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Report No: ICR00005460

THE INTERNATIONAL DEVELOPMENT ASSOCIATION

IMPLEMENTATION COMPLETION AND RESULTS REPORT

IDA-51050; 1DA-62770; IDA-62870; TF-12434; TF-12435

ON

CREDIT

IN THE AMOUNT OF SDR 321.4 MILLION
(US$500 MILLION EQUIVALENT)

AND

ADDITIONAL CREDIT
IN THE AMOUNT OF SDR 208.7 MILLION
(US$300 MILLION EQUIVALENT)

AND

SCALE-UP FACILITY ADDITIONAL CREDIT
IN THE AMOUNT OF US$100 MILLION

AND GRANTS

IN THE AMOUNT OF US$3,684,082
FROM THE GLOBAL ENVRIONMENT FACILITY

AND

IN THE AMOUNT OF US$4,563,499
FROM THE SPECIAL CLIMATE CHANGE FUND

TO THE

Federal Republic of Nigeria

FOR THE

Nigeria Erosion and Watershed Management Project

July 19, 2023

Environment, Natural Resources & The Blue Economy Global Practice
Western And Central Africa Region

CURRENCY EQUIVALENTS

Exchange Rate Effective June 28, 2023

Currency Unit =	Nigerian Naira (NGN)
NGN 764.50 =	US$1
US$ 1.34 =	SDR 1

FISCAL YEAR
July 1 – June 30

Regional Vice President: Ousmane Diagana

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ABBREVIATIONS AND ACRONYMS

ACRESAL	Agro-Climatic Resilience in Semi-Arid Landscapes
AF	Additional Financing
ARAP	Abbreviated Resettlement Action Plan
BCA	Benefit Cost Analysis
CMP	Catchment Management Plan
CDD	Community Driven Development
CIG	Community Interest Group
CPS	Country Partnership Strategy
CRI	Corporate Results Indicator
CSA	Climate Smart Agriculture
COVID	Coronavirus Disease
DA	Designated Account
DEA	Department of Environmental Assessment
EIA	Environmental Impact Assessment
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
FCPF	Forest Carbon Partnership Facility
FGN	Federal Government of Nigeria
FMARD	Federal Ministry of Agriculture and Rural Development
FME	Federal Ministry of the Environment
FMF	Federal Ministry of Finance
FMP	Federal Ministry of Power
FMST	Federal Ministry of Science and Technology
FMW	Federal Ministry of Works
FMWR	Federal Ministry of Water Resources
FPMU	Federal Project Management Unit
FSC	Federal Steering Committee
FTC	Federal Technical Committee
FY	Fiscal Year
GCM	Global Climatic Model
GEF	Global Environment Facility
GEO	Global Environmental Objective
GIS	Geographic Information System
GRASS	Gully Rapid Action and Slope Stabilization
IRR	Internal Rate of Return
INT	Integrity Vice Presidency, The World Bank
ICT	Information and Communications Technology
IDA	International Development Association
IE	Impact Evaluation
IFR	Interim Financial Report
IPCC	Intergovernmental Panel on Climate Change
ISP	Implementation Support Plan

NIWRMC	Nigeria Integrated Water Resources Management Commission
NPV	Net Present Value
LGA	Local Government Area
LPG	Liquified Petroleum Gas
LULC	Land Use and Land Cover
MDA	Ministries, Departments and Agencies
M&E	Monitoring and Evaluation
MIS	Management Information System
MTR	Mid-Term Review
NAPA	National Adaptation Program of Action
NASRDA	Nigeria Space Research and Development Agency
NEMA	National Emergency Management Agency
NEWMAP	Nigeria Erosion and Watershed Management Project
NIHSA	Nigeria Hydrological Services Agency
NIMET	Nigeria Meteorological Agency
NCE	National Center of Excellence
NDC	Nationally Determined Contributions
NPC	National Planning Commission
NWRI	National Water Resources Institute
OHS	Occupational Health and Safety
OAGF	Office of the Accountant General of the Federation
PAD	Project Appraisal Document
PDO	Project Development Objective
RPF	Resettlement Policy Framework
RAP	Resettlement Action Plan
RBDA	River Basin Development Authority
SCCF	Special Climate Change Fund
SCCU	Special Climate Change Unit (of FME)
SME	State Ministry of Environment
SOE	Statement of Expense
SPMU	State Project Management Unit
SPC	State Project Coordinator
SSC	State Steering Committee
STC	State Technical Committee
STEP	Systematic Tracking of Exchanges in Procurement
TOR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
UNILAG	University of Lagos
WBG	World Bank Group

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P124905	Nigeria Erosion and Watershed Management Project
Country	**Financing Instrument**
Nigeria	Investment Project Financing
Original EA Category	**Revised EA Category**
Full Assessment (A)	Full Assessment (A)

Related Projects

Relationship	Project	Approval	Product Line
Supplement	P126549-Nigeria Erosion and Watershed Management Project	08-May-2012	Global Environment Project
Additional Financing	P164082-Nigeria Erosion and Watershed Management Project (NEWMAP) - Additional Financing	27-Jun-2018	IBRD/IDA

Organizations

Borrower	Implementing Agency
Federal Republic of Nigeria	National Project Implementation Unit, Federal Ministry of Environment

Project Development Objective (PDO)

Original PDO

To reduce vulnerability to soil erosion in targeted sub-watersheds.

