stage:	Recurrent: ☐	Due Date:	Frequency:	Status:
Project Risks						
Design	Rating	Low				
Description: Overall risks: Inadequate mechanisms to overcome the challenges of international waters to support regional integration and realize optimal multipurpose water	**Risk Management:** This risk has been mitigated through MWRD1. The majority of the feasibility studies have been completed under MWRD1 for activities to be implemented under MWRD2 and frameworks or systems are in place to better manage the challenges obstacles faced under MWRD1. Established mitigation measures will continue by supporting: a) communication, coordination, and collaboration among all riparian countries; b) sound planning taking into consideration water availability and development activities; c) effective project and financial management as well as efficient disbursement arrangements with clearly defined roles and responsibilities to avoid					

resources development. Spending significant resources and time attempting to mobilize Counterpart funding from Member States Component specific design risks: Component 1 Regional institutional development: The partition of costs and benefits are not adopted by the four riparian states Component 2 Local level multipurpose water resources development: *Hydro agricultural*: Contractors are poorly selected and supervised leading to delays in implementation. Water user associations do not transition to paying maintenance fees meaning that operation and maintenance is not supported in future. *Sustainable fisheries*: Fisheries management measures could cause short term negative impacts on the livelihoods of some groups, for example by restricting access to resources to protect fish stock in the medium to long term. Conflicts may occur between the project supported community and other users of same fishing grounds. *Reduction of water related disease*: Poor coordination between national authorities lead to duplication of efforts or insufficient support for the program. Insufficient/unqualified human resources at regional and national levels may impact on	implementation inertia. d) use of the water charter and the repartition key to maintain clear objectives regarding the equitable sharing of (direct and indirect) benefits among riparian countries and communities living in the Basin from available water resources to all stakeholders and riparian countries

Resp: Both	Stage:	Recurrent: ☐	Due Date:	Frequency:	Status:

Risk Management:

It is important to continue counterpart funding in order to assure the ownership of the project by member states. The Bank and the OMVS High Commission are completing a review of the contributions paid by each member state and the modalities of payment. OMVS High Commission has confirmed that they support maintaining contributions at the same level - $12 million. This funding level is tied to (i) dated covenants and (ii) project components which are a high priority for member states, but are not part of the core mandate for OMVS (reduction of water related diseases, WRUA capacity building and aquaculture development).

Resp: Both	Stage:	Recurrent: ☐	Due Date:	Frequency:	Status:

Risk Management:

Component 1: The proposed activities will attempt to reduce this risk by ensuring a complete and objective set of base data is provided and that states are participate fully in the discussions and development of the partition of benefits and costs.

Component 2:
Hydro agricultural: Stronger contracts with national agencies and increased support and supervision by OMVS. Forming/supporting water user associations will initiate at the start of implementation so that there is strong community ownership, communities will need to demonstrate their commitment to maintain schemes before the project is started.
Sustainable fisheries: The project will apply adequate mitigation measures, such as support to alternative revenue generating activities where required. The project will support the local Government that has a coordinating role among various villages within its mandated areas to be better equipped to respond to such conflicts.
Reduction of water related disease: This sub component will support coordination of activities with the National programs, regular meetings of the different steering committees, capacity building for the health and community staff to enhance the sense of ownership. Recruitment or secondment qualified health specialists to support the national coordination committee is being reviewed and should be effective before the beginning of the project. The project will provide support for quantifying needs, improving supply management and advocacy to partners and suppliers of LLINs and drugs. Monitoring of vector resistance is already initiated by USAID teams in Senegal, Mali and Guinea and will be ongoing.
Climate change adaptation: The Project will support a basin-wide effort to strengthen the understanding of the need for better environmental management and inclusion of climate change adaptation into decision-making.

project implementation. Donated drugs and LLINs may not be sufficient. Vectors may become resistant to insecticides. *Climate change adaptation*: Political willingness to use tools and mechanisms related to environmental management and/or climate change adaptation. Component 3 Regional Planning: Delays in decision making put back construction of infrastructure to the point where the studies have become obsolete	Component 3: The indicator for success for this component is that a financing decision has been taken. Activities will focus on building future consensus as well as providing high quality technical work. Component 4:					
	Resp:	Stage:	Recurrent: ☐	Due Date:	Frequency:	Status:
Social and Environmental	Rating	Moderate				
Description: Populations affected by the project may raise concerns about the project and eligibility for compensation. There may be resistance by affected populations to the proposed dams at an early stage The infrastructure (and possibly re-afforestation activities in sensitive ecological area) component of the project may impact on fragile ecologies. Land distribution and management has been a serious source of tension, especially for the rural population of the Senegal valley in Mali and Mauritania	**Risk Management:** The majority of the infrastructure component has already been assessed and frameworks prepared under MWRD1. The prepared Environmental And Social Management Framework, the Resettlement Planning Framework and the Pest and Pesticide Management Plan have been reviewed and updated under preparation of MWRD2. An ESIA has also been prepared, consulted upon, and disclosed for MWRD2. Sub-project ESIAs would screen for possible impacts on wetlands or other natural habitats and incorporate appropriate mitigation or compensation measures within the detailed design of sub-projects. The project includes measures for dam safety, including the establishment of a Dam Safety Advisory Panel. Based on experience from MWRD1 it has also been agreed to increase the resource allocation to supervision of the implementation of Environmental and Social Safeguards. Personnel charged specifically with overseeing health safety and the environment will be put in place in the regional coordination teams, in all agencies and on the worksites. Following lessons learnt in MWRD1 the project will only work in areas where there are no land tenure issues. The governments submit proposed areas for the standard OMVS/Bank evaluation process with confirmation that ownership is fully agreed in these areas.					
	Resp:	Stage:	Recurrent: ☐	Due Date:	Frequency:	Status:

<table>
<tr><td>Program and Donor</td><td>Rating</td><td colspan="5">Low</td></tr>
<tr><td rowspan="2">Description:

Budget cuts in donor countries impact on project financing. This is a key risk for the Dutch Trust Fund given the recent cuts in Holland.

Lack of coordination /alignment of donors standards or requirements</td><td colspan="6">Risk Management:

The project is well established and donors have a high level of confidence in OMVS, therefore this project is likely to be a high priority for retention.

The Dutch Trust Fund would be implemented in parallel also follows Bank fiduciary procedures and safeguard policies</td></tr>
<tr><td>Resp:</td><td>Stage:</td><td>Recurrent: ☐</td><td>Due Date:</td><td>Frequency:</td><td>Status:</td></tr>
<tr><td>Delivery Monitoring and Sustainability</td><td>Rating</td><td colspan="5">Moderate</td></tr>
<tr><td rowspan="2">Description:

Differences in implementation capacity between member states could hamper the timely achievement of program outcomes.

Poor quality implementation by community organizations</td><td colspan="6">Risk Management:

Through MWRD1, significant steps have been taken to reduce this risk through capacity building. For example, a framework for Monitoring and Evaluation has been established and standardized templates and other tools developed for technical supervision and oversight. MWRD2 will build on what was done under MWRD1 and more resources will be dedicated to ensure full compliance with all Bank technical and fiduciary requirements. Enhanced supervision and implementation support will be provided for Mali and Guinea.

High levels of participation and consultation throughout preparation and implementation of the project will be maintained.</td></tr>
<tr><td>Resp:</td><td>Stage:</td><td>Recurrent: ☐</td><td>Due Date:</td><td>Frequency:</td><td>Status:</td></tr>
<tr><td>Other (Optional)</td><td>Rating</td><td colspan="5">Substantial</td></tr>
<tr><td rowspan="3">Description:

Procurement Risks:

Possible delays in taking procurement actions like preparation of BD, RFPs, BER, etc. due to the workload of the Procurement Units in SAED, ADRS and DNGR
Absence of a procurement specialist and procurement unit at SONADER</td><td colspan="6">Risk Management:

Close monitoring of procurement plan on a monthly basis and closely monitor and exercise quality control on all aspects of the procurement process, including evaluation, selection and award. Responsibility: OMVS High Commission Procurement Unit</td></tr>
<tr><td>Resp: Client</td><td>Stage: Implementation</td><td>Recurrent: ☑</td><td>Due Date:</td><td>Frequency: Monthly</td><td>Status: Not Yet Due</td></tr>
<tr><td colspan="6">Risk Management:

Establish a Procurement Unit or recruit a qualified procurement specialist before effectiveness. Responsibility: SONADER</td></tr>
</table>

Inadequate contracts administration/management may create delays on services delivery and several unjustified contract amendments, Lack of coordination in the flow of information relating to procurement between the Bank and Executing Agencies	Resp: Client	Stage: Preparation	Recurrent: ☐	Due Date: 30-Sep-2013	Frequency:	Status: Not Yet Due
	Risk Management: Close monitoring of the contracts execution. Responsibility: ADRS, DNGR, SAED, SONADER					
	Resp: Client	Stage: Implementation	Recurrent: ☑	Due Date:	Frequency: Monthly	Status: Not Yet Due
	Risk Management: Centralize all procurement requests at the OMVS High Commission					
	Resp: Client	Stage: Implementation	Recurrent: ☐	Due Date: 30-Sep-2013	Frequency:	Status: Not Yet Due

6. Overall Risk	
Implementation Risk Rating:	**Substantial**

Annex 5: Implementation Support Plan

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2

Strategy and Approach for Implementation Support

1. A number of measures aimed at ensuring implementation proceeds as planned have been put in place. These include:

a. Focal points in the Senegal, Mali and Mauritania country offices. A full time Senior Social Development Specialist in Dakar, a full time Senior Rural Development Specialist in Nouakchott and a full time Lead Water and Sanitation Specialist in Bamako work closely with the TTL to facilitate the implementation of the project and to provide regular contact with the client. The project team will also be able to draw on the other Bank staff based in the region including a Senior Irrigation Consultant in Mauritania and Financial Managements Specialist in Mali and in Senegal and the Senior Procurement Specialist in Dakar.

b. The Bank will conduct at least two formal missions per year. The mission team will include Bank staff working on irrigation and agriculture, health, water resources management, fisheries and climate change adaption as well financial management and procurement staff, and other specialists as required.

c. Supervision of financial management will be risk-based. Given the moderate risk rating associated with existing financial management arrangements, one on site visit will be conducted each year by the Bank in addition to the review of IFRs and the audited financial statements at the PCU and the executing agencies. The first mission will be conducted 6 months after the first disbursement. Supervision will focus on the review of the project's financial management system, including accounting, reporting and internal controls. The Bank team will also work with the Program Coordinator and the Financial Management Specialist at the PCU to assist in coordination among different departments and units for financial management and reporting.

d. Considerable safeguards have been put into place to guard against procurement fraud risk. These are presented in the procurement section of Annex 3.

Table 5.1: Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate
First twelve months	Establishment of the Designated Accounts at OMVS and at the executing agencies Quality of terms of reference Procurement of key contracts Execution of contracts Implementation of the EMP and PPMP	Core team skills; Agriculture, fisheries, health, water resources development Procurement Financial management Environment and social safeguards	US$ $250,000 in BB

12-48 months	Quality of terms of reference Procurement of key contracts Execution of contracts Application of the EMP and PPMP	Core team skills; Agriculture, fisheries, health, water resources development Procurement Financial management Environment and social safeguards	US$250,000 in BB per Annum

Implementation Support	Frequency
Desk reviews	
Interim financial reports review	Quarterly
Audit report review of the program	Annually
Review of other relevant information such as interim internal control systems reports.	Continuous as they become available
Procurement prior reviews and above the Prior Review Thresholds and guidance whenever needed	Continuous
On site visits	
Review of overall operation of the FM system	Annual for Implementation Support Mission)
Monitoring of actions taken on issues highlighted in audit reports, auditors' management letters, internal audit and other reports	As needed
Transaction reviews (if needed)	As needed
Capacity building support	
FM training sessions	During implementation and as and when needed.
Procurement clinics	During Project Launch and on a monthly basis

Skills Mix Required

Skills Needed	Number of Staff Weeks/ Year	Number of Trips / Year	Comments
Task team leader	25	2 international	Core team based in DC
Irrigation and agriculture	25	2 international, 2 local	Core team based in region with support from team in DC
Health	25	4 international	Core team based in DC
Water resources	25	2 international	Core team based in DC
Fisheries	10	2 international	Core team based in DC
Forestry Specialist	6	1 international	Core team based in region with support from team in DC
Climate adaptation	25	2 international	Core team based in DC
Monitoring and evaluation	6	1 international	Core team based in DC
Procurement	12	1 local	Core team based in Region with support from team in DC

Financial Management	12	2 local	Core team based in region with support from team in DC
Environmental and Social Safeguards	15	4 local, 1 international every 2 years	Core team based in region with support from team in DC

Partners

Name	Institution/Country	Role
Maarten Gischler	Netherlands	Task Team Leader for Netherlands Program with OMVS

Annex 6: GEF/LDCF Incremental and Additional Cost Analysis

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2

A. Context

1. Due to existing high levels of variability, climate change will alter the timing, distribution, and quantity of water resources globally. Most models project wetter conditions in West Africa (+2%) while drier conditions are projected in Southern Africa and the Sahara (-4% and -6%, respectively). The main and most understood climate drivers of inter-annual and decadal rainfall variability in Africa are Atlantic (and other) Ocean sea surface temperature patterns (West Africa and the Sahel), El Niño–Southern Oscillation (ENSO) behavior (West, Southern and East Africa) and Indian Ocean dynamics (East and Southern Africa)[15]. At present, model simulations of future climate do not show clear tendencies in the future behavior of these large-scale drivers[16]. Overall, these results suggest that warming is very likely to be larger than the global annual mean warming throughout the continent and in all seasons. On balance, higher temperatures are likely to increase evaporative demand throughout Africa. Annual rainfall in East Africa is likely to increase but it is unclear how rainfall in the Sahel, the Guinean Coast and the southern Sahara will evolve.

