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Report No: PAD940

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 131.8 MILLION
(US$200 MILLION EQUIVALENT)

TO THE

REPUBLIC OF KENYA

FOR A

COASTAL REGION WATER SECURITY AND CLIMATE RESILIENCE PROJECT

NOVEMBER 21, 2014

Global Water Practice (GWADR)
Country Department –AFCE2
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 16, 2014)

Currency Unit	=	Kenya Shilling (K Sh)
K Sh 89	=	US$1
US$1	=	SDR 0.67069

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AFD	French Development Agency *(Agence Française de Développement)*
BCC	Behavior Change Communication
CBK	Central Bank of Kenya
CBO	Community Based Organization
CDA	Coast Development Authority
CDD	Community-Driven Development
CFA	Community Forest Association
CFO	Chief Finance Officer
CGE	Computable General Equilibrium
CIDP	County Integrated Development Plan
CLTS	Community-Led Total Sanitation
CWSB	Coast Water Services Board
DA	Designated Account
DMA	District Metered Area
DSPE	Dam Safety Panel of Experts
EEZ	Exclusive Economic Zone
EIRR	Economic Internal Rate of Return
EMCA	Environmental Management and Coordination Act
EPP	Emergency Preparedness Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
FIRR	Financial Internal Rate of Return
FM	Financial Management
FNPV	Financial Net Present Value
FS	Feasibility Study
FFS	Farmer Field School
GCMs	Global Climate Models
GDP	Gross Domestic Product
GIS	Geographic Information System
GoK	Government of Kenya
GOS	Global Observation System
HVC	High-Value Crop

I&D	Irrigation and Drainage
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
ICOLD	International Commission on Large Dams
ICT	Information and Communication Technology
IDA	International Development Association
IDS	Irrigation Demonstration Scheme
IE	Impact Evaluation
IFR	Interim Financial Report
IGAs	Income-Generating Activities
IPF	Investment project financing
IPMP	Integrated Pest Management Plan
ISC	Implementation Support Consultant
IWUA	Irrigation Water User Association
K Sh	Kenyan Shilling
KARI	Kenya Agricultural Research Institute
KENAO	Kenya National Audit Office
KFS	Kenya Forest Service
KWAWASCO	Kwale Water and Sewerage Company
KWSCRP-1	Kenya Water Security and Climate Resilience Program – Phase 1
KWSCRP-2	Kenya Water Security and Climate Resilience Program – Phase 2 Coastal Region Water Security and Climate Resilience Project
LAPSSET	Lamu Port and Southern Sudan–Ethiopia Transport Corridor
M&E	Monitoring and Evaluation
MCM	Million Cubic Meters
MDG	Millennium Development Goal
MEWNR	Ministry of Environment, Water, and Natural Resources
MoA	Memorandum of Agreement
MIGA	Multilateral Investment Guarantee Agency
MOC	Ministerial Oversight Committee
MOWASCO	Mombasa Water and Sewerage Company
MoU	Memorandum of Understanding
MPC	Ministerial Procurement Committee
MTC	Ministerial Tender Committee
MTP	Medium-Term Plan
NEMA	National Environmental Management Authority
NGO	Non-Governmental Organization
NRMP	Natural Resources Management Project
NRW	Non-Revenue Water
ODF	Open Defecation Free
O&M	Operation and Maintenance
OE	Owner's Engineer
OP/BP	Operational Policy/Bank Procedures
ORAF	Operational Risk Assessment Framework
PA	Project Account
PAD	Project Appraisal Document

PAP	Project-Affected Persons
PDO	Project Development Objective
PEP	Partnership for Economic Policy Analysis
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PMU	Project Management Unit
PPDA	Public Procurement and Disposal Act 2005
PPOA	Public Procurement Oversight Authority
PPP	Public Private Partnership
PS	Principal Secretary
PSC	Project Steering Committee
QCBS	Quality and Cost-Based Selection
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SDR	Special Drawing Rights
SPA	Service Provision Agreements
TCC	Technical Coordination Committee
TORs	Terms of Reference
TTL	Task Team Leader
US$	United States Dollars
VMG	Vulnerable and Marginalized Groups
VMGF	Vulnerable and Marginalized Groups Framework
VMGP	Vulnerable and Marginalized Groups Plan
WASH	Water, Sanitation and Hygiene
WaSSIP	Water and Sanitation Service Improvement Project
WBG	World Bank Group
WPA	Water Purchase Agreement
WRMA	Water Resources Management Agency
WRUA	Water Resources Users Association
WSP	Water and Sanitation Program
WSS	Water Supply and Sanitation

Regional Vice President:	Makhtar Diop
Country Director:	Diarietou Gaye
Senior Global Practice Director:	Junaid Kamal Ahmad
Practice Manager:	Jonathan Kamkwalala
Task Team Leader:	Gustavo Saltiel

REPUBLIC OF KENYA
Coastal Region Water Security and Climate Resilience Project

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PAD DATA SHEET

Kenya

Coastal Region Water Security and Climate Resilience Project (P145559)

PROJECT APPRAISAL DOCUMENT

AFRICA

GWADR

Report No.: PAD940

Basic Information		
Project ID	EA Category	Team Leader
P145559	A - Full Assessment	Gustavo Saltiel
Lending Instrument	Fragile and/or Capacity Constraints [ ]	
Investment Project Financing	Financial Intermediaries [ ]	
	Series of Projects [X]	
Project Implementation Start Date	Project Implementation End Date	
16-Dec-2014	31-Dec-2021	
Expected Effectiveness Date	Expected Closing Date	
02-Mar-2015	31-Dec-2021	
Joint IFC		
No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Jonathan S. Kamkwalala	Junaid Kamal Ahmad	Diarietou Gaye	Makhtar Diop

Borrower: Republic of Kenya

Responsible Agency: Ministry of Environment, Water and Natural Resources

Contact:	Robinson Gaita	Title:	Director of Irrigation, Drainage, and Water Storage
Telephone No.:	254-20-2716103	Email:	rkgaita@gmail.com

Project Financing Data(in USD Million)					
[ ]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[X]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	200.00	Total Bank Financing:	200.00
Financing Gap:	0.00		

Financing Source	Amount
BORROWER/RECIPIENT	0.00
International Development Association (IDA)	200.00
Total	200.00

Expected Disbursements (in USD Million)

Fiscal Year	2015	2016	2017	2018	2019	2020	2021	2022
Annual	4.00	7.00	6.00	35.00	35.00	55.00	48.00	10.00
Cumulative	4.00	11.00	17.00	52.00	87.00	142.00	190.00	200.00

Proposed Development Objective(s)

The development objective of the project is to sustainably increase bulk water supply to Mombasa County and Kwale County, and increase access to water and sanitation in Kwale County.

Components

Component Name	Cost (US$ Millions)
C1- Mwache Dam and Related Infrastructure	165.00
C2- Kwale County Development Support	25.00
C3- Project Management	10.00

Institutional Data

Practice Area / Cross Cutting Solution Area

Water

Cross Cutting Areas

[X] Climate Change
[ ] Fragile, Conflict & Violence
[ ] Gender
[ ] Jobs
[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection	Water supply	50	100	
Water, sanitation and flood protection	General water, sanitation and flood protection sector	25	100	

Public Administration, Law, and Justice	Public administration- Water, sanitation and flood protection	15	100	
Agriculture, fishing, and forestry	Irrigation and drainage	10	100	
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Environment and natural resources management	Water resource management	40
Urban development	City-wide Infrastructure and Service Delivery	30
Environment and natural resources management	Climate change	20
Rural development	Rural services and infrastructure	10
Total		100

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
Water Purchase Agreement		31-Dec-2015	

Description of Covenant

The Recipient shall, by no later than December 31, 2015, enter into a WPA with the Mombasa County Government, in form and substance acceptable to the Association, detailing the volumes, pricing and services for the provision of water from Mwache Dam to the Mombasa County.

Name	Recurrent	Due Date	Frequency
Emergency Preparedness Plan		01-Dec-2019	

Description of Covenant

The Recipient shall (a) no later than December 1, 2019, prepare and provide to the Dam Safety Panel and the Association the Dam Emergency Preparedness Plan; (b) finalize said Plan taking into account the recommendations of said Panel, not later than twelve (12) months prior to the projected date of initial filling of the reservoir to be constructed with respect to the Dam; and (c) maintain the organizational and other requirements of said Plan in a manner satisfactory to the Association.

Name	Recurrent	Due Date	Frequency
Dam Operation and Maintenance Plan		01-Jun-2020	

Description of Covenant

The Recipient shall: (a) no later than June 1, 2020, prepare and provide to the Dam Safety Panel and the Association the Dam Operation and Maintenance Plan; (b) finalize said Plan taking into account the recommendations of said Panel, and not less than six (6) months prior to the projected date of initial filling of the reservoir to be constructed with respect to the Dam; (c) maintain the organizational and other requirements of said Plan in a manner satisfactory to the Association; and (d) carry out operation and maintenance of said Dam in accordance with the provisions of said Plan.

Name	Recurrent	Due Date	Frequency
Project Steering Committee		02-Apr-2015	

Description of Covenant

The Recipient shall, no later than one month after the Effective Date, establish and thereafter maintain a Project Steering Committee with adequate resources and terms of reference satisfactory to the Association, for the purpose of (a) providing high level strategic guidance on Project planning and implementation; (b) facilitating overall coordination of the Project, including dealing with Executing Agencies; and (c) where appropriate, endorsing the Annual Work Plans and Budgets for forwarding to the Association for its subsequent approval.

Name	Recurrent	Due Date	Frequency
Project Implementation Manual		31-Mar-2015	

Description of Covenant

The Recipient shall (a) by no later than March 31, 2015, update the PIM; and (b) thereafter implement the Project in accordance with the PIM; provided that in the event of any inconsistency between the provisions of the PIM and this Agreement, the provisions of this Agreement shall govern.

Name	Recurrent	Due Date	Frequency

Dam Impoundment and Resettlement of Displaced Persons		01-Dec-2020	

Description of Covenant

The Recipient shall ensure that the impoundment of the reservoir of the Dam under Part A of the Project shall commence only after the completion of the resettlement of 100% of the Displaced Persons identified in the RAP, in accordance with the provisions of the RAP, and in a manner satisfactory to the Association.

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Clara Alvarez Rodriguez	Senior Infrastructure Finance Specialist	Infrastructure Finance	GEEDR
Stephen Diero Amayo	Consultant	Financial Management	GGODR
Henry Amena Amuguni	Senior Financial Management Specialist	Financial Management	GGODR
John Bryant Collier	Operations Officer	Environmental Safeguards and Operations	GENDR
Bekele Debele Negewo	Senior Water Resources Spec.	Water Resources	GWADR
Efrem Fitwi	Senior Procurement Specialist	Procurement	GGODR
Nagaraja Rao Harshadeep	Senior Environmental Specialist	Water Resources Development	GENDR
Sameer Ahmed Kamal	Operations Analyst	Operations	GWADR
Elizabeth Wairimu Karuoya	Team Assistant	Team Assistant	AFCE2
Jane A. N. Kibbassa	Senior Environmental Specialist	Environmental Safeguards	GENDR
Dawit Tadesse Mekonnen	Program Assistant	Program Assistant	GWADR
Samuel Dawuna Mutono	Senior Water & Sanitation Spec.	Water & Sanitation	GWASA
Regassa Ensermu Namara	Senior Water Resources Econ.	Water Resources Economics	GWADR
Pascaline Wanjiku Ndungu	Urban Specialist	Urban Development	GWADR
Christiaan Johannes Nieuwoudt	Finance Officer	Finance Officer	CTRLA
Andreas Rohde	Senior Sanitary Engineer	Sanitary Engineer	GWADR
Gustavo Saltiel	Program Manager	Task Team Leader	GWADR
Lewnida Sara	Operations Analyst	Operations	GWASA
Helen Z. Shahriari	Senior Social Scientist	Social Development and Social Safeguards	GURDR
Satoru Ueda	Lead Dam Specialist	Dam Specialist and	GWADR

		Engineering	
Kishor Uprety	Senior Counsel	Legal	LEGAM
Juliana Chinyeaka Victor	Senior Monitoring & Evaluation Specialist	Monitoring & Evaluation	GPSOS
Sirein Awadalla	Operations Analyst	Operations	GWADR

Non-Bank Staff

Name	Title	City
George Annandale	Water Resources Specialist	Lakewood
Eduardo Mestre	Senior Institutional Specialist	Barcelona
Juan Morelli	Agricultural Economist	Montevideo

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Kenya	Mombasa	Mombasa District	**X**		
Kenya	Kwale	Kwale District	**X**		

I. STRATEGIC CONTEXT

A. Country Context

1. Over the past 50 years, Kenya has established itself as an important regional player on the African continent, and especially in East Africa, and has achieved successes on multiple fronts. The country is currently emerging from a strong, yet uneven, decade of growth. From 2000 to 2009, annual growth rates in the Gross Domestic Product (GDP) averaged 3.9 percent, a notable increase from the previous decade's average of 2.3 percent. In 2008, the country's economic performance declined dramatically, with post-election violence, drought, the global financial crisis, and high food and fuel prices contributing to a negative per capita GDP growth rate. Yet the economy—underpinned by structural reforms, a new Constitution, and a spur in infrastructure investment—recovered, climbing to a growth rate of 5.8 percent in 2010. Since then, a series of domestic and external shocks reversed this momentum, decreasing growth rates to approximately 4.4 percent in 2011 and 4.6 percent in 2012.

2. The Kenyan economy remains in the bottom group of the World Bank's income classification and poverty is high, at around 40 percent. Kenya is among the world's poorest countries, ranking 147 out of 187 countries on the 2014 Human Development Index. In 2012, Kenya was classified as a low-income country, with a per capita income of US$870. Achieving the status of upper-middle-income country in 2030, as stated in the Vision 2030 strategy, implies a rapid and sustained increase of Kenya's per capita income. The Vision 2030 foresees GDP growth of 10 percent over the medium term, and the Second Medium-Term Plan (MTP) projects that growth will accelerate to 10 percent by 2017.

3. Tourism and agriculture, followed closely by industry and services, are the main drivers of growth. The performance of these sectors is conditional on progress in the water sector. Kenya's economy is vulnerable to erratic climatic patterns and a fragile natural resource base, including limited water availability. The World Bank estimates that climate variability costs the country an average 2.4 percent of GDP per year, and water resources degradation another 0.5 percent, seriously affecting the country's competitiveness. Climate change threatens to result in additional stresses related to rising temperatures (increasing system evaporation and irrigation requirements) and to uncertain changes in rainfall. Other environmental threats are numerous, as evidenced by unsustainable water abstractions, poor land use practices, deforestation, encroachment in recharge areas, and pollution, which have already seriously degraded many critical watersheds.

4. While national absolute poverty has declined, the Kenyan poverty profile reveals strong regional disparities in the distribution of poverty, with the lowest incidence in the central province and the highest in the northeastern province. Inequalities in the distribution of incomes in urban areas continue to rise. Differences in share of income and social services are observed across regions, genders, and even specific segments of the population. Inequality is observed not only in incomes but also in terms of social exclusion and the inability of different population groups to access social services and enjoy socio-political rights.

5. The coastal region[1], in particular, is faced with complex challenges that may hinder the realization of its full development potential. Challenges include rampant poverty, youth unemployment (which may lead to religious radicalization and insecurity), gender disparity, food and nutritional insecurity, natural resources degradation, climate change and variability, and inadequate infrastructure. Five of the six counties in the coastal region are among the fourteen counties regarded as most marginalized nationwide, due to historical injustices and other factors. This area is also particularly susceptible to climate variability and change, not only from changes in upstream hydrology, land degradation, and water quality, but also from sea-level rise.

6. The population of the coastal region has been estimated at 3.3 million (2009). About 80 percent reside in the counties of Mombasa, Kwale, and Kilifi. The population of the coastal region is estimated to more than double to approximately 8 million in 20 years. It is evident that the historical pattern of Kenya's regional inequality has undergone very little change. Even today, the coastal region is known for a range of socio-political and economic problems including widespread poverty, combined with a very high degree of inequality. There persists among the coastal region's population a feeling of being economically and politically marginalized in post-independence Kenya. The coastal region has the second-highest rural poverty levels in Kenya (after the northeastern province), while even urban poverty levels in Mombasa have been found to be somewhat higher than in other major cities in Kenya. In conclusion, the available statistics paint a clear picture of socio-economic marginalization and neglect of many rural and urban communities in this region, which is among Kenya's most deprived, especially as regards health services, education, water supply, sanitation, and food security.

7. Kenya's Vision 2030 aims to transform Kenya into a newly industrializing, middle-income country providing a high-quality of life to all its citizens by the year 2030. The coastal region promises significant economic potential for Kenya as a whole. The province harbors several flagship projects, including the US$20 billion Lamu Port and Southern Sudan–Ethiopia Transport Corridor (LAPSSET) and the Mombasa Port Expansion, Dongo Kundu bypass. These two projects in particular are part of the grand plan of creating a Mombasa Free Trade Zone similar to that of Dubai, at an overall cost of about K Sh 200 billion (US$2.35 billion). Mombasa is the largest seaport in East Africa and plays an important role in both the country's and the region's economy given that the commercial imports and exports of its neighboring land-locked countries transit through its port. The city is also a popular tourist destination, drawing more tourists to the country than any other national feature. This generates significant pressure on infrastructure, housing, transport, and social services, as well as on the environment and water resources.

B. Sectoral and Institutional Context

8. Water security is a key issue given that Kenya's people and economy are highly vulnerable to erratic climatic patterns and limited water availability due to their reliance on key sectors (agriculture, tourism, hydro-energy, etc.) that depend on rainfall and water availability. In the past two decades, from 1992–2012, Kenya was ranked first among African countries in terms

[1] Coastal region refers to the areas that were part of the Coast Province prior to the devolution in 2013.

of people affected by droughts (roughly 46 million people) and fifth in terms of those affected by floods (about 2.8 million people) during the same period. Kenya has limited freshwater endowments and is classified as a chronically "water scarce" country in absolute and relative terms. It faces the additional challenge of high inter-annual and intra-annual rainfall variability. Climate variability and hydro-climatic shocks (droughts and floods) disproportionately affect the poor, and climate change is projected to exacerbate existing climate risks and water resource constraints. Kenya has yet to adequately manage its highly variable hydrology to improve climate resilience, as evidenced by decades-long underinvestment in water infrastructure.

9. The Government has planned a large-scale water investment program to address these challenges and to close the massive water infrastructure gap that has been estimated at US$5–7 billion. This is to be supported by the establishment of a strong and modern institutional and legal structure that aligns the water sector with the Constitution of Kenya 2010 through a Water Bill reflecting the new devolution principles under discussion in Parliament.

10. Nationally, access to safe water and sanitation facilities is limited. Estimates from the WHO / UNICEF Joint Monitoring Program for Water Supply and Sanitation (JMP)[2] show that in 2012, the proportions of Kenya's urban and rural populations with access to an improved water supply stood at 82.3 percent and 55.1 percent, respectively. According the JMP, in 2012 the proportions of urban and rural populations with access to improved sanitation facilities were 31.3 percent and 29.1 percent, respectively, for a national rate of 29.6 percent, which is very low. Generally, coverage in both water and sanitation is highly variable across the country. Projections indicate that by 2015, approximately 14 million Kenyans will lack access to improved water sources, which is more than the MDG target of 11.5 million people. As for sanitation, projections indicate that 26.6 million people will lack access to improved sanitation services in 2015. This is about 12 million people more than the 14.7 million targeted in the MDG. Based on these trends, therefore, it is unlikely that Kenya will meet MDG targets by 2015.

11. In the coastal region, the water situation is generally serious. Demand largely exceeds water supplied into the systems, non-revenue water is high, revenue collections are low, and the utilities – the Mombasa Water Supply and Sanitation Company (MOWASCO), the Kwale Water and Sewerage Company (KWAWASCO), and others – are technically insolvent, with expenditure obligations exceeding cash income. The total water demand for the coastal region has been projected at 364,243 m^3 per day for 2015 and is expected to more than double by 2035 (887,253 m^3/day). About half the demand comes from Mombasa County. To address the significant shortage of bulk water supply to Mombasa and other coastal towns, the government of Kenya (GoK) has explored a number of different options as part of the Water Supply Master Plan for Mombasa and Other Towns Within Coast Province prepared under the Water Supply and Sanitation Improvement Project (WaSSIP), financed jointly by the World Bank and the Agence Française de Développement (AFD). This and other studies have confirmed that the coastal region has water resources available to satisfy the water demand of the region at least until 2035. Those studies have also confirmed that the Mwache Dam is a key investment to meet demand and increase water security for the coastal region, and particularly for Mombasa County.

[2] http://www.wssinfo.org/data-estimates/tables/

12. The devolution[3] process and new Water Bill constitute an important opportunity to foster reforms and change. Mombasa County has already started to explore options for the establishment of a sound institutional and service provision framework for the water sector at the county level and has identified certain key success factors:

- Clear political accountability with sound policies and good governance; well-informed politicians with effective separation of roles, including the segregation of policy and planning from service providers at the county level.
- Effective professional leadership and management with a business approach, innovation and measurable objectives for the water service provider.
- Establishment of tariff levels that recover costs and generate revenues to support service improvements.
- Strong attention to serving customers.

13. With these principles as departure points, Mombasa County has identified regional planning, the relationship between bulk water supply and service delivery functions, and institutional reforms as key issues.

14. On the other hand, Kwale County is in a more rudimentary situation, given the predominantly rural nature of the county. Kwale County has five small towns, namely Kwale, Ukunda/Diani, Msambweni, Kinago and Lunga Lunga, which account for about 18 percent of the county's total population of 649,531 (2009 census). About 15 percent of the total population have access to improved water, 18.4 percent have access to improved sanitation and 51 percent practice open defecation (compared to the national average of 15 percent). Of 464 primary schools and 74 secondary schools, only 163 (35 percent) and 42 (57 percent) respectively are reported to have adequate sanitation. Kwale County has no piped sewer system. The population relies on septic tanks (especially in urban areas) and pit latrines. Given the low capacity of its water service provider (KWAWASCO), the Ministry of Environment, Water, and Natural Resources (MEWNR) and Kwale County are currently preparing a comprehensive support program under the first phase project, the KWSCRP-1, to strengthen the service provider and put in place a sound policy, institutional, and legal framework at the county level.

C. Higher-Level Objectives to which the Program Contributes

15. The World Bank is supporting the ambitious agenda for the water sector through a long-term, transformational program aimed at building water security and climate resilience for economic growth and social well-being. The Kenya Water Security and Climate Resilience Program responds to this need, and was an integral element of the 2010–2013 Country Partnership Strategy. The first phase of this program, the KWSCRP-1, was approved by the International Development Association (IDA) in June 2013. It focuses on the progressive development of a water investment pipeline, integrated and participatory basin planning, and

[3] With the adoption of the 2010 Constitution of Kenya, the GoK has required that all institutional and legal frameworks be reviewed and aligned with it. The Constitution includes a number of provisions that have important implications for the water sector, including devolution of certain functions from the national level to the county level.

technical assistance to the evolving water sector institutions and in the implementation of sector reforms at a critical period of constitutional and political transition where devolution plays a critical role in the current complex governance context. The proposed Coastal Region Water Security and Climate Resilience Project (KWSCRP-2) is the second operation under the program, focusing on significantly increasing access to water and sanitation in the coastal region. The proposed project is consistent with the World Bank Group's Country Partnership Strategy for Kenya for 2014-2018, which was endorsed by the WBG Board of Executive Directors on June 5, 2014, and is included under the strategy's "Competitive and Sustainability" domain of engagement.

16. KWSCRP-2 will contribute to the World Bank Group's goals of ending extreme poverty and promoting shared prosperity, particularly given the historical and current poverty and inequality situation of the coast province relative to other provinces in Kenya. Access to water and sanitation will improve general health conditions and quality of life among poor urban and rural households that currently rely on expensive water sources and are exposed to serious health risks due to lack of sanitation. The project will also contribute to Kenya's Vision 2030 Medium-Term Plan (MTP) 2 and sectoral plans for water and sanitation to ensure that improved water and sanitation are available and accessible to all. These activities are being developed and aligned with the Kwale and Mombasa County Integrated Development Plans (CIDPs).

17. The KWSCRP-2 is also aligned with the World Bank Group's Africa Regional Strategy, specifically Pillar Two: Vulnerability and Resilience. Reducing vulnerability and building resilience in the water sector is the central purpose of the proposed project. To this end, the Mwache Dam and related infrastructure would act as a buffer against the most severe hydrologic shocks (including floods and droughts), as well as address food insecurity, low productivity, and constrained growth in Mombasa County and throughout the coastal region more broadly.

18. As part of the Kenya Water Security and Climate Resilience Program, the proposed project has strong linkages with the first phase operation, the Kenya Water Security and Climate Resilience Project (KWSCRP-1). A major objective of KWSCRP-1 is to enhance the institutional framework and strengthen capacity for water security and climate resilience for the country. As such, KWSCRP-1 has been envisaged as an "umbrella" for the overall program. The proposed KWSCRP-2 provides an opportunity to achieve these objectives in the coastal region and to anchor KWSCRP-1 activities to a high-visibility investment in Kenya's water sector (e.g. Mwache Dam). Accordingly, KWSCRP-1 is financing a number of priority studies in the coastal region, particularly in Kwale and Mombasa Counties, including studies for water supply, sanitation and irrigation activities in Kwale County, and for the investments downstream of the Mwache Dam. In addition, activities under KWSCRP-1 will finance and support the implementation of a Non-Revenue Water Program in Mombasa County, which includes civil works and the provision of goods and services to improve the efficiency of MOWASCO, as well as provide support for related reforms. Finally, combined support from KWSCRP-1 and KWSCRP-2 is expected to contribute to the devolution and sector reform process in the coastal region, in particular, in Kwale and Mombasa Counties. These strong linkages and synergies between the two phases of the KWSCR program will enhance the synergies between the two operations and help ensure a coordinated approach for the successful implementation of the program.

19. The proposed project builds on and complements other ongoing activities in the broader water program in Kenya, including the World Bank and AFD-financed WaSSIP project, which supported the Water Supply Master Plan for Mombasa and Other Towns within Coast Province. It also builds on support from the Water and Sanitation Program (WSP) to the marginal areas of Mombasa County and to the devolution process. The investments supported by the KWSCRP-2 will, in turn, trigger additional projects and activities in the coastal region, some of which will further contribute to improving water and sanitation services in the region. Furthermore, KWSCRP-2 is fully aligned with the support provided by the government of The Netherlands to Mombasa County by financing efficiency improvements in MOWASCO through a partnership with the Dutch utility Vitens Evides.

20. Finally, increasing access to water sanitation and supply will contribute to reaching the MDGs as well as the post-2015 Water, Sanitation and Hygiene (WASH) targets and indicators and to reducing poverty and achieving shared prosperity in the coastal region. The project is expected to play a key role in reducing the vulnerability of marginalized groups to the health risks posed by water-borne and sanitation-related diseases, as well as curbing the impact of these diseases on education, the economy, and the environment. Without sanitation, girls are more likely to drop out of school or are vulnerable to attacks while seeking privacy. Ending open defecation can save children's lives by reducing disease transmission, stunting, and under-nutrition, all of which are obstacles to childhood cognitive development and future economic productivity. Poor sanitation has been estimated to cost Kenya the equivalent of 0.9 percent of GDP,[4] due mainly to premature deaths, pollution, the cost of health care treatment, lost time, and low productivity. By improving the management and disposal of wastewater and domestic fecal sludge, the project will contribute to reducing pollution that affects both water resources and ecosystems.

21. Despite its acknowledged potential, the coastal region is fairly marginal in terms of socioeconomic development relative to most other regions of Kenya. The project is expected to benefit not only the direct project target population but also the wider population of the coastal region through the economic impacts that the project's implementation would catalyze. Investment in the Mwache Dam and its related facilities enhances water supply in the entire coastal region by allowing the reallocation of existing water supplies and the creation of additional water supplies. The availability of a reliable water supply would have direct and indirect effects on almost all sectors of the coastal region's economy, including agriculture, tourism, education, health, industry, etc.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

22. The overarching development objective of the KWSCR program is to improve water security and build climate resilience in Kenya.

[4] *Economic Impacts of Poor Sanitation in Africa*, WSP, 2012.

23. The development objective of this specific project (KWSCRP-2) is to sustainably increase bulk water supply to Mombasa County and Kwale County, and increase access to water and sanitation in Kwale County.

B. Project Beneficiaries

24. An estimated 626,200 people will directly benefit from this project. This figure represents the beneficiaries in Kwale County that would be provided with improved water sources, sanitation facilities, and improved hygiene and sanitation practices; benefits from the 100-hectare irrigation demonstration pilot under Component 2 of the project[5].

25. Project beneficiaries also include communities that would benefit from catchment management activities under Sub-Component 1.2, and the livelihoods improvement activities under Sub-Component 2.3[6].

C. PDO-Level Results Indicators

26. Key results that the proposed Project will support are:

i. 626,200 direct project beneficiaries[7], of whom 48 percent are female
ii. Potential bulk water supply from the Mwache Dam (67.9 MCM/yr)
iii. 190,000 people provided with access to "improved sanitation facilities"
iv. 205,000 people provided with access to "improved water sources"

III. PROJECT DESCRIPTION

A. Project Components

27. The project will have two main components that support the PDO: (i) Component 1 - Mwache Dam and Related Infrastructure; and (ii) Component 2 - Kwale County Development Support. In addition, Component 3 - Project Management will support project implementation. The funding envelopes for major components and sub-components are summarized in Table 1. Refer to Annex 2 for a detailed description of project components.

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[5] These figures do not include the potential beneficiaries from the bulk water supply of 186,000 m3/day (67.9 MCM/year), which is expected to supply 1,395,000 people with urban water access, as this project is not financing the downstream infrastructure needed for this bulk water to supply beneficiaries in Kwale and Mombasa Counties (refer to Figure 1). Potential beneficiaries are calculated assuming a per capita consumption of about 100 liters/person/day, adjusted for 25 percent water that is unaccounted for, and will be tracked at the KWSCRP program level.

[6] These will be quantified during project implementation, once the precise locations and scope of the catchment management and livelihood improvement activities have been defined.

[7] This number is the sum of people provided with (i) access to improved water sources under the project (which includes potential beneficiaries in urban areas who will receive bulk water from Mwache, and beneficiaries who will receive water in Kwale's urban and rural areas); (ii) improved sanitation facilities under the project (includes both urban and rural sanitation facilities in Kwale County); (iii) training to improve hygiene and sanitation practices and (iv) benefits from the 100-hectare irrigation demonstration scheme. Annex 1 provides a breakdown and additional details.