FINANCING

		Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing				
P124905	IDA-51050	500,000,000	500,000,000	450,679,180
P124905	IDA-62770	300,000,000	300,000,000	286,667,057
P124905	IDA-62780	100,000,000	100,000,000	99,922,174
P126549	TF-12434	3,960,000	3,684,082	3,684,082
P126549	TF-12435	4,630,000	4,563,499	4,563,499
Total		**908,590,000**	**908,247,581**	**845,515,992**
Non-World Bank Financing				
Total		**0**	**0**	**0**
Total Project Cost		**908,590,000**	**908,247,581**	**845,515,992**

KEY DATES

Project	Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
P124905	08-May-2012	16-Sep-2013	25-Jan-2016	30-Jun-2020	30-Jun-2022

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
27-Apr-2018	347.54	Reallocation between Disbursement Categories
29-Jun-2021	836.14	Change in Results Framework Change in Loan Closing Date(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Substantial

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	26-Mar-2013	Unsatisfactory	Unsatisfactory	.93
02	23-Oct-2013	Unsatisfactory	Moderately Satisfactory	1.81
03	23-Apr-2014	Moderately Unsatisfactory	Moderately Satisfactory	20.75
04	03-Nov-2014	Moderately Satisfactory	Moderately Satisfactory	31.62
05	04-Jun-2015	Moderately Satisfactory	Moderately Satisfactory	61.09
06	07-Dec-2015	Moderately Satisfactory	Moderately Satisfactory	90.52
07	17-Jun-2016	Moderately Satisfactory	Moderately Unsatisfactory	127.67
08	26-Dec-2016	Satisfactory	Moderately Satisfactory	155.37
09	25-Jun-2017	Satisfactory	Satisfactory	297.76
10	26-Dec-2017	Satisfactory	Satisfactory	312.34
11	27-Apr-2018	Satisfactory	Satisfactory	347.54
12	08-Nov-2018	Satisfactory	Satisfactory	413.26
13	13-May-2019	Satisfactory	Satisfactory	451.10
14	26-Dec-2019	Satisfactory	Satisfactory	739.64
15	29-Jun-2020	Satisfactory	Satisfactory	754.64
16	04-Feb-2021	Satisfactory	Satisfactory	794.64
17	29-Jun-2021	Satisfactory	Moderately Satisfactory	836.14
18	29-Oct-2021	Satisfactory	Moderately Satisfactory	804.30
19	15-Feb-2022	Satisfactory	Moderately Satisfactory	832.70
20	29-Jun-2022	Satisfactory	Satisfactory	835.58

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Agriculture, Fishing and Forestry	**60**
Irrigation and Drainage	30
Forestry	15
Other Agriculture, Fishing and Forestry	15
Public Administration	**6**
Other Public Administration	6
Transportation	**6**
Other Transportation	6
Water, Sanitation and Waste Management	**28**
Other Water Supply, Sanitation and Waste Management	28

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Finance	**0**
Finance for Development	3
Disaster Risk Finance	3
Urban and Rural Development	**0**
Rural Development	54
Land Administration and Management	54
Disaster Risk Management	9
Disaster Response and Recovery	3
Disaster Risk Reduction	3
Disaster Preparedness	3

Environment and Natural Resource Management	**0**
Climate change	108
Mitigation	10
Adaptation	98
Renewable Natural Resources Asset Management	1
Biodiversity	1
Water Resource Management	25
Water Institutions, Policies and Reform	25
Private Sector Development	**100**
Jobs	100

ADM STAFF

Role	At Approval	At ICR
Regional Vice President:	Obiageli Katryn Ezekwesili	Ousmane Diagana
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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. **Nigeria was one of the fastest growing economies in the world with significant contribution from renewable and non-renewable natural resources**. However, Nigeria also had one of the highest inequality levels globally and poverty remains high, with 84% the 2008 population considered poor. Economic growth had also come at a high cost, with the non-oil economy experiencing natural resource overreach and economic losses from environmental degradation and natural disasters (e.g., flood and landslides) estimated at 9% of GDP. Environmental degradation exacerbated by climate variability threatened economic growth and undermined Nigeria's efforts to reduce poverty.

2. **Population growth, unsustainable land and water management practices, poor land use and physical works planning, governance issues, and climate risks combined in complex ways to drive environmental degradation**. Such degradation was accelerating in northern Nigeria where high levels of poverty, resource depletion, rainfall variability, recurrent droughts and floods, soil infertility and erosion, and deforestation was compromising the livelihoods of 80% of northern Nigerians who depended on natural resources for survival. Rapid environmental degradation was also evident in the widespread gully erosion in southeastern Nigeria – a region with an estimated 3,000 gullies in 2006, up to 10 km long with multiple fingers spreading through the rural or urban landscape.