2. At about 1,800 km long, the Senegal River is the second longest river of West Africa. It originates in Guinea, runs through western Mali and then flows westwards creating the border between Senegal and Mauritania. The Senegal River Basin covers a surface area of about 300,000 square kilometers (km^2). The plateau in northern Guinea represent 31,000 km^2 (11 percent of the basin), western Mali represents 155,000 km^2 (53 percent of the basin), southern Mauritania represents 75,500 km^2 (26 percent of the basin) and northern Senegal represents 27,500 km^2 (10 percent of the basin). The basin is inhabited by approximately twelve million people, 85% of which live near the river. The upper basin has remained largely an area of subsistence agriculture based on shifting cultivation. In the valley and the delta, traditional production systems and modern systems (irrigation with water pumped from the river) exist side by side. Stream flow modifications have been observed in the Senegal basin and the major causes of this phenomenon are: climatic change, population growth and its implications, problems in implementation of appropriate water and environmental management, and insufficiencies in technology and financial resources. In scenarios that project increased rainfall, stream flow within the Senegal basin will double by 2030 creating some adaptation challenges[17].

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[15] Christensen, J. H., B. Hewitson, A. Busuioc, A. Chen, X. Gao, I. Held, R. Jones, R. K. Kiolli, W.-T. Kwon, R. Laprise, V. Magaña Rueda, L. Mearns, C. G. Menéndez, J. Räisänen, A. Rinke, A. Sarr and P. Whetton (2007). Regional climate projections. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (ed. by S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor and H. L. Miller). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[16] Merryfield, W. J. (2006). Changes to ENSO under CO2 doubling in a multimodel ensemble. Journal of Climate 19(16), 4009-4027.

[17] Oyebande, Lekan, and Shakirudeen Odunuga. "Climate change impact on water resources at the transboundary level in West Africa: the cases of the Senegal, Niger and Volta Basins." Open Hydrology Journal 4.1 (2010): 163-172.

3. The impacts of climate change and other stresses on water resources and changes to flooding risks in the future will necessitate adaptation on the part of water resource management institutions and water users. Adaptation may involve trade-offs between meeting the needs of different sectors, for example, maintaining power production or maintaining in-stream flows for fish[18]. Examples of adaptations to climate change in the water sector in developing countries are less documented. This is possibly because developing countries have many issues to cope with besides the impact of climate change on water resources[19]. Ragab and Prudhomme (2002) list adaptation options for arid and semi-arid regions; these include: rainwater harvesting, water storage in underground reservoirs and the development of salt tolerant crops to make use of brackish water and, alternatively, options that reduce the demand for water such as improved irrigation efficiency and water recycling. Where water resource management decisions are taken without proper information on possible future climate change impacts, ineffective adaptation may result, as vulnerabilities to future climate change are increased.

4. Sustainable water utilization is one of several contemporary and critical issues facing the basin region because of its unequal natural geographic distribution and unsustainable water use. Within the basin, the impact of an intensification of the West African Monsoon (WAM) is likely to have the greatest impact especially around Senegal and Mauritania. Changes in the rainfall regime within the basin may also be associated with shifts in seasonality. At present it is unclear whether any greening of the basin zone will represent additional regional rainfall or will facilitate a redistribution of rainfall. The rainy season across the basin was characterized by enhanced rainfall activity, with amounts about 15% above the long term climatological mean for the period 1950- 2005. However, this represents a 60% increase in rainfall relative to the most recent 30 years climatological mean for 1971-2000.

5. Water resources are vital to the support of livelihoods particularly agriculture and fisheries-based livelihoods. Climate change threatens to put pressure on water resources due to a possible increase in the already high variability in rainfall and river flows and changes to the geographical distribution of water resources, some areas possibly becoming drier, whilst others becoming wetter. Adaptation is complicated by the trans-boundary nature of water resources. Approximately 90% of all Africa's surface freshwater resources are situated in river basins and lakes that are shared between two or more countries. There are 60 transnational river basins in Africa, covering 62% of the continent's area. 30 of these river basins are shared by more than two countries, including the Senegal River Basin[20]. In most of these areas water management has been compromised by climate variability and competing trans-boundary needs for water. In the next century demographic changes and economic activities in urban areas will increase

[18] Kundzewicz, Z. W., L. J. Mata, N. W. Arnell, P. Döll, P. Kabat, B. Jiménez, K. A. Miller, T. Oki, S. Zekai and I. Shiklomanov (2007). Freshwater resources and their management. In: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (ed. by M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden and C. E. Hanson), 173-210. Cambridge University Press, Cambridge, UK.

[19] Kabat, P., R. E. Schulze, M. E. Hellmuth and J. A. Veraart, Eds. (2002). Coping with the impacts of climate variability and climate change in water management: a scoping paper. DWC report number DWCSSO-01 (2002). International Secretariat of the Dialogue on Water and Climate, Wageningen.

[20] Ragab, R. and C. Prudhomme (2002). Climate change and water resources management in arid and semi-arid regions: Prospective and challenges for the 21st century. Biosystems Engineering 81(1), 3-34.

competition for Africa's freshwater resources[21]. Additionally, changes in land use and pollution from domestic, industrial and agricultural sources will exacerbate problems related to water quality.

6. The introduction of the dams has had several effects on the basin's population and environment. The Manantali dam located on the Bafing tributary in Kayes, Mali is the largest in the Basin. Its purpose is to reduce extreme floods, generate hydroelectricity and store water to supplement dry-season flow for irrigation and navigation. The Diama dam located about 40 km upstream from St. Louis, Senegal helps to impede seawater intrusion thereby protecting wells, maintain the Senegal River level, and creating freshwater reserves for agricultural activities. Since the dams were filled, groundwater recharge and the piezometric surface have been modified. Reducing the volume of the natural floods reduces the area of natural recharge zones. Conversely, flow regulation during low water periods and irrigation of large surfaces boosts groundwater recharge in some areas[22]. The Senegal River Basin's flood plain ecology has transformed from a salty and brackish aquatic environment with distinct seasonal changes to a low-flow perennial freshwater ecology. The installation of the dams has also facilitated a year-round availability of freshwater in adequate quantities which has led to the expansion of irrigated agriculture in the valley.

7. Over that past 3 decades, OMVS has demonstrated its effectiveness and commitment to addressing the environmental and socioeconomic issues in the Basin. OMVS was at the fore of the implementation of the GEF supported *Senegal River Basin Water and Environmental Management Project*, which was executed between 2004 and 2008 in partnership with the World Bank, UNDP and IUCN. The implementation of this earlier GEF Project was successful as demonstrated by the implemented objectives, which included: the establishment of a Trans-boundary Diagnostic Analysis (TDA) and Strategic Action Plan (SAP); the establishment of pilot micro-grants related to environmental conservation and improvement of the income of the Basin population; the built capacity OMVS and Member States experts; and the full involvement of Guinea in the environmental management framework for the basin. The satisfactory implementation of this project also facilitated the development thereafter of the World Bank *Multi-Purpose Water Resources Development* Program which is an adaptable program loan (now converted to IPF) including 2 phases, the first of IDA US$110M and the second of US$212.5M. The Senegal River Basin Water and Environmental Management Project also catalyzed a program financed by the Netherlands.

8. The achievements of these projects could be threatened by potential difficulties related to climate change impacts and broader trans-boundary water resource management issues, emerging in the region, including: agricultural land degradation, water pollution caused by the development of irrigated agriculture and the agro-industry, and riverbank erosion. A time series decomposition of the Senegal River's annual low volumes strongly suggests that water resources availability has been substantially curtailed since 1960. With a focus on climate change resilience development, the proposed GEF Alternative is designed to ensure that OMVS is

[21] Arnell, N. W. (2006). Climate Change and Water Resources: A Global Perspective. In: Avoiding dangerous climate change (ed. by H. J. Schnellnhuber and W. P. Cramer), xii, 392 p. Cambridge University Press, Cambridge; New York.

[22] http://webworld.unesco.org/water/wwap/case_studies/senegal_river/

prepared and equipped to deal with these emerging issues by (i) updating the work done in the first GEF project and by (ii) buttressing the efforts of the baseline World Bank/IDA project (MWRD2).

B. Alignment with relevant national and regional priorities for development and climate change adaptation

Mali

9. In December 2006, Mali adopted its second Poverty Reduction Strategy Paper, known as the "Growth and Poverty Reduction Strategy Framework" (GPRSF) covering the period 2007-2011. The GPRSF is designed as the first phase of the ten-year action plan to achieve the MDGs and is embedded in the Government's long term vision "Mali 2025". Its overall goal is to promote redistributive growth and poverty reduction by boosting productive sectors and consolidating public sector performance.

10. This project is in line with the GPRSF priorities and Mali NAPA strategies that foster the general objective of contributing to the mitigation of adverse impacts of climate variability and climate change on the most vulnerable populations. The project's components build on the guidelines of the Strategic Framework for Growth and Reduction of Poverty (CSCRP) and the Rural Development Strategy (SDR) that were identified. They include the:

- Identification of sectors, communities and the most vulnerable areas to climate variability and climate change;
- Identification of adaptation needs and priority areas, communities and the most vulnerable areas to climate variability and climate change;
- Identification of adaptation options, including: the use of meteorological information to improve agricultural production and contribute to food security; and the development of training modules to encourage local residents to practice strategies for the adaptation to climate change.

Mauritania

11. The Government's efforts to address the above constraints include putting in place such national strategies and policies as the: Poverty Reduction Strategy Paper (PRSP, revised in 2001) and the National Action Plans for Adaptation to Climatic Change (NAPA, 2004).

12. The Mauritania NAPA identifies climate change adaptation and a critical condition for achieving its development. This project addresses the following priorities listed in the Mauritania NAPA:

- The establishment of a system for the monitoring and mitigation of impacts related to the dynamics of sustainable socio-economic development which respecting the conservation of the environment.
- Establishment of a schedule for division of water and management regulations to prevent conflict of use.

- The reinforcement of capacities to ensure the perfect implementation of Integrated Water Resources Management (IWRM) activities through the creation of viable institutions responsible for monitoring and evaluation of the status of water resources and the provision of reliable information to the various partners.

Guinea

13. The main document for planning and environmental strategy of Guinea is the National Environmental Action Plan (NEAP) adopted in 1994. The five programmatic areas of NEAP for Guinea are focused on rural development, urban development, coastline and sea, culture and services and environmental management.

14. The project activities have been designed to align with the following NAPA priorities for Guinea:

- Promotion of appropriate technologies for climate change adaptation;
- Information, education and communication (Promoting environmental education in favor of coastal communities)

Senegal

15. The two most prevalent documents related to environmental sustainability in Senegal are the National Environmental Action Plan (NEAP) and the overall guidance document *(la lettre de politique d'orientation environnementale du Sénégal)* produced by the Ministry of Environment and Natural Protection.

16. In line with Senegal's project priorities, as defined in the NAPA, this project aims to improve sustainable use of water, build capacity and raise awareness for climate change adaptation in the Basin. The NAPA priorities include the:

- restoration of wetland ecosystems and the protection of the environment,
- re-establishment of producer organizations and their training on watershed resources management to enhance their adaptive capacity to climate change.

C. SAP priorities to be addressed

17. The project is in-line with the SAP Vision for the Senegal River Basin which is based on the OMVS foundational texts, the Water Charter, the 2003 Nouakchott Declaration, etc. This vision links the Basin current status (as described in the TDA) with the future that its stakeholders envisage. The proposed GEF funded activities (mapping, modeling, scenario building, climate change vulnerability and TDA assessments, and program piloting) are critical to addressing the following applicable Long-Term Environmental Quality Objectives (LTEQOs):

LTEQO 1. The challenge posed by desertification in the Senegal River Basin is surmounted by sustainably reversing the process of deforestation, erosion, siltation and soil salinization

- Measure 2: Awareness raising, education and information on land degradation and desertification;

- Measure 3: Development and application of an action program for the restoration and protection of riverbanks and headwaters;
- Measure 5: Promotion of sustainable agro-pastoral practices;
- Measure 6: Implementation of an enabling legal environment for sustainable use of water and land resources.

LTEQO 2. Optimally controlled water resources are managed through integrated and sustainable systems to ensure good water quality and adequate availability to users

- Measure 2: Ensure better control of improvements in water quality; and
- Measure 3: Promote innovative approaches to water management that alleviate poverty while protecting the environment.

LTEQO 3. The prevalence of waterborne diseases is reduced to a level that no longer poses a public health problem

- Measure 1: Health education and awareness raising on the causes of waterborne diseases;
- Measure 2: Epidemiological monitoring;
- Measure 3: Combat disease vectors.

LTEQO 5. Areas with high biodiversity value are identified, restored and sustainably preserved

- Measure 1: Strengthen capacities/environmental education;
- Measure 3: Reduce fishing pressure.

D. Incremental/Additional Costs Reasoning

Description of the Baseline (See Annex 2 for more detail)

18. The **IDA project** (MWRD2) originally had three inter-related components supporting the project development objective: (1) Institutional development; (2) Multipurpose water resources development (3) Infrastructure Management and Planning.

Component 1: Institutional Development

19. The overall objective of Component 1 is to build capacity for cooperative management. This first component will support both institutional development and project implementation through the following main elements:

(a) 1.1 – Updating the partition of costs and benefits
(b) 1.2 - Modernizing and reinforcing the institutional capacities of OMVS and related agencies
(c) 1.4 - Strategic management of the project

Component 2: Multi-Purpose Water Resources Development

20. The overall objective of this component is to promote income-generating activities and to improve livelihoods for the basin population. This component includes a number of core multi-sectoral activities related to the development of water resources in some sub-basins. Sub-components are:

(a) 2.1 - Hydro-agricultural development and water resources protection
(b) 2.2 - Sustainable fisheries management and aquaculture

(c) 2.3 - Reduction of the incidence of water-related diseases

Component 3: Infrastructure Management and Planning

21. The overall objective of Component 3 is to advance climate resilient water resources planning and development in the region. There are three main sub-components:

(a) 3.1 - Dam management and hydropower development
(b) 3.2 – Mapping the river basin
(c) 3.3 – Development of navigation

Baseline Scenario

22. The proposed GEF/LDCF project will further support the baseline development objectives of the World Bank MWRD2 IDA project. In addition, it will increase the sustainability of the IDA project, the resilience of the Basin's population in the face of climate change and will improve environmental management practices in the Basin. The proposed project would, among other things, identify and plug knowledge gaps in the project design with regard to needed resilience building measures. Currently, there are significant unresolved research challenges in comprehending the resilience needs (at local, national and regional levels) in the Basin and what capacities need to be leveraged to catalyze the wider adoption and integration of climate change planning into regional development plans. Since there are not many initiatives on resilience building to climate change in the Basin it is not feasible assess the degree to which they can reduce vulnerability or enhance resilience to climate change. Also, there is little systematic understanding of the feasibility, costs, efficacy, and limits of adaptation actions in the Basin.