Table 1: Summary of Components, Sub-Components, and Financing

Components and Sub-Components	Financing (US$m)
Component 1: Mwache Dam and Related Infrastructure	**165**
SC 1.1: Civil Works and Related Infrastructure	*160*
SC 1.2: Mwache Catchment Management	*5*
Component 2: Kwale County Development Support	**25**
SC 2.1: Water Supply Investments	*12*
SC 2.2: Sanitation Investments	*4*
SC 2.3: Sustainable Livelihoods Improvement	*5.5*
SC 2.4: Irrigation Demonstration Scheme	*3.5*
Component 3: Project Management	**10**
Total	**200**[8]

Component 1: Mwache Dam and Related Infrastructure (US$165 million equivalent)

Sub-Component 1.1: Civil Works and Related Infrastructure (US$160 million equivalent)

28. The Water Supply Master Plan for Mombasa and Other Towns within Coast Province, prepared under the WaSSIP, evaluated five scenarios for meeting the water demands of Mombasa and the coastal region. These scenarios included different combinations and phasing, of potential sources of water, including well fields, springs, aquifers, and dams. A multi-criteria analysis consisting of four parameters (engineering, economics, environmental and social aspects, and political economy) was used to evaluate these scenarios. The scenario selected (Scenario "B1") has advantages from an economic, environmental, and engineering point of view, and includes the priority development of the Mwache Dam. Ultimately, the dam is expected to provide 186,000 m^3/day (67.9 MCM/year)[9] for urban water supply to Mombasa County and Kwale County.

29. The dam site is located across the Mwache River at the Fulugani village (Kwale County), about 22 km west of the city of Mombasa in the coastal region of Kenya and near the coastline. The proposed dam is a concrete gravity dam with a height of about 78 m and with a reservoir capacity of about 118 million m^3.

[8] The main counterpart contribution is expected to be used for implementation of the Resettlement Action Plan (RAP).

[9] An additional potential supply of 41,000 m^3/day (about 15 MCM/year) - with lower reliability of 75 percent compared urban water supply reliability of 99 percent - will be available from the dam. Based on the results of the 100 hectare demonstration (pilot) scheme, the economic and financial viability of full development of the proposed irrigation scheme (currently estimated at 2,000 hectare) in the project area will be assessed after two full years of operation in the demonstration area (i.e., by early 2018). This will, in turn, allow the GoK to make a decision on how best to allocate the additional supply of water available from the dam.

30. This component will finance the construction of the main dam (Mwache), one check dam, raw water transmission lines (gravity-fed) to the treatment plant, and transport infrastructure (approach road to dam site and bridges), as well as supply electromechanical equipment and buildings related to the dam site—i.e., all of the infrastructure needed to supply water (raw water, before treatment works) to the water supply system in the coastal region. This also includes implementation of the environmental and social management plan, dam safety plans and Resettlement Action Plan (RAP). Specific activities for the sedimentation management plan will be developed under this sub-component, while implementation of these activities will be financed under Sub-Component 1.2 (refer below).

31. A GoK-appointed Dam Safety Panel of Experts (DSPE), consisting of experts in dam engineering design and construction, geology, and hydrology/sedimentation and financed under KWSCRP-1, have reviewed the dam design and safety plans. The DSPE will be maintained throughout project implementation for continuing technical oversight and guidance on construction of the Mwache Dam. In addition, a packaged consultancy for detailed design/bidding document preparation, technical support for the bidding process, and construction supervision/quality assurance as the Owner's Engineer is being processed under KWSCRP-1.

Sub-Component 1.2: Mwache Catchment Management (US$5 million equivalent)

32. The Mwache watershed has undergone significant degradation as a result of poor land use practices in pursuing food production, resulting in a general decline in soil quality, livestock, and crop productivity, as well as in upstream erosion, downstream flooding, and sedimentation. These threaten the economic lifespan of the proposed Mwache reservoir, and the livelihood and food security of the local populations, many of whom already live in extreme poverty.

33. This sub-component aims to improve sustainability of the Mwache catchment, integrating conservation activities with the needs of local communities to develop sustainable economic activities. Recognizing that a robust watershed management strategy entails addressing ecosystem degradation at the watershed level, this sub-component supports an integrated, participative approach to water resources management, introducing sustainable livestock, agriculture, forestry and land management practices. Activities under the sub-component will be based on livelihoods, to ensure that communities will have incentives to play an active and engaged role in conservation activities.

34. These activities will involve promoting approaches to improve sustainable land and water management of the catchment, in line with the agreed sedimentation management plan. The activities will target erosion-prone "hot spot" sub-catchment areas in each of the three counties that overlap with the Mwache catchment (refer to the map in Annex 6), and which are to be determined by the Regional Office of the Water Resources Management Agency (WRMA) based on transparent selection criteria. The methodology adopted in the Water Act of 2002 and implemented by WRMA through the establishment and support of Water Resource User Associations (WRUAs) then becomes crucial for successful water resources management and catchment protection. Some of the activities supported under the sub-component include agricultural conservation practices, reduction of erosion and sediment loss, afforestation,

drainage line treatment, water harvesting and groundwater recharge, area rehabilitation, grazing/stall-feeding improvement as well as livestock improvement, monitoring and evaluation (M&E), enhancement of biodiversity and eco-tourism especially around the project reservoir, and associated institutional support. In addition to community-led initiatives, the sub-component will also fund the acquisition of heavy machinery needed to remove the sediment loads from the check dams.

35. The activities will be planned and executed using a community-led approach, coordinated by a Project Implementation Unit (PIU) managed by the Coast Development Authority (CDA) and co-located with the PMU Office in the coastal region. The delivery of the sub-component will involve relevant stakeholders including Water Resources Users Associations (WRUAs); Kwale and Mombasa County governments; the WRMA; the Kenya Forestry Service (KFS); the Kenya Agricultural Research Institute (KARI); community leaders; and local NGOs.

Component 2: Kwale County Development Support (US$25 million equivalent)

36. This component will support development in Kwale County, where the Mwache Dam is located, through investments in water supply and sanitation in rural communities and small towns; a demonstration irrigation scheme to inform, design, and establish the viability of a large-scale irrigation program in Kwale in the future; and livelihoods investments. By supporting these activities, Component 2 will bring near-term and medium-term benefits to Kwale County, in parallel to planning and preparation for the large-scale infrastructure that would supply water to Kwale (from Mwache, and other sources) in the long term. Water supply and sanitation activities have been designed considering the post 2015 Sustainable Development Goals (SDG) targets, which focus more on eliminating open defecation; achieving universal access to basic drinking water, sanitation and hygiene for households, schools and health facilities; and progressively eliminating inequalities in access.

37. In parallel to the activities above, the ongoing KWSCRP-1 will provide technical and financial support for the reduction of non-revenue water, and the development of financial, management, and commercial strategies for KWAWASCO. Technical advice on sustainable development and management of rural water and sanitation schemes will also be provided.

<u>Sub-Component 2.1: Water Supply Investments (US$12 million equivalent)</u>

38. This sub-component will support increased access to water supply in small towns and rural communities in Kwale County. In terms of urban supply, the priority for Kwale County is to increase water supply through the rehabilitation and expansion of existing water supply schemes particularly in Kwale, Ukunda, Lunga Lunga/Vanga and Msambweni towns. In Kwale and Ukunda, the project will support the rehabilitation and expansion of the water supply distribution network, as the two main sources – the Marere Springs and Tiwi aquifers – have both been recently rehabilitated under WaSSIP. Rehabilitation of the Kinango water distribution network will be undertaken by Kwale County using its own funds. For Msambweni and Lunga Lunga where current water supply systems are assessed as both limited and dilapidated, the project will support the identification and development of additional water sources (including boreholes) in addition to the rehabilitation works. This will ensure maximum utilization of the

current water supply to these towns, as well as develop the capacity for additional supply after completion of the Mwache Dam. The preparation of designs and tender documents for these rehabilitation works will be financed under the ongoing KWSCRP-1.

39. In terms of rural supply in Kwale County, priority will be given to communities affected by the construction of the dam. Rural water investments will be informed by the Kwale Water Resources Assessment and Water Supply Development Master Plan that will be prepared under KWSCRP-1. The Master Plan will establish project viability and further develop priority sub-projects identified by the county, including (i) support for expansion or augmentation and the extension of rural water supply pipelines from the off-takes along bulk water supply systems (which need to be redesigned, rehabilitated and expanded); (ii) construction of boreholes and small dams; (iii) other water point sources including protected dug wells and springs; and (iv) rainwater collection. Preparation of the master plan will be participatory, and rural water supply activities will be designed based on community priorities that will be identified through consultation with and the active participation of the main stakeholders, including affected communities. This master plan will take into consideration the competing and interlinked demands for the water resources in Kwale, including those shared with Mombasa. The master plan will also map and identify the performance of water point sources in rural areas as well as initiatives by other development partners. Efforts will also be made to strengthen the operation and maintenance system to enhance sustainability.

40. Investments to be supported under this sub-component will be selected and prepared in line with the KWSCRP Investment Framework. Application of the Investment Framework, which will continually be improved through application and refinements under KWSCRP-1, will help ensure that transparent selection criteria are used for the selection of sub-projects, and that selected sub-projects are prepared according to agreed quality assurance standards, including on technical, economic, financial, environmental, social, and institutional aspects.

Sub-Component 2.2: Sanitation Investments (US$4 million equivalent)

41. This sub-component will support increased access to improved sanitation facilities in both urban and rural areas, with priority being given to the latter. On the policy side, the project will support the development of a strategy to promote household sanitation, taking cultural beliefs into account. In addition, communities will be trained on sanitation and hygiene. Working together with the Water and Sanitation Program (WSP), this sub-component will support Kwale county in its efforts to improve the enabling environment for the scale-up and sustainability of rural sanitation and hygiene through: (i) support to develop an action plan addressing any bottlenecks identified (from the situational analysis) to creating sustainable conditions for the implementation of rural sanitation at scale; (ii) carrying out an audit of the existing monitoring system and, if necessary, making data collection more efficient, improving quality of data collected, and improving data analysis; (iii) support for the development of tools and guidelines for demand creation using behavior change communication; (iv) support for the development of an innovative business model to strengthen the supply chain for improved sanitation products and services; and (v) mentoring the county government to ensure successful implementation of the program.

42. Specifically, and in line with the Kenya Ministry of Health's approach and guidelines, the sub-component will support Kwale County with strengthening the programmatic conditions to implement Community-Led Total Sanitation (CLTS) and sanitation marketing at scale, while strengthening the supply and household demand for improved sanitation. In addition, in order to have sustained behavior change, CLTS should be reinforced by continued Behavior Change Communication (BCC). This will be based on an innovative, evidence-based communications campaign developed by the Ministry of Health. The core objectives of the campaign are to create a need for improved sanitation among the target audience and to educate the target audience on improved sanitation options and hygiene (including hand washing with soap). The activities will include support for (i) the enhancement of the enabling environment for the scale-up and sustainability of rural sanitation and hygiene through the establishment of a sanitation hub, with support for the setting up and running of the Inter-Agency Coordination Committee (to ensure coordinated implementation of sanitation activities and the creation of community units to ensure long-term sustainability of sanitation and hygiene (of 165 targeted community units, 68 have been established thus far); (ii) the roll out of 100 percent Open Defecation Free (ODF) Rural campaign; (iii) the roll out the Improved Sanitation Campaign, and (iv) Construction of public sanitation facilities in 40 schools and 10 health facilities selected from both rural and urban areas in line with the post-2015 targets and indicators.

43. Kwale County has no piped sewer system. The urban population relies on septic tanks and pit latrines. In addition to creating public sanitation facilities in schools and health centers, construction of at least one sludge treatment facility for the management of sludge from septic tanks and pit latrines in urban areas and public institutions is envisaged. Preparatory work for these activities will include the preparation of a sanitation master plan covering Kwale urban and rural areas under KWSCRP-1, and the sewerage master plan for Kwale town, which is being prepared by the Coast Water Services Board (CWSB) under WaSSIP.

Sub-Component 2.3: Sustainable Livelihoods Improvement (US$5.5 million equivalent)

44. This sub-component seeks to improve livelihoods in Kwale County - considered the wider area of influence of the Mwache Dam - through support to benefit-sharing and sustainable livelihood paradigms for the largely rural communities in the area. . Catchment conservation practices – such as steep slope and riverbank cultivation – are not sustainable where alternative livelihoods need to be supported. Therefore, in these areas, the component will aim to develop alternative livelihood activities for common interest groups that are currently dependent on the unsustainable use of natural resources, with a focus on new income-generating activities.

45. Recent experiences with demand-driven projects in Kenya suggest that strong, motivated community groups can be formed in Kenya to undertake activities to promote sustainable practices that reduce the pressure on degraded watersheds and restore and improve livelihoods. This component will adopt a demand-driven approach, whereby proposals will be sought from communities in the catchments and forest perimeters to invest in livelihood-enhancing micro-projects that support the natural resource base. These could include opportunities to establish afforestation schemes; the development of private sector/community partnerships for timber, fuel-wood and/or fodder production; the production/sale of seedlings; the introduction of

productivity-enhancing techniques of agro-forestry or conservation farming, beekeeping, and other investments in farm agriculture development.

46. The sub-component will unite various actors from different sectors under a Steering Committee to vet and prioritize proposals. Four million dollars will be provided to fund community micro-projects, with additional funds for capacity building and training. Once proposals are selected, targeted engagement employing capacity-building techniques and technical targeted training will support communities with the implementation of their micro-projects. Arrangements following clear and transparent procedures to be defined in the Operational Manual will develop synergies for building the capacity of community-based organizations (CBOs), including the WRUAs and Community Forest Associations (CFAs) to be formed. Given the importance of the livestock sector to productive livelihoods, activities focused on enhancing livelihoods activities will also be supported.

Sub-Component 2.4: Irrigation Demonstration Scheme (US$3.5 million equivalent)

47. This sub-component will support the final preparation and implementation of an irrigation demonstration scheme on an area of about 100 hectares. The sub-component will support identification of intervention strategies for irrigation development and the implementation of different agricultural practices. The demonstration project will also establish the viability of developing a larger irrigation scheme in the area (between 2,000 and 3,000 ha). This information will allow the GoK to make a decision on how to best allocate the potential additional supply of water available from the Mwache Dam in the future.

48. The demonstration phase will include the advance construction of one check dam with the capacity to deliver 3 million cubic meters (MCM) of water annually, which will allow for the commencement of irrigation activities even while the main dam is being constructed. The check dam will also serve to hold, remove, and reduce the sediment loads to the Mwache Dam site.

49. This sub-component will entail the construction of the irrigation and drainage (I&D) infrastructure; agricultural support services; value chain and marketing linkages development; and participatory irrigation management through the Irrigation Water User Association (IWUA). The demonstration project is expected to test (i) the land tenure and use aspects of irrigation development in the area; (ii) the market for the high-value crops (HVCs) that would need to be grown to recover the O&M costs related to the infrastructure; (iii) the irrigation technologies proposed (drip, sprinklers, bubble, flood irrigation) and hence the assumptions about irrigation efficiency and potential irrigable area; and (iv) farmers' ability to adapt to innovative technology and their capacity to pay for O&M costs through volumetric water tariffs.

Component 3: Project Management (US$10 million equivalent)

50. Component 3 will support effective project implementation through the completion of KWSCRP-2. Specifically, this component will finance the required office space, goods (e.g., vehicles), equipment (e.g., computers), staff, consultant services, travel, training, and operating costs that will allow for the successful implementation of project activities. These responsibilities include project management and coordination, procurement and financial management, project

monitoring and evaluation (including impact evaluation), social and environmental safeguards management and oversight, and strategic project communications and outreach.

B. Project Financing

51. Project financing in the amount of US$200 million equivalent will be provided by IDA. The project activities are 100 percent IDA-financed.

52. Approximately 88 percent of IDA financing will be dedicated to infrastructure, with the large majority of infrastructure financing allocated for the civil works on the Mwache Dam and related infrastructure (Component 1). About 7 percent of the financing will go to design and supervision, 3 percent to goods and equipment (including electromechanical works), and 2 percent to operating costs.

53. At midterm, about three years after effectiveness, the project will assess the extent to which activities are adequately implemented and make any adjustments needed.

54. Retroactive financing is provided, on the condition that expenditures are made in line with WBG policies and procedures and that appropriate fiduciary management is applied (provision of receipts and other relevant documentation). Retroactive disbursement up to the amount of USD 1.5 million will be available for eligible expenditures paid on or after December 31, 2013.

Lending Instrument

55. The lending instrument is investment project financing (IPF).

Project Cost and Financing

56. Total project financing requirements are estimated at US$200 million equivalent, all of which is financed by IDA. Component amounts (inclusive of price and physical contingencies of about 25 percent) are shown in Table 2. The Government of Kenya will ensure the provision of counterpart financing for the implementation of the Resettlement Action Plan (RAP).

Additional Investments in the Coastal Region Water Supply Systems

57. The Water Supply Master Plan for Mombasa and Other Towns within Coast Province determined that the Mwache Dam is a key investment in seeking to meet demand and increase water security for the region, and particularly for Mombasa. The Master Plan envisions three stages of water infrastructure development, and cumulative investments of about US$1 billion by 2035 (including costs associated with Mwache).

58. Additional infrastructure investments in the coastal region's water supply system are needed in order for the bulk water supply made available by the Mwache Dam to be treated and to reach Mombasa and Kwale Counties. As shown in Figure 1 (below), downstream investments in a water treatment plant (US$55 million), pumping stations and water tanks (US$52 million), and transmission lines (US$88 million) are needed to ensure that water from the Mwache Dam

reaches the key coastal region storage tanks that would be used for onward distribution. These components should be put in place by the time the Mwache Dam is constructed and filled, by around 2020.

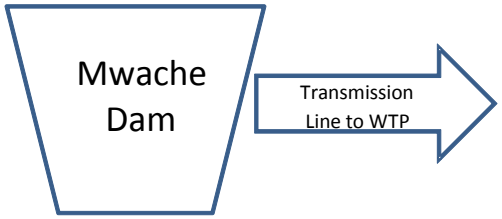
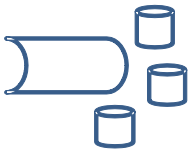
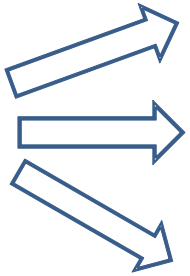
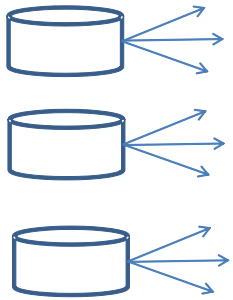
Table 2: Project Cost and Financing

Project Components	Project Cost (US$ m)	IDA Financing (US$ m)	% Financing
1. Mwache Dam and Related Infrastructure	165.0	165.0	100%
2. Kwale County Development Support	25.0	25.0	100%
3. Project Management	10.0	10.0	100%
Total Project Costs	200.0	200.0	100%
Interest During Implementation	0.0	0.0	
Front-End Fees	0.0	0.0	
Total Financing Required	200.0	200.0	100%

59. Over the long term, additional investments in the coastal region's downstream distribution networks—including in utilities in Mombasa and Kwale County—would be needed. These have been estimated at about US$200–US$250 million.

60. One of the options under consideration for financing the pumping stations and transmission lines needed by 2020 is a potential public-private partnership (PPP) structure under which a private company would build, operate, and finance the required investments based on a Water Purchase Agreement (WPA) signed with a GoK-owned off-taker. For this purpose, the GoK is considering the use of an IDA Payment Guarantee, as this instrument has been applied consistently and successfully in Kenya to promote private investment (equity and debt) in the power sector.

Figure 1: Mwache Dam and the Coastal Region Water Supply System
Summary and Current Status

			Pumping Stations and Water Tanks 	Transmission to Storage Tanks 	Onward Distribution to Mombasa and Kwale Counties 
FINANCING NEEDED	US$160m	US$55m	US$52m (by 2020)	US$88m (by 2020)	US$200-250m (by 2035)
FINANCING SOURCE	KWSCRP-2 (this project)	AFD*	-	-	See below
NOTES	KWSCRP-1 Component 1.1 will finance all of the infrastructure needed to supply water (raw water, before treatment works) to the water supply system in the coastal region. The includes the construction of the main dam (Mwache), two check dams, raw water transmission lines (gravity-fed) to the treatment plant, transport infrastructure (approach road to dam site and bridges), electromechanical equipment and buildings related to the dam site.	*AFD is commencing preparation of the WTP project, currently at identification stage. Preliminary detailed design exists as part of Mwache Dam detailed design.	Financing for pumping stations to be identified. Preliminary detailed design exists as part of Mwache Dam detailed design.	Per Master Plan, financing of US$88m is needed for ~135.5km of transmission lines to supply treated water from Mwache to existing tanks in Changamwe and Kaya Bombo, and a New Water Tank.	Additional downstream investments (estimated at US$200–250m), including in utilities in Mombasa and Kwale County, are needed over the long term. Preparatory studies for priority investments are being financed under the ongoing KWSCRP-1, while selected investments in Mombasa County are planned under WaSSIP-2 (FY 16/17). KWSCRP-1 will also support utility reforms in both counties and reduction of NRW.

Source: Water Supply Master Plan for Mombasa and Other Towns Within Coast Province, November 2013. Estimates for "Onward distribution to Mombasa and Kwale Counties" provided by MEWNR and PMU team.

61. A series of complementary investments and activities under the ongoing and planned World Bank projects are under consideration to ensure the efficient use and distribution of the water supplied from Mwache Dam to the coastal region and Mombasa. These include:

i. *Investments in a water supply distribution system in Mombasa*. The planned Water Supply and Sanitation Investment Project, second phase (WaSSIP-2; FY 2016/17); will support critical investments in Nairobi and the coast, a significant amount of which is expected to finance rehabilitation and expansion of the distribution system in Mombasa.

ii. *Water Mains on Mombasa Island and North Mainland* (US$12 million) – WaSSIP Lot 1 (AFD).

iii. *Water Mains on Mombasa Island, North Mainland, West Mainland, and South Mainland* (US$6 million) - WaSSIP Lot 2 (IDA).

iv. *Reduction of Non-Revenue Water*. (US$20 million) – cofinanced by Vitens-Evides and KWSCRP-1. MOWASCO has recently launched a Non-Revenue Water (NRW) reduction program, including development of District Metered Areas (DMAs) to ensure the network is broken down into easily measured, controlled, and managed units where water balances can be developed and NRW reduction strategies employed effectively and with economic sustainability. The program will also include leak detection and repairs, as well as hydraulic modeling.

v. *MOWASCO turnaround.* With support from KWSCRP-1 and WSP, a program to reform the service provider is currently being developed by the county and MEWNR. See Annex 7 for details.

vi. *Support to Kwale Water and Sewerage Company (KWAWASCO) and other Water Service Providers.* Activities to support capacity building of the KWAWASCO and other Water Service Providers in the region will be provided under KWSCRP-1. See Annex 7 for details.

vii. *Water Treatment Plant and transmission lines.* MEWNR is currently assessing with the Treasury different options for financing the Water Treatment Plant, pumping stations and water tanks, and the transmission lines that will be required to process and distribute the water delivered by the Mwache Dam. The above-mentioned WaSSIP-2 project (FY 2016/17) is expected to contribute to financing these investments. In addition, potential PPP structures and the use of a World Bank Guarantee are being explored as part of discussions for the wider KWSCR program.

C. Program Objective and Phases

62. The overarching objective of the Kenya Water Security and Climate Resilience Program (KWSCRP) is to improve water security and build climate resilience by strengthening water and climate risk investment planning, preparation, and implementation that is supported by an enhanced enabling institutional framework. The KWSCRP adopts a long-term programmatic approach, whereby a series of investment operations linked to the same overarching objective are undertaken. This approach provides the necessary flexibility for the phasing of investment

operations in the series, to address opportunities and challenges as they emerge. It is expected that the KWSCRP will be implemented over a period of 10 to 12 years.

63. KWSCRP-1 (P117635, Credit Number IDA 5268-KE) was approved by the World Bank board on June 18, 2013 and declared effective on October 24, 2013. The project development objectives of KWSCRP-1 are to (i) increase availability and productivity of irrigation water for project beneficiaries; and (ii) enhance the institutional framework and strengthen capacity for water security and climate resilience for the country. KWSCRP-1 focuses on the progressive development of a water investment pipeline, integrated and participatory basin planning, and technical assistance to the evolving water sector institutions and sector reforms at a critical period of constitutional and political transition.

64. The Coastal Region Water Security and Climate Resilience Project (KWSCRP-2) is the second operation under the program and its design is consistent with the approach envisaged for the program in that investment preparation follows a sound investment framework and incorporates a multi-sectoral, multi-dimensional approach.

D. Lessons Learned and Reflected in the Project Design

65. Project design has benefited from best practices and lessons learned from national, regional, and global water-related projects that have been examined in detail. Some of the key lessons learned that are reflected in the current project design are described below.

66. *Long-term, yet flexible, commitment*. The KWSCRP adopts a long-term programmatic approach, whereby a series of investment operations linked to the same overarching objective is undertaken. In contrast to the piece-meal approaches that have not been fully satisfactory in the past, such a commitment is required to transform the sector by sustainably and comprehensively advancing implementation of a vast water sector investment program. At the same time, flexibility is required in light of the significant reforms associated with aligning the water sector to the 2010 Constitution of Kenya. The programmatic design provides the necessary flexibility for the phasing of investment operations in the series to address opportunities and challenges as they emerge. Investment operations under KWSCRP will be taken up when they are ready, as is the case for the Mwache Dam.

67. *A gradual approach to building institutions.* Experience with projects aimed at developing a rational system of resource allocation in an environment of scarcity indicates that building the necessary institutional and regulatory frameworks is a long-term and arduous process. When capacity is weak, building confidence through gradual improvements—for example, through piloting, developing, and applying norms and guidelines to design dams, and building institutions for water management and local development—is the most effective approach.

68. *Complementary infrastructure and institutional development.* Project design reflects the need for not only financing the Mwache Dam, but also for coordinating additional investments from different sources and fostering the necessary institutional reforms to ensure that these investments are sustainably planned, implemented, operated, and managed for long-term sustainable performance.

69. *Stakeholder coordination.* The importance of adequate coordination among all stakeholders has been repeatedly identified as a critical component for success in complex water sector projects that involve multiple stakeholders across a range of related sectors. Establishing coordination mechanisms is even more important in light of the significant institutional and legal reforms and the shifting institutional structure in Kenya. Implementation arrangements that include close collaboration between the Project Management Unit (PMU) located at the national level (MEWNR), as well as the CWSB, the CDA, and Mombasa and Kwale Counties will ensure a strong platform for coordination and exchanging information among a broad range of stakeholders to ensure their continuous and proactive engagement.

70. *Synergies with development partners*. The project's design has been informed by and has benefited from extensive discussions with development partners working in Kenya's water sector. Throughout project implementation, synergies with development partners will continue to be built, including through the established Water Sector Technical Working Group. There is a close coordination with the Agence Française de Développement (AFD) in the context of the WaSSIP and possible funding for the Mwache Water Treatment Works as well as with the Government of the Netherlands through the activities implemented by Vitens Evides in Mombasa County.

71. *Inclusive approach to sustainable infrastructure development*. Infrastructure has a critical role to play in contributing to poverty reduction and regional development by simultaneously addressing rural livelihoods improvements, enhancing climate resilience, and supporting urban development and growth in strategic coastal areas of Kenya. The design of Mwache Dam has benefited from experience gained through different dam projects, as well as to thorough preparatory work and studies. Consequently, the KWSCRP-2 has been organized around two complementary components for successful implementation and results. The second component supports important water investments in Kwale County, one of the poorest in Kenya, where the dam will be built.

72. *Integrating climate risk into dam design.* The current design of Mwache Dam has taken into account a sensitivity analysis intended to capture the effect of climate change, concluding that the proposed reservoir volume satisfied demand with the required reliability, both with the coefficient of variation of annual discharges exhibited in the past record and with the coefficient value increased, for climate change sensitivity analysis. The analysis has been reviewed by the GoK-appointed Dam Safety Panel of Experts. In addition, an independent analysis of the vulnerability of the current dam design to climate is being conducted under the ongoing World Bank study titled "Addressing the Climate Vulnerability of Africa Infrastructure" (P126254).

73. *Importance of integrated catchment management and upstream investments.* Investments that the Bank and other development partners have supported relating to large water infrastructure such as dams have generated several lessons. These include the need for adequate upstream catchment management in highly erodible areas where the dam storage and life can be threatened by erosion that reduces its effective storage. These lessons have been integrated into the project design through a sub-component aimed specifically at reducing erosion from targeted high-erosion areas in the dam catchment.

74. *Comprehensive package of World Bank Group (WBG) services.* The WBG does not always effectively coordinate the deployment of its financial, convening, and advisory services or make the most of its comparative advantage when it comes to having different arms and instruments with which to service clients. Consequently, it has a smaller development impact than it would if the different units worked together and products were more efficiently leveraged. Improved coordination of the World Bank's activities in Mombasa will lead to more integrated outcomes with greater benefits and reduced transaction costs for both the county government and the World Bank. If applied more widely, the same approach could have similar positive impacts nationally. There is therefore a strong case for deploying a comprehensive package of services, including IDA financing, WSP technical advisory services, WBG guarantees, and perhaps IFC and MIGA involvement to establish a roadmap that would provide a high-level strategy for the improvement of water resources and services and implementation of integrated urban water management in Mombasa County.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

75. MEWNR will serve as the implementing agency of the project through the Project Management Unit (PMU) established under KWSCRP-1 and supported by Component 3 of this project. The PMU will report to the Principal Secretary (PS) for Water, MEWNR, and will be granted a high degree of autonomy to ensure efficient implementation of the project, including through the application of rules, criteria, and procedures agreed with the World Bank. The PS, as the Accounting Officer of MEWNR, has appointed the PMU as a procuring unit and has delegated financial management responsibilities to the PMU, within the Legal Framework stipulated in the procurement law of Kenya.[10] Notwithstanding these provisions, the PMU will be accountable to the Principal Secretary for Water, MEWNR.