3. **Environmental degradation was significantly impacting the health, environment, economic and social assets of communities, especially the poor in erosion-prone watersheds**. Over 460,000 ha of forestland was lost in Nigeria between 2000 and 2010.[1] The cost of ongoing environmental degradation and associated disasters such as landslides and flooding was estimated at 9% of GDP in 2011. Erosion, specifically, had caused loss of human lives, damage to infrastructure (including roads, highways, pipelines, houses and buildings, and silted waterways), and losses to natural assets (including productive farmland and forests, and thus, watershed functions). Degradation was also exacerbating erosion and siltation downstream, compromising biodiversity and weakening natural buffers against climate and erosion risk.

4. **The causes of gully erosion in Nigeria were largely anthropogenic and linked to poverty**. These included: (a) improper road design and construction, particularly inadequate drainage; (b) poor solid waste management in urban and peri-urban areas that chokes the already-inadequate drainage; and (c) destructive and unsustainable land-use practices (such as overgrazing, deforestation, cultivation of marginal lands, and uncontrolled mining for building material) that removed protective vegetative cover, reduced biodiversity, and disturbed the fragile soil.

5. **Investments by states and federal institutions to address erosion were fragmented and inadequate**.[2] Efforts to address gully erosion had been partial or temporarily ineffective due to: (a) insufficient technical capacity; (b) poor, incomplete or inadequate scale of response (such as an over-emphasis on inflexible civil engineering interventions without addressing water flows in the sub-watershed); (c) absent or weak land-use planning; (d) weak community involvement in prevention and restoration activities; and (e) insufficient attention to alternative livelihood options.

6. **The Nigeria Erosion and Watershed Management Project (NEWMAP) was designed to address the limitations to effective gully erosion prevention and management in Nigeria.** NEWMAP was to invest in public environmental goods; improve institutional performance, governance, multi-sector coordination, and information access; and establish replicable investment models that could be scaled up within and beyond the project's scope.

[1] UNCCD (2018). Nigeria. Final report of the Land Degradation Neutrality Target Setting Program

[2] Nigeria has a federal system, with 36 state governments and 774 local governments. With significant decentralization, state and local governments control almost 50% of public spending and are responsible for land use planning and management.

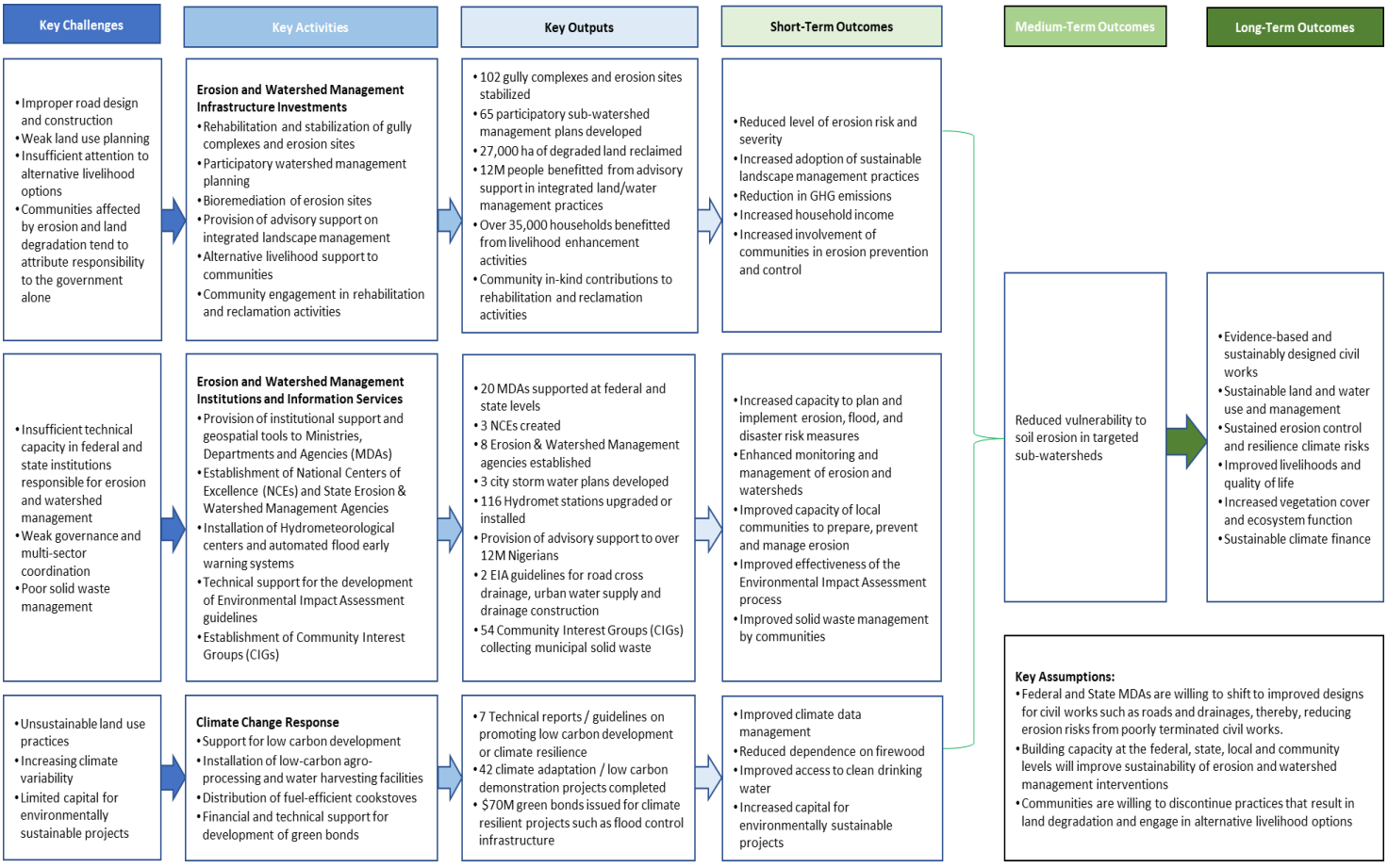
7. **NEWMAP aligned with Nigeria's Vision 20:2020 and Transformation agenda priorities of resolving the country's long-standing infrastructure problems**, particularly in power and transportation, and institutional reforms in agriculture and other sectors. It was also designed to contribute to Nigeria's First National Communications for the UNFCC which prioritized gullies in southern Nigeria, and Nigeria's action plans for the UN Conventions on Biological Diversity (UNCBD) and on Combating Desertification (UNCCD).