23. The scientific analysis and modeling would be applied in the design of these components leading to more climate resilient outcomes (sometimes referred to as "climate proofing"). The proposed GEF/LDCF project will enhance sustainability of the IDA project to respond to the effects of both short term climate variability as well as long term change in the Basin. In line with GEF-5, IW-1, objective: Catalyze Multi-State Cooperation to Balance Conflicting Water Uses in Trans-boundary Surface and Groundwater Basins while Considering Climatic Variability and Change. This objective supports work to enhance the capacity of the Basin countries to tackle issues of climate variability and change by implementing different technologies and measures using local demonstrations.

24. This project aims to help reverse further degradation of the natural resources base in the Basin and to reduce the vulnerability of the local population and resources to climate change by conducting several studies which will use simulation models and observations to assess climate change impacts on local livelihoods. The analyses would capture both climate change impact and adaptations: (i) in agriculture and irrigation (climate sensitivity); and (ii) in water resources management, at the basin level. The LDCF resources will bring in additionality by integrating measures for climate change adaptation into the project. Overall adaptation benefits also include improved land-use and improved flood and drought risk management.

25. In the business-as-usual (baseline) scenario, MWRD2 aims to provide targeted institutional and technical support to support; (i) capacity building and coordination of OMVS and update the partition of benefits; (ii) continue hydro-agricultural and water resources protection work in new areas, initiate fisheries activities in Guinea and continue in the remaining states; also incorporating new elements of aquaculture, (iii) continue addressing the public health risks from water related diseases including treatment of critical neglected tropical diseases and continued LLINs distribution contributing to universal coverage (iv) develop hydro power through additional studies and safeguard existing hydraulic structures through essential maintenance works (v) support the future development of navigation and (vi) complete large scale mapping of the basin.

26. In the absence of the assistance from the GEF/LDCF, OMVS would continue to advance activities in the Basin through MWRD2 and other various multilateral and bilateral sources. However, a number of significant challenges would remain for the member states to cope with continuous climate-related challenges, including: (i) limitations in OMVS and national cellules with regards to climate change resilience planning capacity, (ii) gaps in technical knowledge in regards to the utilization of dated trans-boundary diagnostic and climate risk vulnerability assessments, as well as only partial mapping being completed in (iii) limited attention being paid to piloting climate change resilience building measures that are based on scientific evidence and updated climate change scenario modeling, and, (iv) no detailed mapping to track critical issues identified in the SAP, such as erosion or typha invasion. Furthermore, potential economies of scale and multiplier effects, to address these issues, would not be fully realized. Key untapped opportunities under the baseline scenario are elaborated as follows:

27. **Fragmented knowledge and limited focus on climate change adaptation issues**: Overall, a large and continuously increasing amount of financial resources is being dedicated to broad water resource management projects in the region. Without GEF financing, significant gaps will remain related to climate change resilience development and many ongoing and planned environmental management initiatives in the Basin will remain lacking with failed opportunities for realizing economies of scale and building regional harmony on the Basin climate change agenda. For example, the proposed GEF project will use climate change scenarios, simulation models and observations to assess climate change impacts on local livelihoods. The analyses would capture both potential climate change impacts and would facilitate the selection of appropriate adaptations in: (i) agriculture and irrigation (climate sensitivity); and (ii) water resources management, at the basin level. The GEF funded interventions will bring in additionality to the baseline by integrating measures for climate change adaptation, thereby strengthening the knowledge base on climate change which is critical to the sustainability of the baseline intervention.

28. **Lack of updated geographic data:** Without GEF financing, there will be continued deficiencies with regards to cartographical mapping in the Basin. The Basin has not updated its topographical maps for many decades due to priorities being placed in other thematic areas. In Guinea the last update of the basin maps was completed between 1977 and 1982. In Mali and Mauritania, the original mapping completed in 1960 was only partly updated in the 1970's. Only in Senegal has mapping been updated more recently with new information provided in 2004 and 2012 under EU financing. MWRD2 currently only financing for large scale mapping. In order to

properly conduct the climate change scenario modeling and properly pilot the adaptation activities the maps in the region have to be updated and detailed maps of critical areas need to be made available.

29. **Outdated climate change resilience studies, TDA, and limited technical capacities on climate change resilience development**: Further research and monitoring is needed to evaluate adaptation best practices and to assess effects of climate change on socio-economic and ecological dimensions in the Basin. Without GEF support, constraints for regional climate change resilience coordination and knowledge exchange at the technical level would continue to persist. The region would continue to rely on outdated data and information for local planning on climate change adaptation techniques leading to increasing constraints on the livelihoods of the local Basin population. Furthermore, important shortfalls would remain related to the piloting of adaptation techniques in the Basin. Under the baseline scenario, regional stakeholders would continue to rely on unpiloted adaptation techniques and outdated climate risk vulnerability assessments.

30. **Limited practical focus on the climate change resilience needs of smallholders in the Basin**: Under the baseline scenario, immense needs would remain related to participation and representation of smallholders in climate change resilience piloting. There are very limited investments in piloting and analytical work to better understand the impacts of climate change on these vulnerable people. At present, pilot projects are rarely taking stock of the social and environmental co-benefits they may or potentially could achieve.

GEF/LDCF Incrementality/Additionality

31. The combined GEF and LDCF resources of US$16 million will be blended with the IDA and Dutch Trust Fund financed activities to enhance the benefits under the baseline scenario of US$79.6 million.

32. The Dutch Trust Fund support to the baseline is geared towards reversing the trends of degradation of water resources and the environment of the basin. The 3rd Dutch project consists of the following parts: (i) the protection of headwaters and the fight against land degradation in the upper basin; (ii) the fight against invasive aquatic plants in the delta and the establishment of water user associations; (iii) the improvement of data and knowledge on natural resources in the basin; and, (iv) institutional support.

33. The GEF Alternative has been strategically designed to address the aforementioned shortfalls and constraints. The Global Environment Objective for the GEF Alternative is to strengthen trans-boundary water resources management in the Senegal River Basin including climate change adaptation and implementation of priority actions of the Strategic Action Plan.

34. The GEF Alternative will provide financing for critical activities that are currently not covered by any other donor. The added value of the GEF-financed activities is elaborated as follows:

35. **Enhanced technical capacities on climate change resilience development; an updated climate change resilience study and Trans-boundary Diagnostic Analysis:** The GEF

Alternative will support countries to address an important constraint to reliable and accurate climate data availability, thereby laying the foundation for systems that respond to national reporting needs as well as the interconnected landscape scope. Moreover, GEF activities will help lay the foundation needed for allowing Basin countries access to plan for climate change impacts beyond the Basin borders.

36. **Fostering increased regional cohesion:** The GEF Alternative will further foster regional cohesion as ensured by the regional design of the GEF project. The Project places a strong emphasis on knowledge and information exchange and will further provide some, albeit modest, support directly to OMVS national cellules and select national agencies to ensure full engagement in and contribution to regional climate resilience building efforts.

37. **Greater focus on the climate change resilience needs of stakeholders in the Basin:** As part of the resilience piloting efforts, the project will focus on the climate change resilience and trans-boundary needs of agricultural and non-agricultural stakeholders (such as, small holders and fishermen) in the Basin respectively. The piloting will also focus on the implementation of community-based water management measures, including development of water user associations and farmers' professional cooperatives. The project aims to strengthen the capacity to adapt to climate change of the countries sharing the Senegal River by supporting the needed steps to design and implement adaptation piloting strategy in the trans-boundary context.

38. **Leveraging economies of scale through enhanced coordination with the baseline projects:** Incremental support from GEF offers an important opportunity to enable strong coordination amongst development partners on climate change resilience development. The GEF Alternative will help to realize significant economies of scale by supporting OMVS to address shared technical and analytical needs and by enhancing complementarities and spill-over effects among the different Basin initiatives. As such, the GEF Alternative will serve as a rallying-point bringing together policy-level decision makers as well as technical experts from within the region and around the world.

39. Sub-components under the GEF Alternative that build upon the Baseline are as follows:

Component 1: Institutional Development (US$$2.98 million)

1.1 - Sub component 1.1 would support

(a) Finalization and implementation of the basin wide Inclusive Framework through supporting the implementation of the Water Charter [GEF funded]

(b) Capacity building for Guinea through dissemination and training on the basic texts of OMVS [GEF funded].

1.3 - Training of OMVS regional and national staff, and national agencies to lead climate adaptation efforts in the region; and the training of pilot program beneficiaries (individual stakeholders, water user associations, and farmers' professional cooperatives) on appropriate climate change adaptation measures. [GEF funded; Component 1b- GEF datasheet]

1.4 - Strategic management of the project, including running costs for the PCU

40. The GEF increment of this component focuses on: (i) the development and delivery of a capacity development and training program on climate change adaptation delivered to the direct beneficiaries of the proposed climate resilience piloting, and the staff/stakeholders in the regional OMVS office, national cellules, and relevant national agencies; (ii) a gap analysis that looks at the missing aspects at the national level which are needed to fully implement the Water Charter; and the drafting of national legislation/regulations for the application of the Water Charter in each country; including a specific focus on the harmonization of Guinea's legislation to correspond with the framework of OMVS; (iii) the dissemination and training/capacity building in Guinea on the basic texts of OMVS and, (iv) the strategic management of the project.

41. The key steps in the adaptation training process, particularly for direct beneficiaries, include: an adaptation knowledge deficit analysis, adaptation training planning, and adaptation training implementation and monitoring.

42. The LDCF portion of this sub-component will support the institutional capacity building of OMVS, National Ministries of Environment, and other climate-change relevant agencies of the riparian countries to improve their management and technical capacities to lead climate change adaptation efforts in the region. The coordination, communication, and information exchange between OMVS and these agencies will also be improved by this effort thereby reinforcing the OMVS network and information management role.

43. The proposed capacity building program will be administered to:

a) OMVS Regional staff;
b) The National Coordination Committee structure [*Cellule Nationale de Coordination* (CNC)] established by OMVS, in each of the riparian countries. Each CNC brings together representatives of Ministries involved in or affected by water management in the Senegal River and also representatives of civil society organizations. Each CNC has a Secretariat with permanent staff and logistical equipment provided by OMVS;
c) The Local Coordination Committee structure [*Cellule Locale de Coordination* (CLC)] also established at each of the 28 administrative districts in the basin; and,
d) Pilot program beneficiaries (individual stakeholders, water user associations, and farmers' professional cooperatives) trained by CLC and CNC trained-trainers.

44. The GEFTF portion of this project will cover the gap analysis and the drafting of national legislation/regulations for the application of the Water Charter in each country. The Charter, ratified in 2002, outlines principles in water allocations, establishes water management and environmental sustainability principles, and aims at protecting rights of affected populations. In meeting the challenges to sustainably develop the Basin, the four riparian countries committed themselves to establishing an inclusive framework for joint management of the shared resources. The increment will also support the writing and implementation of national legislation for all riparian countries each country's national legislation contains provisions for the effective implementation of the Charter. In addition, the GEF increment will also support the full

harmonization of Guinea's legislation to correspond with the OMVS framework. The GEF increment will also support the dissemination of the basic texts of OMVS; distributing the documents to all relevant agencies and training key stakeholders in Guinea on their regional obligations newcomers to OMVS.

45. **Running costs for GEF and LDCF funded elements**: This activity will finance project management costs related to fiduciary management, monitoring and evaluation, technical reporting and audits as well as any incremental operating costs. Effective institutional management arrangements for the GEF project are crucial to its success, especially in view of the need to ensure an adequate breadth of participation in preparing and implementing this new type of project.

Component 2: Multi-Purpose Water Resources Development (US$7.0 million)
Sub-component 2.4: Pilot approaches to improve climate resilience

46. This sub-component focuses on the demonstration of: (i) climate change adaptation measures and (ii) integrated water resource management practices in the Basin. Average flow from the Senegal River has been significantly affected by climate variability and change over the last decades. Thus, the current average flow (from the early 1970s to present) is only equal to 50% of the average flow between 1950 and 1970 and 25% of the average flow for the first half of the last century (between 1903 and 1950). Since the basin population has significantly increased (it has multiplied by three since the beginning of the 1960s), per capita water supply from the river has seen an extraordinary reduction over recent decades. This sharp decrease in per capita water supply is not always noted, given the actual low level of mobilization of this resource.

47. The purpose of the LDCF portion of this component is to introduce, demonstrate and implement the identified adaptation measures in selected demonstration areas, and to adjust and integrate appropriate adaptation measures into the implementation of the project based on the literature gap analysis, preliminary conclusions of the modeling and scenario building activities, and stocktaking of already completed climate changes studies.

Component 3: Infrastructure management and planning (US$$6.02 million)

Sub-component 3.2: Planning for climate resilience

48. This sub-component aims to strengthen the regional and national data knowledge base for Basin management with an emphasis on developing and integrating climate variability and change. Understanding adaptation is important for two reasons: (a) adaptation will reduce the final impacts of climate change and thus is important for measuring vulnerability, and (b) what specifically should be done in different places over different time periods to facilitate adaptation.