76. The core functions of the PMU will be coordination and facilitation, fiduciary oversight (procurement and financial management), environmental and social safeguards supervision, monitoring and evaluation (M&E) and impact evaluation, annual work programming and budgeting, and reporting. The PMU will undertake procurement, financial management, and reporting for all project activities. The PMU will also be responsible for supervising the implementation of the social and environmental safeguards instruments prepared for the project (the Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP), the Resettlement Action Plan (RAP), the Vulnerable and Marginalized Groups Plan (VMGP), the Integrated Pest Management Plan (IPMP), Dam Safety Plans, etc.). In order to carry out these functions for KWSCRP-2, the PMU will establish an

[10] Kenyan Law designates MEWNR as a Procurement Entity, with the PS as the Accounting Officer. The Ministerial Tender Committee (MTC) and the Ministerial Procurement Committee (MPC) are the final authorities for the award of tenders, depending on the financial threshold reached (MPC in the case of lower financial thresholds). The Accounting Officer is empowered by Kenyan Law to establish procurement units. The PMU has been appointed as a procurement unit within MEWNR and will follow procurement procedures agreed in the Finance Agreement. However, all procurement will be approved and awarded by the MTC or the MPC, depending on the amount of the contract.

office in the coastal region that is fully devoted to the implementation of the Project and ensure close coordination with the executing agencies.

77. Executing agencies[11] will work closely with the PMU to execute Component 1 (Mwache Dam and Related Infrastructure) and Component 2 (Kwale County Development Support). The two agencies initially designated as executing agencies are the Coast Development Authority (CDA) for Component 1.1 and the Kwale County Government for Component 2. In order to ensure close coordination with the executing agencies and timely delivery of project activities, the PMU will establish an office in the coastal region that is fully devoted to the implementation of the Project and will most likely be co-located with CDA PIU.

78. For **Subcomponent 1.1 (Civil Works and Related Infrastructure)**, an Owner's Engineer (OE), which could be a consortium of firms with relevant national and international experience, will be hired to undertake the preparation of detailed design, technical support for procurement, and supervision and quality assurance of the Mwache Dam construction works contract. CDA will establish a small Project Implementation Unit (PIU) of two or three engineers assigned full-time to the project to work directly with the OE. The OE will be directly responsible for delivering the sub-component activities, including project planning and reporting, construction supervision and quality assurance, compliance monitoring of social and environmental safeguards instruments, etc. The PMU and CDA PIU will work closely with the OE to monitor the delivery of the Dam project.

79. For **Subcomponent 1.2 (Mwache Catchment Management),** the CDA PIU and PMU office in the coastal region will deliver the sub-component in close partnership with the affected communities; local governments, including Kwale and Mombasa counties; and relevant agencies, including CDA, CWSB, Water Resources Management Authority (WRMA), and Kenya Forestry Service (KFS). The watershed management activities will be aimed at protecting the long-term investment in the Mwache dam. Partners would be involved in all stages from identification to preparation of technical specifications and terms of reference (TORs) to implementation and operation.

80. **Component 2 (Kwale County Development Support)** will be executed by a PIU established with the Kwale County Government (the executing agency). The PIU will work in close partnership with the affected communities, municipal governments, CWSB, CDA, and the PMU. An Implementation Support Consultant (ISC) will be contracted to support the PIU in delivering the four sub-components of Component 2.

81. The PMU and PIUs will each appoint a Manager through a competitive process, subject to No Objection from the World Bank on the specific terms of reference, criteria for selection and adequate qualifications for the position. Each unit will additionally have a core staff of professionals with the necessary expertise and experience to deliver the activities under their

[11] MEWNR is responsible for overall implementation of the project, including the fiduciary responsibilities of procurement and financial management, through the PMU, the "implementing agency". In order to avoid confusion, those agencies that would typically execute investments or other project-related activities under their mandate are referred to herein as "executing agencies".

respective components. In addition, the PMU will engage procurement and financial management staff with the requisite skills to manage the fiduciary functions and reporting in compliance with Bank requirements. Project staff will be recruited competitively, based on criteria agreed with the World Bank and in accordance with the World Bank Selection and Employment of Consultants Guidelines.[12] Project staff could also include those from the civil service and employees of MEWNR, CDA, Kwale County, or CWSB, in accordance with current civil service rules.

82. A Project Steering Committee (PSC), chaired by the PS for Water, MEWNR, will be established, primarily as a consultative group and to provide high-level, strategic guidance on project activities. It will be composed of representatives from Kwale County, Mombasa County, CDA, and the National Treasury. Participation in the PSC can be extended beyond this core group to other agencies (e.g. CWSB, WRMA, KFS, local water utilities) on an as-needed basis. The PMU will serve as the Secretariat to the PSC.

83. In addition to the PSC, the PMU will establish a Technical Coordination Committee (TCC) to provide working guidance and facilitate project delivery among the various project sub-components. The TCC will be chaired by the Project Manager and include the heads of the two PIUs, representatives of Kwale and Mombasa Counties, CDA, and other agencies on an as needed basis. The Coastal Region PMU Office will serve as the Secretariat to the TCC.

84. Implementation arrangements are discussed in further detail, including by sub-component, in Annex 3.

B. Results Monitoring and Evaluation (M&E)

85. A comprehensive system of M&E methodologies will be supported under the project. Reporting on progress and any shortcomings will be undertaken on a quarterly and annual basis in order to build a learning platform to inform project management and to improve project performance. To the extent possible, M&E data will be made publicly available in order to improve transparency and project governance.

86. ***Results and Process Monitoring and Evaluation***. The M&E system will track progress in implementation against timescales and targets, as well as resource use against budgets. Results will be tracked via input-output monitoring, whereby the inputs (investment costs, quantities of inputs, etc.) are compared with outputs actually achieved against annual targets. Process monitoring will focus on processes that are critical for meeting the project's objectives, such as the progress of training/capacity building initiatives and execution of sub-projects.

87. ***Implementation Arrangements for Results and Process Monitoring and Evaluation.*** All agencies involved in the implementation and execution of the project will participate in the process of data collection, compilation, analysis, and use. The PMU, through the M&E specialist

[12] World Bank Guidelines: Selection and Employment of Consultants under IBRD Loans & IDA Credits & Grants by World Bank Borrowers, January 2011.

appointed for the KWSCR program, will have overall responsibility for coordination, including collating information from all entities for quarterly and annual progress reporting, using an agreed format, as well as preparation of baselines. Data will be collected and managed by each agency through a designated focal point, who will be responsible for data acquisition, collation, and reporting for their respective sub-components. In the case of Component 2, Kwale County will be in charge of setting up a specific M&E system that will feed into that of the overall project. Kwale County's specific M&E system will have two purposes: (i) to monitor and evaluate the investment itself; and (ii) to serve as a tool to scheme operations and performance at full development, including after project completion. The project will fund necessary equipment (computers, software), other goods (e.g., vehicles), capacity building (training), and incremental staff to strengthen results and process monitoring at the project level and to equip the PMU and focal points to carry out these responsibilities. Consultants will be contracted to provide technical support to the implementing and executing agencies in the development and operation of the overall M&E system. An M&E workshop will be carried out immediately upon effectiveness, including all relevant actors.

C. Sustainability

88. The design of the KWSCRP-2 project aims to strengthen institutional, economic/financial, environmental/social, and infrastructure sustainability in the terms described below.

Institutional Sustainability

89. As in KWSCRP-1, institutional sustainability is crucial for the implementation and long life of activities under both components of the project. For this reason, necessary support to improve and enhance the legal and institutional framework of key institutions that are critical to meeting KWSCRP-2 project objectives must be continued and enhanced. This will be ensured by providing sufficient and timely support to key institutions to contribute to accomplishing their mandates, attributes, and functions, with regard to technical, environmental, social, economic, financial management, procurement, and M&E matters. The PMU will continue to act as a transitional entity, while investment and managerial capacities are established in the key agencies for the project. The KWSCRP-2 project will also enhance institutional sustainability by facilitating stakeholder participation and building capacity. These functions include several activities related to investments under Components 1 and 2.

90. Specific measures have been put in place to ensure effective project implementation supported and aligned with the ongoing institutional and legal reform period. These include the continuation and augmentation of tasks falling to the PMU itself, including its existing operational autonomy to apply rules, criteria, and procedures as agreed with the World Bank. As it is in KWSCRP-1, the PMU will remain fully abreast of the status of the evolving institutional reforms and devolution processes, and will systematically detect and be prepared to cope with any issues or challenges that may arise, including those that could affect project implementation, and will accordingly put mitigating measures in place. Formal commitments, such as Memorandum of Agreements (MoAs) with the agencies involved in project activities will be established, as needed. Considering the institutional and legal support needs of KWSCRP-2, measures such as these are absolutely transitional; thus, they are not meant to replace or take

over the evolving institutional structure of Kenya's water sector or the complex processes of devolution that are presently under way.

91. Institutional sustainability is a key objective for both components of KWSCRP-2, given the multipurpose nature of this project and the involvement of several parties of different origins, mandates, attributes, and functions intervening in various stages. This sustainability will be ensured through the specifications, roles, and responsibilities contained in a MoA to be adopted to implement coordinated and coherent project management over its duration.

92. Many key activities under KWSCRP-2 are directly linked to the MoA that is being developed in conjunction with the GoK and participating county governments for the purpose of establishing a stable foundation for the intervening parties—namely, MEWNR, CDA, WRMA, CWSB, MOWASCO, and the governments of Mombasa and Kwale counties—to cooperate in the achievement of the common objective, which is the successful development, construction, and implementation of the Mwache Dam.

93. The MoA establishes the basis for the modalities regarding cooperation, agreements with third parties, communication strategy, as well as implementation provisions among intervening parties, with a general description of the roles and commitments of each party with respect to the Mwache Dam Project. Consequently, the agreement includes the general and specific terms of cooperation establishing the specific responsibilities of CDA, WRMA, CWSB, as well as the governments of Kwale and Mombasa counties. Provisions have been made to ensure the timely and productive intervention of local communities in development activities. Furthermore, the MoA also considers the possibility of the participation of third parties (private investors, PPPs, etc.) in the financing and operation of portions of this complex multi-objective project.

94. Subsequent to the Memorandum of Understanding between the National Government and Mombasa County, there shall be a binding contractual agreement through which Mombasa County will purchase water in accordance with volumes and tariffs agreed with the National Government. The framework for development of a Water Purchase Agreement will be based on a number of technical inputs. The framework will be refined in order to identify the technical studies required and map out the legal issues to ensure that by the indicated date of December 31, 2015, the WPA has been concluded and become binding on the two parties.

95. With support from KWSCRP-1 and WSP, a program to reform the service provider MOWASCO is currently being developed by the county and by MEWNR (see Annex 7 for details). A similar program is under discussion between MEWNR and Kwale County to establish the water sector institutions and strengthen the service provider at the county level.

96. Finally, the activities under Sub-Component 2.1 are being developed and aligned with Kwale County's own County Integrated Development Plan (CIDP). This, combined with technical assistance to Kwale County, including on their master planning process, will help the county government to implement Sub-Component 2.1 as well as its own larger water supply program. These will ensure ownership and institutional sustainability.

Economic and Financial Sustainability

97. The sustainability of the expected economic benefits of the KWSCRP-2 project depends on the continued maintenance of the physical infrastructure and the operational efficiency of bulk water suppliers and water service providers. Specifically, the operational efficiency and financial sustainability of MOWASCO is crucial for overall project success because it is expected to receive and distribute the bulk of the water from Mwache Dam water to Mombasa. Moreover, amortization of the IDA credit is expected to come largely from the water tariffs charged by MOWASCO to its customers in Mombasa County. However, MOWASCO currently faces operational challenges. Its infrastructure is inadequate, old, and dilapidated. Little structural attention has been given to the distribution network. Low-income areas or informal settlement areas lack adequate water supply services. These factors have led to MOWASCO's current dire financial situation. The bulk of the meager revenue it generates is spent on operational activities, leaving little room for maintenance and investment activities.

98. MOWASCO has substantial revenue generation potential, which could be realized by reducing NRW and servicing new customers. The reduction of NRW and additional supplies would enable the company to service and bill new customers and to reactivate the existing non-functioning connections. The total number of active connections could potentially increase from the current figure of 42,720 to 296,955 in 2030. The total billed volume could increase from 23,344 m^3 per day in 2013 to 234,316 m^3 per day in 2030. Billed water revenue could increase from US$8.8 million in 2013 to US$94.4 million in 2030. However, these enhancements require substantial downstream investments in the distribution systems and upstream investments in bulk water supply sources, such as the Mwache Dam and treatment plant. The required downstream investment alone is considerable, estimated as follows: (i) US$58 million to receive additional bulk water supplies and increase the customer base; (ii) US$30.4 million to replace existing assets; and (iii) annual operating expenses of about US$18.8 million to purchase bulk water, pay salaries and wages, and cover O&M, transport, travel, and other costs.

99. In view of these investments, the cash flow analysis and the income statement for MOWASCO depict a healthy financial outlook for the company. The financial net present value (FNPV) associated with the cash flow is about US$1.2 million and the financial internal rate of return (FIRR) is 12.36 percent. The results of the income statement analysis further support the conclusion derived from the cash flow analysis: the net earnings for MOWASCO are projected to jump from their current negative standing to US$32.9 million per annum in 2030. These results suggest that MOWASCO has favorable growth potential. They also indicate that it can meet its financial obligations as a standalone company and invest in and operate the distribution system. The positive financial situation of MOWASCO is partly due to the significant difference between the current bulk water tariff it pays and the water tariff it charges its customers, as well as to the huge untapped customer base in Mombasa County. However, to realize the projected financial situation, MOWASCO needs to attain considerable operational efficiency.

Environmental and Social Sustainability

100. Increasing environmental degradation and climate variability threaten the sustainability of the expected benefits of KWSCRP-2—in particular the Mwache Dam—in terms of water

supply for Mombasa, increased agricultural production, and subsequent economic growth. Reducing this anthropogenic-induced degradation and promoting pro-poor, climate-resilient growth in the overall catchment area is therefore crucial to achieving sustainability and poverty alleviation, as well as improving the health and well-being of the people in the area. The project proposes to implement catchment protection activities in the Mwache dam catchment to reduce soil erosion and sediment loss thereby ensuring the longevity of significant investments in the Mwache dam infrastructure. Watershed management activities—including biophysical, agricultural, forestry and land management and livestock activities, among others—will be done in a participative, multi-sectoral, and cooperative manner, focusing at the local community level on service delivery and support for the sustainable co-management of natural resources. Community engagement in watershed management and livelihood activities greatly enhances the project's sustainability

101. The GoK recognizes that environmental management, poverty reduction, and economic growth are closely linked, and has designed policies and institutional frameworks to address the situation. The government's long-term development strategy, Vision 2030, accordingly includes strategies for action in the environment sector, including conservation of natural resources, pollution and waste management, high-risk disaster zone management, environmental planning and governance, and climate change adaptation.

102. The KWSCR program has established an Environmental and Social Management Framework (ESMF), a Resettlement Policy Framework (RPF), and a Vulnerable and Marginalized Groups Framework (VMGF), prepared under KWSCRP-1. These instruments aim to ensure sustainability, inclusion and equity during project implementation, and secure compliance with the World Bank's environmental and social policies as well as the policies and legislation of the GoK. To address the issues related to land acquisition and resettlement, a Resettlement Action Plan (RAP) has been prepared and was disclosed in the country and the World Bank Group Infoshop in September 2014. This RAP includes the Mwache Dam itself (SC 1.1) as well as the 100 hectares irrigation pilot (SC 2.3). An Environmental and Social Management Impact Assessment (ESIA), which will form the basis of an Environmental and Social Management Plan, and a Vulnerable and Marginalized Groups Plan (VMGP), has also been prepared in consultation with the communities in the project areas and with other major stakeholders, to ensure their participation in, and input into, the project.

103. Specific ESIAs and RAPs for subprojects in water supply and sanitation (and, if applicable, for the catchment management and livelihoods activities) will be prepared, in accordance with the ESMF and RPF respectively, once the exact location and scope of these subprojects are defined as part of implementation.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

104. The following table summarizes the risk ratings in the Operational Risk Assessment Framework (ORAF). Details of the risk analysis and description of risk categories are provided in the ORAF, found in Annex 4.

Table 3: Summary of ORAF Risk Ratings

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

B. Overall Risk Rating Explanation

105. **The project has an overall risk rating of High before mitigation.** Overall project risk is considered high due to the need to manage potential safeguards issues (including social, environmental, health, and safety impacts associated with the construction and operation of the Mwache Dam and the need for population resettlement), but also due to other factors, including financing for downstream investments; the size of contracts associated with procurement of a dam and the capacity of the implementing agency to supervise dam procurement and construction; the number of stakeholder agencies and the changing institutional context; the high level of engagement needed with local communities; and the challenges associated with the evolving security situation in the coastal region. In order to address the environmental, social, health, and safety impacts envisaged, the project is carrying out an ESIA for the Mwache Dam and related infrastructure. A full assessment of the risks and the proposed mitigation measures are included in the ORAF, attached as Annex 4. Some key risks are discussed briefly below.

106. **Safeguards Implementation.** Approximately 4,250 project-affected persons (PAPs), constituting about 746 families or households, will be resettled due to the construction of the Mwache Dam. While a robust set of safeguards instruments (see the "Environmental and Social" section below) has been developed to address the environmental and social issues incumbent on the government when constructing a large dam, there remains a risk that safeguards measures detailed in these instruments might not be adequately implemented. The PMU, which has already contracted qualified specialists in environmental, social, and dam safety issues, will be responsible for safeguards implementation. They will work closely with the Owner's Engineer (OE) and the executing agencies to ensure all required actions set forth in the safeguards instruments are carried out and that required monitoring and reporting takes place. The Bank will also include regular implementation review of all safeguards instruments.

107. **Financing for downstream investments.** A large amount of water infrastructure (the water treatment plant, pumps, transmission lines, storage tanks, etc.) with investment needs on

the order of US$ 150 million is needed, in addition to the dam, to ensure that the dam's water reaches and is consumed by the intended populations in Mombasa and Kwale Counties. There is a risk that, if downstream financing for the key infrastructure needed does not materialize, it will jeopardize the basic premise of and benefits from the dam. In order to mitigate this risk, a study to better analyze and quantify the downstream investments needed will be conducted under KWSCRP-1. In addition, the Bank will continue to work closely with the GoK and its development partners to identify possible financing sources. This includes exploring the possibility of a PPP supported by an IDA Payment Guarantee, which is an instrument that has been successfully tested in Kenya to promote private investment in the power sector.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

Economic Analysis

108. The coastal region has a water supply deficit of about 215,043 m^3 per day. About half of this deficit stems from Mombasa County alone. Thirty percent of the population of Mombasa lives in low-income areas or informal settlements. Only a small percentage of the residents in these areas is directly connected to pipelines, receiving water from low-quality, high-priced sources. Institutions and industries also face the twin problems of high cost and intermittent water supply. The situation in Kwale County is even worse, as only 1 percent and 10 percent of the rural and urban populations, respectively, have access to potable water services. Moreover, the livelihood of the Kwale county population, which is predominantly rural, is significantly constrained by exposure to climate variability and a low level of water resources development.

109. The economic implications of the water supply shortfall and the low level of water resources development and management are quite understandable. They pose a public health burden, increase the cost of doing business, discourage private investment, limit livelihood opportunities, increase drudgery for women and children, and reduce property values, among other outcomes. Capturing these and other effects in just a few economic indicators is difficult, if not impossible, due to the multifarious channels through which access to water impinges on human well-being. Quantifying such effects requires the application of complementary and special methodological frameworks, other than the conventional cost-benefit analyses.

110. Consequently, a thorough analysis of the economy-wide impacts and contributions of the KWSCRP-2 to the twin goals of eradicating extreme poverty and boosting shared prosperity in the coastal region is currently under way.[13] The analysis employs an integrated economic modeling framework involving a Computable General Equilibrium (CGE) model and a household-based micro-simulation model to assess the poverty reduction and distributional impact of KWSCRP-2. The results of these analyses strengthen the knowledge base on the causal linkages between investments in water infrastructure/institutions, economic growth, poverty, and shared prosperity. Additional water supplies resulting from KWSCRP-2 would enhance

[13] An international organization known as Partnership for Economic Policy Analysis (PEP) has been contracted to conduct a thorough analysis of these issues.

economic growth in the region by improving public health, encouraging private investment, improving livelihood opportunities, enhancing property values, avoiding drudgery for women and children (and releasing time to be spent on education and other household livelihood opportunities). More importantly, access to safe and secure water supplies would have long-term impacts on the region's human capacity development.

111. In addition, a conventional cost-benefit analysis was conducted to evaluate the project's financial and economic effects. "With" and "without" project scenarios were developed to assess the incremental costs and benefits associated with the overall project and project components. The analysis was achieved in two steps. First, financial and economic analysis was done for each of the major sub-project components, namely Mwache Dam and Related Infrastructure and Water Supply Coverage in Kwale County. The project components evaluated account for over 95 percent of the total project costs. The objective of these analyses was to test the financial and economic viability of the specific sub-components. Second, based on the results of the analysis of the sub-components, the benefits and costs of the entire project were analyzed to determine the viability of the overall project.

112. The financial and economic analysis for the Mwache Dam and Related Infrastructure component was done considering two scenarios for water allocation: (i) allocation of the total amount of water from the dam for water supply in Mombasa and Kwale Counties; and (ii) allocation of 80 percent of the water for water supply in Mombasa and Kwale Counties and 20 percent for irrigation development in Kwale County. The results of the economic analysis indicate that the Economic Internal Rate of Return (EIRR), without considering the economic surplus, ranges between 13 percent and 15 percent, depending on the water allocation and cropping pattern assumptions. These values increase to more than 22 percent when the economic surplus is considered. Thus, the subproject component is economically viable under all of the water allocation scenarios considered. However, allocating 20 percent of the water to irrigation, particularly for irrigating high-value crops, promises better economic returns. Therefore, the economic viability of water allocation to irrigation significantly depends on the type cropping pattern. As expected, increasing the share of high-value crops such as vegetables and fruits improves the economic viability of investments in the irrigation system.

113. The water supply for rural and small towns in Kwale County can be provided from connections to the existing and planned bulk water supply system in the coastal region and through diversified systems, such as water point sources (e.g., boreholes, protected dug wells, and protected springs), rainwater collection (roof catchments, water pans, and rock catchments), and small dams across seasonal streams. To demonstrate the financial and economic viability of this sub-component, a sample of these water sources was selected. All of the systems considered are economically viable, as the ENPV is positive and EIRR is well above the assumed opportunity cost of capital, even without adding consumer surplus. The addition of consumer surplus to the benefits significantly magnifies the economic viability of the water supply systems, both for rural areas and small towns. This is because Kwale county residents (both rural and urban) who currently lack access to improved water sources face high cost-per-unit of water.

114. The results of the economic analysis for the overall project show that, in sum, the project is economically viable, even when 20 percent of Mwache Dam water is allocated to irrigation.

Inclusion of the economic surplus in the cost-benefit analysis significantly improves the economic viability of the overall project. The EIRR values, omitting the economic surplus, range between 14 percent and 15 percent, depending on the assumed water allocation scenarios and cropping pattern. When the economic surplus is included, the corresponding values range between 36 percent and 39 percent. These results are typical of water supply projects in developing countries.

115. In conclusion, the expected development impacts of the project are considerable and varied, including improvements in human health and livelihood opportunities, with clear positive economic returns for each of the possible water allocation scenarios considered. Without public investment, the services required to realize these benefits may be undersupplied. The World Bank's engagement in this project is justified and is expected to add value and leverage both the Government of Kenya's and the Bank's ongoing initiatives.

Financial Analysis

116. The financial analysis focused on the Mwache Dam and Related Infrastructure component of the project and the assessment of MOWASCO's operational viability, as the major recipient of the planned bulk water supply from Mwache reservoir. Currently, MOWASCO has operational challenges. Its infrastructure is inadequate, old, and dilapidated. Little structural attention has been given to its distribution network. Low-income areas or informal settlement areas lack adequate water supply services. The bulk of the revenue generated is spent on operational activities, leaving little room for maintenance and investment activities.

117. There are ongoing and planned initiatives to turn MOWASCO around and improve its readiness to receive and distribute additional bulk water supplies (see Annex 8). Mombasa's county government, guided by the vision of providing safe, reliable and affordable water and sanitation services in an efficient and viable manner to the residents of Mombasa County, is planning to put in place state-of-the-art governance structures and institutional arrangements to ensure that mechanisms and incentives exist to achieve the desired services and performance improvements, aimed at achieving universal water coverage. AFD and the World Bank, through WaSSIP, are investing in rehabilitation or replacement of old infrastructure, as well as expansion of networks and water mains. Vitens-Evides International is currently providing technical support to MOWASCO to reduce NRW, improve billing against the same amount of water currently supplied, and attain and maintain costs of operation at a percentage no greater than the industry benchmark of 60 percent of revenue.

118. MOWASCO has substantial revenue-generation potential, which could be realized by reducing NRW and the acquisition of additional water supplies from Mwache Dam. Reduction of NRW and additional supplies would enable the company to service and bill new customers and reactivate the existing non-functioning connections. The total number of active connections could increase from 42,720 in 2013 to 296,955 in 2030. The total billed volume could increase from 23,344 m^3 per day in 2013 to 234,316 m^3 per day in 2030. Billed water revenue could increase from US$8.8 million in 2013 to US$94.4 million in 2030. Attaining these targets requires substantial downstream investments in the distribution systems, specifically: (i) US$58 million to receive additional bulk water supplies and increase the customer base, which involves

expanding distribution systems (including the tertiary distribution network), and acquiring equipment and vehicles; (ii)US$30.4 million in capital expenditure to replace of existing assets; and (iii) annual operating expenses of about US$18.8 to purchase bulk water, as well as cover costs related to salaries and wages, O&M, transport, travel, and others.

119. The projected cash flow analysis for the planned investment depicts a healthy financial prospect for MOWASCO. The FNPV associated with the cash flow is about US$1.2 million and the FIRR is 12.36 percent. The net earnings for MOWASCO are projected to jump from its current negative figure to US$32.9 million per annum in 2030, suggesting that MOWASCO has favorable growth potential. The analysis shows that MOWASCO can meet its financial obligations as a standalone company and invest in and operate the distribution system. MOWASCO's positive financial situation is partly due to the significant difference between the current bulk water tariff it pays and the water tariff it charges to its customers, as well as to the huge untapped customer base in Mombasa. However, to realize the projected financial situation, MOWASCO needs to attain considerable operational efficiency, for instance by reducing the number of employees per 1,000 connections from the current 6 to 3.5 and attaining and maintaining costs of operation at a percentage not greater than the industry benchmark of 60 percent.

B. Technical

120. Dam Design: The proposed dam is a concrete gravity dam with a height of about 78 m and with a total reservoir capacity of about 118 million m^3. The dam is expected to supply 186,000 m^3/day (67.9 million m^3/year) for urban water supply (to Mombasa and Kwale Counties).

121. The Dam Safety Panel of Experts (DSPE) for the project met in September 2013 and during March–April 2014. Overall, the panel endorsed the dam's design, and has provided comments and recommendations that will be reflected in the final design. The DSPE will be maintained throughout project implementation for continuous technical oversight and guidance on the detailed design and construction works. In addition, a consulting firm is being procured to undertake detailed design preparation, technical support for the bidding process, and construction supervision/quality assurance as the Owner's Engineer. The TORs have been reviewed and cleared.

122. Geological Assessment: The dam site is mainly composed of Mazeras and Mariakani sandstones, micaceous sandy siltstones, and siltstones with some weathering and sub-horizontal joints. Boreholes, permeability tests, and laboratory tests (compressive strength, etc.) have been conducted. Permeability is low, as shown in the Lugeon test results. The foundation condition is generally considered sufficient for supporting the proposed dam with required treatment works.

123. Hydrology Assessment: The relevant hydrological characteristics (inflow, design floods, safe yield, etc.) have been computed using standard methods, and flood hydrology has been assessed to determine the key features of the dam design. The hydrological analysis caters for an environmental flow of 7.8 MCM/year, which has been finalized in consultation with the WRMA and confirmed by the ESIA. The reservoir yield has also been checked with the reservoir operation simulation, including environmental flow release and irrigation water supply, among

other elements. The sensitivity to climate change of the reliability of water supply from the dam reservoir was considered using an increased coefficient of variation in discharge flow patterns.

124. Sedimentation was identified as a key issue during the design process. The catchment area for the dam is estimated at 2,250 km^2, while annual sediment yield from the catchment (without any sedimentation management measures) is estimated at 2.1 million m^3 per year. Implementation of key measures in the sedimentation management plan (i.e., catchment management to reduce soil erosion, the construction of two check dams, the inclusion of two bottom outlets allowing for regular flushing/sluicing of sediment, and sufficient dead storage volume) are expected to maintain the live storage volume for more than 100 years. These activities are included in the current project design and budget, and will be a key part of the operations procedure for the dam.

125. The Bank team has also worked with WRMA to better understand the erosion patterns in the Mwache Dam catchment (see Figure 2). The catchment management activities, financed under Component 1, will adopt integrating approaches for sustainable land management in the priority erosion hotspots using a participatory watershed management approach.

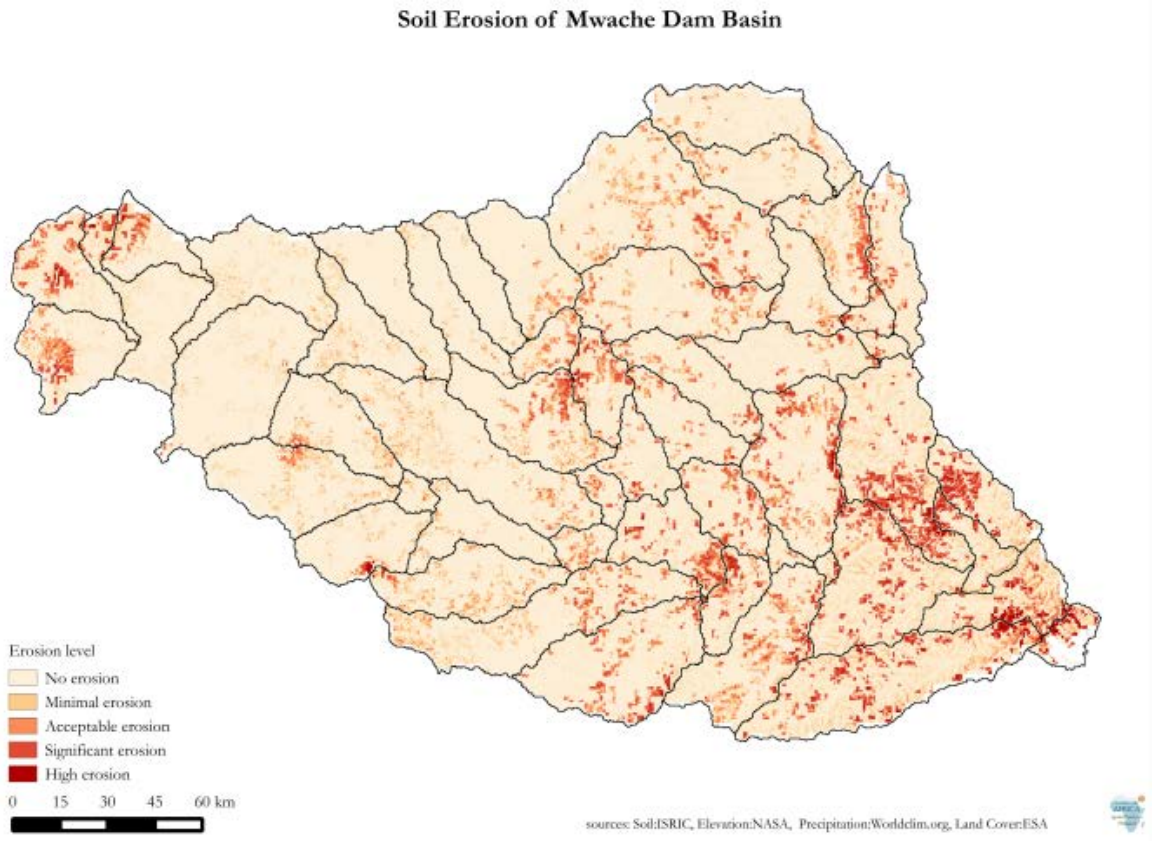


Figure 2: Soil Erosion "Hot Spot" Areas in Mwache Dam Basin

C. Financial Management

126. The financial management (FM) assessment revealed that all three agencies (i.e. the PMU under MEWNR as the implementing agency, and the CDA and Kwale County as executing agencies) have adequate FM capacity to implement the project. The budgeting, funds flows, accounting, internal control, financial reporting and auditing arrangements are deemed to be adequate. The project has developed an FM manual with comprehensive financial procedures and guidelines. About 90 percent of the project cost consists of civil works and consultancies with low FM risk. The remaining 10 percent consists of operating costs, training and grants for livelihoods (2.5 percent). Adequate FM measures including internal audit risk-based fiduciary review, Bank FM on-site review and annual external audits have been put in place to manage the related fiduciary risks.