8. **NEWMAP was also consistent with the Bank's Country Partnership Strategy II (2010-2013)**, which sought to support sustainable and inclusive non-oil growth through improved environmental and climate risk management aimed at tackling weak policy, institutional and incentive frameworks to support wider adoption of sustainable land use practices. NEWMAP also aligned with the GEF and SCCF goals of developing replicable local and community innovations on climate adaptation and soil, water, and biodiversity conservation that can be scaled up.

Theory of Change (Results Chain)

9. **This ICR Report expanded the original theory of change** to better reflect activities, outputs and outcomes not fully captured in the original ToC in the 2012 PAD, and the changes made during the 2018 Additional Financing (Figure 1).

Figure 1. Theory of Change



Project Development Objectives (PDOs)

10. The Project Development Objective (PDO) was "to reduce vulnerability to soil erosion in targeted sub-watersheds."

Key Expected Outcomes and Outcome Indicators

11. **The project aimed to achieve the key expected outcome to reduce vulnerability to soil erosion in targeted sub-watershed** (PDO) through an integrated watershed management approach informed by interlinked challenges related to poverty, ecosystem services, climate change, disaster risk management, biodiversity, and institutional performance and governance. The original key outcome indicators were: (a) Targeted gully complexes and other erosion sites treated with at least 75% of planned rehabilitation measures for targeted sub-watersheds (number); (b) Targeted gully complexes and other erosion sites with reduced severity level after treatment (number); (c) Vegetation cover in treated sub-watersheds (%); and (d) Direct project beneficiaries (number), of which female (%).

Components

12. **Component 1: Erosion and Watershed Management Infrastructure Investments** (original allocation US$405.97, actual allocation US$665.94M) supported the gully rapid action and slope stabilization in severe erosion sites, development of integrated watershed management plans and the provision of sub-grants for livelihood enhancement and skill acquisition in local communities situated along the corridors of erosion sites. The component also supported the construction of complementary and preventive erosion and water management structures. In addition, the SCCF grant specifically co-financed the provision of water harvesting systems to reduce run-off from increased rainfall intensity and preserve water for use during prolonged dry season.

13. **Component 2: Erosion and Watershed Management Institutions and Information Services** (original allocation US$39.7M, actual allocation US$76.49M) aimed to strengthen the enabling environment for effective implementation of erosion and watershed management at the federal, state, and local government levels. The component supported ministries, departments, and agencies at all three tiers of government to improve their capacity and technical effectiveness as well as modernize their monitoring services for erosion and watershed management in Nigeria. The component also supported trainings for contractors and non-government organizations procured for the project on labor intensive works and natural resource management-based enterprises.

14. **Component 3: Climate Change Response** (original allocation US$30M, actual allocation US$50.38M) piloted low carbon and climate resilient demonstration to promote energy access in rural areas, and supported studies on the potential for renewable energy development in Nigeria, data analysis on climate risks, harmonization of climate-related policies, and resource mobilization to strengthen the national framework for climate action. Since future climate change could increase flooding and soil erosion, reducing incentives to cut trees (by piloting solar-powered alternatives), and increasing benefits to planting trees and maintaining forests, would support mitigation (through carbon sequestration) and adaptation (through soil binding, groundwater infiltration and other ecosystem benefits).

15. **Component 4: Project Management** (original allocation US$32.92, actual allocation US$124.02M) supported the effective delivery of project targets including management and coordination at federal and state levels, social and environmental risk management, procurement and financial management, and project M&E (Table 1).