49. Specific activities under LDCF portion of this component include:
    (a) An improvement of the monitoring network for hydro-meteorological data is critical to the management of the Basin's resources. The OMVS-Senegal River Basin hydro-meteorological network consists of 20 hydrological stations and 24 meteorological

stations. While there have already been some improvements in this network, the network is still not comprehensive, due to inadequate financing. In order to have accurate data to forecast stream flows and effectively manage variability, further strengthening of these networks is required. Through this activity, the GEF increment will ensure that there is:

- Consistent hydro-meteorological data collection;
- Improved prediction of flows and flood flows of the Senegal River;
- Enhanced understanding and allocation to different uses of trans-boundary water resources in the Senegal River basin;

(b) No comprehensive studies on climate risk vulnerability have been conducted on the Basin. And most of the limited assessments completed (contained in broader subject documents) are dated [e.g. *Etude de la gestion des ouvrages communs de l'OMVS (Gibbs et al 1987)*; *West African Water Vision (WATAC 2000);* and *Water, Drought and Desertification in Africa. In: Sustainability of Water Resources under Increasing Uncertainty (April 1997)*]. LDCF funds will be used to conduct a stocktaking of previous assessments of climate risk vulnerability in the Basin.

(c) After the full stocktaking and gap analysis is completed an updated assessment of the vulnerability of the Basin to climate change will be conducted. It is planned that this assessment will be completed before the revision of the TDA and the update of the SAP (if necessary). The updated assessment will also be completed before the commencement of the piloting activities planned in Component 2. It is expected that the information from the vulnerability assessments will be necessary to inform the proper implementation of the targeted program planning and piloting.

50. Improved hydrological and meteorological systems contribute to the development of an information base for decision making and help the riparian countries plan for and mitigate the impacts of extreme weather events. The importance of hydrometric networks have been overlooked in many countries around the world, but the broad public good that comes from strengthening these systems is now widely recognized in water resources operations. Improved hydrometric information among riparian countries also has a strong regional "public good" element as it enhances collective knowledge.

51. The GEF TF portion of this component focuses on a thorough review and update of the existing water resources models used in the Basin, use of modeled scenarios to complete an assessment of the impacts of flooding and droughts on downstream ecology in the Basin and capacity building to support the use of models in decision making. Floods are an intrinsic part of the climatic and hydrological regime of the Basin. While large floods result in great damage, "normal" flooding brings some considerable benefits. Accordingly, there is a need to address flood management in ways that preserve the benefits of flooding, while reducing the damage to assets and associated costs from flooding. This activity builds upon on previous optimization and hydrological simulations of the Manantali reservoir, models at the key monitoring station, Diama dam models and the rainfall runoff model. Under this component the models in use by OMVS in the Senegal River Basin would be updated to include climate change and hydraulic infrastructure. In addition satellite images of the Senegal River Basin would be purchased to

provide information on land use through the basin. This modeling and mapping are critical because the downstream changes in land use since the 1970's are not known in detail; the increase in extreme events, due to climate change, will impact on dam operation, both in terms of hydropower production and preventative flow releases to protect against major flood events. These questions need to be answered for a range of magnitudes and durations of flood events. A detailed and more specific model would help facilitate a better understanding of the hydrological systems in the Basin and will lead to the improved dam operation in the future. In consultation with stakeholders, new operational rules will be proposed if needed. Findings and recommendations would be submitted to the Permanent Water Commission for review. The use of the updated models would be supported by training, hardware and software, for example model licenses, as required. The ultimate aim is that these tools inform the decisions made by the Permanent Water Commission in water allocations and future development in the Basin.

52. The GEF portion of the project also supports the update of the 2007 TDA and an update of the SAP if needed. The TDA identified among the myriad of environmental concerns confronting the Basin, five particularly urgent problems including: (a) land degradation and desertification; (b) decreased water supply and degradation of water quality; (c) proliferation of invasive species; (d) prevalence of water-related diseases; and (e) threats to biological diversity. The update of the TDA will look at the status of these urgent problems and will suggest new strategies for addressing them.

53. The approach to updating the TDA will be highly participatory and include the following steps:

(a) Review the 2007 TDA and the vulnerability assessments conducted under this project to identify information gaps;
(b) Identification and classification of the current status of environmental problems identified in the aforementioned review, and the emerging issues to be addressed by the TDA update;
(c) Classification of issues by order of priority;
(d) Analysis of the causal chain.

54. Several workshops (at least 4 national workshops i.e. one per country followed by a regional workshop) will be held. Consultations will also take place at the local level working with the CLCs. Workshop participants will include members of the riparian central government bodies, the private sector local governments, producer associations, the academic community, and non-governmental organizations. After completion the revised TDA will be disseminated to relevant stakeholders.

55. Participation of the project in IW-learn activities to ensure dissemination of project implementation progress and results and outcomes. This will be done using regional and global events, knowledge notes and other products. (Approximately 1% of the GEF grant amount will be committed to this activity).

56. The GEF Alternative is strategically designed to complement the ongoing regional efforts related to climate change resilience readiness and trans-boundary water resources management. Incremental value added includes:

(a) Strengthened national cellules and relevant national agencies through targeted capacity building on climate change adaptation thus setting the stage for a robust response, as trained trainers, in the Basin to climate change issues.
(b) Enhanced enabling environment for the implementation of necessary additional policy and institutional reforms to facilitate enhanced trans-boundary management actions in the Basin.
(c) Increased partnerships and coordination between OMVS, National Ministries of Environment, and other climate change relevant Agencies of the riparian countries to improve their management and technical capacities to lead climate change adaptation efforts in the region.
(d) Regionally relevant focus on the climate change resilience needs of smallholders and fishermen in the Basin (i.e. diminishing wetlands and nursery areas, etc.).
(e) Contribution to the building the adaptation capacity of WUAs in the Basin as a complement the work of MWRD2.
(f) A strengthened monitoring network for hydro-meteorological data which is critical to the management of the Basin's resources.

Global Environment Benefits

57. All of the river basins located at the same latitude as the Senegal River (the Gambia River, Niger River and Lake Chad Basins) have faced ecological disputes over the last three decades. Deforestation, siltation, loss of plant and animal biodiversity, etc. have had varying impacts throughout the region but are all part of an ordinary landscape influencing all its basins, including the Basin. In addition, because of its hydro-agricultural developments (and particularly the large dams), the Senegal River is one of the most modified Sahelian river basins due to human intervention. However, the river basin environment maintains critical ecological significance as established by its numerous ecological sites having national, regional and, global significance.

58. Studying the effects of flooding and droughts on downstream ecology and other knowledge generation activities in the proposed project will lead to environmental benefits resulting in restored and sustained freshwater, coastal and marine ecosystems goods and services, including globally relevant biodiversity and ecosystems. The Senegal River Basin is host to five sites included on the list of Wetlands of International Importance (Ramsar sites). In addition, other protected areas include: the Bafing Wildlife Reserve created to offset wildlife habitat loss from filling the Manantali reservoir; the Lake Magui on the Kolimbiné, an area with high concentrations of livestock,; and the classified forest of Bakoun in the upper basin in Guinea.

59. Many of the riparian communities are struggling with persistent rural poverty, and flood and drought incidents are still major obstacles. Many of the communities also rely on capture fisheries for their subsistence. The project approach is to carry out investment and provide livelihood support which would benefit the communities, contribute to the rehabilitation and protection of natural aquatic habitats, and increase the resilience of the local population to climate change.

60. Another key global environmental benefit resulting from this project will be the enhanced capacity in the Basin to plan for climate change resilience and improved trans-boundary management as a result of the strengthened capacity of the OMVS and other national bodies. This will result in; (i) reduced vulnerability, in the region, to climate variability and climate-related risks, and increased ecosystem resilience through catalyzing multi-state cooperation to balance water use across sectors; (ii) reduced pollution load in the Basin waters from nutrient enrichment and other land based stresses; and, (iii) restored and sustained capacity to absorb carbon to reduce global warming.

61. Consequently, global environmental benefits are expected to materialize beyond the timeframe of the project as member states take action to curb the effects of climate change in the Basin. The likely manifestation of other global environmental benefits, such as biodiversity conservation and reduced land degradation, as secondary benefits of this project, will not be measured by the project. The measurement of global environmental benefits will focus on the focal areas which are at the core of this project's design (International Waters and Climate Change Adaptation).

Incremental/Additional Costs

62. The project will be implemented with the financial support of the GEF (US$4 million) and LDCF (US$12 million) under the International Waters (IW) and Climate Change Adaptation (CCA) Focal Areas. The total project cost of the GEF Alternative amounts to US$ 95.60 million (incremental cost of $16 million from GEF complemented with co-financing of $79.60 million) as per Table 6.1 below. Co-financing is taken to include the financing provided which will act to either catalyze or build upon elements funded by the GEF program. This includes; (i) the work funded by the Dutch Trust Fund to address the problems of invasive species, (ii) work funded under the MWRD2 program to support the integration of Guinea, complete hydro agricultural development, mapping work and support infrastructure development. These are summarized in the table below and also described above. The co-financing is provided by the World Bank ($63.6 million), the Dutch Trust Fund ($15 million) and in kind co-financing is provided by member states ($1 million).

Table 6.1: GEF Alternative: Breakdown of Funding Sources by Component *

GEF Project component	Baseline Project Component Reference	GEF (US$M)	Baseline financing (US$M)	Total (US$M)
1a) IW Institutional Strengthening	Component 1.1	0.84	6.50	7.34
1b) CCA Institutional Strengthening	Component 1.3	1.40	9.50	10.90
2a) IW Knowledge generation and dissemination	Component 3.2	0.80	4.00	4.80
2b) CCA Knowledge generation and dissemination	Component 3.2	3.07	20.10	23.17
3a) CCA Targeted Program Piloting	Component 2.4	7.00	28.00	35.0

3b) IW-SAP Program Piloting, Modeling and Scenario Building	Component 3.2	2.15	11.50	13.65
	TOTAL	**16.00**	**79.6**	**95.6**

*costs do not including contingency

E. Consistency with GEF and LDCF Strategic Priorities and Parent Programmatic Approaches

63. The proposed operation contributes to the GEF-5 International Waters (IW) Strategy as well as to the GEF-5 Climate Change Adaptation (CCA) Strategy. More specifically, the Project supports: IW-1: Outcome 1.1: Implementation of agreed Strategic Action Programs (SAPs) incorporates trans-boundary IWRM principles (including environment and watershed management) and policy/ legal/institutional reforms into national/local plans; CCA-1: Outcome 1.2: Reduced vulnerability to climate change in development sectors; and CCA-2: Outcome 2.1: Increased knowledge and understanding of climate variability and change-induced threats at country level and in targeted vulnerable areas; and, Outcome 2.2: Strengthened adaptive capacity to reduce risks to climate-induced economic losses. As such, the Project is consistent with the following Strategic Objectives (SO):

Climate Change Focal Area:

- SO-1: Reducing Vulnerability: Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level.
- SO-2: Increasing Adaptive Capacity: Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level.

International Waters:

- SO-1: Catalyze multi-state cooperation to balance conflicting water uses in trans-boundary surface and groundwater basins while considering climatic variability and change.

64. The GEF Alternative aims to address key barriers to climate change resilience planning in the Basin, specifically as they relate to the enabling environment, i.e. institutional and technical capacities, and good practice development. As such, the project aims to support the Basin countries in the development of a shared, long-term vision for climate change resilience development that will help to sustain the multiple ecosystem services (biodiversity, climate change adaptation, water services) as well as socio-economic benefits (livelihoods and production) that the Basin can provide. The GEF Alternative supports knowledge creation, information sharing, and capacity building at the regional level that can help feed into the broader national climate change mitigation and adaptation strategies of the riparian countries. The project further seeks to address a major shortcoming in the area of climate change resilience management in the Basin by contributing to the update of literature and studies on climate vulnerability.

65. By enhancing capacities for addressing trans-boundary management issues in the Basin, this project will also strengthen the whole Basin management agenda and over the longer term

contribute to creation of other environmental and social benefits. The Project specifically aims to promote inclusive participation of key stakeholder groups; for example, in the review of the TDA and the piloting of the adaptation and water resource management measures, to better achieve social co-benefits in its approaches.

F. Complementarities with other ongoing initiatives in the Senegal River Basin

66. The project, as designed, will further strengthen the capacity of OMVS to effectively carry out its mandate. The World Bank has several on-going or planned national projects in the agriculture, health, environment, and water sectors in all of the riparian countries of the Basin. In addition, the Bank has funded some technical assistance to OMVS in support of the Inclusive Framework of the Basin. The proposed project will build on and be complementary to these national projects to ensure more effective and greater impacts on the ground.

67. The African Development Bank (AfDB) is supporting some agricultural projects in the some riparian countries of the basin such as in Mauritania. In addition, as the lead agency for the New Partnership for Africa's Development infrastructure program, the AfDB is supporting a number of studies related to regional infrastructure development and sound environmental management. The Agence Française de Développement (AFD) has been supporting OMVS on master-planning and sanitation.

68. The LDCF is supporting a Full-Size Project (FSP) in Guinea to reduce the vulnerability of Low Elevation Coastal Zones (LECZs) to climate change impacts, including sea level rise (SLR). Based on assessments undertaken for both the Initial National Communication (INC) and Guinea's recently concluded National Adaptation Programme of Action, climate change is expected to have intense and acute impacts on LECZs. Existing baseline pressures such as erosion are likely to be compounded by the increased incidence of salinization and flooding as result of climate driven pressures. The resultant impacts on coastal zones are expected to incur serious development challenges to Guinea given that coastal lands play a key role in national agriculture production (rice) and food security and is the location of over one third of the country's population. The LDCF is also supporting the Enhancing adaptive capacity and resilience to climate change in the agriculture sector in Mali project. This project is based on the most urgent and immediate adaptation options identified during the recently completed NAPA process and complies with the LDC Fund guidelines and principles. This project also fully reflects the priorities stated within the framework of the Initial National Communication of Mali to the UNFCCC. In addition, by focusing its intervention on strengthening capacities for adaptation to climate change in the agricultural (including livestock farming) sector, in the context of rural livelihood opportunities, the project is designed as a contribution to the pursuit of the MDGs.