127. The project's FM arrangement will be based on existing public financial management PFM systems in the country at the Ministry, including the use of IFMIS, the GoK standard chart of accounts and the G-pay/T-24 Central Bank of Kenya (CBK) EFT system. The Ministry's External Resources Section under the oversight of the Ministry's Head of Accounting Unit will provide support to the PMU to coordinate the FM arrangements for the project. MEWNR will retain overall fiduciary responsibility for the project implementation. The Ministry will be responsible for accountability and financial reporting, including the preparation of the annual financial statements and quarterly Interim Financial Reports (IFRs). Project budgets will be prepared by MEWNR based on annual work plans from each of the executing agencies. The project will adopt the SOE method of disbursement. The designated account (DA) will be opened at the CBK as will the main Project Account (PA). Sub-project bank accounts will be opened for each of the executing agencies (CDA and Kwale County) in IDA-approved financial institutions, for the implementation of the respective components and sub-components. Payments for civil works and consultancy contracts under Component 1 will be made from the Project Account or through direct payments, depending on the minimum threshold.

128. The conclusion of the FM assessment is that the financial management arrangements have an overall residual risk rating of Substantial which satisfies the Bank's minimum requirements under OP/BP10.00, and are therefore adequate to provide, with reasonable assurance, accurate and timely information on the status of the project, as required by IDA.

D. Procurement

129. The procurement risks associated with the project and the proposed mitigating measures are detailed in Annex 3. MEWNR has been assessed by IDA, as of May 2014, as having sufficient capacity to implement procurement actions for the project. The assessment reviewed the organizational structure for implementing the project and the interaction between the project's staff responsible for procurement duties and the management of the Ministry. Based on the procurement capacity assessment, the overall project procurement risk is Substantial.

130. The key issues and risks concerning procurement for implementation of the project have been identified and include systemic weaknesses in the areas of: (i) accountability for procurement decisions; (ii) procurement record keeping; (iii) the capacity of procurement staff; (iv) procurement planning; (v) procurement process administration, up to and including the

award of contracts; (vi) contract management; and (vii) procurement oversight. To mitigate these weaknesses, corrective measures have been agreed, as listed in Annex 3, which include:

(a) Review and update – by project effectiveness – the sections of the Procurement Guide (which is part of the Project Implementation Manual prepared for the current project) that: (i) define the roles and responsibilities of all those involved in any aspect of procurement implementation for this project; (ii) set forth the sequence and timeframe for the completion of procurement decisions in all categories of contracts, as well as for coordination of the contribution of all those involved in procurement implementation; and (iii) establish service standards for processing payments to contractors and suppliers.

(b) Align the preparation processes of procurement plans, work plans, and budget estimates.

(c) Establish separate effective tracking systems of: (i) procurement plan implementation; and (ii) processing of payments to contractors and suppliers.

(d) Confirm, by project effectiveness, that one additional competent procurement officer from the current ministry staff is either dedicated to or hired for the project, bringing the total to three. Currently, two procurement officers are responsible for all procurement activities of Kenya's WSCRP (1), and with additional staff, the team could handle procurement activities for both projects, namely, KWSCRP 1 and 2.

(e) In consultation with the Public Procurement and Oversight Authority (PPOA) and the Kenya National Audit Office (KENAO), ensure that procurement audits by PPOA and financial audits by KENAO are conducted jointly.

131. The MEWNR procurement unit has 19 staff, including a Head of Procurement, a Deputy Head, eight Supply Chain Management Officers, and four assistant Supply Chain Management Officers. However, their experience involves mainly local procurement under Kenya procurement laws and procedures using the Public Procurement and Disposal Act 2005 (PPDA) and the national Standard Bidding Document, with limited experience in international procurement. Therefore, it would be essential to dedicate at least two additional procurement specialists well versed in World Bank guidelines, exclusively to handle procurement activities for the two projects. With close guidance on the application of World Bank guidelines on the procurement of goods, works, and the selection of consultants during the first year of operation, the two dedicated procurement specialists, appropriately supported by the current experienced MEWNR staff, can adequately handle procurement under the project.

E. Environmental and Social Issues (including Safeguards)

132. KWSCRP-2 has been assigned an Environmental Assessment Category A and triggers Safeguard Policies on Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Pest Management (OP 4.09), Physical Cultural Resources (OP/BP 4.11), Safety of Dams (OP/BP 4.37), Involuntary Resettlement (OP/BP 4.12), Indigenous Peoples (OP/BP 4.10) and Forests (OP/BP 4.36). Specific safeguards documents have been prepared for KWSCRP-2 activities that are consistent with the Environmental and Social Management Framework (ESMF), a Resettlement Policy Framework (RPF), a Vulnerable and Marginalized Groups Framework (VMGF), and Integrated Pest management Framework (IPMF) developed under KWSCRP-1.

133. An ESIA for the project has been prepared for components with completed designs and specified locations, in accordance with the existing ESMF prepared for KWSCRP-1. The ESIA has identified environmental issues envisaged from the proposed project activities, specifically the dam, including a check dam and pilot irrigation component. The ESIA has addressed potential adverse impacts at different stages of the project, including: decreased water quality due to sedimentation; disruption of aquatic habitat and ecological systems downstream of the Mwache River; loss of riverine vegetation; and generation of dust and noise during construction. The results of the ESIA have been incorporated into an ESMP outlining specific mitigation measures to address any impacts identified that may be generated by the project's activities.

134. From a social perspective, the project will reduce vulnerability to floods and droughts (the latter being one of the reasons for poverty among the people living in the project area) and, more broadly, will address food insecurity, low productivity, and constrained growth in the coastal region. Specifically, to ensure sustainability and address poverty in the area, under Component 2 the project will: (i) develop water resources and catchment management activities, engaging the farmers living upstream of the dam; (ii) finance community-driven development initiatives for Kwale County where the Mwache Dam is located; (iii) finance small irrigation infrastructure for a 100 hectares demonstration plot and agriculture productivity improvement program, where more than 200 households—including women-headed households—will benefit from the irrigated plots; and (iv) improve water supply and sanitation infrastructures in Kwale county. The last item will specially benefit women in the area, where, according to the socioeconomic assessment undertaken for the preparation of the RAP, it is the duty of women to collect water and to clean and cook. The engagement of the communities in watershed management and in improving access to water and sanitation will help to ensure the project's sustainability and will reduce poverty.

135. Approximately 4,250 PAPs, constituting about 746 families or households, will be resettled due to the construction of Mwache Dam. Based on consultations conducted as part of the RAP preparation, a large majority of PAPs made clear that they were not willing to be resettled outside their communities. Utmost care will be taken to ensure that PAPs are resettled in the same area as per the RAP. Measures to this effect include ensuring that resettlement sites in the same area are identified in accordance with the RAP, and that RAP implementation is closely monitored by the PMU, an independent consultant, NGOs, and the Bank. Measures will be taken to make sure affected communities have easy access to grievance mechanisms to provide feedback on RAP implementation. The majority of those living in the project area are Duruma, a group considered vulnerable and marginalized. As a result, in addition to the RAP, which mainly covers this group, a Vulnerable and Marginalized Group Plan (VMGP), with mitigation measures, has been prepared in consultation with this group. The grievance mechanism in the VMGP takes into account the availability of judicial recourse and customary dispute settlement mechanisms at the disposal of the VMG.

136. For Component 2 activities, the existing ESMF, RPF, VMGF, and IPMF will be used to ensure that safeguard issues are incorporated during project design. Detailed ESIAs will be conducted for the water supply and sanitation components in Mombasa and Kwale Counties once the locations, designs, scope, and other aspects of the project are known, and these will be submitted for approval by the Bank prior to construction.

Table 4: Disclosure Dates of Environmental and Social Safeguards Documents

Document	Disclosure Dates	
	World Bank Group Infoshop	In-Country
Environmental and Social Impact Assessment (ESIA)	June 18, 2014	June 23, 2014
Resettlement Action Plan (RAP)	October 3, 2014	October 4, 2014
Vulnerable and Marginalized Group Plan (VMGP)	October 29, 2014	October 4, 2014

F. Safeguards Policies Triggered

137. Table 5 details the safeguards policies that are triggered by the project.

Table 5: Safeguards Policies Triggered

Safeguards Policies	Yes	Reasons for Triggers & Proposed Mitigation Measures	No
Environmental Assessment (OP/BP 4.01)	X	Construction of dam-related infrastructure on Mwache River is likely to reduce environmental flow downstream of the dam, with negative consequences on the productivity and ecological integrity of the Mwache creek and its dependent biophysical and socio-economic environment. Based on the Environmental and Social Management Framework (ESMF) for the KWSCRP-1, an Environmental and Social Management Impact Assessment (ESIA) has been prepared for the project, which will be the basis of an Environmental and Social Management Plan (ESMP) that will prepare detailed measures to mitigate impacts identified. The ESIA has established potential positive and negative impacts, which include decreased water quality due to sedimentation, and disruption of aquatic habitats and ecological systems downstream of Mwache River. Since the Mwache Dam is envisaged to bring 67.9 million cubic meters of water per year to Mombasa and Kwale, disposal of additional wastewater generated may have environmental impacts. As a result, an ESIA analysis, based on the ESMF for KWSCRP-1, will be conducted for this additional wastewater in the future, as needed.	
Natural Habitats (OP/BP 4.04)	X	Project activities related to dam construction may lead to alterations in flow regimes of freshwater into Mwache Creek, such as reduction in silt discharge, which could cause changes in nutrient cycling in the creek ecosystem, effectively disrupting the marine life trends and the associated productivity, including mangrove development. Inundation of the area could also change the ecological settings related to biological diversity and indigenous species of flora and fauna, or cause the potential transformation of the area's ecological characteristics due to invasive species, including vectors. For this reason, the Natural Habitats policy is triggered. The project will strive to retain the ecological functions of the wetlands, which include water purification, flood protection, and habitat for aquatic animals and plant species.	
Pest Management (OP 4.09)	X	Although the project will not be financing pesticides, support for the development of an irrigation scheme under Component 2 is likely to involve the use of different types of agrochemicals to control diseases, pests, and vectors. The project will promote the use of integrated pest management approaches and seek to reduce reliance on synthetic chemical pesticides. An Integrated Pest Management Plan (IPMP) will be prepared in accordance with the Integrated Pest Management Framework for KWSCRP-1 to provide guidance on the pests and pesticides. The IPMP will additionally provide guidance on the assessment of environmental and health risks associated with the envisaged pesticide use and integration of specific measures to address these risks in the project design.	
Physical Cultural Resources (OP/BP	X	The project is likely to inundate cultural heritage sites/graves and/or encounter cultural resources during the construction of the dam. The ESIA will address impacts on physical	

4.11)		cultural resources and provide a cultural resources management plan, including "Chance Finds." Guidance on addressing chance finds for individual investment during project implementation has been prepared as part of the ESMF for KWSCRP-1.	
Involuntary Resettlement (OP/BP 4.12)	X	The main sub-component under the project (Sub-Component 1.1) includes the construction of a dam across Mwache River in Kasemeni Division of Kinango District in Kwale County. This includes the Mwache Dam and reservoir, related roads and bridges, and one check dam for sedimentation. The main impacts on involuntary resettlement are related to the dam, as these activities will require the acquisition of the land and properties, impacting assets and requiring physical resettlement of some of the households. Other project activities—particularly those pertaining to water supply and sanitation investments, but also possibly activities focusing on livelihoods and catchment management—could also affect land and assets. To address the issues related to land acquisition and resettlement, a Resettlement Action Plan (RAP) has been prepared and was disclosed in the country and World Bank Group Infoshop in October 2014. This RAP was prepared in accordance with the principles detailed in the Resettlement Policy Framework (RPF), which was prepared for the KWSCRP-1 and covers all the components being financed by the IDA in this phase of the project whose scope and activities are known and defined at this time. This includes the Mwache Dam itself (SC 1.1) as well as the 100 hectare irrigation pilot (SC 2.3). The RAP estimates for the dam and reservoir are that about 746 families (4,250 people) would be displaced, requiring resettlement. This figure is subject to confirmation of the final design of the project. Safeguards documents for the facilities associated with the dam (but not financed under the IDA credit)—including the water treatment plant, pumping stations, and transmission lines—would not be included in the scope of the main RAP. However, the RAP can be updated at a future date to incorporate the impacts from these associated facilities, if needed. Specific RAPs for subprojects in water supply and sanitation (and, if applicable, for the catchment management and livelihoods activities) will be prepared once the exact location and scope of these subprojects are defined as part of implementation. These specific RAPs will be based on the principles of the existing RPF prepared under KWSCRP-1.	
Indigenous Peoples (OP/BP 4.10)	X	The project area is inhabited by the Durumas, a sub-tribe of the Mijikenda and categorized as vulnerable and marginalized by the Constitution of Kenya. Thus, a Vulnerable and Marginalized Groups Plan (VMGP) has been prepared and disclosed in the country on October 4, 2014 and at the World Bank Group Infoshop on October 29, 2014. This document was prepared based on Vulnerable and Marginalized Groups Framework (VMGF), which was prepared and disclosed under KWSCRP-1 and in close consultation with the VMG. A social assessment was undertaken to understand sociocultural and other relevant social and economic characteristics of the Duruma and to ensure that the grievance mechanisms reflect the availability of judicial recourse and customary dispute settlement mechanisms among the VMGs. As with the RAP, the initial VMGP will cover all the project components being financed by IDA whose scope and activities are defined at this time. An updated VMGP would incorporate the facilities associated with the dam but not financed by IDA, while specific VMGPs for subprojects in water supply, sanitation, catchment management and livelihoods activities will be prepared once the exact location and scope of these subprojects are defined.	
Forests (OP/BP 4.36)	X	The proximity of Mwache Forest and its associated cultural and ecological importance, as well as its climatic value, is a factor that triggers the policy. Activities proposed under Mwache Catchment Management will involve promoting approaches to improve sustainable land and water management in Kwale and will include afforestation of the catchment area to reduce erosion and sedimentation of Mwache Dam.	
Safety of Dams (OP/BP 4.37)	X	The proposed dam is a concrete gravity dam with a height of about 78 m and with a reservoir capacity of about 118 million m3. The dam is expected to supply 186,000 m3/day (67.9 MCM/year) for urban water supply. An independent Dam Safety Panel of Experts (DSPE) comprising dam design/construction, geology/geotechnical and hydrology/sediment experts	

		has been established to review the concept, design and construction of Mwache Dam. The DSPE has held two missions in September 2013 and March - April 2014, and has provided comments and recommendations, which are to be reflected in the final design. The DSPE will be maintained throughout project implementation for continuous technical oversight and guidance for detailed design and construction works. Per OP/BP 4.37, four key Dam Safety Plans will be prepared. These include (i) Construction Supervision and Quality Assurance Plan; (ii) Instrumentation Plan; (iii) Operation & Maintenance (O&M) Plan; and (iv) Emergency Preparedness Plan (EPP). The Construction Supervision and Quality Assurance Plan has been prepared under which a consulting firm in charge of detailed design preparation and construction supervision/quality assurance is being procured as the Owner's Engineer (OE). The Instrumentation Plan will be finalized as a part of the detailed design/bidding document, and will be submitted to the DSPE and World Bank for review. A preliminary draft O&M Plan and a draft framework Emergency Preparedness Plan (EPP) have been prepared and reviewed. A full-fledged O&M Plan and EPP will be prepared no later than six months and twelve months respectively prior to the first reservoir impoundment during implementation.	
Projects in Disputed Areas (OP/BP 7.60)		OP/BP 7.60 will not be triggered by the proposed investment.	X
Projects on International Waterways (OP/BP 7.50)		OP/BP 7.50 will not be triggered by the proposed investment. The Mwache Dam is located on the Mwache River, whose basin lies fully within Kenya’s borders.	X

Annex 1: Results Framework and Monitoring

Country: Kenya

Project Name: Coastal Region Water Security and Climate Resilience Project (P145559)

Project Development Objectives

PDO Statement

The development objective of this project (KWSCRP-2) is to sustainably increase bulk water supply to Mombasa County and Kwale County, and increase access to water and sanitation in Kwale County.

These results are at	Project Level

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	YR7	End Target			
Direct project beneficiaries	☒	Number	0	0	0	62,620	159,665	250,480	375,720	500,960	626,200	Annual	M&E system periodic progress reports	PMU
Female beneficiaries	☒	Percentage Sub-Type Supplemental	0	48%	48%	48%	48%	48%	48%	48%	48%	Annual	M&E system periodic progress reports	PMU
Bulk water supply from Mwache Dam	☐	MCM/yr	0	0	0	0	0	0	0	67.9	67.9	Annual	M&E system periodic progress reports	PMU
Number of people provided with access to Improved Water sources under the project	☒	Number	0	0	0	20,500	54,365	82,000	123,000	164,000	205,000	Annual	M&E system periodic progress reports	PMU

People provided with access to "improved sanitation facilities" under the project.	☒	Number	0	0	0	19,000	47,500	76,000	114,000	152,000	190,000	Annual	M&E system periodic progress reports	PMU
People provided with access to "improved sanitation facilities" - urban	☒	Number Sub-Type Breakdown	0	0	0	2,200	5,500	8,800	13,200	17,600	22,000	Annual	M&E system periodic progress reports	PMU
People provided with access to "improved sanitation facilities"- rural	☒	Number Sub-Type Breakdown	0	0	0	16,800	42,000	67,200	100,800	134,400	168,000	Annual	M&E system periodic progress reports	PMU

Intermediate Results 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	YR7	End Target			
Component 1: Mwache Dam and Related Infrastructure														
Sub-Component 1.1: Civil Works and Electromechanical equipment														
Construction of Mwache Dam and associated works	☐	Percentage	0%	0%	0%	15%	40%	70%	100%	100%	100%	Annual	M&E system periodic progress reports	PMU
Number of mandatory visits by Dam Safety Panel	☐	Visits per year	0	2	2	2	2	2	2	2	2	Bi-Annual	Dam Safety Panel Reports	PMU
Environmental and Social management plan implemented	☐	Yes/No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Annual	M&E system periodic progress reports	PMU
Sub-Component 1.2: Mwache Catchment Management														

Target area where land and water mgmt. practices have been adopted as a result of the project	☐	Hectares (ha)	0	0	0	200	500	800	1,200	1,600	2,000	Annual	M&E system periodic progress reports	PMU
Component 2: Kwale County Development Support														
Sub-Component 2.1: Water Supply Investments														
Number of people in rural areas provided with access to Improved Water sources under the project	☒	Number	0	0	0	11,000	30,615	44,000	66,000	88,000	110,000	Annual	M&E system periodic progress reports	PMU
Number of people in urban provided with access to Improved Water sources under the project	☒	Number	0	0	0	9,500	23,750	38,000	57,000	76,000	95,000	Annual	M&E system periodic progress reports	PMU
Sub-Component 2.2: Sanitation Investments														
People trained to improve hygiene behavior or sanitation practices under the project	☒	Number	0	0	0	23,000	57,500	92,000	138,000	184,000	230,000	Annual	M&E system periodic progress reports	PMU
Sub-Component 2.3: Sustainable Livelihoods Improvement														
Beneficiaries that feel that sub-project investments reflect their needs	☒	Percentage	0	0	0	50	50	80	80	90	90	Every two years, starting YR 3	M&E system periodic progress reports	PMU
Improvement in	☐	Percentage	0	0	0	5	5	10	10	15	15	Annual	M&E system	PMU

household income due to sub-project investments		increase											periodic progress reports	
Sub-Component 2.4: Irrigation Demonstration Scheme														
Technologies demonstrated in the project	☒	Number	0	0	0	2	2	2	3	3	3	Annual	M&E system periodic progress reports	PMU
Crops demonstrated in the project	☐	Number	0	0	0	2	4	8	8	8	8	Annual	M&E system periodic progress reports	PMU
Water users provided with new/improved irrigation and drainage services (number)	☒	Number	0	0	0	20	50	80	120	160	200	Annual	M&E system periodic progress reports	PMU
Total beneficiaries from new/improved irrigation and drainage services (including dependents of key water users)	☐	Number	0	0	0	120	300	480	720	960	1,200	Annual	M&E system periodic progress reports	PMU
Component 3: Project Management														
Project M&E established and operational	☐	Qualitative	NA	Established	Fully operational	Fully operational	Fully operational	Fully operational	Fully operational	Fully operational	Fully operational	Annual	M&E system periodic progress reports	PMU
Reports produced on time with adequate quality , including annual, mid-term, final	☐	Yes/No	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Annual	M&E system periodic progress reports	PMU

Description of Indicators for Results Framework

Project Development Objective Indicators	
Indicator Name	Description (indicator definition etc.)
Direct project beneficiaries	Direct beneficiaries are people or groups who directly derive benefits from the project. This number, at the PDO-level, is the sum of several intermediate results indicators that measure direct beneficiaries from a number of the project's key interventions. In this case, it is the sum of the number of people provided with (i) access to improved water sources under the project (beneficiaries who will receive water in Kwale's urban and rural areas under Sub-Component 2.1), (ii) improved sanitation facilities under the project (which includes urban and rural sanitation facilities under Sub-Component 2.2) and the number of people trained to improve hygiene behavior or sanitation practices (under Sub-Component 2.2) and (iii) beneficiaries from the 100 ha irrigation demonstration scheme
Female beneficiaries	Based on the assessment and definition of direct project beneficiaries, this number specifies the expected percentage of the beneficiaries is female. Figures are based on the 2009 population census for Mombasa County (where majority of project beneficiaries will be located).
Potential bulk water supply from Mwache Dam	The dam is expected to provide a potential supply of 186,000 m3/day (67.9 MCM/year) for urban water supply (to Mombasa and Kwale Counties) after construction and filling of the dam is complete.
People provided with access to "improved sanitation facilities" under the project.	This indicator measures the cumulative number of people who benefited from improved sanitation facilities that have been constructed under the project. This includes people newly provided with access to "improved sanitation facilities" and does not include people benefiting from rehabilitation works.
People provided with access to "improved sanitation facilities" - urban	Breakdown of core indicator.
People provided with access to "improved sanitation facilities"- rural	Breakdown of core indicator.

Intermediate Results Indicators	
Indicator Name	Description (indicator definition etc.)
Component 1: Mwache Dam and Related Infrastructure	
Sub-Component 1.1: Civil Works and Electromechanical equipment	
Construction of Mwache Dam and associated works	This indicator captures, as a percentage, the physical progress in terms of construction of the Mwache Dam and associated works.

Number of mandatory visits by Dam Safety Panel	This indicator measures the number of annual visits to the site by the Dam Safety Panel of Experts. The Panel will make at least one annual visit to the site, which will include a focus on environmental and social monitoring.
Environmental and Social Management Plan implemented	This indicator captures adherence to the Environmental and Social Management Plan (ESMP) during the project life.
Sub-Component 1.2: Catchment Protection and Livelihood Support	
Target area where land and water mgmt. practices have been adopted as a result of the project	This indicator measures the physical land area in which watershed protection, catchment management, and other resulted activities have been adopted.
Component 2: Kwale County Development Support	
Sub-Component 2.1: Water Supply Investments	
Number of people in rural areas provided with access to Improved Water sources under the project	This indicator measures the cumulative number of people in rural areas who benefited from improved water sources that have been constructed under the project.
Sub-Component 2.2: Sanitation Investments	
Number of people in urban areas provided with access to Improved Water sources under the project	This indicator measures the cumulative number of people in urban areas who benefited from improved water sources that have been constructed under the project.
Sub-Component 2.3: Sustainable Livelihoods Improvement	
Beneficiaries that feel that sub-project investments reflect their needs	This indicator is intended to measure the satisfaction of beneficiary communities with the sub-project investments under the sustainable livelihoods improvement sub-component.
Improvement in household income due to sub-project investments	This indicator measures the percentage increase in household incomes due to sub-project investments, relative to the household income before sub-project investments commenced.
Sub-Component 2.4: Irrigation Demonstration Scheme	
Technologies demonstrated in the project	At least three irrigation technologies will be demonstrated during the pilot, namely dragline sprinklers, hosepipe irrigation and drip irrigation. The latter may be utilized at the latter stages of the scheme.
Crops demonstrated in the project	At present, it is anticipated that eight different crops would be demonstrated as part of the irrigation scheme. The crops are: cereals (maize), pulses (green gram, cowpeas), vegetables (capsicum, tomato, watermelon, amaranthus) and fruits (banana, and mango).
Water users provided with new/improved irrigation and drainage services (number)	Number of water users (farmers) benefiting from irrigation demonstration project.
Total beneficiaries from new/improved irrigation and drainage services (including dependents of key water users)	Number of individuals (including farmers, water users, and their dependents) benefiting from improved drainage and irrigation services.

Component 3: Project Management	
Project M&E established and operational	Project M&E established and operational
Reports produced on time with adequate quality , including annual, mid-term, final	Reports produced on time and with adequate quality , including annual, mid-term and final evaluation

Annex 2: Detailed Project Description

Component 1: Mwache Dam and Related Infrastructure (US$ 165 million equivalent)

Sub-Component 1.1: Civil Works and Related Infrastructure (US$ 160 million equivalent)

1. **Introduction**. This component will finance the construction of the main Mwache dam, one check dam, raw water transmission lines (gravity-fed) to the treatment plant, transport infrastructure (approach road to dam site and bridges), electromechanical equipment and buildings related to the dam site that is all of the infrastructure needed to supply water (raw water, before treatment works) to the coastal region's water supply system. The component also includes implementation of the environmental management plan.

2. **Alternatives**. The Mwache Dam has been selected as a priority source of water to meet demand and increase water security for the coastal region as part of the Water Supply Master Plan for Mombasa and Other Towns within the Coast Province, prepared under the Water and Sanitation Service Improvement Project (WaSSIP). The Master Plan evaluated five development scenarios that included different combinations of water resources. A multi-criteria analysis, consisting of four key parameters (engineering, economics, environmental and social aspects, and political economy), was used for comparison purposes. These scenarios considered several surface and ground water alternatives to meet the demand for water in the region. The recommended scenario (Scenario "B1") includes three phases of development between 2015 and 2035, which would include water supply from well fields (Baricho, Tiwi, Msambweni), springs (Mzima, Marere), and dams (Mwache and Mkurumudzi). Phase 1 of Scenario "B1" includes the development of Mwache Dam.

3. At feasibility stage, the specific site proposed for Mwache Dam was selected in comparison with two other sites located upstream of the selected site. Topographical, geological, environmental and social conditions were considered.

4. **Project Site**. The dam site is located across the Mwache River at the Fulugani village, in the Kasemeni Division of the Kinango sub-county of Kwale County, about 22 km north-west of the city of Mombasa in the coastal region of Kenya. The proposed dam falls within the drainage system of the rivers of Mwache and Mnyenzeni and their tributaries. The seasonal river flows turn into large torrential flows during the rainy season, draining through Mwache Creek to the Indian Ocean at Kilindini Harbor.

5. Based on the topography, geological conditions, and the current dam design, the selected dam site is not expected to have any "fatal flaws" such as faults, seismic risk, and reservoir leakage or reservoir slope instability.

6. **Geology**. A geological analysis has been conducted by the design consultant based on data from sixteen boreholes in the area of the dam. The geology of the area comprises Triassic age sedimentary rocks of the Duruma Sandstone Series. Locally, the Duruma Sandstone is subdivided into the Mariakani Sandstone formation (consisting of interbedded sandstone and siltstone) which is overlain by the relatively more massive Mazeras Sandstone formation.

Geotechnical investigations and testing undertaken to date, which include geologic mapping, subsurface investigations by boreholes and test pits and laboratory testing, have helped refine the design of the dam regarding the excavation line, consolidation / curtain grouting works, etc. Additional geological investigations and testing, to be completed as part of the finalization of dam design, will enable the foundation treatment works to be refined further. A Geotechnical Baseline Report will also be prepared to define the geotechnical risks to be shared between the client and contractor as part of the bidding document.

7. **Seismic Hazard**. In general, seismic zoning maps for Kenya categorize the area of the dam as presenting a low seismic hazard, with the potential for "slight damage" resulting from earthquakes. A site-specific seismic study, following International Commission on Large Dams (ICOLD) Bulletin 148 guidelines, was performed based on data available from the United States Geological Survey (USGS) and the Global Seismic Hazard Assessment Program. Based on a probabilistic assessment, the parameters for the Operating Basis Earthquake (OBE) that is an earthquake with a 144-year return period; and the Safety Evaluation Earthquake (SEE) that is an earthquake with a 10,000-year return period, were determined and reflected in the seismic design of the dam.

8. **Hydrology**. Relevant hydrological characteristics (inflow, design floods, safe yield, etc.) have been computed using standard methods. Implications of the availability of only a short record (14 years) of measured discharges and stochastic techniques for augmenting the hydrological assessment have been extensively discussed. The estimated mean inflow to the dam is estimated at 113 MCM/yr. An environmental flow of 7.8 MCM / year has been finalized in consultation with the Water Resources Management Authority (WRMA) and as part of the Environmental and Social Impact Assessment (ESIA).