Table 1. Project Components and Allocations *All in million USD*

Components	Original IDA	Actual IDA	Original GEF	Actual GEF	Original SCCF	Actual SCCF
1. Erosion and Watershed Management Infrastructure Investments	398.88	652.46	3.96	3.68	3.13	3.06
2. Erosion and Watershed Management Institutions and Information Services	38.20	73.49	0	0	1.50	1.50
3. Climate Change Response	30.00	50.38	0	0	0	0
4. Project Management	32.92	124.02	0	0	0	0
Total	**500.00**	**900.00**	**3.96**	**3.68**	**4.63**	**4.56**

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

16. **The project has undergone a level 2 restructuring in 2018 (with Additional Financing [AF] included) and two extensions, in 2018 (as part of the Additional Financing), and in 2021. NEWMAP also expanded from 7 to 23 participating states**.

Revised PDOs and Outcome Targets

17. The original PDO, as stated in the Project Appraisal Document (PAD) and financing agreement, was not modified throughout the duration of the project.

Revised PDOs Indicators

18. **Significant changes were made to all four original PDO indicators during the 2018 restructuring**. The indicator "direct project beneficiaries (number), of which female (%)" was dropped, since direct project beneficiaries were already captured by two intermediate indicators ('People receiving project-supported advisory support services' and 'Households benefitting from livelihoods enhancement activities'). The indicator "Targeted gully complexes and other erosion sites treated with at least 75% of planned rehabilitation measures for targeted sub-watersheds (number)" was modified to increase treatment levels from 75% to 100% to ensure that all construction works were fully completed. The number of "Targeted gully complexes and other erosion sites treated with 100% of planned measures for targeted sub-watersheds (number)" and "Targeted gully complexes and other erosion sites with reduced severity level after treatment (number)" was revised from 30 to 55 to reflect additional funds received. Vegetation cover in treated sub-watersheds (%) was revised to "Area under bioremediation in targeted sub-watersheds (ha)" for clarity and to better capture results that can be attributed to NEWMAP. Two new PDO indicators "Land area under sustainable landscape management practices (ha)" and "Net Greenhouse Emissions' (tCO2-eq annually)" were added as CRIs.

Revised PDOs Indicators

19. **Original project components did not change, but activities, disbursement estimates, and scope of various project elements were revised in the 2018 restructuring**, when new states, project activities and intervention sites were added.

20. **All four project component budgets were increased because of the AF approved in 2018**. Component 1 was increased by US$304M (increasing total to US$659.2M), Component 2 by US$40M (total of US$74.99), Component 3 by US$24M (total of US$50.38), and Component 4 by US$32M (total of US$124.02) for an additional financing of US$400M and a total project financing of US$900M equivalent. Component 1 activities were scaled-up to 22 additional intervention sites in the three existing subcomponents of (a) gully rapid action and slope stabilization; (b) integrated watershed management; and (c) sustainable land management livelihoods. Component 2 added the establishment of National Centers of Excellence (NCEs) in erosion control, development of erosion risk maps and guidelines for road construction, and capacity strengthening of the Environmental Impact Assessment (EIA) Agency - to strengthen erosion planning and prevention, watershed management, environmental and social risk management. Component 2 also incorporated a solid waste management activity to address improper waste disposal, which was threatening the sustainability of civil works in project intervention areas. Further, Component 3 was modified to focus primarily on climate change adaptation including the development of Green Bonds to enable capital-raising and investment for new and existing projects with environmentally sustainable benefits. Lastly, Component 4 was scaled-up to support project management beyond the initial 7 participating states to the 16 additional states that joined subsequently.[3]

[3] NEWMAP was initiated in 7 states (Anambra, Abia, Cross River, Ebonyi, Edo, Enugu, and Imo) then was scaled-up to 16 additional states (Akwa Ibom, Delta, Gombe, Kano, Kogi, Oyo, Plateau, Sokoto, Nasarawa, Borno, Niger, Katsina, Ondo, Ogun, Ekiti and Kaduna).

Other Changes

21. **Financing.** The main objective of the 2018 additional financing of US$ 400 million was to scale up successful gully restoration and watershed management activities from 7 to 23 States and add new activities that had emerged from implementation experience, global commitments, and country initiatives. The additional financing allowed for the implementation of activities that strengthened technical and coordination capacities of relevant federal, state, and local government agencies for watershed, erosion, and disaster risk management. The additional financing also supported pilots of low-carbon development options to assess their potential for scale-up as viable climate change adaptation measures.

22. **Priority Re-alignment.** The additional financing aligned with the priorities of the Nigeria's Economic Recovery and Growth Plan (2017-2020), particularly environmental sustainability, job creation and public-private partnership by investing in public infrastructure, restoring degraded land, and mobilizing private financing (green bonds) for carbon efficient projects in the agriculture, forestry, transport, and power sectors. NEWMAP also enhanced Nigeria's preparedness to respond to natural hazards and climate risks through investments in erosion management, hydrometeorological services and landscape restoration, which was consistent with a key focus area of the Bank's CPS (FY14-FY19) to enhance Nigeria's resilience to climate variability. NEWMAP also contributed to a strategic pillar of the CPF (FY21-FY25) that is enhancing climate resilience through sustainable erosion control structures, landscape management practices and livelihood options.