69. The Adaptation Fund is supporting the Enhancing Resilience of Communities to the Adverse Effects of Climate Change on Food Security in Mauritania. The project goal is to enhance the resilience of vulnerable communities to the effects of climate change on food security by (a) strengthening government services to support communities in their participative development and implementation of local adaptation and natural resource management plans; and (b) mobilizing communities to invest in resilience and climate change adaptation. The Fund

is also supporting the Senegal Adaptation to Coastal Erosion in Vulnerable Areas project. The project's overall objective is to contribute to the implementation of Senegal's NAPA.

70. In Senegal, the GEF Trust Fund is supporting Sustainable Management of Fish Resources, World Bank implemented, project. The combined development objective/global objective for the proposed GEF project is to empower small-scale fishers to sustainably co-manage the coastal fisheries resources and, conserve the key habitats that support these resources through: (i) extending the partnerships formed between fishing communities and the Government in the ongoing GIRMaC project to small-scale fishers throughout the country, (ii) working with fishers and the Government to implement the President's Directive to establish a national network of marine protected areas, (iii) improving the management of the industrial fisheries that often compete with small-scale fishers for the coastal resources, and (iv) establishing a long-term financing mechanism to support the resource management investments necessary to rehabilitate the coastal fisheries resources and ensure they remain healthy enough to support a large number of coastal livelihoods and contribute to the national economy far into the future.

71. The project also builds on the work of the TerrAfrica World Bank/GEF Sahel and West Africa Program (SAWAP), which is the Bank's main support to the continent's Great Green Wall Initiative (GGWI). The SAWAP portfolio has projects in all of the riparian countries except for Guinea. The SAWAP objective is to expand sustainable land and water management in targeted landscapes and in climate vulnerable areas in West African and Sahelian countries. Through the SAWAP, the Bank is supporting Sahelian and West African countries to secure more food, fiber, freshwater, and firewood while protecting natural assets in the face of climate variability and change. Five of 12 SAWAP projects have been approved by the Bank Board (as of 25 March 2013). The approved projects include budget for participation in regional knowledge sharing and program level Monitoring and Evaluation (M&E) through the proposed regional hub project described in this PAD – the Building Resilience through Innovation, Communication and Knowledge Services (BRICKS) Project.

Table 6.2: Incremental Costs and Global Environment Benefits

GEF incremental activity	**Baseline activity**	**Global Benefits**	**Incremental Costs**
GEF Component 1 a and 1b			
The formulation of national regulations to apply the principles of the Water Charter and the harmonization of Guinea's legislation to correspond with the framework of OMVS	Modernizing and reinforcing the institutional capacities of OMVS and related agencies Strategic management of the project	Multi-state cooperation to reduce threats to the international waters of the Basin.	**Baseline:** US$ **$ 16**M **Increment:** US$ $2.98M
The implementation of a capacity development program and the training on climate change adaptation developed and		Reduced vulnerability to climate variability and climate-related risks, and increased ecosystem resilience	

delivered for OMVS National Cellules and National Agencies and local pilot program beneficiaries on climate change adaptation	Community level capacity building	through catalyzing multi-state cooperation to balance surface and groundwater use across sectors.	
GEF Component 3a			
Studying the impacts of flooding and droughts on downstream ecology in the Basin to guide future dam operations in relation. The piloting and implementation of agronomic water-saving measures for subsistence farmers; and, the implementation of community-based water management measures, including development of existing water user associations and farmers' professional cooperatives to adapt to climate change impacts.	Hydro-agricultural development and water resources protection Sustainable fisheries management and aquaculture Increase the coverage of interventions to address water-related diseases	Restored and sustained freshwater, coastal and marine ecosystems goods and services, including globally relevant biodiversity and ecosystems. Improved watershed function. Biodiversity assets identified and better protected in the Basin through improved water conservation. Reduced vulnerability to climate variability and climate-related risks, and increased ecosystem resilience through catalyzing multi-state cooperation to balance surface and groundwater use across sectors.	**Baseline:** US$ **$ 28.0** M **Increment:** US$ $ 7.0 M
GEF Component 2a, 2b, 3b			
The update of the 2007 Transboundary Diagnostic Analysis (TDA) and information gaps filled for the TDA; revised TDA widely disseminated; an update of the SAP based on the TDA update completed, if necessary; and IW-learn participation. The strengthening of the monitoring network for hydrometric data; stocktaking of previous	Dam management and hydropower development Update the mapping of the river basin Improved environmental	Reduced vulnerability to climate variability and climate-related risks, and increased ecosystem resilience through catalyzing multi-state cooperation to balance surface and groundwater use across	**Baseline:** US$ **$** 35.6M **Increment:** US$ $6.02M

studies in the Senegal river basin on assessment of vulnerability to climate change and potential adaptation options, including local knowledge and practice; and an updated assessment of the vulnerability of Basin to climate change	management through implementation of the SAP	sectors.	
			Total Baseline Financing: US$ **$ 79.6** M **Total GEF Increment:** US$ $16M

Annex 7: MWRD2 Base Line and Lessons learnt from MWRD1

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2

1. In the Table 8.1 given below the work completed under MWRD1 and the residual needs for MWRD2 are summarized. Table 8.1 aims to be as concise as possible, further details and reports are available on request.

Table 8.1: Activities under MWRD1 and needs for MWRD2

Work completed under MWRD1	Residual needs and activities for MWRD2
Component 1	
Institutional reform of OMVS was completed and the institutional framework updated. Basic functionality is in place. IT systems and hardware and vehicles were provided. Training and capacity building for OMVS has been ongoing through the 6 years of the project. Evaluation of the national cellules including roles, responsibilities and composition was completed.	Increased capacity for national cellules to enable them to supervise more effectively executing agencies. Training needs identified by OMVS and executing agencies include; extended procurement training, environmental safeguards, monitoring and evaluation. Improved communication between OMVS and national cellules; VC facilities are required to enable meetings with minimal cost, IT systems need to be upgraded and additional vehicles provided for field supervision. Support to OMVS strategic coordination and collaboration among national water and agricultural technical bodies, including exchange of experiences and best practices. Reinforcement of local level consultation with communities and civil society representatives. Institutional capacity building on climate change adaptation for OMVS, national cellules and national agencies.
The integration of Guinea into OMVS was facilitated through; inclusion in decision making processes, workshops and training on the basic texts of OMVS, data management, procurement and environmental management. Guinea is now an operational member of OMVS; Guinea has ratified the OMVS convention, is paying contributions, has adopted OMVS legislation as the overarching legal framework for water resources management and Guinean staff are fully integrated into the revised operational structure of OMVS.	Revision and agreement on the partition of costs and benefits between the four countries. Update of the national legislation of Guinea to reflect the overarching OMVS legislation already adopted. Additional training and support for Guinea to strengthen their position within OMVS, including support for understanding and application of the basic texts of OMVS.
The rehabilitation and modernization of the documentation center were completed. The internet portal for the documentation center was updated with an online database (OMVSDOC, RESOLUDOC and Archives). Furniture and other materials were provided.	Digitization of existing data, including that available from executing agencies and national cellules. Capacity building for staff working in the documentation center and recruitment of additional personnel. (These are considered to be running costs and would not have a significant additional impact – OMVS agreed to cover these costs).
Modernization of the Permanent Water Commission was completed through a	Strengthening the Permanent Water Commission through improved under understanding of environmental issues relating to climate

Work completed under MWRD1	Residual needs and activities for MWRD2
number of studies, including updating the monograph of the Senegal River, a flood analysis and a study classifying the thresholds for permitting abstractions.	change and how they can be addressed. Supporting the application of the water charter through improved understanding of surface and ground water quality, publishing the monograph of the Senegal River, disseminating recommended thresholds for abstraction permitting, extending the flooding study into the upper basin, study on the application of pollution taxes. (These studies are thought to be important, but divert focus and resources away from completion of the partition of costs and benefits; in addition, based on lessons learned from MWRD1, MWRD2 will focus on a smaller number of actions with larger impact).
Communication and diffusion of information was improved including; documentaries on schistosomiasis and malaria (shown on national television channels and Africable), OMVS journal incorporating regular project updates.	Continued information and sensitization on project activities. Rehabilitation of the communication systems for disasters (Member states have national agencies for disaster response and this is not strictly the mandate of OMVS).
Component 2	
Hydro-agricultural and water resources protection Detailed information on hectarage and areas of intervention are given in the OMVS progress report and in the ISRs. Water intakes, pumping stations and canals were developed including; • Rehabilitation / construction of the Canal de Krankaye (Senegal); • Recalibration of supply canals and rehabilitation/construction of flow control infrastructure and intakes at Laouiji, Bellara, Chechia, Dioulol, Kaedi; • 3 pumping station were constructed or rehabilitated and 16 motor or electric pumps were purchased and installed; • Approximately 5,000ha of land were rehabilitated or developed for irrigated agriculture, including low land areas, across the four riparian states; • Women's cooperatives and irrigated small gardens were created; • Reforestation and capacity building was completed in Guinea; • Creation / support to water user groups provided to facilitate operation and maintenance;	Further investments in irrigated agriculture and agroforestry to realize more of the basin potential (Through the activities outlined below it is hoped to create sufficient capacity for improvements to continue, development of full basin potential is outside the scope of the project). Slope stabilization, agroforestry and rehabilitation/development of irrigation and low lands for areas identified and studied during MWRD1 but not completed due budget constraints and delays; • Development of low land areas in Guinea and Mali, • Rehabilitation/development of irrigation areas in Mali, Mauritania and Senegal • Agroforestry in Guinea and Mali. Slope stabilization, agroforestry and rehabilitation/development of irrigation and low lands for new areas. These are mostly adjacent to areas developed during MWRD1 in order to build economies of scale. • Rehabilitation/development of new areas of low lands/irrigation. • Expanded agroforestry in Guinea and Mali • Creation / support to water user groups to facilitate operation and maintenance • New studies in Guinea to enable them to prepare an investment pipeline

Work completed under MWRD1	Residual needs and activities for MWRD2
• Studies were completed in Mauritania and Senegal to enable national Governments to prepare an investment pipeline.	
Fisheries • Fish resources characterization studies in the Senegal River Basin; • Technical studies related to infrastructure for fisheries (such as fish centers for conservation and trade); • Infrastructure, including landing points and markets; • Training of fisheries actors (fishermen, traders, processors, etc.); • Support to fisheries associations and councils, formation of fishing councils • Distribution of equipment for fishing (including boats and nets) and for processing and conservation of fresh fish (including smoking ovens and cool boxes) • Implementation of alternative activities (agriculture) during the fishing closure season	Continued support to fishing communities along the length of the Senegal River Basin. (Interventions can only address a fraction of the Fishing Communities along the Senegal River). Interventions selected which are close to markets and MWRD1 intervention areas to build economies of scale. New activities will be introduced in Guinea and scaled-up in Mali, Mauritania and Senegal as follows: • Infrastructure including landing points and fish centers for conservation and trade – including cold rooms at markets. • Training and equipment for women to improve fish processing, including facilities for drying /fermenting fish, smoke ovens, cold stores, improved sanitary conditions etc. • Creation / strengthening of fishing councils to monitor and support sustainable fishing practices, including equipment, transport etc. • Preparation and adoption of local conventions signed by the fishermen associations and the local administration. • Developing small-scale aquaculture both in existing water bodies/reservoirs and ponds created by dams and small irrigation structures where MWRD2 has interventions. • Supporting local fishermen to create artificial ponds, construction or rehabilitation of small-scale hatcheries , provision of training and equipment for local operators. • Implementation of alternative activities (agriculture) during the fishing closure season. • Distribution of equipment including boats and nets.
Health • Distributions were completed of more than 2.5 million insecticide treated nets with 80+% coverage and increased regular use (from 57.5% to 74.1% for < 5years) within intervention areas. • Mass treatment of schistosomiasis and STH was completed with a coverage of 80+% of children and 65+% of adults at risk in the areas of intervention.	Continued support for: • Distribution of insecticide treated nets, contributing to universal coverage of the basin population • Continued treatment for schistosomiasis, STH and the most common co-endemic neglected tropical diseases aiming for universal treatment coverage in the basin population.
Component 3	
The Master Plan for the Senegal River Basin (SDAGE) was developed and validated. Tools for the dissemination and training on this document were developed. An overarching plan for energy transmission – to develop the local power	Support to implement the management plan including development of local level planning documents (OMVS agreed that they should take direct control of this activity and will seek outside financing – possibly from AFD - experts from the PCU will be available to provide advice and guidance)

Work completed under MWRD1	Residual needs and activities for MWRD2
pool – and a strategic regional environmental and social evaluation were also developed as part of this process.	
Capacity building for dam operating agencies and studies for the renovation of; electric and electronic installations for automatic and command systems and cathodic corrosion control systems at Diama dam	Support to dam maintenance: • Urgent maintenance works, including renovation of electric and electronic installations for automatic and command systems, repairs and rehabilitation of the corrosion protection system • Overall Inspection and analysis of the condition of Diama dam

Lessons learnt from MWRD1

Fiduciary Management

2. There have been difficulties in mobilizing counterpart funds from some member states over the duration of implementation of MWRD1. During MWRD2, the counterpart funding will be maintained at the same level as recommended by OMVS; however a timeline with dated covenants has been established for the payment of the remaining amounts..

3. For the executing agencies responsible for implementation hydro-agricultural activities, difficulties were encountered in maintaining the personnel needed to guarantee an adequate quality and rigor of implementation. For MWRD2, the performance management contracts for the executing agencies will be modified to including binding provisions related to the maintenance of the personnel.

4. To improve auditing procedures, it is proposed to engage external auditors for 2 months each year to evaluate the national executing agencies, national cellules and the regional project coordination unit. Auditors would be engaged for each country with additional support for the regional headquarters.

5. Bank supervision of financial management was also enhanced during implementation of MWRD1 to include 2 Financial Management specialists, each covering two countries. This approach will be retained during MWRD2.

6. In addition contractors were sometimes not able to mobilize the human and material resources needed. For MWRD2, executing agencies and the project coordination unit need to improve the selection of suppliers by a rigorous evaluation of the technical and financial bids.