9. Whilst the spillway and energy dissipater has been designed based on the 1 in 10,000 year flood (2,830 m3/s), the Probable Maximum Flood (PMF) (5,700 m3/s) has been used as a "check flood" to ensure that overtopping would not take place. The temporary diversion arrangement during construction is designed based on the 25-year return flood (400 m3/s). These projections will be refined during the preparation of detailed design.

10. **Sedimentation**. Sedimentation was identified as a key issue during the design process. The catchment area for the dam is estimated at 2,250 km2, while annual sediment yield from the catchment (without any sedimentation management measures) is estimated at 2.1 million m3 per year. These sediment deposits, if not adequately managed, can negatively impact water supply reliability in the long run. The sedimentation management plan focuses on minimizing the impacts of sedimentation, and will include the following key aspects: (i) catchment management to reduce soil erosion, (ii) the construction of two check dams[14], which will be regularly emptied of sediment to be used as construction materials, (iii) the inclusion of two bottom outlets allowing for sediment flushing and sluicing, and (iv) securing sufficient dead storage volume of approximately 40 million cubic meters. These activities are budgeted for and included in the design of the project.

[14] One check dam is financed under Sub-Component 1.1. The other is financed under Sub-Component 2.4, as it will also supply water for the demonstration irrigation scheme.

11. By these measures, the live storage of the reservoir will not be depleted for more than 100 years. Successful operation of the dam in terms of reducing sedimentation would depend on regular removal (and use) of the sediment accumulating in the check dams, and periodic low level flushing / sluicing of the deposited sediment through bottom outlets. In particular, there is a strong emphasis on the efficiency and maintenance of the upstream check dams, which are also expected to create employment and revenue opportunities through the removal and productive use of the sediment.

12. **Climate Risk Analysis.** The current design of the dam has considered a sensitivity analysis intended to capture the effect of climate change (via an increased variability in discharge pattern), concluding that the proposed reservoir volume satisfied demand with the required reliability, both with the coefficient of variation of annual discharges exhibited in the past record and with the coefficient value increased, for climate change sensitivity analysis. The value for the coefficient of variation (Cv) was assumed to increase from 0.3 to 0.5 considering possibly increased flow variation under a climate change scenario, while the mean annual rainfall in the catchment was assumed to remain unchanged. The latter assumption was deemed conservative in the report, as the Global Climate Models (GCMs) generally indicate an increase in the mean annual rainfall in the Eastern Africa region. While the reliability of domestic water supply (67.9 MCM/year) is 99 percent under the base case, it could be reduced by around 20 percent in the case of a remote but possible discharge pattern with a much higher variability of Cv 0.5. Although it would be possible to maintain higher reliability under such a scenario by increasing the reservoir capacity, the investment costs would also be higher to raise the height of the dam.

13. In addition, an independent analysis of the vulnerability of the current dam design to climate change is being conducted under the ongoing World Bank study titled “Addressing the Climate Vulnerability of Africa’s Infrastructure” (P126254). The study, expected to be completed in mid-to-late 2014, will provide further insight on how project design can ensure effective performance under a wide range of possible scenarios.

14. The Water Supply Master Plan for Mombasa and Other Towns within Coast Province, which has prioritized Mwache for water supply to Mombasa and other coast cities, has also considered other uncertainties such as those related to population growth and changing patterns of urbanization.

15. **Dam and Ancillary Structures**. The proposed dam is a concrete gravity dam with height of about 78m, crest length of 425 m, and a reservoir capacity of 118 million m3 (MCM). This includes a live storage volume of 78 MCM and dead storage volume of 40 MCM. Four options for dam types were considered in the early design stages. For example, a center core rock fill dam was originally considered, but was rejected due to the insufficient availability of required materials.

Table 2.1: Key features of main Mwache Dam

Main Dam	
• Type of dam	Concrete gravity dam
• Latitude	$03^0$59'12"S
• Longitude	$39^0$31'07"E
• Max. Height of dam (Above deepest foundation level)	77.9 m
• Deepest River bed level	El. 14.0m
• Deepest foundation level	El. 11.0m
• Dead storage level	El. 49.5m
• Full Reservoir Level (FRL)	El 82.2m
• Maximum Reservoir Level (MSL)	El. 86.0m
• Crest Level	88.9m
• Length of dam at its crest	452 m

16. **Spillway**. A spillway discharge capacity of 2,830 m3/s according to 10,000 years return period flood has been proposed. Key features of the spillway are summarized in Table 2.2 below. The PMF has been used as check flood to ensure that overtopping would not happen. The detailed design will be finalized based on a hydraulic model test.

Table 2.2: Key features of Spillway

Spillway	
• Spillway crest elevation	El. 82.2 m
• Type	Ungated Ogee wier with stepped spillway
• Length of Spillway	155 m
• Energy dissipater	Stilling basin

17. **Construction**. Key sources of potential construction material include sound rocks available in active quarries in the nearby area, sound sandstone outcrops exposed at the existing Mwache River bridge crossing (5km upstream of the site), and sound rocks available in the reservoir bed area. These rocks would be crushed into coarse and fine concrete aggregate. Adequate quantities of natural sand, which appear to be suitable for concrete, are available in the Mwache river bed and in beds of other nearby rivers. Further investigations will be undertaken as part of the detailed design to confirm the quality, quantity and location (including haul distance) of these potential sources of construction materials.

18. In terms of the construction schedule, the tentative period of the dam related works is estimated at around 7 years including bidding process, construction execution, and reservoir impoundment. A detailed construction schedule using a Gantt chart will be prepared as part of detailed design.

19. In terms of the construction arrangements, the Ministry will appoint an Owner's Engineer (OE) for design review, construction supervision and quality control of all dam related construction works. A consulting firm is currently being retained. The TORs have been prepared and cleared with due attention to the firm's critical role in quality control and construction supervision in coordination with various entities. The OE will also assist the Ministry with finalizing the detailed design / bidding document and evaluation of bids, contract negotiations, etc.

20. **Costs**. The cost breakdown for Sub-component 1.1 is shown in the Table 2.3 below. The cost of the civil works is approximately US$ 145.6 million (US$ 114.8 million base cost, with a contingency of US$ 30.8 million, or 27 percent). A significant contingency amount has been maintained for the civil works based on the outcome of the detailed design and further review by the DSPE and the World Bank team.

Table 2.3: Cost Breakdown for Mwache Dam and Related Infrastructure

#	**DESCRIPTION**	**US$(m)**
1.	**CIVIL WORKS**	**145.6**
a.	Additional Investigations	1.0
b.	Site Preparation Costs (1)	2.6
c.	Buildings	2.0
d.	Access Road and Bridges	8.2
e.	Excavation	5.1
f.	Earth filling with compaction	0.5
g.	Concrete	77.5
h.	Re-enforcement	10.1
i.	Grouting and Drainage	1.8
j.	O&M and EPP Plans	0.3
k.	Instrumentation	1.5
l.	Raw Water Supply Infrastructure	1.1
m.	Operations & Maintenance	2.4
o.	Miscellaneous (2)	0.7
p.	Contingency for Civil Works	30.8
2.	**ENVIRONMENTAL IMPACTS MITIGATION**	**3.7**
a.	EMP and ESIA implementation	1.7
b.	Check Dam	2.0
3.	**OWNER'S ENGINEER AND PROJECT SUPERVISION**	**10.7**
a.	Detailed Design and Construction Supervision of Works	10.7
	TOTAL COST ESTIMATE FOR SC 1.1	**160.0**

Notes: Notes: (1) “Site Preparation Costs” includes Power Supply, Ancillary Camp Facilities, Vehicle, etc. (2) “Miscellaneous” includes sluice gates, guard gates, valves, coffer dam, etc.

21. **Dam Safety Panel**. Consistent with the World Bank’s Dam Safety Policy (OP 4.37), a Dam Safety Panel of Experts (DSPE), appointed by the GoK and consisting of experts in dam engineering design and construction, geology, and hydrology and sedimentation, has supervised the development of the dam design report and key related studies. The DSPE’s guidance and feedback, including as part of two missions (September 2013 and March/April 2014) to Kenya, has supported the finalization of key dam design aspects, including a comparison and selection of the dam type. The DSPE will remain appointed until the first filling of the dam and initial operation period. It is expected that there would be at least two panel meetings per year, with additional panel meetings as required at key points in the preparation process, including to review the detailed design, bidding documents, relevant investigations and tests, to check the condition of the excavated foundation, and other tasks.

22. **Dam Safety Plans**. For OP 4.37, four key Dam Safety Plans will be prepared. These include (i) a Construction Supervision and Quality Assurance Plan; (ii) an Instrumentation Plan; (iii) an Operation & Maintenance (O&M) Plan; and (iv) an Emergency Preparedness Plan (EPP). Each is discussed in turn below.

23. A draft (i) Construction Supervision and Quality Assurance Plan has been prepared and reviewed during appraisal, under which a consulting firm in charge of construction supervision and quality assurance is being procured as the Owner’s Engineer (OE). This will also cover detailed design review, additional investigations, and bidding package preparation

24. The (ii) Instrumentation Plan will be finalized as a part of the detailed design/bidding document, and will be submitted to the DSPE and World Bank for review. The Plan will provide instrumentation layout, section, details and specifications. It will also provide frequency of reading and trigger values for each instrument.

25. The (iii) Operations & Maintenance (O&M) Plan will be completed during project implementation, six months prior to the first impoundment of the reservoir. A preliminary O&M Plan has been prepared and reviewed during appraisal. The O&M plan will cover all aspects of the dam, including water supply, irrigation, environmental flows, and flood control. The O&M plan will also contain specific information on the electrical and mechanical equipment, and instrumentation installed, spare parts, etc. The O&M plan will cover key aspects of the project including general information; salient project features; operation guidelines and procedures; monitoring program; safety inspections; directory of drawings, records, suppliers and vendor manuals; and relevant appendices.

26. The (iv) Emergency Preparedness Plan (EPP) will be completed during project implementation, twelve months prior to the first impoundment of the reservoir. A broad framework EPP has been prepared and reviewed during appraisal. The EPP will contain general issues of organization, communication, procedures for evacuation, local facilities, inundation maps, early warning system, safety equipment, warning levels for different deficiency levels, response matrix for different deficiency levels, and other reservoir-specific information. The

final EPP is expected to include a detailed downstream topographical survey, as well as a dam break and downstream flooding simulation.

27. **Proposed Supply**. The dam is expected to supply 186,000 m3/day (67.9 MCM/year) for urban water supply to Mombasa and Kwale Counties in Kenya's coastal region, consistent with the Water Supply Master Plan for Mombasa and Other Towns within Coast Province.

28. Assuming full development of the downstream infrastructure currently envisioned under the Water Supply Master Plan for Mombasa and Other Towns Within Coast Province, it is estimated that, by 2035, about three-fourths of the water from Mwache Dam will go to Mombasa County (supplying just under half of Mombasa's projected water demand by 2025), while the rest will go to Kwale County (supplying about 70 percent of Kwale's projected water demand).

29. An additional potential supply of 41,000 m3/day (about 15 MCM/year) will be available from the dam, with lower reliability of 75 percent vis-à-vis urban water supply reliability of 99 percent. Based on the results of the 100 hectare demonstration (pilot) scheme, the economic and financial viability of full development of the proposed irrigation scheme (estimated at up to 2,000 hectare) in the project area will be assessed after two full years of operation in the demonstration area (that is by 2018). This will, in turn, allow the GoK to make a decision on how best to allocate the additional supply of water available from the dam. The demonstration irrigation scheme would be supplied with water from one of the check dams. It is anticipated that the check dam would be constructed in the near-term, and that the demonstration scheme would be operational before construction of the main Mwache dam.

Sub-Component 1.2: Mwache Catchment Management (US$ 5 million equivalent)

30. This Sub-component aims to improve sustainability of the Mwache catchment, as well as provide support for community livelihoods in the area. The river watershed has undergone significant degradation as a result of poor land use practices in pursuing food production. Most of the area has been cleared of vegetation, leaving it bare and exposed to different forms of soil erosion. This scenario is made worse by non-farming land use activities such as charcoal burning which has devastated vegetation cover in most parts of the watershed. The impacts of this massive land degradation include a general decline in soil, livestock and crop productivity and upstream erosion, including downstream flooding and sedimentation, which converge as a threat to the economic lifespan of the proposed Mwache reservoir, in addition to damaging the livelihood and food security of the people, many of whom are already in extreme poverty.

31. This situation calls for a robust watershed management strategy that aims to ensure effective conservation, restoration and protection of the environment. This goal can still be attained; therefore, the premise of the sub-component strategy is that much of the ecosystem degradation would be best resolved at the watershed level rather than on individual farms. Watershed management should therefore have a holistic approach that targets optimizing the use of land, water and vegetation while reducing the negative impacts listed above. Table 2.4 shows a draft watershed management plan that proposes strategies for addressing some of the impacts identified.

Table 2.4: Draft watershed management plan

Impacts of degradation	Objectives	Proposed Strategy
• Soil erosion • Reduced soil water holding capacity • Soil crusting and compaction • Reduced soil fertility	o Minimizesoil loss o Enhance water infiltration o Increased soil water holding capacity o Minimize evaporation from the soil o Increased soil productivity	➢ Promoting conservation agriculture where aiming towards minimum tillage ➢ Constructing check dams ➢ Constructing terraces ➢ Planting cover crops i.e. legumes, vetiver, etc. ➢ Tree planting ➢ Constructing gabions in areas with big gulley's ➢ Discouraging farming in areas with steep slopes ➢ Runoff water harvesting ➢ Maintaining a buffer zone in areas close to rivers. ➢ Encouraging agroforestry practices ➢ Using of compost and farm manure ➢ Constructing water retention ditches ➢ Crop residue mulching ➢ Crop rotation with deep rooted plants that use water in deeper horizon ➢ Stabilizing terraces using grasses such as Napier ➢ Information dissemination on good practices

32. To recover and protect the Mwache watershed, an integrated participative approach to water resources management is necessary, introducing sustainable livestock, agriculture, forestry and land management practices, and integrating conservation activities with the needs of local communities to develop sustainable economic activities. For communities to be active participants in conservation activities, they need to have clear incentives where conservation and improved production for income-generation coincide. Activities need to be livelihood based because if the users of land, who are largely poor subsistence farmers, are not convinced that activities will have a direct, discernable and short-term impact on their income and food security, they will either not engage in these activities at all, or the changed practices will not be sustainable.

33. Promoting community participation in the strategies is paramount to its ultimate success and sustainability. Therefore, robust training programs targeting the farmers from the catchment area to empower them in all the above strategies are critical. Effective catchment management at the local level can only happen with the full involvement of those who live and work in the areas, taking responsibility for the conservation of their own resources upon which they depend. The methodology adopted in the Water Act of 2002 and implemented by WRMA through the establishment and support of Water Resource User Associations (WRUAs) then becomes crucial for successful WRM and catchment renewal and protection.

34. The activities will be planned and implemented in a community-led way with the active participation of relevant stakeholders, including WRUAs, the specialized Departments of the CDA; Kwale, Taita Taveta and Kilifi County Governments; WRMA; KFS; KARI; and local NGOs. Synergies will be developed towards the sustainable management of the catchment area. The CDA as the regional development authority will coordinate activities. WRMA will lead the formation of WRUAs to strengthen their capacity and support the development and implementation of Sub Catchment Management Plans (SCMPs) to be funded by this sub-component. KFS will provide support and services on farm and on dry land afforestation for sustained supply of goods and services such as fodder, wood fuel, timber, and non-wood forest products, thereby enhancing environmental conservation. KARI will carry out a ground data compilation to support the identification of solutions to the existing problems causing the deterioration of the area's resources. The county governments will support the participatory process and the implementation of all activities in their counties' administrative areas.

35. WRUAs will be encouraged and supported in preparing SCMPs. In the process of developing the management strategy, the Regional Office of WRMA will follow clear transparent criteria for the selection of prioritized erosion-prone "hot spot" sub catchment areas. WRMA has the mandate and experience in engaging the support of WRUAs in the development of these SCMPs. The sub-component, in its support for the work of the WRMA Regional Office, will follow the prioritization and ranking process already used by WRMA. The initial stages of WRUA establishment, strengthening and planning will be financed through WRMA to catalyze the process, but the implementation of the SCMPs will be done through CDA and not through the WRMA to avoid the conflict of interest of being both regulator and developer.

36. Activities will involve promoting approaches to improve sustainable land and water management of the catchment in line with the agreed sedimentation management plan for the Mwache dam. The sub-component will fund the acquisition of heavy machinery to remove the sediment loads from the checkdams. The sustainable productive potential of the livestock sector will be enhanced through (i) improvement of fodder production (fodder trees, improved pastures, etc.,); (ii) better herd management practices; (iii) genetic upgrading; and (iv) the development of accessible and effective para-vets (community-based animal health workers) networks. It will also include: agricultural conservation practices, the reduction of erosion and pollution, afforestation, drainage line treatment, water harvesting, sand dams and groundwater recharge, area rehabilitation, grazing/stall-feeding improvement, monitoring, enhancing biodiversity and eco-tourism especially around the project reservoir, as well as associated institutional support. On-going catchment and sub-catchment planning processes (supported under KWSCRP-1) will set the strategic direction for area targeting, participatory investment design, operation, and M&E.

Component 2: Kwale County Development Support (US$ 25 million equivalent)

37. This Component will support development in Kwale County, where the Mwache Dam is located, through investments in water supply and sanitation in rural communities and small towns; and a demonstration irrigation scheme to inform design and establish viability of a large scale irrigation program in Kwale in the future, and livelihoods investments. By supporting these activities, Component 2 will bring near-term and medium-term benefits to Kwale County, in parallel to the planning and preparation for the large-scale infrastructure that would supply water

to Kwale (from Mwache, and other sources) in the long-term. Water supply and sanitation activities under Component 2 have been designed considering the post 2015 Sustainable Development Goals (SDG) targets, which have more focus on eliminating open defecation; achieving universal access to basic drinking water, sanitation and hygiene for households, schools and health facilities; and progressively eliminating inequalities in access. The provision of water and the promotion of sanitation and hygiene will be closely linked for maximum benefits.

38. In parallel to the above activities, KWSCRP-1 will provide technical support to Kwale Water and Sewerage Company (KWAWASCO) for reduction of non-revenue water, development of financial, management and customer strategies and technical advice on sustainable development and management of rural water and sanitation schemes. In addition, preparation of detailed designs for the infrastructure required to supply water from Mwache Dam to urban centers in Kwale will be financed under KWSCRP-1.

Sub-Component 2.1: Water Supply Investments (US$ 12 million equivalent)

39. This sub-component will support increased access to water supply in small towns and rural communities in Kwale County.

40. Water supply at the coast and particularly in the urban areas is based primarily on a bulk water supply system. Currently, the Coast Water Services Board (CWSB) is responsible for the efficient and economic provision of water and sanitation services in the six counties in the coastal region, including Kwale County. CWSB has contracted water services providers for provision of water and sanitation services in specified jurisdiction areas. Under the devolved system, provision of water and sanitation services is a county government function, and this continues to be provided by existing water companies. The Kwale Water and Sewerage Company (KWAWASCO) is thus responsible for provision of water and sanitation services in small towns and urban areas of Kwale County. Service provision in rural communities is through small rural water schemes, most of which are owned and managed by individuals (45 percent) and community based organizations (36 percent). Only about 1 percent is managed by KWAWASCO through Service Provision Agreements (SPA).

41. Kwale's priority for urban water supply is to increase water supply through rehabilitation and expansion of existing water supply schemes particularly in Kwale, Ukunda, Lunga Lunga/Vanga and Msambweni towns. In Kwale and Ukunda, the project will support the rehabilitation and expansion of the water supply distribution network, as the two main sources- Marere Springs and Tiwi aquifer- have both been recently rehabilitated under WaSSIP. Rehabilitation of Kinango water distribution network will be undertaken by Kwale County using its own funds. For Msambweni and Lunga Lunga where current water supply systems are assessed as both limited and dilapidated, the project will support the identification and development of additional water sources (including boreholes) in addition to the rehabilitation works. This will ensure maximum utilization of current water supply to these towns, as well as develop capacity for additional supply after completion of the Mwache Dam. Preparation of designs and tender documents for these rehabilitation works will be financed under the ongoing KWSCRP-1.

42. In terms of rural supply in Kwale County, priority will be given to communities affected by the construction of the dam. Rural water investments will be informed by the Kwale Water Resources Assessment and Water Supply Development Master Plan that will be prepared under KWSCRP-1. The master plan will establish project viability and further develop priority sub-projects identified by the County, including support for expansion/augmentation and extension of rural water supply pipelines from the off-takes along bulk water supply systems (which need redesigning, rehabilitation and expansion); construction of boreholes and small dams; other point sources including protected dug wells and springs; and rainwater collection. Preparation of the master plan will be participatory, and rural water supply activities will be designed based on community priorities that will be identified through consultation with and active participation of the main stakeholders, including affected communities. This master plan will take into consideration the competing and interlinked demands for the water resources in Kwale, including those shared with Mombasa. The master plan will also map and identify the performance of water point sources in rural areas. Attention will also be given to strengthening the operation and maintenance system to enhance sustainability.

43. Investments to be supported under this sub-component will be selected and prepared in line with the KWSCRP Investment Framework. Application of the Investment Framework, which will continually be improved through application and refinements under KWSCRP-1, will help ensure that transparent selection criteria are used for selection of sub-projects, and that selected sub-projects are prepared according to agreed quality assurance standards, including on technical, economic, financial, environmental, social and institutional aspects.

Sub-Component 2.2: Sanitation Investments (US$ 4 million equivalent)

44. This sub-component will support increased access to improved sanitation facilities in both urban and rural areas.

45. A recent Water and Sanitation Program (WSP) study estimates that out of a population of 700,000, only 18.4 percent have access to improved sanitation. Just over half of the population practices open defecation, compared to the national average of 15 percent. This leads to estimated losses of at least KES 677 million (US$ 8 million) each year due to poor sanitation, including losses due to access time, premature deaths, health care costs and productivity. Out of 464 primary schools and 74 secondary schools, only 163 (35 percent) and 42 (57 percent) are reported to have adequate sanitation respectively. The county assesses itself as having no shared vision for sanitation, and no clear advocacy plan to gain support for sanitation. Other challenges include insufficient number of government staff in place to implement sanitation activities, and the lack of quality assurance controls for sanitation products and services by the county.

46. On the policy side, the project will support the development of a strategy to promote household sanitation, taking into account cultural beliefs. In addition, communities will be trained on sanitation and hygiene. Working together with the Water and Sanitation Program (WSP), this sub-component will support Kwale county with improving the enabling the environment for scale up and sustainability of rural sanitation and hygiene through: (i) support to develop an action plan to address any bottlenecks identified (from the situational analysis) to creating sustainable conditions for implementation of rural sanitation at scale; (ii) carrying out an audit of the existing monitoring system and if needed to make data collection more efficient,

improve quality of data collected and ease data analysis; (iii) supporting the development of tools and guidelines for demand creation using behavior change communication; (iv) supporting the development of an innovative business model to strengthen the supply chain for improved sanitation products and services; and (v) mentoring the county governments to successfully implement the program.

47. Specifically, and in line with the Kenya Ministry of Health's approach and guidelines, the sub-component will support Kwale County to strengthen the programmatic conditions for implementation of CLTS and sanitation marketing at scale; to strengthen supply and household demand for improved sanitation. In addition, in order to have sustained behavior change, CLTS should be reinforced by continued Behavior Change Communication (BCC). This will be based on an innovative, evidence-based communications campaign developed by the Ministry of Health. The core objectives of the campaign are to create a need for improved sanitation among the target audience and educate the target audience on improved sanitation options and hygiene (including hand washing with soap). Sanitation marketing addresses both the improvement of the supply chain as well as communication for behavior change. With CLTS and sanitation marketing, it will be possible to integrate hygiene improvement and sanitation promotion into one program. The project will support (i) the establishment of a 'sanitation hub' at the County to ensure coordinated implementation of sanitation activities, and support the setting up and running of the Inter-Agency Coordination Committee (to ensure coordinated implementation of sanitation activities); (ii) the creation of at least 20 community units to ensure long-term sustainability of sanitation and hygiene (out of 165 targeted community units, 68 have been established); (iii) roll out of 100 percent Open Defecation Free (ODF) rural campaign; and (iv) roll out of the Improved Sanitation Campaign.

48. Kwale County has no piped sewer system. The urban population relies on septic tanks while pit latrines are used in rural areas. Sanitation services and hygiene practice in rural areas that include Community Led Total Sanitation (CLTS)15 services are provided by non-governmental organizations with funding from respective development partners. With the participation of the relevant stakeholders, a sanitation master plan covering urban and rural areas in Kwale will be prepared under KWSCRP-1, which will provide the baseline for future investments. This is in addition to the sewerage master plan for Kwale town being prepared by CWSB under WaSSIP. These master plans will provide the best alternatives for improving sanitation coverage in Kwale County, taking into consideration the effect of increased population, urbanization and water supply. Investments under this sub-component will include construction of public sanitation facilities in selected schools16 and health facilities in both rural and urban areas, in line with post 2015 targets and indicators. Additional activities will include construction of at least one sludge treatment facility for management of sludge from septic tanks and pit latrines in urban areas and public institutions.

[15] CLTS inspires and empowers communities to stop open defecation by building and using toilets. If facilitated properly, CLTS can prompt a community to take collective action and can have immediate results. The process is community driven. Under CLTS, with a little follow up, communities become are self-monitoring, relieving the district of some of the responsibility.

[16] There are 361 public primary schools and 58 public secondary schools in Kwale County

Sub-Component 2.3: Sustainable Livelihoods Improvement (US$ 5.5 million equivalent)

49. This sub-component seeks to improve livelihoods in Kwale County the "area of influence" of the Mwache dam, defined as those areas of the Mwache watershed that are located in Kwale County, through support to benefit-sharing and sustainable livelihood paradigms for the largely rural communities in the area. Emphasis will be placed on areas where the required catchment conservation practices are not sustainable, such as in steep slope and river bank crop cultivation, where alternative livelihoods need to be supported. In these areas, the component will aim to develop alternative livelihood activities for common interest groups currently dependent on the unsustainable use of natural resources, focusing on new income-generating activities. These would include enhancing the production capacity of livestock, and/or items such as water source protection, water harvesting, improved energy-efficient cook stoves, alternative energy products, low-cost irrigation and water management, crop cultivation in zai pits, composting of vegetable residue and manure, establishment of tree nurseries (for indigenous species, fruit or fodder trees and/or woodlots), improved livestock breeds and management, production value addition, sustainable brick making, bee keeping, and household-level pond aquaculture.

The sub-component will draw upon successful demand driven experiences in Kenya (e.g. the recently closed Natural Resources Management Project in Upper Tana, the Kenya Coast Development Project and its Development Fund of the Coast (*Hazina ya Maendeleo ya Pwani;* HMP), the Lake Victoria Environmental Management Program, and the Western Kenya Community Driven Development (CDD) Project). These experiences demonstrate that strong, motivated community groups can be formed in Kenya to undertake activities to promote sustainable practices that reduce pressure on degraded watersheds and restore and improve livelihoods.

50. Using a community-led approach, proposals will be sought from communities in the treatment catchments and forest perimeters to invest in livelihood enhancing micro-projects which support the natural resource base. For example, support will be provided for opportunities to establish afforestation schemes, development of private sector/community partnerships for timber, fuel-wood and/or fodder production, production/sale of seedlings, introduction of productivity-enhancing techniques of ago-forestry or conservation farming, beekeeping, and other investments in farm agriculture development.

51. The sub-component will unite various actors from different sectors under a Steering Committee to vet and prioritize proposals. Four million dollars would be made available to fund community micro-projects, with additional funds for capacity building and training. Once proposals are selected, targeted engagement with communities, employing capacity building techniques and technical targeted training will support the communities with the implementation of their micro-projects. Arrangements following clear and transparent procedures to be defined in the Operational Manual would develop synergies for capacity building of CBOs (including WRUAs and CFAs to be formed). Given the prevailing productive livelihood importance and productive potential of the livestock sector in the coastal rural areas, the activity will focus on enhancing productivity through (i) improving fodder availability and herd management practices, (ii) genetic upgrading, and (iii) the development of accessible and effective para-vets networks.

Sub-Component 2.4: Irrigation Demonstration Scheme (US$ 3.5 million equivalent)

52. Kenya has tangible potential for food security and poverty alleviation through irrigated agriculture while mitigating pressure over its natural resource base. This sub-component will support the implementation of an irrigation demonstration scheme (IDS) for about 100 hectare. The activities condense intervention strategies for irrigation development and validation of improved agricultural practices. The IDS will also offer proven practices for the viability of developing a larger irrigation scheme in the area (between 2,000 and 3,000 hectare). The IDS will also involve the advanced construction of the upper check dam planned under component 1, with a capacity to deliver 3 million cubic meters (MCM) of water annually which will allow for the commencement of the learning curve for irrigated agriculture activities while the main dam is being constructed. This will be an added value to its necessary main role of holding, removing and reducing the sediment loads that otherwise would end up silting the main Mwache dam site.

53. The IDS is expected to test adapted approaches and technologies for the development of irrigation in the coastal region. These include: (a) the land tenure and water use aspects of irrigation, (b) the marketing strategies for the crops that would need to be grown to enable recovering O&M costs of the I&D infrastructure, (c) the irrigation and production technologies (drip, sprinklers or bubble irrigation, use of compost, integrated pest management, etc.) and hence, the best practices for water efficiency and irrigation potential given the water allocation for irrigation from the main dam, and (d) the farmers capacity to adopt innovative technologies, and their capacity to pay for O&M costs through volumetric water tariffs.

54. The IDS would comprise the following four activities: (i) construction of the irrigation and drainage (I&D) infrastructure; (ii) development of agricultural support services, value chain and marketing linkages; (iii) participatory irrigation management through Irrigation Water User Association (IWUA); and (iv) project management.

55. Infrastructure development would start with the construction of the upper check dam in order to advance the development of the IDS by about one year. The sub-component will fund investments for conveying water to the farms, including head-works and the irrigation water distribution network. The irrigation system will be pressurized in a piped system to supply water from the reservoir to the demonstration fields. The irrigation water distribution network will consist of the following parts: (i) booster pumping system; (ii) buried pipe water distribution network; and (iii) field drip and sprinkler system. The distribution network will be made up of PVC or HDPE buried pipes and manually operated zone valves (1 for each farm of approximately 4,000 m^2).