23. **Closing date.** As part of the 2018 restructuring, the original loan closing date was extended from June 2020 to June 2021 to help address the 16-month delay in project effectiveness, and allow sufficient time for scale-up. Subsequently, the project's closing date was extended by 12 months (to June 30, 2022, for a total project duration of 10 years) to address substantial implementation delays due to COVID-19. Finally, in the 2021 extension, the end date for all PDO and intermediate result indicators was changed from June 30, 2021 to June 30, 2022 (Table 2).

Table 2. Timeline of significant project milestones and changes

Board approval	08-May-2012	Mid-term review	25-Jan-2016	Original closing date	30-Jun-2020
Effectiveness	16-Sep-2013	Additional financing	20-Jun-2018	Actual closing date	20-Jun-2022

24. **Results Framework.** Three intermediate indicators were dropped ("GEF and Special Climate Change Fund tracking tools updated"; "Application of multisector Management effectiveness tool by state and federal governments; "Duration for approving EIAs for category 1 projects") because they were no longer relevant or could not be easily attributed to project activities and/or key outcome targets. Additionally, five new intermediate indicators were introduced: (a) Packages with detailed design for treatment of gully complexes and erosion sites in targeted sub-watersheds prepared under the project that have received WBG No-Objection but not financed by NEWMAP (number); (b) NCEs in erosion control established, operational and functional (number); (c) States with improved erosion risk mapping (number); (d) Community Interest Groups collecting municipal solid waste in project intervention areas (number); and (e) Development of Green Bond (number).

25. **Targets:** The targets for seven original intermediate indicators were increased to reflect the project's additional financing, and two of these indicators were rephrased to clearly articulate their linkages to project activities: "Low carbon demonstration projects under implementation" was changed to "Climate adaptation / low carbon demonstration projects completed"; and "Monitoring and reporting systems producing data on project progress at federal and state levels" became "Reports produced on project progress at federal and state levels." Also, "Proportion of upgraded or new Hydro-Met Stations providing data that is published annually" was revised to "Upgraded and newly installed stations providing data for integrated catchment planning", and the unit of measurement was changed from percentage to number for clarity.

Rationale for Changes and their implications for the Theory of Change

26. The original PDO outcome indicators were changed once (during the 2018 restructuring) to clearly link project activities to the PDO and reflect additional funds allocated to the project. The main rationale for these changes as summarized from the preceding paragraphs is: (a) additional financing which led to revised disbursement estimates, higher end targets, addition of new activities, and scale-up to more intervention sites and states; and (b) effectiveness and COVID-19 related delays resulting in extension of closing date (Table 3). The additional financing, which almost doubled the original IDA loan, expanded project activities that contributed to reduce the vulnerability to soil erosion in targeted sub-watersheds. The revisions, particularly of Component 2, strengthened the operations and maintenance of civil works, erosion planning and management, capacity for climate change investments as well as sustainability of project interventions, which strongly enhanced the original theory of change.

Table 3. Results Framework Revisions during the 2018 Restructuring

Original		Revised/New		Rationale
Indicator	**Target**	**Indicator**	**Target**	
PDO Indicators				
Targeted gully complexes and other erosion sites treated with at least 75% of planned measures for targeted sub-watersheds (number)	30	Revised – Targeted gully complexes and other erosion sites treated with 100 % of planned measures for targeted sub-watersheds (Number)	55	The original indicator was reworded for clarity and to ensure that all civil works would be fully completed to avoid erosion and flooding impacts. The end target was adjusted to reflect the projects' additional financing
Targeted gully complexes and other erosion sites with reduced severity level after treatment (number)	30	NA	55	The end target was adjusted to reflect the projects' additional financing.
Vegetation cover in treated sub-watersheds (%)	+6	Revised – Area under bioremediation in targeted sub watersheds (ha)	400	The indicator was revised for clarity and to better capture what can be attributed to the project, and the measurement unit changed accordingly.
Direct project beneficiaries (number), of which female (#)	681,000	NA	NA	The indicator was dropped because direct project beneficiaries were already captured by two intermediate indicators, i.e. 'People receiving project-supported advisory support services' and 'Households benefitting from livelihoods enhancement activities'
NA	NA	New – Land area under sustainable landscape management practices (ha)	400	This CRI was added to capture the area of land bioremediated under the project
NA	NA	New – Net Greenhouse Emissions (tCO2 -eq annually)	-2,411	This CRI was added to capture emission reductions from areas under bioremediation in project sub watersheds
Intermediate Results Indicators by Components				
Component 1: Erosion and Watershed Management Institutions and Information Services				
Targeted land treated for erosion with selected measures in targeted sub-watersheds (ha)	12,000	NA	20,000	The end target was increased to reflect the project's additional financing.
Participatory sub-watershed management plans developed under the project for targeted erosion affected sub-watersheds	30	NA	38	The end target was increased to reflect the project's additional financing.
People receiving project-supported advisory support services in	45,000	NA	90,000	The end target was increased to reflect the project's additional financing.