Planning and Management

7. A key lesson in the overall management of MWRD1 was the difficulties in supervising a large number of dispersed activities, specifically the wide range of technical studies completed under the project. The activities under Component 1, while important, were time-consuming to manage and the final impacts difficult to aggregate and quantify. Under MWRD2, there is a significant consolidation of the number of activities.

8. The monitoring of field activities at the regional level was often delayed or insufficient, particularly during the later stages from February 2012 onwards. OMVS experts often focused their time in Dakar rather than supporting the national cellules or executing agencies. Inadequate supervision of field activities, specifically construction and rehabilitation of irrigation schemes, has meant that at times, problems were not identified and recommendations not implemented in a timely manner. To improve the monitoring of activities over MWRD2, more regular field supervision is recommended – including at least quarterly missions by the OMVS experts. The budget for this has been provided under the Project.

9. Executing agencies have not always performed well in the application and implementation of the selection criteria (economic viability of investments, beneficiary led, environmental and social conformance), or in planning for the future development and maintenance of investments made. For MWRD2 these issues need increased surveillance to ensure successful implementation.

10. During the preparation of MWRD1, many of the budget allocations were underestimated, particularly for the dam studies, and hydro-agricultural investments. Many planned activities were delayed due to lack of funds given the actual budget requirements. Changes were made at the mid-term review which restructured the project to cancel some of the secondary activities that had not yet started. For MWRD2, costs are based on actual contracts, wherever possible, or on more detailed market reviews.

11. A number of activities under the project required studies to develop design before implementation. Delays in the process for recruiting consulting services and implementing these studies led delays in starting to implement these activities. This will be addressed under MWRD2 by prioritizing those works for which studies have been completed and accelerating studies for new areas including procuring consultant services in the first year of the project. All new studies must be completed before the mid-term review of the project.

Implementation Arrangements

12. During MWRD1, the skills within the regional Project Coordination Unit (PCU) at OMVS headquarters were significantly developed through on the job training and supervision. However for MWRD2, the PCU will be strengthened with the following technical skills: civil engineering, forestry and climate change adaptation.

13. OMVS has an internship program funded by the High Commission. MWRD1 has benefitted from the involvement of at least 2 of these interns which in turn contributes to institutional capacity. It is expected this approach will be continued in MWRD2.

14. The activities financed by IDA and by the Trust Funds were managed by separate project units in OMVS. To better facilitate coherence and coordination of activities, and to reduce overhead management costs, one PCU will be responsible for implementation of MWRD2, the GEF/LDCF and the Dutch Trust Fund.

15. The role of the national cellules is critical to the successful implementation of the Project. In the first phase this role was well defined, however implementation was more difficult as cellules were not given a dedicated budget for supervision.. During MWRD2, the national cellules will be given a budget for supervision of national activities on the basis of appropriate justification and accounting systems.

Safeguards

16. The safeguards capacity within OMVS has significantly increased during implementation of MWRD1. However at the national level, capacity needs to the strengthened in MWRD2 to ensure that contractors respect the environmental and social terms of the contracts. Maintenance of safeguards personnel will be included in the performance management contracts of the executing agencies.

17. The control of rice eating birds is a challenge for the hydro-agricultural executing agencies. However, ultimately the problem appears to be mainly due to improper harvesting practices and there are mitigation measures referenced under the Pest and Pesticide Management Plan.

18. Consideration was given to using the fisheries component as both a livelihoods component and to reduce malaria transmission by eating larvae. However, it appears that mosquitos are most problematic in the irrigation channels where water level control for fisheries development would not be possible. This would also dirty the water and exacerbate health problems. This proposition was therefore dropped.

Monitoring and Evaluation (M&E)

19. The monitoring capacity within OMVS has improved significantly throughout implementation of MWRD1. The main lesson learnt is that sufficient financing needs to be allocated for M&E. In addition it was noted that the majority of indicator tracking completed was based around implementation and immediate impacts, for example irrigation areas serviced and fish sales. It has therefore been difficult to quantify the wider impacts of the project on household income and quality of life. Additional household surveys are proposed to identify the wider project impacts.

20. During MWRD1, the results framework was substantially simplified during the mid-term review and project restructuring. The main lesson learnt from this process was that the results framework was too ambitious in terms of the number and type of indicators. For example, the indicator on yield was deleted because the project only focuses on supplying bulk water and rehabilitation of infrastructure, it does not include the other elements for commercialization, inputs, cropping patterns and so on which are equal determinants affecting yield.

Annex 8: Economic and Financial Analysis

SENEGAL RIVER BASIN: Multipurpose Water Resources Development Project 2 (MWRD2)

Introduction

1. To improve coordinated management of water resources for socially, environmentally and economically sustainable development in the Senegal River Basin, the World Bank in 2006, supported the design and implementation of a USD110 million Multi-Purpose Water Resources Development Project (MWRD1). MWRD1 had three main components: (i) Regional Institutional Development for Water Resources; (ii) Local Level Multi-Purpose Water Resources Development; and (iii) Regional Multi-purpose and Multi-sectoral Master Planning. Activities of the project were implemented in the four participating countries (Senegal, Mali, Mauritania and Guinea) over a five-year period (2007-2013).

2. The second project (MWRD2) to be implemented over a seven-year timeframe (2013-2021) consists of three comparable inter-related components aimed at scaling-up the activities initiated under MWRD1 and expanding its achievements. Its components include: (1) Institutional development; (2) Multi-purpose water resources development and (3) Infrastructure management and planning.

3. The financial and economic analysis of the proposed investment operation has been carried out based on an analysis of existing data on costs and benefits of productive activities financed under the first project. These findings along with additional information related to MWRD2 were used to assess the financial and economic attractiveness of this latter. The analysis was conducted in a partnership with the Investment Centre of FAO. That analysis is described below.

FINANCIAL AND ECONOMIC ANALYSIS APPROACH

MWRD1

4. *Scope of work.* Data for the financial and economic analyses of MWRD1 and MWRD2 was collected during a field visit undertaken during the appraisal mission of the second project. For both operations, financial analyses were conducted for agriculture and fishery productive investments implemented between 2007 and 2013or to be executed over the five coming years in the four participating countries. Over a period of 30 years at a 12 percent discount rate, the evidence-based analysis confirms that MWRD1 selected productive investments are financially attractive in Mali, Mauritania and Senegal as demonstrated by their Financial/Economic Rates of Return (IRR/ERR) and their positive Net Present Values (NPVs), summarized in the table below:

Table 8.1: Results of financial and economic analyses of fishery and agriculture productive investments under MWRD1

Country	FINANCIAL VIABILITY		ECONOMIC VIABILITY	
	Financial IRR (%)	NPV (USD)	ERR (%)	NPV (USD)
Guinea	(0.1)	(5,756,000)	(4.2)	(16,56,000)
Mali	31.6	33,578,000	24.6	37,112,000
Mauritania	18.1	9,114,000	13.5	3,778,000
Senegal	40.2	51,289,000	28.3	50,796,000
Project	**25.9%**	**81,752,000**	**20.5%**	**80,012,000**

5. *Guinea exceptionality*. The negative financial and economic indicators for Guinea are essentially due to two main factors: (1) fishery income generating activities which are very lucrative have not been implemented under the first project due to the fact that Guinea has joined the OMWS very recently; (2) the very limited agricultural irrigated perimeters (140 ha in in Low-lands) developed or rehabilitated under MWRD1 are just beginning to be exploited by intended end-users and to yield benefits. The combined effect of these two factors has led to low returns on investments both in terms of jobs creation and revenue generation which in turn have negatively affected the associated financial and economic indicators. However, MWRD2 is expected to significantly contribute to highincome generation in this country notably due to the development of newirrigated perimeters and the introduction of fisheries including aquaculture. On the other hand, Mali and Senegal productive investments good financial and economic fallouts are mainly explained by the fact that: (i) surface areas cultivated in MWRD1 intervention zones are larger in these two countries and generate consequently higher level of production and revenue for farmers; and (ii) both countries have the highest number of primary fishery beneficiaries generating more income and creating more jobs. All these factors have a significant positive impact on the financial and economic rates of return.

6. *MWRD1 Economic Efficiency.*MWRD1 economic efficiency was tested through the identification of some economic benefits generated during the implementation period at the regional level. Analyses confirm that employment and income generation induced by the MWRD1 project have considerably improved livelihood of local communities living in the project intervention areas except in Guinea where the project financial and economic impact are not yet noticeable for the reasons explained earlier. The table below provides a summary of economic benefits generated by the first project:

Table 8.2: Incremental Socioeconomic Benefits generated by MWRD1

COUNTRY	Jobs Creation			Income Generation		
FISHERIES						
	Without MWRD1	With MWRD1	Incremental per country %	Without MWRD1	With MWRD1	Incremental per country %
GUINEA	NA	NA	NA	NA	NA	NA
MALI	1540	7,655	46%	4,963,000	33,237,000	45%
MAURITANIA	660	3,333	20%	2,127,000	14,471,000	20%
SENEGAL	1140	5,712	34%	3,674,000	24,801,000	34%
Sub-Total	**3,340**	**20,040**	**16700**	**10,764,000**	**72,509,000**	**61,745,000**
HYDRO-AGRICULTURE						
GUINEA	560	672	4%	135,000	1,272,000	4%
MALI	3,758	4,510	30%	1,734,000	6,419,000	16%
MAURITANIA	2,868	3,400	23%	11,410,000	16,875,000	18%
SENEGAL	5,520	6,400	43%	26,460,000	45,389,000	63%
Sub-Total	12,706	14,982	2,276	39,739,000	69,954,000	30,215,000
Total both Sub-sectors	**16,046**	**35,022**	**18,976**	**50,503,000**	**142,463,000**	**91,960,000**

7. The economic analysis reveals that, over the five years of MWRD1 implementation, about 18,076 new jobs have been created in the fishing and hydro-agricultural sub-sectors (16,700 and 2,276 respectively). The induced incremental income generation has been estimated to US$142,463,000 (US$72,509,000 in fisheries and US$30,215,000 in hydro-agriculture).The related per capita daily average revenue has increased from US$1.34 to US$3.67 in fishery and from US$0.43 to US$0.79 in hydro-agriculture sub-sector. The associated daily incremental income is respectively US$2.34 and US$0.36 (primary beneficiaries and employees).

8. *MWRD1 contribution to poverty alleviation in project interventions areas*. The computation of the number of people having crossed the poverty line due to the first project implementation is done based on the following assumptions: (i) the daily absolute poverty line frequently used for international comparisons by the United Nations is US$2.0; (ii) the family average size in the project area is about seven people and (iii) each of the 3,340 fishery units employs four additional people in fishery activities. Results of the above computation which takes into account all these assumptions reveal that the incremental number of people reaching or crossing the poverty line is about 30,076 people because of MWRD1 implementation. On the other hand, the analysis indicates that implementation of agricultural activities has helped about

2,697 people to get out of poverty. In consequence, MWRD1 productive investments total impact on poverty alleviation as measured by the number of people having a daily income over the poverty line due to the first project implementation is about 32,773 people.

9. *MWRD1 Environmental benefits*. Positive environmental impacts induced by the implementation of the first project are mostly non-monetary externalities and these include: (i) improved land and water management through the use of efficient and innovative irrigation technologies that have contributed to considerably reduce water waste in areas where this resource is scarce; (ii) river bank construction and beautification, forest regeneration, and afforestation of key vulnerable and degraded areas have significantly reduced soil erosion in critical areas and increased the restoration of coastal and marine biodiversity and ecosystems; The above observed environmental benefits have ultimately translated to improved hydro-agriculture productivity both quantitatively and qualitatively, food safety, employment development and enhanced living conditions and comfort for local populations in the project interventions zones. Some of these environmental benefits have been evaluated in previous sections.

10. However, development of irrigated perimeters under the first project had some negative environmental impacts, the most noticeable being soil pollution due to uncontrolled use of various pesticides and inadequate management of solid wastes and wastewaters produced by Kayes and Mahina fish markets. If appropriate measures are not taken to mitigate these negative environmental effects, the production, productivity and quality of vegetable crops such as potatoes, sweet potatoes, okra and onion will be negatively affected. It is therefore critical that training of local small farmers on the rational use of pesticides be supported by the second project to curb their adverse effects and preserve the economic benefit streams expected from the hydro-agriculture activities planned under the proposed operation.

11. *MWRD1 health benefits*. Curative and preventive activities undertaken during the implementation of the first project such as the provision of praziquantel and albendazole treatment, mass distribution of long-lasting insecticide treated bed-nets, information and education on preventive health practices for targeted local communities have yielded considerable economic benefits that have not been quantified in this analysis because of lack of usable data. These include direct health expenditure avoided, child death averted, and income gained due to avoided days lost from work as a result of malaria and NTD illnesses. Additionally, Health activities undertaken during the first project have certainly indirectly contributed to increase the productivity of agricultural activities and of the fishery units because of the reduction of the prevalence rate of Malaria and other tropical disease induced by these activities in the project interventions areas.

12. *MWRD1 Energy benefits*. Various preliminary studies have been conducted under the first project to identify energy capacity generation of three major water infrastructures: Diama Dam, Balassa Dam and Koukoutamba. Advanced studies regarding Koukoutamba Dam indicate that the contribution of this infrastructure to the regional hydropower generation is huge (294 MW) with low negative environmental and social impacts. It is anticipated that the realization of this infrastructure would on the other hand generate considerable socioeconomic benefits in the

river basin but which the analysis has not assessed due to lack of usable data and the impossibility to precisely determine the occurrence of the first benefits.

13. *MWRD1 food security and nutritional benefits*. The first project has contributed to reduce malnutrition and food insecurity in the project areas. The project has supported diversification of crops and the use of improved seeds and fertilizers which has led to an incremental crop production to about77,130 tons per year (71,853 tons of diversified agricultural products and 5,277 tons of fish) available to the populations living in the project area and beyond.

14. It is anticipated that implementation of MWRD2 whose design has taken into consideration lessons learned from MWRD1 at the institutional, technical, socio-environmental, financial and fiduciary levels, would consolidate the above quantified and unquantified economic returns and sustainably strengthen the needed coordinated management of basin water resources, for a multi-dimension shared sustainable development in the basin.