56. The Agricultural Support and Value Chain activities would support farmers with growing, adding value and market high-value irrigated agricultural products in a competitive and sustainable manner including: (i) the establishment of irrigation management facilities (operator house, office, and IWUA meeting room that will also serve for on-site training sessions); (ii) planning and management of a demonstration plot in farmer fields; (iii) establishment of a nursery for producing seedlings for new crops, and a compost producing unit; (iv) capacity building and training through the Farmer Field School (FFS) approach; (v) support for farmer-market linkages development (e.g. through private sector partners such as VEGPRO); (vi) post-

harvest infrastructure (cold storage room and packing space); and (vii) the creation of a revolving fund for farmers to access required inputs and services.

57. These activities will be coordinated and developed by an IDS Technical Manager under the supervision of the Kwale County Agricultural Department. Specialized technical support will be provided by CDA and KARI support services, and from exporters of horticultural products as part of production contracts to be developed. KARI has experience with farmers in small scale irrigation schemes in the country, which have experienced difficulties incorporating HVCs and will assist them in their transformation, recommending the right crops, treatment of soils and irrigation water practices. Working with partners along different agricultural products value chains, KARI is well placed to work with the communities in efficient HVCs irrigated agriculture, and in linking farmer groups to relevant actors including market actors, value addition and processors. Farmers will be supported with the creation synergies with the relevant private sectors, micro financing entities, local NGOs, services and input providers, among other things.

58. The Participatory Irrigation Management activities will aim to enhance the efficiency and financial sustainability of the I&D infrastructure, aiming also to enhance overall water use efficiency. This will involve (a) development and strengthening the capacity of the IWUA to carry out the O&M and cost recovery functions of the system; (b) development of a volumetric water tariff system; (c) participatory development and testing of new cropping patterns and production technologies, and (d) M&E of the economic results of the new crops, technologies, and post-harvesting and marketing processes. Technical assistance to strengthen IWUAs; office and GIS/MIS equipment for the IWUA and supporting agencies, and staff capacity building and study tours will be also provided.

59. Project management support activities will strengthen the capacity of the IWUA and supporting agencies to plan, report, and perform M&E. The cost items include management, training and specialized irrigation extension staff costs, operating costs, GIS and MIS systems, equipment and vehicles, and capacity building costs. The project implementation arrangements will then include a PMU at the Kwale County offices and a management team at the IDS level. The implementation of the social management plan including gender issues, and the environment management plan will be managed from the county PMU.

Component 3: Project Management (US$ 10 million)

60. Component 3 will support effective project implementation through the completion of KWSCRP-2. Specifically, this component will finance the required office space, goods (e.g., vehicles), equipment (e.g., computers), staff, consultant services, travel, training and operating costs that will allow for the successful implementation of project activities. These responsibilities include project management and coordination, procurement and financial management, project monitoring and evaluation (including impact evaluation), social and environmental safeguards management and oversight, and strategic project communications and outreach.

Annex 3: Implementation Arrangements

Institutional Context

1. The efforts of the Government of Kenya (GoK) to conform and realign its water resource management and development institutions, policies and strategies to the new 2010 Constitution of Kenya are underway. A new water policy bill is before Parliament after being scrutinized by the Law Commission and the Constitutional Transition Commission. This transformation involves the redefinition and realignment of roles and responsibilities, powers and functions, and the creation of new organizations, in many cases by transforming existing organizations. An important aspect is the adaptation of water sector policies and strategies to the new roles and functions assigned by the Constitution to the new county governments.

2. The context for the project is thus marked by the transition of the entire sector and key development institutions to a new institutional and legal framework. The project is designed to support this transformation by directly involving the relevant county governments and other responsible agencies in the execution of project components and sub-components. In this environment, it is essential that implementation of the project be based on an overall design and approach that ensure continuity, avoid delays and cost increases, and mitigate potentially negative effects of gaps and problems that may emerge as the new institutional, legal, and policy framework of the water sector is put in place.

Overall Project Institutional and Implementation Arrangements

3. MEWNR will serve as the implementing agency of the project through the Project Management Unit (PMU) established under KWSCRP-1 and supported by Component 3 of this project. The PMU will report to the Principal Secretary (PS) for Water, MEWNR, and will be granted a high degree of autonomy to ensure efficient implementation of the project, including through the application of rules, criteria, and procedures agreed with the World Bank. The PS, as the Accounting Officer of MEWNR, has appointed the PMU as a procuring unit and has delegated financial management responsibilities to the PMU, within the Legal Framework stipulated in the procurement law of Kenya.[17] Notwithstanding these provisions, the PMU will be accountable to the Principal Secretary for Water, MEWNR.

4. The core functions of the PMU will be coordination and facilitation, fiduciary oversight (procurement and financial management), environmental and social safeguards supervision, monitoring and evaluation (M&E) and impact evaluation, annual work programming and budgeting, and reporting. The PMU will undertake procurement, financial management and reporting for all project activities. The PMU will also be responsible for supervising the implementation of the social and environmental safeguards instruments prepared for the project

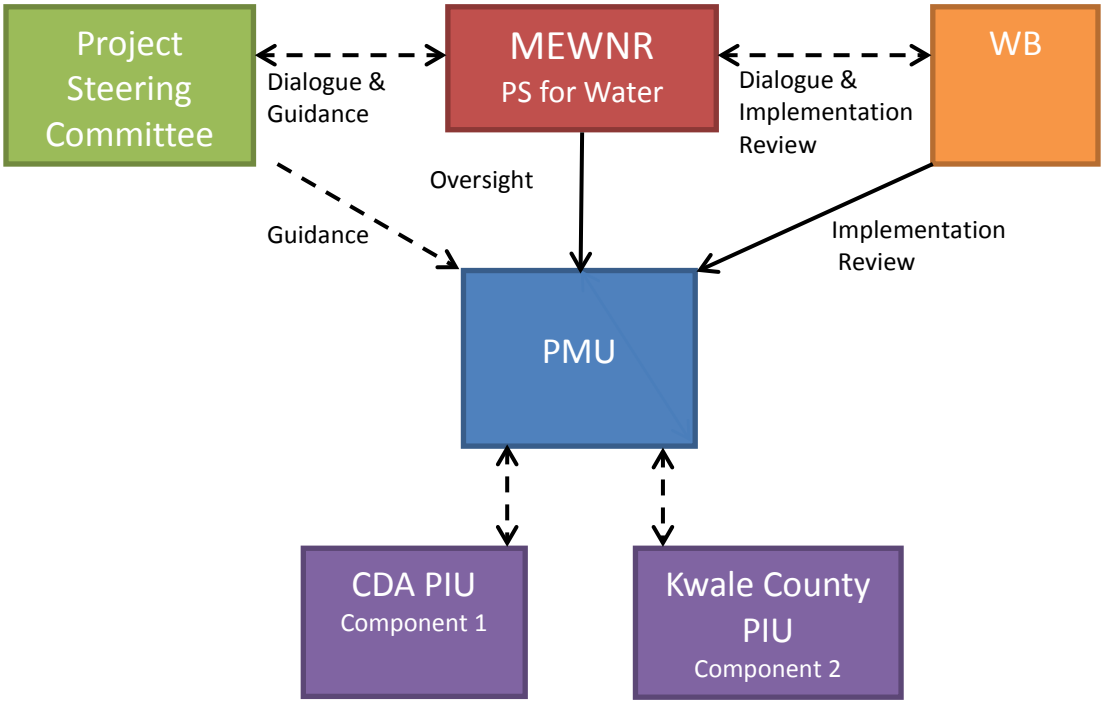
[17] Kenyan Law designates MEWNR as a Procurement Entity, with the PS as the Accounting Officer. The Ministerial Tender Committee (MTC) and the Ministerial Procurement Committee (MPC) are the final authorities for the award of tenders, depending on the financial threshold reached (MPC in the case of lower financial thresholds). The Accounting Officer is empowered by Kenyan Law to establish procurement units. The PMU has been appointed as a procurement unit within MEWNR and will follow procurement procedures agreed in the Finance Agreement. However, all procurement will be approved and awarded by the Ministerial Tender Committee or the Ministerial Procurement Committee, depending on the amount of the contract.

(ESIA and ESMP, RAP, VMGP, IPMP, Dam Safety, etc.). In order to carry out these functions for KWSCRP-2, the PMU will establish an office in the coastal region that is fully devoted to the implementation of the Project and close coordination with the executing agencies.

5. Executing agencies[18] will work closely with the PMU to execute Component 1 (Mwache Dam and Related Infrastructure) and Component 2 (Kwale County Development Support). The two agencies initially designated as executing agencies are the Coast Development Authority (CDA) for Sub-Component 1.1 and the Kwale County Government for Component 2. In order to ensure close coordination with the executing agencies and timely delivery of project activities, the PMU will establish an office in the coastal region that is fully devoted to the implementation of the project.

6. Figure 3.1 below outlines the relationship between the PMU and the two executing agencies (including their respective PIU's) within the overall framework of KWSCRP-2.

Figure 3.1 – Summary of Implementation Arrangements



7. ***Core Functions of the PMU***. The core functions of the PMU will be coordination and facilitation, fiduciary oversight (procurement and financial management), environmental and social safeguards supervision, monitoring and evaluation (M&E) and impact evaluation (IE), annual work programming and budgeting, and reporting as described below:

[18] MEWNR is responsible for the overall implementation of the project through the PMU. In order to avoid confusion, those agencies that would typically execute investments or other project-related activities under their mandate are referred to herein as "executing agencies".

a. The PMU will be responsible for coordinating and facilitating execution of Component 1 and Component 2, with the executing agencies through a Project Implementation Units – PIUs. The PMU will coordinate reporting on progress, and resolution of issues and constraints to timely and efficient project implementation.

b. The PMU will undertake all procurement and financial management for the project. Terms of reference (TORs) and goods specifications required to prepare bidding documents as well as all invoices, payment certificates and other data that may be needed for financial management and reporting will be prepared by the PMU, CDA, and Kwale County for their respective components. The PMU will manage the project account, as well as clear and process all requests for payments.[19] Invariably, the PMU will be responsible for all audits. For Component 1 and Component 2, the CDA and Kwale County PIUs will approve payment requests respectively from consultants and forward them to the PMU.

c. The PMU will be responsible for supervising the timely and appropriate preparation and implementation of environmental and social safeguards instruments, as well as for reporting to the World Bank on implementation progress. All project activities must respect the environmental and social safeguards frameworks (ESMF, RPF, VMGF and IPMF) prepared under KWSCP-1 as well as the specific safeguards instruments prepared for this project (ESIAs, RAPs, ESMPs, VMGPs, IPMPs, etc.). The implementation of safeguards instruments requires competent staff. In the event that the PMU, CDA, or Kwale County requests assistance for and/or does not have sufficient capacity to take full responsibility for safeguards preparation and implementation, the recruitment of consultants or consulting firms to support the necessary tasks will be undertaken. If consultants are used to supplement appropriate sponsor staff, they must be selected from NEMA's approved list of qualified consultants.

d. The PMU will help to develop implementation capacity in the CDA and Kwale County by providing support. The support will be defined in capacity assessments and will be set forth in capacity building action plans based on them. Additionally, "just in time" technical assistance may be provided through the services of consulting firms, or by procuring additional embedded support consultancies to aid in the development of required capacities.

e. The PMU will be responsible for overall project M&E and impact evaluation, working closely with the CDA and Kwale County. Under sub-component 1.1, the Mwache Dam, the Owner's Engineer (OE) will furnish reports to the CDA PIU

[19] The Kwale County PIU may apply to the PMU for imprest funds in Kenyan Shillings under procedures that are acceptable to the World Bank for small "petty cash" type expenses that may be incurred during activity execution. The procedure for imprest payments is as follows: the executing agency (e.g., the Kwale County PIU) submits an application for imprest funds from the PMU in line with existing GoK procedures. The executing agency must have an A-I-E (authority to incur expenditure) issued by the PS for Water. The A-I-E, which is a standard GoK document, will specify the nature of expenditure to be made and the expenditure code. After the expenditures are made, the A-I-E holders will submit the supporting documents back to the PMU for the payment voucher to be issued. Applications for additional imprest payments can be made using the same procedure.

and PMU according to an agreed schedule and standard. The PMU will be responsible for supporting the establishment of M&E functions in the PIUs for Components 1 and 2, and for consolidating all M&E into regular reports against Results Frameworks, Annual Work Programs, and other benchmarks and targets.

f. The PMU will be responsible for gathering all data necessary for annual work programming and budgeting. The PMU will coordinate and work closely with the CDA and Kwale County to prepare, consolidate and submit annual work programs, budgets, procurement plans and disbursement forecasts. The PMU will also gather and consolidate information into quarterly and annual reports on project implementation and progress. Reports will assess project implementation and the activities of all agencies involved in the project and their consultants, evaluate performance and results against targets and indicators, and provide analysis and commentary on progress, variances from plans and other issues, as well as propose remedies in order to ensure quality and timely implementation and to avoid delays.

8. ***Project Staffing.*** The PMU and PIU Managers will be appointed through a competitive process, subject to No Objection from the World Bank on the specific terms of reference, criteria for selection and adequate qualifications for the position. In addition, each unit will have a key staff of professionals with the necessary expertise and experience to undertake the responsibilities for delivering both project components. Project staff will be recruited competitively, based on criteria agreed with the World Bank and in accordance with World Bank guidelines for the selection and employment of consultants.[20] Staff could also include those appointed or seconded from the civil service from MEWNR, CDA, Kwale County Government, Mombasa County Government, CWSB or other agencies, in accordance with current civil service rules.

9. ***PMU Staffing.*** The Project Manager appointed by the PS for Water to head the PMU will bear responsibility for delivering the project, on behalf of the PS. In addition, as established under KWSCRP-1, the PMU will have a key staff of professionals with the necessary expertise and experience to undertake the responsibilities for delivering both project components. Project consultant staff will be recruited competitively, based on criteria agreed with the World Bank and in accordance with World Bank guidelines on selection and employment of consultants.[21] Staff could also include those from the civil service, in accordance with current public service regulations.

10. Key staff for the PMU at the PMU office in Nairobi includes a Project Manager, a Technical Manager, an Institutional Development Manager, a Project Accountant, a Senior Procurement Officer, as well as Senior Project Officers (as needed for Engineering, Economics,

[20] World Bank Guidelines: Selection and Employment of Consultants under IBRD Loans & IDA Credits & Grants by World Bank Borrowers – January 2011.

[21] World Bank Guidelines: Selection and Employment of Consultants under IBRD Loans & IDA Credits & Grants by World Bank Borrowers – January 2011.

Legal, Financial Analysis, Water Resources, Sanitation, Climate Resilience, and Monitoring and Evaluation). Of these, four key staff members (Project Manager, Technical Manager, Project Accountant, and Senior Procurement Officer) were appointed as a condition of project effectiveness for KWSCRP-1 financing.

11. Key staff for the PMU office in the coastal region will include: (i) a PMU Coast Coordinator – Senior Project Engineer, (ii) an Environmental and Social Safeguards Officer, (iii) a Social Development Officer, and (iv) a Communications Officer, an Engineer, as well as other staff as needed.

12. ***PIU Staffing*.** The CDA and the Kwale County government will each establish and maintain a PIU for execution and delivery of the respective sub-components, for the duration of the Project. Each of the PIU's will comprise key staff, as described below, who shall be appointed and remunerated by the responsible executing agency.

13. ***CDA PIU*.** The CDA will establish and maintain a PIU with key staff as follows: (i) a PIU Manager – Senior Engineer, and (ii) Qualified Engineer (two if necessary). Staff of the PIU may be seconded and remunerated by the CDA on a full or part-time basis or employed as consultants to the project. In addition, at the request of the CDA, the PMU may engage such other consultants as may be required to complement capacity needs and facilitate delivery of the project. The PIU will be based at the CDA headquarters, and operating costs and logistics will be facilitated by the PMU through its Coast Region Office. As the PIU will be a small unit working directly with the OE, all administrative and logistical support will be provided by the PMU.

14. ***Kwale County PIU*.** The Kwale County government will establish a PIU comprising the following key staff: (i) a PIU Manager, (ii) a PIU Accountant, (iii) a PIU Grants Officer, (iv) a Public Health Coordinator, (v) a Livelihoods and Social Development Coordinator, (vi) a Water Engineer (vii) an Irrigation Engineer, and (vii) an Administration/Procurement officer. Staff of the PIU may be seconded and remunerated by the county government on a full or part-time basis or employed as consultants to the Project. As part of its training program, the PIU will place graduate or middle level diploma interns from Kwale County within the project to undertake specific functions for a maximum period of six months. The PIU may, where the need arises, work with the PMU to engage staff as may be required to complement capacity needs and facilitate delivery of the project.

15. ***Governance***. A Project Steering Committee (PSC), chaired by the PS for Water, MEWNR, will be established, primarily as a consultative group and to provide high level, strategic guidance on project activities. It will be comprised of representatives from Kwale County, Mombasa County, the CDA, and the National Treasury. Participation in the PSC can be extended beyond this core group to other agencies (e.g. CWSB, WRMA, KFS, local water utilities) on an as needed basis. The PMU will act as Secretariat to the PSC.

16. In addition to the PSC, the PMU will establish a Technical Coordination Committee (TCC) to provide working guidance and facilitate project delivery among the various project sub-components. The TCC will chaired by the Project Manager and include the heads of the two

PIUs, representatives of Kwale and Mombasa counties, the CDA, and other agencies on an as needed basis. The Coastal Region PMU Office will act as Secretariat to the TCC.

Implementation Arrangements for Component 1

17. ***Sub-Component 1.1 – Civil Works and Related Infrastructure*** will support the implementation of the Mwache Multi-purpose Dam. For this component, the PMU, in collaboration with the CDA, will contract an Owner's Engineer (OE) which could be a consortium of firms with relevant national and international experience, to oversee the preparation, procurement, and implementation of the works contract. The OE will be responsible for delivering the sub-component activities, including project planning and reporting, civil works supervision, implementation of social and environmental safeguards instruments, etc. The OE will be responsible for preparing tender and design documents, technical supervision of works, and day-to-day contract management as well as the implementation of environmental and social safeguards instruments. The procurement of the OE is being processed based on the terms of reference that have been reviewed and cleared. The CDA, as executing agency for Sub-Component 1.1 will establish a small PIU of two to three engineers to supervise execution, including the procurement of the OE and works contracts. The PMU will maintain overall fiduciary responsibility and work closely with the CDA PIU on the supervision of the sub-component.

18. ***Owner's Engineer (OE)***. The OE, on behalf of the PMU, will be responsible for overseeing implementation of Sub-Component 1.1 by performing the following key functions:

Phase I-1: Detailed Design Preparation including additional investigations and analyses
Phase I-2: Bidding Package Preparation and Technical Assistance for Bidding Process
Phase II-1: Construction Supervision and Quality Assurance
Phase II-2: Post-Construction Service

19. The services to be provided by the OE shall include, but shall not be limited to the following:

a. Complete detailed design for Mwache Dam and related infrastructure including additional geotechnical investigations and analyses;
b. Undertake additional geotechnical investigations and other required supplementary studies and analyses;
c. Prepare bidding documents and provide technical assistance for the tendering process associated with the works contracted, from the stage of drafting prequalification document and bid evaluation through contract award;
d. Fulfill the role of Owner's Engineer including intensive construction supervision and contract administration of civil work contractor / equipment suppliers, as well as quality assurance of the works, including compliance checking with the environmental and social management plan, during the construction period of the assigned supervision contract;

e. Ensure that the works are carried out in accordance with the provisions of the contracts, state-of-the-art technical standards, construction supervision and quality assurance procedures, and with professional skill and care for the orderly progress and satisfactory completion of the Project;

f. Deliver the services through the CDA PIU under the guidance of and in full coordination with the Ministry of Water, Environment and Natural Resources (MEWNR);

g. Coordinate with other consultants to design and supervise associated infrastructure as well as with the Dam Safety Review Panel and World Bank.

20. ***Sub-Component 1.2 – Mwache Catchment Management*** will support activities to protect the watershed and promote livelihood development around the Mwache Reservoir. The work under this sub-component will be executed by the CDA PIU and carried out in partnership with: the affected communities; local governments, including Kwale and Mombasa counties; and relevant agencies, including the CDA, Water Resources Management Authority (WRMA), Kenya Forestry Service (KFS), and the Coast Water Services Board (CWSB). . Partners will be involved in all stages of activity preparation from identification to preparation of technical specifications and terms of reference (TORs) to implementation and operation.

21. The CDA PIU will be responsible for conducting stakeholder communications and designing mechanisms for identifying and preparing the specific watershed protection and livelihood promotion activities; preparing terms of reference and bidding documents when necessary; supervising activity implementation, including implementation of social and environmental safeguards instruments; liaising with local stakeholders on hand-over of completed activities; and follow-up evaluation to ensure activities are sustained after transfer to stakeholders.

22. A local level Project Coordinating Committee will be established. Its membership will comprise the PMU, in addition to groups that are key to sub-project implementation and/or whose activities are likely to be influenced by the sub-project. Membership will be extended to such groups on an as needed basis and could include the following:

a. Regional and/or county and/or district level administrations in the following domains: economic development, agriculture, gender and social development, health, environment, land use, etc.;

b. Farmers and other stakeholders in the Mwache Dam watershed area through their IWUAs and Cooperatives;

c. Representatives of other uses of water and natural resources within the watershed;

d. NGOs, CBOs, and professional associations locally and nationally active in relevant fields;

e. Private sector representatives, including those who express interest in playing an active role in the sub-project (service/good provider, purchaser).

23. The formation and functions of the Committee will be an output of the stakeholders analysis conducted by the PMU.

Implementation Arrangements for Component 2

24. **Component 2 (Kwale County Development Support)** will be implemented by a PIU established with the Kwale County Government (the executing agency). The PIU will work in close partnership with: the affected communities, municipal governments, CWSB, CDA, and the PMU. An Implementation Support Consultant (ISC) will be contracted to support the PIU in delivering the four sub-components of Component 2. The PIUs' key functions are:

a. General management and coordination of sub-project activities and oversight of their implementation;

b. Establishment of and lead participation in the Project Coordination Committee (see below);

c. Stakeholder-inclusive mobilization and organization, including stakeholders in addition to farmers and their organizations;

d. Overall supervision of contractor and consultants;

e. Monitoring and evaluation of sub-project activities and preparation of the various sub-project reports;

25. An Implementation Agreement (in the form of a Memorandum of Agreement) will be established between the PMU and the Kwale County and CWSB PIUs. It will detail the commitments of the various parties by outlining the cooperative terms of the agreement (e.g., objectives, time period, etc.) and the respective roles and responsibilities. The Implementation Agreement will specify the following responsibilities for the executing agency:

a. Prepare an overall implementation plan for Component 2;

b. Collect the necessary information for the preparation of Annual Work Plans;

c. Prepare draft Annual Work Plans and budgets, and obtaining approval of them from partner agencies for inclusion in the overall Annual Work Plan that the PMU will forward to the World Bank for no objection;

d. Ensure that each year the Annual Work Plan and budget are incorporated into county budgets and programs;

e. Mobilize the human and material resources necessary for the execution of the Annual Work Plan;

f. Manage the execution of the Annual Work Plan, including preparation of all documents needed for procurement of consultants, works and goods; management of contracts; and approval of invoices for payment and preparation of disbursement requests (as noted above, actual procurement and financial management processes will be handled by the PMU);

g. Coordinate M&E of inputs, outputs, outcomes according to the project's Results Framework and the M&E system established under the project;

h. Report twice a year on activities and results against the Annual Work Plan, and preparing a comprehensive report of sub-component progress at the end of each year; and

i. Coordinate with the PMU on the preparation of annual financial reports and audits.

26. For the delivery of Component 2, Kwale County has been appointed as executing agency as follows:

a. ***Subcomponent 2.1 (Water Supply Investments)*** will be executed by Kwale County through a PIU to be established within the Kwale County Government, in close coordination with the CWSB. The PIU will be responsible for delivering most of the sub-component activities, including project planning and reporting, civil works supervision, implementation of social and environmental safeguards instruments, etc.

b. ***Subcomponents 2.2 (Sanitation Investments)*** will be executed by Kwale County through a PIU to be established within the Kwale County Government, in close coordination with the CWSB. The PIU will be responsible for delivering most of the sub-component activities, including project planning and reporting, civil works supervision, implementation of social and environmental safeguards instruments, etc.

c. ***Subcomponent 2.3 (Sustainable Livelihoods Improvement)*** will be executed by Kwale County, working closely with local communities. The sub-component will finance sub-projects in local communities based on an agreed upon framework with strict eligibility and selection criteria that are acceptable to the World Bank. Sub-projects will be subject to a ceiling, specified in the Project Implementation Manual (PIM), and must adhere to the World Banks procurement guidelines and other fiduciary requirements as well as environmental and social safeguards. Similar to Sub-Component 1.2, a local level Coordinating Committee will be established. Its membership will comprise the PIU, in addition to groups that are key to sub-project implementation and/or whose activities are likely to be influenced by the sub-project. Membership will be extended to such groups on an as needed basis and could include the following:

i. Regional and/or county and/or district level administrations in the following domains: economic development, agriculture, gender and social development, health, environment, land use, etc.;

ii. Farmers and other stakeholders in the Mwache Dam watershed area through their IWUAs and Cooperatives;

iii. Representatives of other users of water and natural resources within the watershed;

iv. NGOs, CBOs, and professional associations locally and nationally active in relevant fields;

v. Private sector representatives, including those who express interest in playing an active role in the sub-project (service/goods provider, purchaser).

d. ***Subcomponent 2.4 (Irrigation Demonstration Scheme)*** will be executed by Kwale County through a PIU to be established within the Kwale County Government, in close coordination with the CWSB. The sub-component is a pilot irrigation activity that will prepare 100 hectares for irrigation. The PIU will deliver the activities in accordance with an agreed work plan. A local level Project Coordinating Committee will be established by the PIU. Membership will be extended to such groups on an as needed basis and could include the following:

i. Regional and/or county and/or district level administrations in the following domains: economic development, agriculture and agricultural extension, gender and social development, health, environment, land use;

ii. Farmers in the pilot area through their IWUAs and Cooperatives;

iii. Representatives of other uses of water and natural resources within or near the pilot area;

iv. NGOs, CBOs, and professional associations locally and nationally active in relevant fields; and

v. Private sector representatives, including those who express interest in playing an active role in the production and marketing of agricultural commodities in the pilot area.

Financial Management

27. The World Bank conducted FM assessments of the Ministry of Water, Environment and Natural Resources (MEWNR), Coast Development Authority (CDA) and a desk review of Kwale County. The FM assessment revealed that all of the three agencies have adequate FM capacity to implement the project. The budgeting, funds flows, accounting, internal control, financial reporting and auditing arrangements are deemed to be adequate. The project has developed an FM manual with comprehensive financial procedures and guidelines. About 90 percent of the project cost consists of civil works and consultancies with low FM risk. The remaining 10 percent consists of operating costs, training and grants to local communities in Kwale County for livelihood activities. Adequate FM measures including internal audit risk-based fiduciary review, Bank FM on-site review, and annual external audits have been put in place to manage the related fiduciary risks.

28. The project FM arrangements will be based on existing country PFM systems at the Ministry including the use of IFMIS, the GoK standard chart of accounts (SCOA) and the G-pay/T-24 Central Bank of Kenya (CBK) EFT system. The Ministry's External Resources Section

under the oversight of the Ministry's Head of Accounting Unit will provide support to the PMU with coordination of the FM arrangements for the project. MEWNR will retain overall fiduciary responsibility for the implementation of the project. Project budgets will be based on annual work plans from each of the executing agencies which would then be compiled and consolidated by the PMU with support from the Ministry CFO. The project will open a Designated Account (DA) and the main project account at the Central Bank of Kenya (CBK) and payments will be made through IFMIS and the G-pay/T-24 EFT system. Sub-project bank accounts will be established in each of the executing agencies (CDA and Kwale County) in IDA-approved financial institutions for the implementation of the respective components and sub-components. Payments for civil works and consultancy contracts under Component 1 will be made via direct payments depending on the minimum threshold. Details of the FM assessment for each of the three agencies are provided below:

29. The FM unit of the Ministry is headed by a qualified Principal Accounts Controller (PAC), supported by a team of qualified and experienced staff. MEWNR has established a well-staffed PMU with a qualified and experienced project accountant. The implementing agency relies on an elaborate government internal control structure to process payments and submit timely financial reports. The implementing agency has developed an FM manual for the project. The Ministry has adequate experience in implementing World Bank-funded projects having implemented KWSCRP-1, the Natural Resource Management Project (NRMP), and the Water and Sanitation Service Improvement Program (WaSSIP). For purposes of FM arrangements, the KWSCRP-1 PMU will retain overall fiduciary responsibility for the implementation of the project.

30. The CDA has adequate capacity to execute Component 1 of the project. The Authority maintains adequate accounting capacity headed by a qualified acting Chief Manager Finance and Accounts (CM/F&A), assisted by a team of five accountants with adequate training and qualifications. The executing agency has designated one of the accountants to the Project Implementation Unit (PIU). The project will open and maintain a separate sub-project account at the CDA PIU for receiving disbursements from the main project account (PA) at the PMU and making payments at the regional level. CDA maintains effective systems of internal control involving approval and authorization of procedures and proper segregation of functions in line with Government Financial Regulations and Guidelines. However, the authority has a weak internal audit capacity headed by an Internal Auditor supported by two audit staff, although the approved establishment is for a Manager of Internal Audit and Risk Management, his assistant, a senior internal auditor and two audit staff. Furthermore, none of the auditors has attained the full professional accounting qualification and membership in the relevant professional bodies. However, the project activities are relatively simple and the MEWNR IAD unit will provide additional oversight over the project's fiduciary activities.

31. The assessment indicates that Kwale County has adequate accounting capacity with a team of qualified and experienced accountants working through the recently devolved government IFMIS and G-Pay systems. Similarly, the county maintains a satisfactory internal control framework along the lines of regular government financial procedures and controls, including segregation of functions and internal check mechanisms. However, the county does not have prior experience in the implementation of World Bank-funded projects, being a newly

established system of government. This risk is mitigated by general project design arrangements as well as specific FM arrangements. As part of the design of the project, Kwale County government will only serve as an executing agency under the project, with a limited major fiduciary role. MEWNR will be the implementing agency for the project with overall fiduciary responsibility. In addition, the project will establish an independent PIU within the county government which will be responsible to the PMU at MEWNR for all fiduciary requirements. The county government has already designated a qualified and experienced accountant to support FM functions at the PIU. Furthermore, the project does not expect to disburse substantial amount of funds through the Kwale County PIU as most of the payments under the project relate to large works and consultancy contracts which will be paid from the headquarters PMU.