integrated land/water management practices, planning, and/or monitoring under the Project (Number, of which 40% female)				
Households benefitting from livelihoods enhancement activities under the Project (Number, of which	9,200	NA	12,000	The end target was increased to reflect the project's additional financing.
GEF and Special Climate Change Fund tracking tools updated (Number)	4	NA	NA	The indicator was dropped as tracking tools were not directly linked to the PDO
NA	NA	New – Packages with detailed design for treatment of gully complexes and erosion sites in targeted sub-watersheds prepared under the project that have received WBG No-Objection but not financed by NEWMAP (number)	30	This indicator was added to reflect the project's additional financing and to aid sustainability of project impacts - given that the detailed design packages were to be left with the FGN to address erosion control beyond project's lifecycle
Component 2: Erosion and Watershed Management Infrastructure Investments				
Proportion of upgraded or new HydroMet stations providing data that is published annually and uploaded to the web (%)	80	Revised – Upgraded and newly installed stations providing data for integrated catchment planning (Number)	100	The indicator was revised for clarity.
City stormwater master plans developed which are informed by climate projections of increased rainfall intensity and risk assessments	2	NA	3	The end target was increased to reflect the project's additional financing.
Application of multisector management effectiveness tool by state and federal governments (Number)	9	NA	NA	The indicator was dropped because the activity was no longer relevant.
Duration of approving EIAs for category 1 projects (Average working days)	130	NA	NA	The indicator was dropped because it could not be easily attributed to project activities.
NA	NA	New – National Centers of Excellence in erosion control, established, operational and functional (Number)	3	The indicator reflects institutional progress envisaged under the additional financing
NA	NA	New – States with improved erosion risk mapping (Number)	19	The indicator reflects institutional progress envisaged under the additional financing
NA	NA	New – Community Interest Groups collecting municipal solid waste in project intervention areas (Number)	50	This indicator was added to reflect the sustainability element built into the civil works interventions.
Component 3: Climate Change Response				
Low carbon demonstration projects under implementation (Number)	8	Revised – Climate adaptation / low carbon demonstration projects under implementation (Number)	10	This indicator was added to reflect the scaling up of demonstration activities and focus on climate adaptation during the later stage of project implementation.
NA	NA	New – Development of Green Bond Number)	1	The indicator was added to capture how the project supported the development of sovereign Green Bonds in Nigeria
Component 4: Project Management				
Monitoring and reporting systems producing data on project progress at federal and state levels (Number)	9	Revised – Reports produced on project progress at federal and state levels (Number)	18	The indicator was reworded for clarity and to reflect bi-annual reporting (compiled by the FPMU) during project implementation.

II. OUTCOME

A. RELEVANCE OF PDOs

Rating: High

Assessment

27. **Up to 6,000 square kilometers -- almost 6% of Nigeria's land mass -- are severely degraded** at a time when population is increasing at over 2% per year and numerous sectors depend on the integrity of land resources to deliver on key sector objectives. Gully erosion is accelerating throughout the country. Southern Nigeria is affected by massive and expanding gully erosion, an advanced form of land degradation. At appraisal, there were an estimated 3,000 active gullies, spreading through the rural or urban landscape. In southeastern states, gullies and areas exposed to erosion tripled; the total area affected by rill, sheet or gully erosion increased from about 1.33% (1,021 km2) in 1976 to about 3.7% (2,820 km2) in 2006.

28. Equally important, **erosion-related damage to infrastructure affects severed roads, highways, and pipelines, collapsed houses and buildings, and silted waterways and reservoirs. Losses to natural assets include loss of productive farmland and forest, which also compromise watershed functions.** This process exacerbates erosion downstream and siltation, compromises biodiversity important for livelihoods, and weakens natural buffers against climate and erosion risk. Many of the region's land degradation hotspots are also the most densely populated areas, such as Anambra state, the self-proclaimed gully capital of the world and the most densely populated region in Africa. Due to a series of inter-related reasons, ongoing attempts by states and federal institutions to stabilize or prevent gullies have been at best partially or temporarily effective.

29. In this context**, the PDO was well aligned with the priorities of the FGN, the World Bank, and the different financiers (Global Environment Facility (GEF) and the Special Climate Change Fund (SCCF), both at appraisal and completion**. The project was expected to contribute to the growth and resilience goals of Nigeria's Vision 20:20 and the country's Transformation Agenda. This agenda was expected to prioritize job creation and implementation of strategies for resolving Nigeria's long-standing infrastructure problems, particularly in power and transportation, and include institutional reforms in agriculture and other sectors. In addition, the project was specifically designed in response to the President of Nigeria's request to support the country efforts to address severe erosion and its impacts in southeastern Nigeria. In terms of rationale for Bank engagement, the Project was fully consistent with the Country Partnership Strategy II (2010-2013), which sought to support sustainable and inclusive non-oil growth, improved environmental and climate risk management while acknowledges the need to address weak policy, and institutional and incentive frameworks to support wider adoption of sustainable land use practices.