SECOND PROJECT

15. The second project (MWRD2) is to be implemented over a longer time-frame (7 years) and consists of three comparable inter-related components aimed at scaling-up the activities initiated under MWRD1 and escalating the above selected accomplishments both nationally and regionally. Its components include: (1) Institutional development; (2) Multi-purpose water resources development and (3) Infrastructure management and planning.

Overall Benefits and Beneficiaries of MWRD2 Project

16. **Assumptions underlying beneficiaries and benefits determination.** The main benefits deriving from the second operation have been identified based on the following assumptions:(i) The overall zones of intervention for MWRD2 are identified and prioritized according to their production potential, the level of degradation, the needs expressed by the beneficiaries and their commitment to ensuring the full operation and maintenance of infrastructure in the future; (ii) planned measures aimed at supporting the long term sustainability of the project interventions are taken across all member states; (iii) institutional development activities proposed under the project are assumed to improve the capacity of OMVS and related national agencies to successfully implement all planned activities; (iv) participating governments political and fiscal support to OMVS, its related agencies and to the project interventions will be continued to sustain the identified benefits; and (v) the project will phase the rehabilitation of adjacent irrigation areas to ensure that the benefits from bulk infrastructure are realized and result in sustainable maintenance of the whole system.

17. Based on the above assumptions, the project's development impact in terms of expected benefits and beneficiaries include:

- **Socioeconomic benefits**: The project will geographically expand the positive economic effects generated by MWRD1 and significantly contribute to poverty alleviation for local populations living along the Senegal River. Major benefits such as increased food security, reduction of malnutrition and revenues generation will continue to accrue from the development

of hydro-agricultural activities, enhanced support to sustainable fisheries management, and development of small-scale aquaculture in selected locations of the river basin. The project through the recalibration, reshaping and compacting of canals supplying irrigated areas, the rehabilitation of irrigation schemes, and the development of small irrigated gardens will result in significantly increased cultivated area as well as increased crop productivity and the associated economic returns. Support to women cooperatives in processing agricultural products will reduce the rate of loss for perishable produces, develop the local and regional market for related goods, and improve livelihoods for local populations. In addition, crop diversification incorporating high value crops will be possible, breaking the cycle of grain cropping and improving related economic yield. Additional investments in traditional fisheries and small-scale aquaculture in selected basin localities aim at expanding the number of fishermen benefiting from the provision of adapted fishing equipment, adequate landing and storage facilities, as well as better access to markets. The expected resulting benefits are expected, including: (i) improved fish capture and production; (ii) increased fish conservation, processing and supply of diversified derivate goods to local markets; and (iii) better fish quality and size induced by the use of improved fishing techniques and infrastructure which will lead to higher sales prices and increased jobs creation and incomes generation for local communities.

- **Health benefits:** MWRD2 aims to sustainably consolidate results achieved under MWRD1 in terms of water-related disease prevention, in particular the control of malaria and treatment of two NTDs (Schistosomiasis and soil transmitted Helminthes) and the integrated control of three other water–related Neglected Tropical Diseases (Lymphatic Filariasis, Onchocerciasis and Trachoma). The additional positive health impact of the proposed program is expected to be considerable in the river basin. The use of long-lasting insecticidal bed nets (LLINs) during MWRD1 has demonstrated a reduction in childhood malaria morbidity in the River basin. For example, results of surveys conducted by member states during the first project implementation on children aged 6–59 months indicated a reduction of parasitaemia from 5.7 percent in 2008–09 to 2.9 percent in 2010–11. It is expected that continued high coverage of LLINs will also help prevent malaria in new migrants to the intervention areas who may have lower malaria immunity, from contracting malaria. Moreover, the distribution of LLIN to pregnant women will reduce the risk of acute malarial illness in pregnant women (all malaria infections in pregnant women are considered severe) and contribute to reduced anemia and overall better pregnancy outcomes and improvements in birth weight.

Economic benefits of malaria related activities. In addition to affecting individual workers, malaria can also damage the economic environment in which businesses operate, having an impact on the availability of local resources and public health budgets, and slowing economic growth in the Basin. Leading economists have estimated that malaria is responsible for an 'economic growth penalty' of up to 1.3% per year in malaria endemic African countries[23]. It has also been well documented that malaria discourages internal and foreign investment and tourism; effects land use patterns and crop selection resulting in sub-optimal agricultural production; reduces labor productivity through lost work days and reduced on-the job performance and affects learning and scholastic achievement causing frequent absenteeism and, in children who suffer severe or frequent infections, permanent neurological damage and cognitive impairment. It is therefore expected that malaria related activities to be funded under the proposed operation

[23]Sachs and Malaney 2002.The economic and social burden of malaria. *Nature,* 415(6872): 680-5

and which are based on the most cost-effective tools available will have considerable economic benefits for the participating countries' health systems (public health budgets), households in the project areas (expenditure on malaria prevention and treatment) and the private sector (expected increase in productivity and profitability due to gain in productive labor time per averted malaria episode).

Cost-effectiveness of insecticide-treated net (ITN) distribution. Over the past decade, the cost effectiveness of key malaria preventive and curative interventions has been well established. A fairly exhaustive review of the evidence associated with the cost effectiveness of malaria control interventions was published in 2000 by the Global Forum for Health Research. The central message from this analysis is that all of the malaria control interventions evaluated would be an attractive use of resources[24]. In more recent years, the interventions—already established as cost-effective—have been subject to continuous improvements to promote more effective use, reduce costs and improve the cost-effectiveness ratio.

A 2013 study[25] by WHO on insecticide-treated nets in SSA has revealed that use of LLINs is one of the most cost-effective interventions against malaria. In this recent WHO analysis of the cost of five ITN and two indoor residual spraying (IRS) programmes in SSA, LLINs were found to be significantly cheaper to use than conventionally treated nets. The costs per death averted and per DALY averted with LLINs lasting 3 years were less than half the comparable costs incurred in using conventional ITNs. The study's findings also suggest that, in high-transmission areas where most of the malaria burden occurs in children under the age of 5 years, and assuming that this population group can be effectively targeted with LLINs, the use of LLINs is 4–5 times cheaper than IRS, which cannot be targeted to children only. Results of this WHO study confirm thus that malaria related activities planned under the proposed project are cost-effective.

Cost-effectiveness of Neglected Tropical Diseases (NTDs). The project is anticipated to produce great economic health benefits for local populations accruing notably from the implementation of preventive actions against the five NTD diseases, in the form of direct health expenditure avoided, days of school absenteeism avoided, and income gained due to avoided days lost from work as a result of child illness. On the other hand, a comprehensive research and policy analysis study on the economic impact of neglected tropical diseases (NTDs) was recently undertaken by the Hudson Institute's Center for Science in Public Policy in collaboration with the Sabin Vaccine Institute's Global Network for Neglected Tropical Diseases (GNNTD). This report showed that interventions against many of the neglected tropical diseases especially preventable NTDs[26] like onchocerciasis and Lymphatic filariasiswhich are targeted by the proposed operation, using the Mass Drug Administration based on an annual oral administration to everyone in a given endemic area are very cost–effective. It has been estimated that the annual rates of return on investment in control of neglected tropical diseases are about 14 to 30%[27]. Specifically, the economic return from treating Lymphatic filariasis was estimated at $20 for

[24]Goodman, Coleman and Mills 2000. Economic Analysis of Malaria Control in Sub-Saharan Africa, published by the Global Forum for Health Research, May 2000, ISBN 2-940286-00-0

[25] WHO 2013: Global Malaria Programme – Insecticide-treated mosquito nets

[26]Hotez PJ, Molyneuw DH, Fenwick A, Kumaresan J, Sachs SE, Sachs JD, Savioli L. (2007) "Control of Neglected Tropical Diseases." New England Journal of Medicine, 357:1018-27.

[27]Molyneux DH. (2004) "Neglected" diseases but unrecognized successes—challenges and opportunities for infectious disease control. *Lancet* ;**364:** 380–83.

every $1 invested at a cost of around $60 per person treated[28]. The project is expected to generate economic returns which are closed to the above figures.

- **Nutritional benefits**: Sustainable and efficient development of traditional fisheries and aquaculture will help avoid overexploitation of fish resources and will ensure that nutritional needs are satisfied within the poor population groups that rely on the fish stocks as a main source of protein. A socioeconomic study conducted in selected areas covered by the first project has revealed for instance that, for rice production, the quantity consumed is virtually identical to that sold, while for corn, sorghum, mil and fonio, self-consumption is about 80 percent to 90 percent of production and only 10 percent to 20 percent are sold. On the other hand, 49 percent to 57 percent of tomatoes productions are for self-consumption. In addition, increased development of recessional agriculture and rehabilitation of irrigation schemes planned under MWRD2 will increase the number of small holder or subsistence farmers including at least 2,500 women; Implementation of the second operation is also expected to further improve levels of crops diversification and productivity, in particular rice production, which is an essential food for communities living along the Senegal River. The project contribution in malnutrition and food insecurity reduction in the project areas is expected to be very significant. The expected outcome is an increase in production for about 228,000 tons per year (7.5% in fishing products, 92.5% in agriculture and agroforestry). The economic analysis anticipates that implementation of activities to be funded under the second project would lead to an incremental production of about 211,000 tons of diversified agricultural products per year which could reach 280,000 tons per year in the project sites. In addition to this agricultural incremental production in the project sites, it is expected that implementation of fishery activities would generate an incremental production of fish of about 17,000 Tons per year, with the likelihood to reach a total incremental yearly fish production of about 22,000 tons.

- **Environmental benefits**: MWRD2 activities pertaining to the planning and management of land and water resources at the community and sub-basin levels are expected to yield significant environmental benefits, in terms of reduction of soil erosion in critical areas, increased restoration and maintenance of riverbanks through slope stabilization works, reforestation, and development of agroforestry activities. Additionally, it is expected that implementation of MWRD2 activities would considerably contribute to the restoration and sustainability of freshwater, coastal and marine ecosystems goods and services, including globally relevant biodiversity and ecosystems as well as capacity to absorb carbon to reduce global warming. Moreover, it is anticipated that the second project will reduce vulnerability to climate variability and climate-related risks in the river basin while increasing ecosystem resilience through catalyzing multi-state cooperation to balance surface and groundwater use across sectors.

- **MWRD2 Energy benefits.** Two specific studies are planned under the project. Some of these studies aim to identify the capacity generation of the major water infrastructures such as Balassa Dam and Koukoutamba Dam. Presently, the estimated contribution of those two infrastructures to the regional hydropower generation is about 408 MW.

[28] Chu BK, Hooper PJ, Bradley MH, et a. (2010). The economic benefits resulting from the first 8 years of the Global Programme to Eliminate Lymphatic Filariasis (2000-2007).PLoSNegl Trop Dis. Jun 1;4(6):e708.

MWRD2 Project Estimated Costs

18. Project costs include total investment costs over the seven-year implementation period. Annual operation and maintenance (O&M) costs for water control structures and irrigation canals are also taken in account over the project life. They are estimated at 10 percent of total investment costs in perimeters rehabilitation. In the financial analysis only the direct investments on the productive activities are considered in the calculation of the (O&M).

MWRD2 Financial Analysis

19. The financial analysis has focused on a cost-benefit analysis and zeroes of productive investments to be financed under Component 2 (activity 2.1: Hydro-agricultural development and water resources protection; and Activity 2.2: Sustainable fisheries management and aquaculture). The main objective of the analysis was to examine the financial attractiveness of these activities at both the national and regional levels taking into account only related direct costs and benefits. Results of the financial analysis over a period of 30 years at 12 percent discount rate are summarized in table below:

Table 8.3: Results of financial analysis of MWRD2

Country	**Financial Viability (Agriculture and Fisheries)**	
	Financial IRR (%)	**NPV (USD)**
Guinea	40.7%	28,591,000
Mali	42.6%	55,105,000
Mauritania	47.1%	90,695,000
Senegal	46.6%	49,728,000
Project	**44.9%**	**224,119,000**
Financial Attractiveness of Productive Investments		
Agriculture	**30.8%**	**128,669,000**
Fisheries	**163.6%**	**95,450,000**

20. Results of the analyses reveal that MWRD2 hydro-agriculture, fisheries and aquaculture productive investments are financially attractive. Over a period of 30 years at 12 percent discount rate, the project productive investments yield a total NPV estimated at224million USD and an overall financial rate of return of about 44.9 percent. At the sub-sector level, fisheries activities planned under the proposed operation appear to be more financially viable than hydro-agricultural ones generating an internal rate of return of about 163.6 percent as compared to 30.8 percent for hydro-agricultural activities. The contrast observed between financial indicators of these sub-sectors is explained by the fact that hydro-agricultural investments take a longer period of time to generate profit than fishery investments.

MWRD2 Economic Analysis

21. The main objective of the economic analysis carried out was to examine the economic viability of the overall operation at the national and regional levels, by taking into consideration direct and indirect costs and benefits, and converting the above financial prices in economic costs through shadow pricing aimed at eliminating the effects of participating governments' interventions and market distortions. Depreciation charges, expected changes in the general price and direct transfers such as taxes, direct subsidies, and credit transactions including loans, principal repayment, and interest payments were thus excluded from the cost-benefit analysis. Counterpart funding from participating countries provided to support the implementation of discrete activities which are high priorities for member states has been taken into account in the analysis. Public sector financing for the type of activities included in this Project is considered an appropriate vehicle as many of the activities relate to management or development of public goods. On the other hand, several benefits have not been quantified because of lack of usable data. As a result, these were not taken into account in the determination of the project's economic rate of return. These include mainly health, environmental (such as carbon credits), and nutritional benefits which represent returns of significant value for the project. If accounted for, they would enhance the overall economic viability of the proposed investment operation. For that reason, the decision on project feasibility and rationale should also take these elements into account.