32. The conclusion of the FM assessment is that the financial management arrangements have an overall residual risk rating of Substantial which satisfies the Bank's minimum requirements under OP/BP10.00, and is therefore adequate to provide, with reasonable assurance, accurate and timely information on the status of the project required by IDA.

Procurement

A. General

33. Procurement will take place in accordance with Bank practices and as set out in the Project Implementation Manual, which will be approved by the Bank. The following procurement, consultant and anti-corruption guidelines will apply to this project: a) "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 ("Anti-Corruption Guidelines"); b) "Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" dated January 2011 ("Procurement Guidelines") and; c) "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" dated January 2011 ("Consultant Guidelines"). The various items under different expenditure categories are described below. For each contract to be financed by the Credit, the different procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time-frame are agreed between the Borrower and the World Bank 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.

34. **Use of National Procurement Procedures**: All contracts other than those to be procured on the basis of ICB and consulting services shall follow the procedures set out in the Public Procurement and Disposal Act of 2005 (PPDA). The PPDA governs the purchase of works, goods and services using public resources by the central government entities, local authorities, state corporations, education institutions, and other GoK institutions. Under the PPDA, the Public Procurement Oversight Authority (PPOA) has been established, in addition to the Public Procurement Directorate in the National Treasury. The PPDA sets out the rules and procedures of public procurement and provides a mechanism for enforcement of the law. Some provisions of the PPDA are not fully consistent with World Bank procurement guidelines and consultant guidelines, and therefore these may not be applied for the implementation of this project without modification. These provisions and their respective modifications are as follows:

(a) PPDA 55(2): instead, the tender submission date shall be set so as to allow a period of at least 30 days from the later of (i) the date of advertisement, and (ii) the date of availability of the tender documents.

(b) PPDA 4(2)(c): instead, Recipient's government-owned enterprises shall be allowed to participate in the tendering only if they can establish that they are legally and financially autonomous, operate under commercial law and are an independent agency of the recipient's government.

(c) The Borrower shall use, or cause to be used, bidding documents and tender documents (containing, inter alia, draft contracts and conditions of contracts, including provisions on fraud and corruption, audit and publication of award) in form and substance satisfactory to the Association.

(d) PPDA 61(4): instead, extension of tender validity shall be allowed once only, and for not more than thirty (30) days, unless otherwise previously agreed in writing by the Association.

(e) PPDA 66(3)(b): instead, evaluation of tenders shall be based on quantifiable criteria expressed in monetary terms as defined in the tender documents. It shall not be based on a merit points system.

(f) PPDA 39: instead, no domestic preference shall be used in the evaluation of tenders. Therefore, as a result of the non-application of PPDA 66(3)(b) and 39, contracts shall be awarded to qualified tenders having submitted the lowest evaluated substantially responsive tender.

(g) PPDA 67: instead, notification of contract award shall constitute formation of the contract. No negotiation shall be carried out prior to contract award.

(h) PPDA 91: instead, shopping procedure will apply for each low value contracts, in lieu of Direct Procurement, except as otherwise previously agreed in writing by the Association.

(i) Regulations 47: instead, the two envelope bid opening procedure shall not apply under NCB. The Bank's standard bidding documents for goods and works shall be used with appropriate modifications.

35. Procurement of Works: Works procured under this project will include the civil works contracts for Mwache Dam, construction of rural and small towns' water supply to Kwale, and key infrastructure related to the demonstration irrigation project. Procurement will be done using the Bank's Standard Bidding Documents (SBD) for all International Competitive Bidding (ICB) and NCB contracts.

36. **Procurement of Goods**: Goods procured under this project will include office furniture and equipment, motor vehicles, pipes, fittings and construction material, and information technology equipment. Framework agreements may be used to implement some actions such as: (a) goods that can be procured off-the-shelf or are common use with standard specifications; (b) non-consulting services that are of a simple and non-complex nature and may be required from time to time by the same agency(ies) of the Borrower; or (c) low-value contracts for works under

emergency operations. Such arrangements should not restrict foreign competition and should be limited to a maximum duration of three years. The nature and budget for such goods, including the circumstances and justification for its use; the particular approach and model to be adopted; the procedures for selection and award; and the terms and conditions of contracts will be defined and agreed between the Borrower and IDA prior to their inclusion in the updated annual procurement plan.

37. **Procurement of Non-Consulting Services**: Contracts under non-consulting services have yet to be identified. In the event that activities such as workshop venues, transport or IT services are identified, the type and budget for such services will be defined and agreed between the Borrower and IDA prior to their inclusion in the updated annual procurement plan.

38. **Selection of Consultants:** Consulting services to be procured under the project include firms that would serve as the Owner's Engineer for the Mwache Dam Civil Works, the pilot irrigation scheme, and/or the rural and small towns' water supply support to Kwale. An Implementation Support Consultant may also be recruited to support the implementation of water supply activities. A firm or individual consultants may be recruited for monitoring and evaluation activities, including those related to environmental and social impacts, or for other targeted activities as needed.

39. The GoK-owned universities and research institutions in the Borrower's country that are uniquely qualified for specialized tasks may participate with prior agreement between the Borrower and the Bank at project preparation and disclosed in the project documents or participate as sub-consultants in competitive selections in association with private consultants. Contracts to be procured under these arrangements include monitoring and evaluation (M&E), public private partnerships, among others. The budget for such services will be defined and agreed between the Borrower and IDA prior to their inclusion in the updated annual procurement plan.

40. **Operating Costs:** These items will be procured using the Borrower's national procurement and administrative procedures, which are acceptable to the World Bank. The Borrower will also pay for costs associated with any resettlement, land acquisition, compensation and relocation of services.

41. The procurement procedures and SBDs to be used for each procurement method, as well as model contracts for works and goods procured, are presented in the Project Implementation Manual (PIM).

B. Assessment of the Agency's Capacity to Implement Procurement

42. Procurement activities will be carried out by a Project Management Unit (PMU) to be established within MEWNR and includes a Project Manager, a Technical Manager, a Social Specialist, an Environmental Specialist, a Procurement Specialist, a Financial Management Specialist, and a Water Resources Specialist.

43. An assessment of the capacity of the implementing agency to implement procurement actions for the project was carried out by the Procurement Specialist of the World Bank team in May 15, 2014. The assessment reviewed the organizational structure for implementing the project and the interaction between the project's staff responsible for procurement duties and management of the ministry.

44. The key issues and risks concerning procurement for implementation of the project have been identified and include systemic weaknesses in the areas of: (i) accountability of procurement decisions; (ii) procurement record keeping; (iii) capacity of procurement staff; (iv) procurement planning; (v) procurement process administration, up to and including award of contracts; (vi) contract management; and (vii) procurement oversight.

45. The corrective measures that have been agreed are:

i. By effectiveness, review and update the Procurement Guide (which is part of the Project Implementation Manual prepared for the current project) that: (i) defines the roles and responsibilities of all involved in any aspect of procurement implementation of this project; (ii) set out the sequence and timeframe for the completion of procurement decisions of all categories of contracts, as well as for coordination of the contribution of all those involved in procurement implementation; and (iii) establish service standards for processing of payments to contractors and suppliers.

ii. Align the preparation processes of procurement plans, work plans and budget estimates.

iii. Establish separate effective tracking systems of: (i) procurement plan implementation and (ii) processing of payments to contractors and suppliers.

iv. Confirm, by effectiveness, that at least two additional competent procurement officers from the current Ministry staff are either dedicated to or hired for the project, bringing the total to at least four. Currently, there are two procurement officers responsible for all procurement activities of the Kenya WSCRP (1) and with the additional two the procurement team will be able to handle procurement activities for both projects, that is, KWSCRP-1 and 2.

v. In consultation with the Public Procurement and Oversight Authority (PPOA) and the Kenya National Audit Office (KENAO), ensure that procurement audits by PPOA and financial audits by KENAO are conducted jointly.

vi. Based on the procurement capacity assessment carried out in August 2012, and taking into consideration the training and experiences of the procurement staff responsible for procurement activities of this project, the overall project risk for procurement is "**Substantial**".

46. Keys risks, actions and timeframes with respect to procurement are summarized in the table below.

C. The Procurement Plan

47. **Prior Review Thresholds.** Prior review and procurement method thresholds for the project are indicated in the table below.

Table 3.1: Key procurement risks, actions and timeframes

Risk	Action	Timeframe	Responsibility
Inadequate procurement capacity of the PMU (Ministry)	Recruit at least two additional qualified Procurement Specialists knowledgeable of World Bank Procurement Guidelines to fill capacity gaps. The two existing Procurement Specialists working under the current project will work as a team with the incoming ones and strengthen the capacity.	Before Effectiveness	Government (Ministry)
Inadequate practical experience in the application of Bank Procurement Guidelines.	a) Conduct induction procurement training for the PMU procurement staff on Bank procurement procedures; b) Develop and implement formal training program on Bank procurement procedures to procurement staff.	Induction training by Bank staff before effectiveness; and formal training by regional training institutes during the first year of operation.	Bank / Borrower
National procurement procedures are not fully consistent with Bank procedures.	Financing Agreement to include the exception provisions.	Completed during appraisal	Bank / Borrower
Procurement fraud is a risk.	Recruit an independent consultant to carry out annual procurement audits. Incorporate procurement audit as an integral part of the annual financial audits.	Within the first 12 months of project implementation, and during the life of the project.	Government
Review and update the Procurement Guide (part of the Procurement Manual	Prepare a Procurement Manual that: (i) defines the roles and responsibilities of all involved in any aspect of procurement implementation; (ii) set out the sequence and timeframe for the completion of procurement decisions of all categories of contracts, as well as for coordination of the contribution of all those involved in procurement implementation; and (iii) establish service standards for processing of payments to contractors and suppliers.	By effectiveness and through the life of the project	Government
Sustainability of Existing Capacity.	The Ministry shall ensure that procurement officers seconded to the ministry are retained for the duration of the project.	During implementation of the project.	Government
SBD for NCB Contracts.	Bank's SBD to be used for NCB contracts.	During implementation of the project.	Government
RFP documents for selection of consultants.	Bank's RFP documents to be used.	During implementation of the project.	Government
Sporadic and inadequate budgetary support.	Ministry to ensure consistent and timely budgetary support to the project. Align the preparation processes of procurement plans, work plans and budget estimates.	During implementation of the project.	Government
Revised thresholds for	Determine NCB contracts each year in the	Completed during	Government

Risk	Action	Timeframe	Responsibility
ICB/NCB and prior review.	procurement plan to be subject to prior reviewed.	appraisal.	

Goods, Works and Non Consultancy Services

No.	Procurement Method	Threshold (USD)	Prior/ Post/ Review of all contracts	Comments
1.	ICB Goods Works	 ≥ 3,000,000 ≥ 15,000,000	 Prior Prior	
2.	LIB (Goods)	≥ 3,000,000		
3.	NCB Goods Works	 < 3,000,000 <15,000,000	 Prior Review Prior Review	 Above 1.0 million Above 10 million Prior Review
4.	Shopping Goods Works	 < 100,000 < 200,000	 Post Review Post Review	
5.	Direct Contracting	≥100	Prior Review	Below 0.1 million Post Review

Selection of Consultant Services

No.	Selection Method	Prior Review Threshold (USD)	Comments
1.	Competitive Methods (Firms) (QCBS,QBS, FBS, LCS)	≥ 500,000	
2.	Single Source (Firms)	≥ 100,000	
3.	Individual Consultant Selection (ICS)	≥ 200,000	
4.	Consultant Qualification Selection	<300,000	The threshold for CQS is US$ 300,000 as per the Guidelines.
5.	Single Source (ICS)	≥ 100,000	

D. Frequency of Procurement Supervision

48. In addition to the prior review supervision to be carried out from World Bank offices, there will be annual supervision missions to visit the field and to carry out post review of procurement actions.

E. Details of the Procurement Arrangements Involving International Competition

49. Goods, Works and Non-Consulting Services:

(a) List of keys goods and works contract packages to be procured following ICB in the first 18 months:

WORKS

No.	*Works Description*	*Estimated Contract Sum (US$)*	*Procurement Method*	*Review by Bank (Prior / Post)*	*Expected Bid-Opening Date*
W001	Construction of Mwache Dam	146,300,000	ICB	Prior	November 2016
W002	Installation of plastic water tanks and gutters in public institutions	20,000	Shopping	Post	April 2015
W003	Water supply network rehabilitation and expansion in Kwale, Ukunda and Kinango towns	3,000,000	NCB	Prior	April 2015
W004	Construction of point water sources including boreholes, small dams, pans in Kwale rural areas as identified under design consultancy	3,700,000	NCB	Prior	April 2015
W005	Construction of public sanitation facilities in urban areas and public institutions in Kwale County	200,000	NCB	Post	October 2015
W006	Construction of a sludge management facility for KWAWASCO	300,000	NCB	Post	October 2015
W007	Construction of office for PIU	TBC	NCB	Post	March 2015

GOODS

No.	*Goods Description*	*Estimated Contract Sum (US$)*	*Procurement Method*	*Review by Bank (Prior / Post)*	*Expected Bid-Opening Date*
G001	Motorbikes for PIU	20,000	NCB	Prior	March 2015
G002	Project Utility Vehicles (8) for PMU and PIU	500,000	NCB	Post	April 2015
G003	Pipes and fittings for KWAWASCO and construction materials for community water projects	700,000	NCB	Prior	October 2015

50. Consulting Services:

(a) List of consulting assignments:

No.	*Description of Assignment*	*Estimated Cost (US$)*	*Selection Method*	*Review by Bank (Prior / Post)*	*Expected Proposals Submission Date*
C001	Owner's Engineer for additional Investigations and Detailed Design Preparation, Bidding Package Preparation and Technical Assistance for Bidding Process, Construction Supervision and Post-Construction Service for Mwache Dam	10,700,000	QCBS	Prior	February 28, 2015
C002	Consultancy for preparation of Kwale County Water Development Master Plan	1,000,000	QCBS	Prior	March 2015
C003	Consultancy Services for Design and Construction Supervision for Works in Lunga Lunga, Vanga and Msambweni	1,000,000	QCBS	Prior	March 2015
C004	Senior Project Engineer – PMU Coast Office Coordinator	96,000	ICS	Post	June 2015
C005	Environmental and Social Safeguards Officer,	84,000	ICS	Post	June 2015
C006	Project Engineer – PMU Coast	64,000	ICS	Post	June 2015
C007	Sociologist - Social Development Officer	64,000	ICS	Post	June 2015
C008	Conveyance legal services for Mwache Dam Project	79,800	ICS	Post	June 2015
C009	Dam Safety Panel of Experts (DSPE) – Engineering	150,000	ICS/CQS	Prior	June 2015
C010	Dam Safety Panel of Experts (DSPE) – Hydrology	50,000	ICS	Post	June 2015
C011	Dam Safety Panel of Experts (DSPE) – Geotechnical	100,000	ICS/CQS	Prior	June 2015

C012	Impact Evaluation Specialist to monitor the impact evaluation	100,000	ICS	Post	June 2015
C013	Social Safeguards Specialist	100,000	ICS	Post	June 2015
C014	Environmental and Social Impact Assessment (ESIA) and Social Assessment (SA) monitoring	240,000	CQS	Prior	June 2015
C015	Property Valuer for the Mwache Project	20,000	ICS	Post	December 2015
C016	Conduct a baseline survey for Impact Evaluation of Pilot Irrigation Project	100,000	ICS	Post	December 2015
C017	Project Officer (Engineering)	120,000	ICS	Prior	March 2015
C018	Office administrator for PIU office	50,000	ICS	Post	March 2015
C019	Institutional and Planning Specialist	80,000	ICS	Prior	March 2015

Environmental and Social Issues (including safeguards)

51. The GoK enacted the Environmental Management and Coordination Act of 1999, which empowers the National Environmental Management Authority (NEMA) with oversight of environmental compliance. In accordance with this Act, NEMA is responsible for conducting annual environmental audits and carrying out due diligence on the projects that have already undertaken ESIAs, as well as those in the process of undertaking ESIAs. MEWNR has been implementing World Bank-funded projects and has the necessary structures in place to oversee safeguard issues. For this project, the environmental and social specialists hired under the KWSCRP-1 PMU will continue to supervise the application of all environmental and social safeguards frameworks and compliance with NEMA's requirement for ESIAs. The PMU will assess institutional arrangements and the environmental and social safeguards management capacity of each executing agency and oversee capacity enhancement accordingly.

Monitoring & Evaluation

52. Project monitoring and evaluation will be based on the indicators of final and intermediate outcomes (refer Annex 1), and progress in implementation against timescales and targets, as well as resource use against budgets. Key intermediate results for Mwache Dam include construction progress, appointment of the Operations and Management contractor, and implementation of the environmental and Safety Management Plan. Specific activities to be monitored include agreed measures under the project's ESIA and RAP.

53. All agencies involved in the implementation and execution of the project will participate in the process of data collection, compilation, analysis and use. The PMU's M&E specialist appointed under KWSCRP-1, will have overall responsibility for coordination, including

collating information from all entities for quarterly and annual progress reporting, using an agreed format. Data will be collected and managed by each executing agency through a designated focal point, which will be responsible for data acquisition, collation and reporting for their respective sub-components/activities. The M&E specialist will also explore the use of social accountability mechanisms to inform M&E, particularly for community-led activities under Component 2, drawing from lessons learned in this regard in the Bank's Kenya portfolio (including the Western Kenya CDD project).

54. In addition, the Bank will carry out the normal review processes, through regular implementation support missions covering technical, procurement, financial management, safeguards, institutional and other aspects.

55. To the extent possible, M&E data will be geo-referenced and made publicly available in order to improve transparency and project governance.

Role of Partners

56. This is a complex project that requires the participation and long term commitment of several key players and partners, working harmoniously together with the Government of Kenya and the World Bank to make possible the instrumentation and sustainability of the project, in financial terms, but also through continued technical, financial and legal assistance during the subsequent operation and maintenance stages. Thus, there is ample room as well as a critical need to involve donors, private partners and other types of stakeholders, both domestic and from abroad. The need for capital investment for several paramount items such as the treatment plant, transmission line, regulation tanks, improved and amplified distribution systems, etc. clearly portray such needs. That is also the case for badly needed management skills and procedures improvements, transfer of technology, experience and knowledge.

57. The design of the project has been informed by and benefited from extensive discussions with development partners working in Kenya's water sector. Throughout project implementation, synergies with development partners will continue to be built, including through the established Water Sector Technical Group. There is a close coordination with the AFD in the context of the WaSSIP project and with the Government of the Netherlands through the activities implemented by Vitens-Evides in MOWASCO.

Annex 4: Operational Risk Assessment Framework (ORAF)

Kenya: Coastal Region Water Security and Climate Resilience Project (P145559)

Risks

Project Stakeholder Risks						
Stakeholder Risk	Rating	Substantial				
Risk Description: 1. There is a risk that project implementation would be affected by the ongoing institutional transition resulting from the new Constitution and associated coordination issues between multiple agencies involved with water development in the coast. 2. There is a risk that stakeholders in the local communities in Kwale County, where the dam is being constructed, would not be fully integrated into planning and benefit-sharing related to the Mwache dam investment, given the "top-down" nature of investment planning thus far.	**Risk Management:** The multi-sectoral Ministerial Oversight Committee (MOC), established under KWSCRP, will guide and coordinate water investment implementation and help ensure provisions for institutional adjustments are in place to reduce risks during implementation. In addition, KWSCRP-2 will continue to utilize the Project Management Unit established under KWSCRP-1 that was designed to "ring-fence" project preparation and implementation.					
	Resp: Both	Status: In Progress	Stage: Both	Recurrent:	Due Date:	Frequency:
	Risk Management: A social assessment study for the Mwache Dam will be undertaken by an independent consultant in order to highlight the main socio-economic needs of the areas beyond Mombasa that will be the direct beneficiaries of the water, and those persons directly impacted by the dam. The Bank team has and will continue to engage with officials from Kwale county, including with respect to development of Components 2 and 3 of the project. A component has been introduced to support the upstream Kwale country in terms of water security and climate resilience to promote benefit sharing.					
	Resp: Both	Status: In Progress	Stage: Both	Recurrent:	Due Date:	Frequency:
Implementing Agency (IA) Risks (including Fiduciary Risks)						
Capacity	Rating	Substantial				
Risk Description:	**Risk Management:**					

The current management arrangements for large-scale water investments may be inadequate for the size of this operation.	To mitigate this, the project will provide technical support and capacity building assistance, including development of O&M plans and operational support measures, such as producing and enforcing the use of manuals, specific training of key staff, among others. A large scale consultancy (Owner's Engineer) is being procured to undertake detailed design preparation, construction supervision and quality assurance of the dam construction works in a timely and qualitative manner. The operational and management arrangements of investment structures will be agreed with water licenses, water use and regulatory entities prior to project implementation.					
	Resp: Both	Status: In Progress	Stage: Both	Recurrent:	Due Date:	Frequency:
Governance	Rating	Moderate				
Risk Description: The fiduciary review conducted by IDA Treasury in January 2009 identified significant financial management (FM) weaknesses in many (68%) of the Bank-financed projects in Kenya. The subsequent risk-based in-depth audit review in July 2009 revealed corruption and fraud cases in two projects and forensic audits were carried out. In addition, the WB's Integrity Department conducted fraud and corruption investigation in 2009/10 for another project. These three projects were suspended and two of them were subsequently closed. These reviews have resulted in high incidence of ineligible expenditures which the Bank has asked the government to refund.	**Risk Management:** Through the IDA fiduciary in-depth review, the Bank has instituted more stringent FM reviews. These include detailed transaction reviews and on-site field audits as part of FM supervision as well as external annual audits. The Bank FM Unit continues to provide support to GOK in strengthening the capacity of internal audit function both at ministry and Treasury level as well as the capacity of the Kenya National Audit Office (KENAO). The FM Unit is also conducting a review of the country FM systems for identifying weaknesses and redressing them with the government in order to facilitate more effective use of the country FM systems. This review is expected to mitigate the country level FM risks. The Bank has also reviewed and provided input to the draft Public Financial Management law so as to ensure a strong legal framework is in place for managing financial resources.					
	Resp: Both	Status: In Progress	Stage: Both	Recurrent:	Due Date:	Frequency:
Project Risks						

<table>
<tr><td>Design</td><td>Rating</td><td colspan="6">Substantial</td></tr>
<tr><td rowspan="4">Risk Description:

1. As the GoK has not invested heavily in the water sector in nearly two decades; it may not have adequate capacity for planning, design, tender management/bidding and supervision of a large-scale multipurpose dam such as Mwache. Additionally, there are no guidelines on cost allocation and sharing among beneficiaries for multipurpose storage development.

2. The IDA project, as designed currently, does not include financing for the Water Treatment Plant (or the associated transmission lines) that would treat the water from the Mwache Dam. The possibility of developing a Public-Private Partnership (PPP) to finance the treatment plant (and possibly the transmission lines) is being explored with the IFC and the PPP unit in The National Treasury.

3. There is a risk that investors are not attracted to the project due to market conditions, sector issues, a significant period for investments to be totally utilized, etc.</td><td colspan="7">Risk Management:

For the former, MEWNR’s engagement with activities under KWSCRP-1, including through the recruitment of a strong PMU, should assist in building this capacity prior to implementation of KWSCPR-2. For the latter, the Memorandum of Agreement establishing the responsibility of all of the key stakeholders, and the Water Purchase Agreement between MEWNR and MOWASCO should help clarify divisions of responsibility, and cost sharing arrangement, prior to project effectiveness. A large scale consultancy (Owner’s Engineer) and Dam Safety Review Panel will provide oversight and quality assurance of the Mwache Dam related works throughout project implementation in order to ensure the quality of detailed design, construction works and initial test / commissioning of the dam and associated structures.</td></tr>
<tr><td>Resp: Client</td><td>Status: In Progress</td><td>Stage: Both</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency:</td></tr>
<tr><td colspan="7">Risk Management:

In addition, Catchment management activities will be included in the project to reduce sediment deposits and prolong the life of reservoirs, building on experiences and lessons from the NRM and Western Kenya CDD/FM Projects as well as international best practice.</td></tr>
<tr><td>Resp: Client</td><td>Status: In Progress</td><td>Stage: Both</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency:</td></tr>
<tr><td></td><td colspan="7">Risk Management:

The team will support the GoK’s PPP Unit identifying the most suitable structure considering specific market conditions and the potential investor base. Furthermore, the timeline for implementation of the Water Treatment Plant is significantly shorter than that associated for the Mwache dam. As such, there can be a time lag of one or two years between completion of preparation for the treatment plant versus the dam itself. If financing for the Water Treatment Plant under a PPP arrangement cannot be secured, the option to include the treatment plant as Additional Financing under IDA 17 would be considered.</td></tr>
<tr><td></td><td>Resp: Both</td><td>Status: Not Yet Due</td><td>Stage: Implementa</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency:</td></tr>
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<tr><td></td><td></td><td></td><td>tion</td><td></td><td></td><td></td></tr>
<tr><td>Social and Environmental</td><td>Rating</td><td colspan="5">High</td></tr>
<tr><td rowspan="4">Risk Description:

1. Given the nature of the Mwache Dam investment, it is likely that the project could generate socially and environmentally undesirable construction and post-construction impacts, including the need for population resettlement.

2. In addition, high upstream erosion could threaten effective storage and dam life.</td><td colspan="6">Risk Management:

To identify and mitigate these risks, a comprehensive set of safeguards documents, including a revised Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP), Resettlement Action Plan (RAP) and Vulnerable and Marginalized Group Plan (VMGP), is under preparation. For preparation of these documents extensive consultations will be done with the major stakeholders, including the affected communities and mitigation measures will be designed with their inputs.</td></tr>
<tr><td>Resp: Client</td><td>Status: In Progress</td><td>Stage : Both</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency :</td></tr>
<tr><td colspan="6">Risk Management:

The project includes activities to reduce upstream erosion in the Mwache catchment and activities to reduce pressure on the catchment natural resources.</td></tr>
<tr><td>Resp: Client</td><td>Status: In Progress</td><td>Stage : Both</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency :</td></tr>
<tr><td>Program and Donor</td><td>Rating</td><td colspan="5">Moderate</td></tr>
<tr><td rowspan="2">Risk Description:

There are several water and water-related projects and programs underway or planned, supported by the Bank and other development partners, including in Mombasa and the coastal region. Lack of coordination and alignment across numerous activities could lead to duplication of effort and/or reduce effectiveness of interventions.</td><td colspan="6">Risk Management:

The Bank is a member of the Water Sector Working Group (WG) which plays a key role in bringing together DPs to agree on common strategies, proposed investments, etc. The WG has been updated regularly during preparation of KWSCRP-1, and these interactions, as well as bi-lateral interactions with other partners (including AfDB) and Bank projects (including WaSSIP, KMP and KISIP) are expected to continue moving forward.</td></tr>
<tr><td>Resp: Both</td><td>Status: In Progress</td><td>Stage : Both</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency :</td></tr>
<tr><td>Delivery Monitoring and Sustainability</td><td>Rating</td><td colspan="5">Moderate</td></tr>
</table>

Risk Description:	**Risk Management:**					
A number of agencies will be involved in planning, design, construction and O&M arrangements for the dam and related infrastructure. The number of agencies involved, and the varying level of capacity across agencies, may jeopardize sustainability of the project in the near and long-term.	In terms of roles, the Memorandum of Agreement and Water Purchase Agreement will outline the roles and responsibilities of key stakeholder agencies. In terms of capacity, this can be supported at the respective institutions through capacity building initiatives under the first phase of the program (KWSCRP-1), as needed.					
	Resp: Both	Status: In Progress	Stage: Both	Recurrent:	Due Date:	Frequency:

Overall Risk	
Overall Implementation Risk:	**High**
Risk Description	
Overall implementation risk is considered high due to the need for managing safeguards issues (including resettlement), the capacity of the implementing agency to supervise the dam procurement and construction, the challenges associated with the evolving security situation in the coastal region, and the number of stakeholders involved.	

Annex 5: Implementation Support Plan

1. For high-risk projects such as the Water Security and Climate Resilience in the Coastal Region Project, experience recommends that World Bank preparation and supervision teams must be adequately resourced and staffed and be present in the field. Successful implementation and realization of the project's development objective will require intensive supervision. The implementation support plan below responds to the complexity of the project, the significant technical and policy issues that are critical to its success, the uncertainties inherent in a framework approach, and the challenging institutional and governance environment in which the project will be implemented. Adequate World Bank resources and staffing to assure this level of supervision will be made available throughout the project implementation cycle. Project supervision will be undertaken by an inter-disciplinary team of field and headquarters based World Bank experts, with continued strong support from senior management in the Africa Region, the new Water Global Practice as well as from the Country Management Unit.

2. *Implementation Support Phasing*. The project implementation support strategy is based on a phased approach: Years 1 and 2 will mainly entail completion of the technical design and procurement process for Mwache Dam, as well as the initiation of water supply investments and livelihoods improvement in Kwale County, whereas Years 3 to 7 will focus on supervision of construction works.

3. *Team Composition*. The core implementation support team will consist of a Task Team Leader (TTL) and a co-Task Team Leader (co-TTL); an economist; technical specialists and engineers for each identified sub-components; environmental safeguard specialists; social safeguards specialists; institutional specialists; operations specialists; M&E specialists; a procurement specialist; and a financial management specialist. The team will be complemented by headquarters, country office, and consultant support on issues associated with construction works and policy dialogue. The team will liaise and coordinate with other water related projects in Kenya to ensure consistency and increase efficiency.

4. *Frequency of Implementation Support*. There will be at least two full joint supervision missions with relevant development partners each year. Country-based staff will monitor implementation progress on a continuous basis and the Bank team will conduct monthly meetings/video conferences with the PMU to review annual work program progress and address emerging issues. Safeguards and technical field visits to sub-investments will be included in all missions so that each sub-investment will have at least two annual safeguards visits. IDA supervision teams will include environmental and social safeguard specialists or appropriately qualified consultants, in major missions, to review progress in the implementation of the relevant safeguards instruments. The performance of the PMU, its contractors, as well as cooperating agencies, in the implementation of these activities, will be a standard element of IDA project supervision reports.

Implementation Support Plan

Table 5.1: Skills Mix Required

Focus	***Skills Needed***
Supervision of Component 1 (Mwache Dam and Related Infrastructure)	Task Team Leader Co-Task Team Leader Economist Technical Specialists Operations Analyst Environmental Safeguard Specialists Social Safeguard Specialists
Supervision of Component 2 (Kwale County Development Support)	Task Team Leader Co-Task Team Leader Economist Technical Specialists (including WRM, WSS and Rural Development) Operations Officer Operations Analyst Environmental Safeguard Specialists Social Safeguard Specialists
Procurement monitoring of major contracts	Procurement Specialist
Financial management post reviews	Financial Management Specialist
Stakeholder consultation	Operations Officer Social Safeguard Specialists
Monitoring and Evaluation	M&E Specialist
Total Staff Weeks Estimate: 80 – 100 staff weeks	

Annex 6: Map of Project Area

Annex 7: Key Elements of Mombasa Water Supply and Sanitation Company Limited (MOWASCO) Turnaround

(Under discussion between WSP, MEWNR and Mombasa County)

1. The current water situation in Mombasa County is serious. There is insufficient water supplied into the system, the number of active connections is low relative to the population, non-revenue water is high, cash collections are low, staff productivity is low and the utility (MOWASCO) is technically insolvent with its expenditure obligations exceeding its cash income.

2. The County has the constitutional duty to provide water and sanitation services in its area and is committed to significantly improving the water situation in the county.

3. The County Government would need to make final judgments on the exact form of the utility it envisions in the future, but the principle of an independent provider held accountable in a clear governance framework is sound. The **Mombasa Water Supply and Sanitation Company** (MOWASCO) is a potential vehicle to deliver the quantity and quality of water and sewerage services to all its customers. However, the current performance and governance structures – or that of any other potential service provider – must be significantly improved.

4. The County government, as **shareholder**, needs to put in place sound, state-of-the-art governance structures and institutional arrangements to ensure that mechanisms and incentives exist to achieve the desired services and performance improvements, aimed at achieving universal coverage of WSS of an adequate quality and under modern accountability mechanisms.

5. It is proposed that the County Government enter into a formal arrangement with MOWASCO setting out a clear vision, service and **performance targets** and mutual **roles and responsibilities** (including obligations) to achieve the service and performance targets. This contractual arrangement would have to include sound **governance** principles (including separation of roles and responsibilities, non-interference, commitments to support credit control policies and commitments on the part of the County to meet its obligations); and a **financial covenant** between the shareholder and MOWASCO (clearly defining financial relationships, financial obligations and financial targets). High-level political support for the reforms and the MOWASCO program must be translated into a clear strategy and followed by practical commitments by MOWASCO to the reforms and to deliver water service improvements. County government will need to make or endorse difficult decisions (e.g. enforcing credit control, paying its own utility bills, possible staff retrenchments etc.).

6. **Management strategy**. Both the county government and the board of directors must ensure that there is a capable management team in place that is ably led. There are three broad options to consider: use the existing management team with external support, recruit where there are identified gaps, and/or make use of an external management contract to bring in the necessary management expertise. A choice on which option (or combination of options) will be implemented must be made early on in the reform process.

7. **Technical support strategy**. The existing technical support centered on district metered areas (DMAs) and provided by Vitens needs to be accelerated and expanded in scope. The number of DMAs to be completed each year needs to be increased. The scope must be extended to address a wider set of technical and process-oriented issues (in particular customer, revenue and cash collections management). This will require additional financial resources.

8. **Financial strategy**. The finances of MOWASCO need to be turned around. The existing balance sheet must be cleaned up and the utility given a fresh start. The financial strategy has to prioritize revenue growth and a significant increase in cash collections. Expenditure (cash outflows) need to be restricted to available cash, with careful prioritization of expenses and much greater attention to the effectiveness and efficiency of expenses (including staff expenses). Clear financial targets need to be included in a financial covenant with the shareholder, together with the commitments and obligations of the shareholder. External financing of investments (through a combination of grants and loans) must take place within this structured financial covenant between the shareholder (county government) and the utility.

9. **Customer strategy**. Due to the historical poor performance of the Mombasa City County and MOWASCO, customers (existing and prospective) are distrustful of the county government and the utility. The county government and MOWASCO will need to work hard to gain their trust. In this context, unpopular decisions and actions (such as enforcing credit control, raising tariffs and reducing staff numbers) are particularly difficult to make and implement. For these reasons, significant emphasis must be placed on effective customer communications. Communications have to be regular, consistent and credible (truthful). The importance of customer management and communications must be elevated in the business, managed by a person with the appropriate (non-technical) skills, and supported by people with the necessary experience. A strategy needs to be developed and implemented to ensure this activity gets the necessary attention and is effective, including the regular monitoring of customer feedback.

10. Who will lead? Leadership is necessary at two levels – at the county level and at the utility level. An agreement on who exactly these people are, and an allocation of tasks and responsibilities between them to take the reform agenda forward are necessary.

Annex 8. Economic and Financial Analyses

1. Background

1. The coastal region shows a water supply deficit of about 215,043 m^3 per day. About half of this deficit is from Mombasa County alone. Thirty percent of the population of Mombasa lives in low income areas or informal settlements. Only a small percentage of the residents in these areas are directly connected to pipelines, receiving water from low quality and high priced sources. They usually access water from vendors at an average cost of US$2.87 per m^3, which is well above the current tariffs of MOWASCO of US$0.80 to US$1.00 per m^3 for monthly consumption below 20 m^3 [22]. Institutions and industries also face the twin problems of high costs and intermittent supply of water. Some companies in Mombasa obtain water from private sources at a cost of US$10.3 per m^3. The situation in Kwale Country is even worse as only 1 percent and 10 percent of the rural and urban population, respectively have accesses to potable water services. In rural Kwale, the cost of accessing water is on average about US$3.1 per m^3. Moreover, the livelihood of the Kwale country population, which is predominantly rural, is significantly constrained by exposure to climate variability and low level of water resource development.

2. The economic implications of the water supply shortfall and low level of water resources development are quite understandable: they pose a public health burden, increase the cost of doing business, discourage private investment, limit livelihood opportunities, increase drudgery for women and children and reduce property values, among other outcomes. Capturing these and other effects in just a few financial or economic indicators is quite difficult, if not impossible, due to the multifarious channels through which access to water impinges on human wellbeing. Quantifying such effects requires the application of a complementary and special methodological framework other than the conventional cost benefit analyses.

3. Consequently, a thorough analysis of the economy wide impacts and contributions of the KWSCRP-2 to the twin goals of eradicating extreme poverty and boosting shared prosperity in the coastal region is currently underway[23]. The specific objectives of this activity are to enhance the quality of the design and implementation of the KWSCRP-2 and strengthen the knowledge-base on the causal linkages between investments in water infrastructure (and institutions), economic growth, poverty, and shared prosperity. Shared prosperity is defined here as the welfare or income growth of the bottom 40 percent of the target beneficiaries in coastal region. The analysis of the economic effects of the coastal region-and on poverty and the distributional impacts of the KWSCRP-2 is achieved by the application of an integrated economic modelling framework involving the Computable General Equilibrium (CGE) model and the household based micro-simulation model. Additional water supplies resulting from KWSCRP-2 would enhance economic growth in the region through improving public health, encouraging private investment, improving livelihood opportunities, enhancing property values, and avoiding

[22] Socioeconomic survey report of Mombasa Water and Sewerage Company Limited (2011); and http://www.mombasawater.co.ke/index.php/customer-service/water-tariff

[23] An international organization known as Partnership for Economic Policy Analysis (PEP) has been contracted to conduct a thorough analysis of these issues.

drudgery for women and children (releasing time to be spent on education and other household livelihood opportunities). More importantly, access to safe and secure water supplies would have long-term impacts on the region's human capacity development. Hence, the analysis was designed to disentangle the complex relationship between investments in KWSCRP-2, economic growth, poverty, and equity.

2. Methodology

4. In the present case, conventional cost benefit analysis was conducted to evaluate the financial and economic effects of the project. With and without project scenarios were developed to assess the incremental costs and benefits associated with the overall project and project components. The analysis was achieved in two steps. First, financial and economic analysis was done for each of the major sub-project components, namely Mwache Dam and Related Infrastructure and Rural and Small Towns Water Supply Coverage in Kwale County. The project components evaluated account for over 95.8 percent of the total project costs. The objective of these analyses was to test the financial and economic viability of the specific sub-components. Second, based on the results of the analysis of the sub-components, the benefits and costs of the entire project were analyzed to determine the viability of the overall project.

5. Furthermore, the economic analysis involved two scenarios. The first scenario considered only making adjustments to financial costs and benefits, which entailed excluding some costs and benefits and valuing project inputs and outputs at their economic opportunity costs. The second scenario involved measuring and adding consumer surplus to the estimated benefits. This is because the project not only increases the water supply but also reduces its price to Mombasa and Kwale County residents. To achieve this, a linear water demand functions were estimated and coordinates of two points on the demand curves were determined. Coordinates of the first points were based on the prices and quantities of water accessed by households from existing alternative sources. The planned improved water supply quantity and water tariff determined the coordinates of the second point on the linear demand curve.

6. The financial analysis was based on the actual prices that the Water Service Providers in Kwale and Mombasa Counties pay for inputs and receive for water supplied. The sustainability of the economic benefits of the KWSCRP-2 project depends on the financial sustainability of the water service providers. Financial sustainability refers to the ability of the water service providers to finance their businesses, and to operate, and invest in activities without subsidies by generating their own resources. Two types of financial analyses were done. The first assessed the overall financial performance of the project considering the upstream and downstream investments required to deliver water to customers irrespective of the financing mode. The second analyzed the financial sustainability of MOWASCO, given that MOWASCO is expected to receive the bulk of Mwache dam water and amortize 50 percent of the IDA loan from revenues collected from its customers.

7. The expected benefits were assessed based on the type of water use, for example, domestic water supply, industrial water supply, and irrigation water supply. The benefits of domestic water supply include increase of service coverage, reduction of intermittent water supplies, water quality improvement, and resource saving by switching from alternative sources at a higher cost to piped water network at a lower cost per unit. Access to safe and reliable water

improves quality of life and reduces the incidence of water borne diseases. It is assumed that health benefits known to users are reflected in their willingness to pay for good quality water and willingness to pay can be derived from the demand function. The benefits were estimated based on incremental water supplied to the population valued through marginal tariffs and the consumer surplus. In Mombasa and Kwale Counties, the consumer surplus arises from a reduction in water prices and rationing the water supply at a price below that which consumers are willing to pay. Since all incremental treated water is ultimately distributed through water service providers, we use water service providers' tariffs. The consumer surplus was calculated by comparing the costs of alternative sources of water supply in the without project scenario and its associated consumption level with the cost that consumers will have to incur in the "with" project scenario and associated consumption level.

8. Specific assumptions:

a. The opportunity cost of capital is estimated at 12 percent
b. Operation and maintenance cost for small dams and borehole systems was estimated at 10 percent of the initial investment
c. For measuring the consumer surplus for residential water use the demand elasticity of water was assumed to be -0.5[24]. The demand elasticity for industrial water use also ranges between -0.1 to -0.6[25].
d. For Mwache dam the O&M cost was estimated to be 1 percent of the initial capital investment
e. The service life of boreholes and small dams was estimated to be about 20 years
f. The service life of Mwache Dam and reservoir was estimated to be 30 years.
g. The planned area to be irrigated by the possible allocation of 20 percent of the Mwache dam water is about 2000 hectare.
h. The assumed charge for irrigation water is US$0.1 per m^3
i. Cropping pattern assumptions : (1) 40 percent staples, 40 percent vegetables, and 20 percent perennials, and (2) 20 percent staples, 60 percent vegetables, and 20 percent perennials
j. In Mombasa, the current Non Revenue Water is estimated at 50 percent. About 20 percent is estimated to be due to leakage and the remaining 80 percent is due to commercial loss (i.e., the water is consumed by customers without payment).The commercial loss is a cost to MOWASCO and is therefore included in the financial analysis

3. Mwache Dam and Related Infrastructure Component

9. The financial and economic analysis was done considering two scenarios of water allocation. These scenarios are: (i) allocation of the total amount of water from the dam to

[24] See Martin and Thomas (1986)
[25] See Renzetti (1988)

Mombasa and Kwale for water supply, and (ii) allocation of 80 percent of the water to water supply in Mombasa and Kwale and 20 percent for irrigation development in Kwale County. The addition of the second scenario to the analysis is justified due to the high incidence of poverty in Kwale County, which ranges between 72 percent and 75 percent compared to the national average of 45 percent. The major culprit for this unacceptable level of poverty is over reliance on rain-fed agriculture which is prone to the deleterious effects of low and erratic rainfall.

10. The overall scope of activities required to deliver water to the final consumer will cost on the order of US$600 million. The cost disaggregation is as follows: (1) US$165 million for the development of Mwache dam (to be financed by IDA loan), (2) US$195 million for the construction of treatment plant, pumping station, tanks, and transmission lines, (3) US$6 million for resettlement of project affected people, and (4) US$ 200 to US$250 million for augmentation and rehabilitation of water distribution system, reduction of NRW, development of new connections and tertiary networks associated with new connections. In the financial and economic analysis, the total cost required to capture water in Mwache Dam, transmit it for treatment, treat it, store it, and distribute it to Mombasa is considered even though the available budget envelop only allows for the execution of part of the overall activities.

3.1 Results of economic analysis for Mwache dam and related infrastructure

11. The results of the economic analysis of the Mwache Dam and related infrastructure component are summarized in Table 8.1 below. The EIRR without considering the economic surplus ranges between 13 percent and 15 percent depending on the water allocation and cropping pattern assumptions. These values increase to more than 22 percent when the economic surplus is considered. Thus, the sub-project component is economically viable under all of the water allocation scenarios considered, however, allocating 20 percent of the water to irrigation, particularly for irrigating high value crops, promises better economic returns. The economic viability of water allocation to irrigation depends significantly on the type of cropping pattern. As expected, increasing the share of high value crops such as vegetables and fruits improves the economic viability of investments in the irrigation system.

Table 8.1: Results of the economic analysis for Mwache dam and related infrastructure

No	Water Allocation Scenarios	ENPV (Million US$)	EIRR (%)
1	**Allocation of total reservoir water to water supply**		
1.1	Without Consumer Surplus	23.9	13.0
1.2	With Consumer Surplus	226.8	23.4
2	**Allocating 80% of reservoir water to water supply and 20% to irrigation**		
2.1	*Cropping pattern: 40% staples, 40% vegetables, and 20% perennials*		
2.1.1	Without consumer surplus	51.0	14.0
2.1.2	With consumer surplus	223.5	22.2
2.2	*Cropping pattern: 20% staples, 60% vegetables, and 20% perennials*		
2.2.1	Without Consumer Surplus	67.2	14.7
2.2.2	With Consumer Surplus	239.7	22.8

The proximity of the planned irrigation area to the coastal towns guarantees markets for high value crops and the profitability of irrigated agriculture.

4. Rural and Small Town Water Supply in Kwale County

12. The water supply for rural and small towns in Kwale County can be provided from connections to the existing and the planned bulk water supply system in the coastal region, as well as by developing water point sources (e.g., boreholes, protected dug wells, and protected springs), rainwater collection (e.g., roof catchments, water pans and rock catchments), and small dams across seasonal streams. To demonstrate the financial and economic viability of this sub-component, samples of these water sources were selected based on expert consultations and prior water supply development experiences in the County. For rural Kwale, the most promising means of increasing access to safe water is through borehole systems (with a capacity of 40m3 per day and) and small dams (with a capacity of 200m3 per day). The average cost of developing a borehole is US$14,700 and a borehole on average can serve about 300 people. In total about 231 boreholes with a total investment cost of US$3.4million are envisaged for development. In addition about 25 small dams with a total investment outlay of US$2.6 million are planned for development. The unit cost of developing small dams depends on the type of the dam, the method of construction, and the reservoir capacity[26].

13. The interventions considered in the five small towns of Kwale County include:

(1) Improving the efficiency of the current water supply systems to reduce Non-Revenue Water and release extra water for use by households. It is assumed that this intervention will release about 3535m^3 per day. The total investment required to realize this net water saving is about US$3.9 million.
(2) Accessing additional water sources through developing borehole systems. Four boreholes are expected to be developed with a total investment outlay of US$2.1 million.

14. Completion of the financial and economic analysis of these water supply strategies requires an understanding of the existing alternative sources of water on which people depend. This information was obtained by conducting reconnaissance surveys, key informant interviews, and accessing relevant literature on the water supply situations of Kwale County. The major water sources for rural communities are: rivers, springs, collection from roof catchment, and water pan. River is the only year round supply source but is usually far from homestead requiring daily trekking mainly by women and girls. Farm-households reported that on average about five trips to a water source in a day is required, which involves significant opportunity cost of labor. Water pans dry during the dry season and are subject to contamination by animals. Rural households haul water with cans, pails, and jerry-cans; varying in size from 5 to 20 litres. However, the most common equipment for fetching water is a 20 litre jerry-can.

[26] Detailed unit costs were obtained from: (1) Danish International Development Assistance (Danida).2006.Water from Small Dams: A handbook for technicians, farmers and others on site investigations, designs, cost estimates, construction and maintenance of small earth dams, and (2) Ministry of Water and Irrigation.2005.Assessing Unit Costs for Water Supply and Sanitation Services in Kenya.

4.1 Economic analysis for rural and small town's water supply in Kwale County

15. The results of the economic analysis of rural and small towns' water supply systems in Kwale County are summarized in Table 8.2. All of the systems considered are economically viable as the ENPV is positive and EIRR is well above the assumed opportunity cost of capital, even without adding consumer surplus. The addition of consumer surplus to the benefits significantly enhances the economic viability of the water supply systems both for rural areas and small towns. This is because Kwale county residents (both rural and urban) who currently lack access to improved water sources face high cost per unit of water.

Table 8.2: Results of economic analysis of rural and small town water supply systems

No	Items	ENPV (Million US$)	EIRR (%)
1	Rural Water Supply		
1.1	Borehole systems (without consumer surplus)	17.0	102.1
1.2	Small-dams(without consumer surplus)	8.9	75.5
1.3	Rural water supply (Borehole systems and small dams combined)		
1.3.1	Without consumer surplus	25.9	89.7
1.3.2	With consumer surplus	210.8	169.3
2	Small towns water supply		
2.1	Improving the efficiency of existing system (without consumer surplus)	6.4	67.0
2.2	Developing additional water source: Borehole systems (without consumer surplus)	2.5	31.5
2.3	Small towns water supply: aggregate		
2.3.1	Without consumer surplus	8.9	47.4
2.3.2	With consumer surplus	139.2	133.5

5. Economic analysis of the overall project

16. The results of the economic analysis for the overall project (i.e., considering all project components) are summarized in Table 8.3. The results show that overall the project is economically viable even when 20 percent of Mwache dam water is allocated to irrigation. As expected, allocating a significant proportion of the irrigated area to high value crops enhances the viability of the overall project. A series of gross margin analysis done by different consultants and experts drawn from key Kenyan institutions including Kenya Agricultural Research Institute, underlined the profitability of irrigated agriculture in the project area. Considering the economic surplus in the cost benefit analysis significantly improves the economic viability of the overall project. The EIRR values omitting the economic surplus range between 14 percent and 15 percent depending on the assumed water allocation scenarios and cropping pattern. When the economic surplus is included, the corresponding values range

between 36 percent and 39 percent. These results are typical of water supply projects in developing countries.

Table 8.3: Results of economic analysis of the overall project

No	Investment scenarios	ENPV (Million US$)	EIRR (%)
1	80% of Mwache dam water for water supply, 20% for irrigation development in Kwale County with significant proportion of irrigated land allocated to staple crops, and rural and small towns water supply in Kwale County.		
1.1	Without consumer surplus	116.6	14.3
1.2	With consumer surplus	574.3	36.2
2	80% of Mwache dam water for water supply, 20% for irrigation development in Kwale County with significant proportion of irrigated land allocated to High Value crops, and rural and small towns water supply in Kwale County.		
2.1	Without consumer surplus	127.8	14.7
2.2	With consumer surplus	590.6	36.7
3	100% of Mwache dam water for water supply in Mombasa and rural and small town's water supply in Kwale county.		
3.1	Without consumer surplus	58.7	14.5
3.2	With consumer surplus	577.7	38.6

6. Financial analysis

17. The financial analysis focused on the Mwache dam and related infrastructure component of the project and the assessment of operational viability of MOWASCO as the major recipient of the planned bulk water supply from Mwache reservoir.

18. Financial sustainability implies the ability of a firm to finance its business, operating and investing activities without subsidies by generating its own resources from equity and related income borrowing, while repaying short term (operating) credit and by long-term borrowing on its own account. However, currently MOWASCO has operational challenges. Infrastructure is inadequate, old and dilapidated. Little structural attention has been given to the distribution network. Low income areas or informal settlement areas lack adequate water supply services. This situation led to the current dire financial situation, illustrated in Table 8.4. The bulk of the revenue generated is spent on operational activities leaving little room for maintenance and investment activities.

Table 8.4: Selected financial indicators of MOWASCO

Year	Average tariff (US$/m3)	Billed water (Million US$)	Collection efficiency (%)	Operating expenses revenue ratio (%)
2008	0.76	8.38	85	96
2009	0.92	8.82	84	84
2010	1.06	9.78	89	88
2011	1.03	8.92	94	99
2012	1.18	10.36	84	90

19. There are ongoing and planned initiatives to turnaround MOWASCO and improve its readiness to receive and distribute additional bulk water supplies (See Annex 7: Key Elements of MOWASCO Turnaround). The County Government of Mombasa guided by the vision of providing safe, reliable and affordable water and sanitation services in an efficient and viable manner to the residents of Mombasa County is planning to put in place state-of-the art governance structures and institutional arrangements to ensure that mechanisms and incentives exist to achieve the desired services and performance improvements, aimed at achieving universal water coverage. AFD and the World Bank through WaSSIP are investing in rehabilitation or replacement of old infrastructure, expansion of networks and water mains. Vitens Evides International is currently providing technical support to MOWASCO to reduce NRW, improve billing against same amount of water currently supplied, and attain and maintain costs of operation at a percentage not more-than industry bench mark of 60 percent of revenue.

20. Thus, MOWASCO has substantial revenue generation potential, which could be realized by reducing NRW and obtaining additional water supplies from Mwache dam. Reduction of NRW and acquisition of additional supplies would enable servicing and billing new customers and reactivating the existing non-functioning connections. The total number of active connections could potentially increase from 42,720 in 2013 to 296,955 in 2030. The total billed volume can increase from 23,344m3 per day in 2013 to 234,316m3 per day in 2030. Billed water revenue could increase from US$8.8 million in 2013 to 94.4 million in 2030.

21. However, these enhancements require substantial downstream investments in the distribution systems and upstream investments in bulk water supply sources such as the Mwache dam and treatment plant. The required downstream investment alone is considerable, with expenditures estimated as follows:

- US$58 million is needed to receive additional bulk water supplies and increase customer base. This involves expanding distribution systems, including the tertiary distribution network, and acquiring equipment and vehicles.
- US$30.4 million in capital expenditure to replace existing assets, and
- Annual operating expenses of about US$18.8 million to purchase bulk water, and cover salaries and wages, operations and maintenance, and transport and travel costs, among others.

6.1 Results of financial analysis for the Mwache dam and related infrastructure component

22. The financial analysis for the overall investment required to create additional treated bulk water and distribute to households, kiosks, industries, commercial, and public services is summarized in Table 8.5. The analysis also considered scenarios of 50 percent capital subsidy. Annual cash flows were discounted at 12 percent and the life of the project was assumed to be 30 years.

Table 8.5: Summary results of financial analysis

Scenarios	FNPV (Million US$)	FIRR (%)	Long-run Average Incremental Cost (US$ per M^3)
Base scenario (No capital subsidy)	(41.3)	10.3	1.3
50% overall capital subsidy	96.9	18.7	0.69
50% capital subsidy for upstream investments only (i.e., cost of capital for Mwache dam and treatment plant)	50.5	14.9	0.89
50% capital subsidy for downstream investments only (i.e., capital expenditure required to absorb the new bulk water supply and capital expenditure for replacement of existing assets)	5.04	12.2	1.09

23. The FNPV for the base scenario (no capital subsidy) is negative and the FIRR is less than the assumed cost of capital indicating that the system requires either substantial increases in water tariff or public support (or subsidy). The analysis suggests a tariff increment of up to US$1.3 per m3 to ensure the financial sustainability of the system. In fact, the treasury requires the amortization of only 50 percent of the IDA credit, which will be passed on to MOWASCO. The rest is paid by the Kenyan government.

6.2 Results of financial analysis for MOWASCO

24. The cash-flow diagram for MOWASCO is depicted in Figure 8.1. The cash flow was projected based on the assumption that MOWASCO will operate and invest in the distribution system of Mombasa and is provided with bulk water, mainly from Mwache dam. Specifically, the financial projection is based on:

- Estimation of demand for domestic consumption connections, demand from industrial, commercial and public service.
- Estimations of revenue from domestic consumption connections, revenue from industrial, commercial and public service and other revenues
- CAPEX for expansion of distribution system, CAPEX for expansion of tertiary network, CAPEX for new connections , and CAPEX for replacement of existing assets
- Estimation of operating expenses , fixed asset and depreciation schedule, accounts receivables, payables, arrears and dad debt provision
- Bulk water supply tariff of US$0.32 per M^3. MOWASCO in turn charges households US$0.92 per m^3, Kiosks US$0.4 per m^3 and industries and commercial services US$1.38 per m^3.

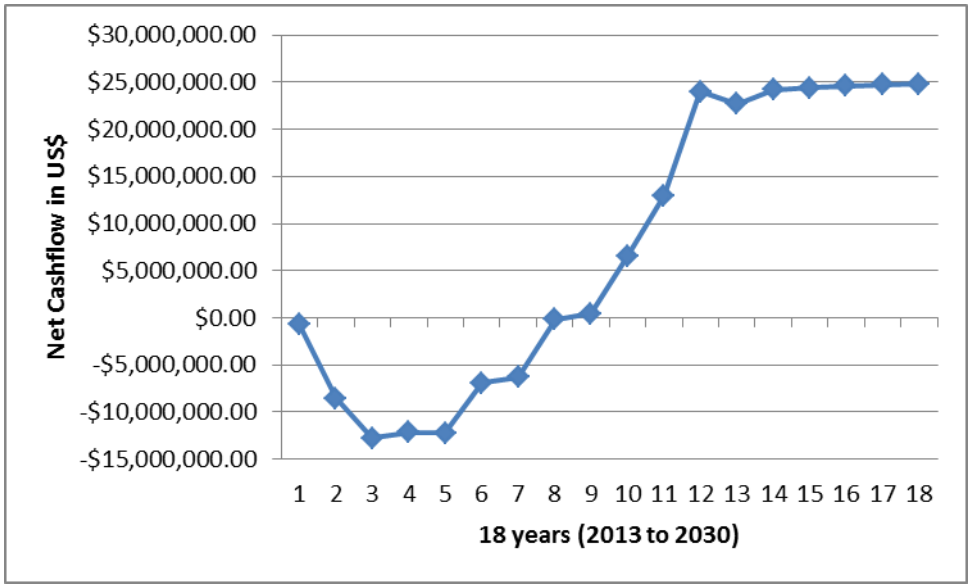

Figure 8.1: Projected cash-flow for MOWASCO (2013 to 2030)

25. The projected cash-flow depicts a healthy financial prospect for MOWASCO. The FNPV associated with the cash flow is about US$1.2 million and the FIRR is 12.36 percent. The results of the income statement analysis further supports the conclusion derived from the cash-flow analysis (Table 8.6).

Table 8.6. Projected income statement for MOWASCO (2013 to 2030)

Items	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total operating revenues US$	10718333	10257828	11583896	12431430	13330809	16726790	21275637	30741911	40843217
Operating expenses (US$)									
Bulk Supply	4744778	4528495	4523936	4473228	4486507	5620263	7153176	10186772	13350118
Salaries & Wages	4052560	2915818	2989630	3069741	3156550	3452777	4100828	4281844	4950279
Operation and Maintenance	357756.1	239013.8	238773.2	236096.8	236797.7	296637.3	377544.4	537657.5	704618.8
Transport and Travel	223750.7	112692.1	115544.8	118641	121996	133444.8	158491	165487	191321
Administration costs	206617.5	170633.4	197438.4	214239.5	232104.8	254765.4	303924.3	391721.8	503401.6
Other Expenses	245750.1	122183	125851.5	129310.4	133174.3	147040.1	175582.5	191074	225648.6
Bad Debt Expense	0	622665.7	711890.3	768308.2	828244.3	1049262	1363717	1695305	1653585
levy fee WASREB	884583.5	844261.1	843411.3	833957.5	836433.1	1047803	1333588	1899151	2488903
Depreciation	92978.57	22453.97	562164.4	1282065	1753525	2300281	2637081	3242053	3882432
Total operating expenses US$	10808775	9578216	10308641	11125587	11785332	14302273	17603933	22591066	27950308
Net Earnings	-90441.54	679612.8	1275255	1305843	1545477	2424517	3671705	8150845	12892909

Table 8.6. Projected income statement for MOWASCO (2013 to 2030) (Continued)

Items	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total operating revenues US$	54680425	72319382	80858134	82968183	85134479	87358550	89641961	91986323	94393291
Operating expenses									
Bulk Supply	17612435	23055648	25347658	26023318	26717299	27430106	28162254	28914277	29686720
Salaries & Wages	5653916	6357155	6557915	6743836	6935044	7131689	7333925	7541911	7755811
Operation and Maintenance	929583.8	1216876	1337849	1373510	1410138	1447760	1486403	1526095	1566864
Transport and Travel	218515.6	245694.7	253453.8	260639.4	268029.3	275629.3	283445.4	291483.8	299750.7
Administration costs	647088	831995	849859.8	873995.5	898817.4	924345	950598.3	977598	1005365
Other Expenses	264721.3	307459.1	319803.2	328790.8	338032.2	347534.7	357305.6	367352.6	377683.4
Bad Debt Expense	1753749	2283131	2459971	2526140	2594117	2663950	2735691	2809393	2885111
levy fee WASREB	3283540	4298335	4725641	4851607	4980988	5113878	5250375	5390577	5534586
Depreciation	4957836	6126122	7568964	7688402	8503673	9299689	10221844	11243053	12378521
Total operating expenses	35321386	44722416	49421114	50670239	52646138	54634581	56781841	59061740	61490413
Net Earnings	19359039	27596966	31437020	32297944	32488341	32723969	32860120	32924583	32902878

26. The net earnings for MOWASCO are projected to jump from its current negative territory to US$32.9 million per annum in 2030 suggesting that MOWASCO have favorable growth potential. The analysis shows that MOWASCO can meet its financial obligations as a standalone company and invest in and operate the distribution system. The positive financial situation of MOWASCO is partly due to the significant difference between the current bulk water tariff it pays and the water tariff it charges to its customers as well as the huge untapped customer base in Mombasa. However, to realize this projected financial situation, MOWASCO needs to attain considerable operational efficiency.