22. In addition, without the project, further deterioration of many irrigation schemes is highly likely due to the absence of alternative funding, resulting in the possibility that significant farm land would be taken out of production negatively affecting many local families and households. The total benefits quantified in the cost-benefit analysis should thus be interpreted as a conservative lower bound estimate. Project viability is based on the economic rate of return and net present value of the measurable, incremental benefits and related costs of the project using the "without-project" and "with-project" criteria. The economic analysis is based on seven-year project implementation period, and the following additional assumptions:

(a) The period for net benefits evaluation is 30 years;
(b) A discount rate of 12 percent is used in the analysis,
(c) Local market reference prices (Senegal and Mauritania) are calculated for key traded commodities and chemical inputs, and used in the economic analysis,

Benefit Streams

23. ***Hydro-agricultural activities***. The benefit stream of the project's hydro-agricultural intervention was estimated under the assumption that financial contributions from respective participating governments to national agencies in charge of irrigation systems maintenance along with fees paid by water user associations and irrigation cooperatives will cover all operating expenses related to the management of the schemes including, routine maintenance, and network rehabilitation.

24. In all four riparian countries, expected benefits include increased farming revenues resulting from the rehabilitation of existing small irrigation schemes, improved water supply and expansion in spate-irrigated agriculture. Farm budgets for each type of irrigation systems are

based on typical three-season: *hibernate*, *contresaison-froide* and *contresaison-chaude* cropping patterns dominated by irrigated paddy rice and including onion (used as reference) and other cereals such as maize and sorghum. The "without-project" scenario assumes that crop distribution and yield are not same over the project life; the "with-project" scenario assumes an increase in key crop yields along with an expansion of cultivated area under spate irrigation. The assumption is made according to five different agricultural production areas (Small and wide size irrigation perimeters, low-lands, natural river irrigation, small gardens).

25. In Guinea and Mali, project benefits will also accrue from the conversion of currently unusable lowland areas into productive agricultural land. This will result in increased production of staple crops such as rice, cowpea, maize, and cassava. In addition, the project will support the establishment of agro-forestry systems. Beyond their environmental benefits, such activities will induce an additional source of income for local population in the medium term through the commercialization of mango, papaya and guava products, and in the longer-term through timber sales. The financial and economic analysis captures such incremental benefits from investment in lowland agriculture and agroforestry along selected Senegal River banks. In Mauritania and Senegal, project benefit streams derived from the comparison of economic benefits generated by small agriculture farms to the investment and maintenance costs of key irrigated infrastructure.

26. ***Fisheries and aquaculture***. Increased revenue from fishing activities in all four countries are modeled based on currently observed fish catch composition (in terms of proportion of each species in the total average catch). In the "without-project" scenario, it is expected that fish catch will decrease annually if fishermen are not endowed with appropriate fishing equipment and efficient fish stock management practices are not adopted. The "with-project" situation assumes an increase in prices of selected fish species due to improved preservation and fish quality while fish catch levels remain the same as the ones currently observed.

The table below presents the estimated economic life of the project' various activities, the beneficiaries and the projected associated benefits:

Table 8.4: Results of the economic analyses of fishery and agriculture productive investments under MWRD2

Overall Project Economic Viability					
			ERR	**NPV (USD)**	
Project			**37.7%**	**343,560,000**	
Guinea			29.5%	40,759,000	
Mali			33.8%	78,055,000	
Mauritania			44.9%	140,804,000	
Senegal			38.4%	83,942,000	
Estimated Economic Life, Number of Estimated Beneficiaries and Benefits					
Activities	**Economic life**	**Number of Primary Beneficiaries**	**Beneficiaries including job creation**	**Average Annual Benefits (US$) per primary beneficiary**	**First Benefits Occurrence**
Fisheries &aquaculture	30 years	8,024	40,260	$3,515 ($9.63 / day)	1st year of project implementation

Agriculture&Agroforestry	30 years	58,313	72,602	$1,270 ($3.47 / day)	2nd year of project implementation
TOTAL	30 years	66,337	112,862	1,542 ($4.22/ day)	-

27. Over a period of 30 years at a discount rate of 12 percent, the analysis reveals that the proposed operation is economically viable at the regional level with a positive NPV of about 343,560,000USD and an overall economic rate of return (ERR) estimated at 37.7 percent. At the national level, the project generates an ERR estimated at 38.4 percent in Senegal, 44.9 percent in Mauritania, 33.8 percent in Mali, and 29.5 percent in Guinea. The high economic rate of return observed in Mauritania is mainly explained by an additional 12.5 million USD financing from IDA aimed at contributing to the development of an irrigated agriculture in targeted Mauritania rural areas.

28. Additional quantitative economic fallouts expected from MWRD2 project implementation are provided on the table below:

Table 8.5: Incremental Socioeconomic Benefits Generated by MWRD2

COUNTRY	**Jobs Creation**			**Annual Income Generation (salary and sector net business income)**		
FISHERIES						
	Without MWRD2	With MWRD2	Incremental Per country	Without MWRD2	With MWRD2	Incremental per country
GUINEA	1,692	8,628	6,936	4,289,000	15,249,000	10,960,000
MALI	2,308	11,708	9,400	5,842,000	20,567,000	14,725,000
MAURITANIA	1,1704	8,604	6,900	4,308,000	15,031,000	10,723,000
SENEGAL	2,209	11,209	9,000	5,596,000	19,703,000	14,107,000
Total	***7,913***	***40,149***	***32,236***	***20,035,000***	***70,550,000***	***50,515,000***
AGRICULTURE and AGROFORESTRY						
GUNEA	5,658	7,260	1,602	5,910,000	17,329,000	11,419,000
MALI	9,783	11,988	2,205	8,645,000	24,001,000	15,356,000
MAURITANIA	18,279	23,272	4,993	9,767,000	23,418,000	13,651,000
SENEGAL	24,593	30,082	5,489	12,641,000	28,321,000	15,680,000
Total	**58,313**	**72,602**	**14,289**	**36,963,000**	**93,069,000**	**56,106,000**
Total both Sub-sectors	**66,226**	**112,751**	**46,525**	**56,998,000**	**163,619,000**	**106,621,000**

29. All the above various economic, health, environmental and job creation benefits along with the expected high economic rate of return at the regional level underscore the rationale for World Bank involvement and maximize the development impact of staff effort. The World Bank is arguably best-placed to bring these multiple sectors together in a single project so as to generate the co-benefits described above.

SENSITIVITY AND RISK ANALYSIS

30. The project's ERR sensitivity to the following two key variables was tested: (i) decrease in productivity of the project's productive investments; (ii) increase of costs of operation and maintenance caused either by insufficient benefits from bulk infrastructure to cover maintenance costs or lack of support from participating governments.

31. ***Sensitivity to changes in productivity***. Results of the sensitivity analysis reveal that if the productivity of income generating activities were to decrease by 19.3 percent due for instance to unavailability of improved seeds, lack of fertilizers, endemic health problems (especially in low-lands and in areas of the Senegal river well-endowed with fish) or social conflicts in project interventions areas, this would negatively affect the project overall economic viability as the project's ERR would decrease from 37.7 to 11.9 percent and the NPV from US$343,560,000 to US$1,911,000. For the project to remain economically viable everything being equal elsewhere, the maximum decrease in productivity of investments (agriculture, agroforestry and fisheries) is 19.1 percent. At this production rate, the project's ERR falls from 37.7 percent to the minimum required rate of return of 12 percent and the project's NPV remains positive at US$1,099,000.

32. ***Sensitivity to increase in maintenance costs***. The analysis has tested the change in project ERR due to a variation of maintenance costs from 10 percent to 20 percent. The analysis reveals that if such situation were to occur, the project overall ERR would decrease from 37.7 percent to 25.5 percent and the associated NPV from US$343,560,000 to US$198,273,000. The project would not remain economically viable if the maintenance costs were to increase above 33.7%. The NPV would become negative with an ERR less than the 12 percent cost of capital which is for this project, the minimum required rate of return.

33. In final, results of the project's ERR sensitivity to these main variables confirm that the risk tied to the implementation of the proposed operation is substantial, mostly due to the complex nature of the project and the difficult context of some participating countries. This risk is somehow mitigated by the sound strategic decision to combine low profitable hydro-agricultural activities with fisheries and income generating agroforestry investments which have a high financial and economic profitability potential. However, the project benefits identified in this analysis and the associated expected financial and economic fallout may be significantly jeopardized if all the measures accompanying the project implementation are not faithfully executed at both national and regional levels.

IBRD 39969

SENEGAL RIVER BASIN MULTI PURPOSE WATER RESOURCES DEVELOPMENT PROJECT

PHASE 2

• PROPOSED/PLANNED DAM SITES:

1	BALASA	10	TOUGUE
2	NIAGARA	11	SAMENTA
3	KOUKOUTAMBA	12	KOLE
4	DIAOYA	13	FAGAN
5	BOUREYA	14	FADOUGOU
6	TENE I	15	GALOUGO
7	TENE II	16	GOURBASI
8	GAYA	17	GOUINA
9	SALOUMA	18	FELOU

- PROJECT AREAS *ZONES DE PROJET*
- PREVALENCE OF WATER-BORNE DISEASE *PREVALANCE DE MALADIES HYDRIQUES*
- WATER QUALITY ISSUES *PROBLÉMATIQUE DE LA QUALITÉ DE L'EAU*
- AREAS IMPORTANT FOR BIODIVERSITY MANAGEMENT *ZONES D'IMPORTANCE POUR LA GESTION DE LA BIODIVERSITÉ*
- AREAS SUCEPTIBLE TO WATER WEED INFESTATION *ZONES SUJETTES À L'INFESTATION PAR LES VÉGÉTAUX AQUATIQUES*
- SOIL EROSION *EROSION DU SOL*
- SILTATION *SEDIMENTATION*
- SOIL SALINIZATION *PROBLÈMATIQUE DE SALINITÉ DE SOLS*
- NATIONAL PARKS (N.P.) AND PROTECTED AREAS *PARCS NATIONAUX (N.P.) ET AIRES PROTÉGÉES*
- SEVERE DROUGHT PRONE AREAS *ZONES SUJETTES À DE SEVERÉS SÉCHERESSES*
- FLOOD PRONE AREAS *ZONES INONDABLES*
- WETLANDS AND SWAMPS *ZONES HUMIDES ET MARÉCAGES*
- RIVER BASIN LIMITS *LIMITES DU BASSIN*
- HYDRO DAM SITES *SITES HYDROÉLECTRIQUES*
- FALLS *CHUTES*
- MAIN ROADS *AXES ROUTIERS PRINCIPAUX*
- POWER TRANSMISSION LINES *LIGNES DE TRANSMISSION ELECTRIQUES*
- CITIES *VILLES*
- NATIONAL CAPITALS *CAPITALES*
- INTERNATIONAL BOUNDARIES *LIMITES DES ETATS*

GSDPM Map Design Unit

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JUNE 2013

IBRD 32165

SENEGAL RIVER BASIN

NOUAKCHOTT
ATLANTIC OCEAN
MAURITANIA
DELTA REGION (ST.-LOUIS/ DAGANA)
MIDDLE VALLEY REGION (DAGANA/BAKEL)
UPPER VALLEY REGION (BAKEL/LABÉ)
Lac Rkiz
Rosso
Podor
Dagana
Lac de Guier
Diama Dam
Saint-Louis
Aleg
To Nkeht
Bagué
Kaédi
Kiffa
Gorgol-Noir
Sakal
Louga
Vallée du Ferlo
Tiangol Louguére
Linguére
Matam
Senegal R.
Karakoro
Mékhé
DAKAR
Thiès
Mbaké
Diourbel
Mbour
SENEGAL
Bakel
Maréna
Nioro-du-Sahel
Nara
Diéma
Kidira
Kayes
Falémé
Kaolack
Kaffrine
Koumpentoum
Tambacounda
Bafoulabé
Baoulé
Bakoye
17
Mahina
16
Kéniéba
Manantali Dam
Kita
BAMAKO
BANJUL
THE GAMBIA
GUINEA BISSAU
BISSAU
Kédougou
15
14
Bafing
5
4
MALI
Tougué
Labé
11
12
13
9
3
8
10
2
Tene
Pita
6
7
1
GUINEA
Dabola
To Kankan
Mamou
To Conakry
0 40 80 Kilometers
0 20 40 60 80 Miles

Area of Map
AFRICA

INFRASTRUCTURE:
- EXISTING RAILROAD WITH FREQUENT OUTBREAK
- MAIN ROADS
- PROJECTED ROADS
- POWER TRANSMISSION LINES
- EXISTING WATER PIPELINES
- WATER PIPELINE UNDER CONSTRUCTION
- PLANNED WATER PIPELINE (NOUAKCHOTT WATER SUPPLY)
- WATER RESERVOIR
- TREATMENT PLANT
- EXISTING DAMS
- IDENTIFIED DAM SITES (SEE LIST*)
- AIRPORTS
- MAIN PORTS
- NAVIGABLE WAY

HUMAN DYNAMICS:
POPULATION
- > 1,000,000 INHABITANTS
- > 500,000 INHABITANTS
- > 100,000 INHABITANTS
- > 50,000 INHABITANTS
- > 20,000 INHABITANTS
- > 5,000 INHABITANTS

- MIGRATION FLOWS
- PREVALENCE IF WATERBORNE DISEASES
- ENDEMIC WATERBORNE AREAS WITH SERIOUS WATER QUALITY ISSUES

ENVIRONMENTAL ISSUES:
- DRYLAND AREAS
- AREAS SUBJECT TO HIGH EROSION
- PROTECTED AREAS WITH BIODIVERSITY RESOURCES (NATIONAL PARKS, GAME RESERVES,...)
- WETLANDS
- AREAS OF FLOOD EROSION AGRICULTURE
- AREAS OF BIG IRRIGATION SCHEMES
- AREAS OF POTENTIAL SILTATION

GEOGRAPHY:
- BASIN BOUNDARY
- BASIN SUB-DIVISIONS
- STREAMS
- SEASONAL STREAMS
- LAKES AND RESERVOIRS
- NATIONAL CAPITALS
- INTERNATIONAL BOUNDARIES

*DAM SITES:

1	BALASA	10	TOUGUE
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SEPTEMBER 2013