30. **Justification of Rating**: Given the Appraisal situation of widespread and uncontrolled gully erosion with attendant impacts on lives, livelihoods and infrastructure (see paras 1–7), the PDO was well aligned with the priorities of the FGN, the World Bank, and other financiers (GEF and SCCF), at appraisal and completion. The project was expected to contribute to the growth and resilience goals of Nigeria's Vision 20:20 and the country's Transformation Agenda. This agenda was expected to prioritize job creation and implementation of strategies for resolving Nigeria's long-standing infrastructure problems, particularly in power and transportation, and include institutional reforms in agriculture and other sectors. In addition, the project was specifically designed in response to the President of Nigeria's request to support the country efforts to address severe erosion and its impacts in southeastern Nigeria. In terms of rationale for Bank engagement, the Project was fully consistent with the Country Partnership Strategy II (2010-2013), which sought to support sustainable and inclusive non-oil growth, improved environmental and climate risk management while acknowledges the need to address weak policy, and institutional and incentive frameworks to support wider adoption

of sustainable land use practices.

31. **GEF/SCCF incremental funding to the project was also highly relevant** as it was part of a larger Umbrella Program led by the World Bank – the *Sahel and West Africa Program (SAWAP) in support of the Great Green Wall Initiative*.

32. At the time of the Additional Financing and project extension, the proposed scaling up helped achieve the objectives of the CPF (FY14-19) while leveraging gender and climate change-oriented cross-cutting aspects through dedicated interventions. NEWMAP investments especially development low carbon technologies were also consistent with a core objective of the CPF (FY21-25) to enhance climate resilience. Further, over 55% of beneficiaries of livelihood enhancement activities were women, contributing to the CPF's (FY21-25) goal of increasing economic opportunities for women. NEWMAP was also consistent with the World Bank's regional strategy for Africa; and with the Biodiversity, Climate Change, and Land Degradation focal area strategies of the GEF and the SCCF.

33. **The PDO became even more relevant at project completion**, mainly because of its consistency with major FGN ongoing strategies, including the intention to respond to the high demand from the remainder of the states to access the benefits of the project. Furthermore, at completion NEWMAP objectives continued to be well aligned with the World Bank's Country Partnership Framework for FY21-25. Within the broader context of supporting Nigeria's COVID-19 crisis response spanning all pillars of the framework outlined in the WBG COVID-19 Approach Paper covering both adjustments to existing operations and preparation of new operations, NEWMAP specifically contributed to addressing the priority of providing support for states' efforts to protect livelihoods, food security and local MSMEs.

34. **Climate Change priorities:** Throughout its implementation NEWMAP has been highly relevant in pioneering preliminary outcomes closely related to all five Strategic Directions of the World Bank's Next Generation Africa Climate Business Plan (NGACBP) of 2020, including (a) Delivering Food Security; (b) Securing Environmental Stability; (c) Driving Clean Energy; (d) Building Resilient Green Cities; and (e) Protecting against Climate Shocks; and two Special Areas of Emphasis: Promoting Climate-Informed Macroeconomic Policies; and Securing Green and Resilient Infrastructure.

35. **Results and lessons learned from the project** were instrumental to the design of the recently approved follow-on ACReSAL Project, which is expected to both consolidate and scale up the successes of NEWMAP while complementing these achievements with a stronger focus on the arid states in Northern Nigeria.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Rating: Substantial

Assessment

36. **Justification of Efficacy Rating**: The efficacy rating is justified by many factors: NEWMAP fully achieved its PDO and expected outcomes, based on the quantitative and qualitative assessment of project outcomes and outputs (see next para); the satisfactory coverage, scope and results of project interventions at the field level; and the strategy applied to integrate environmentally sound landscape stabilization techniques with livelihood improvement practices in the targeted sub watershed. Despite the institutional and operational challenges experienced to achieve adequate closure of project activities mainly due to late completion of civil works, the objective of reducing vulnerability has been achieved, even beyond the significant number of intervened sites, through the improved capacity developed and the comprehensive set of enabling environment instruments produced (that can be fully attributed to the project). The holistic watershed management approach implemented through NEWMAP has been transformational in linking the rehabilitation of severely degraded areas with the maintenance of sustainable ecosystems and better disaster risk management, applying geo-spatial tools for improved information management. Although specific actions on erosion prevention and poverty alleviation were limited, ample evidence demonstrates that this integrated approach has improved the lives of a significant number of people living in the vicinity of now restored areas.

37. **NEWMAP's development objective was to reduce vulnerability to soil erosion in targeted sub-watersheds**. Despite being a commendably simple and focused PDO, the assessment of NEWMAP's efficacy must consider the definition of vulnerability, a key element of the PDO. Applied to natural events such as soil erosion, vulnerability is defined as "the inability to resist a hazard or to respond when a disaster has occurred". Using this definition, the efficacy assessment is based on the extent to which project interventions reduced the inability to resist and/or respond to erosion events in the targeted sub-watersheds."

38. **NEWMAP's design and subsequent implementation aimed at achieving the PDO through three distinct pillars**: (i) civil works to address sites where erosion or flooding caused severe damage (ii) community engagement and support within the intervened sub-watersheds, and (ii) development of a comprehensive set of policy and operational instruments to build capacity and to sustain and expand project outcomes. Applying a highly decentralized implementation strategy, comprising national, regional, and local governments, NEWMAP supported spatially-focused interventions comprising inter-linked activities, to promote environmentally sustainable and socially inclusive improvements, and contributed to the strengthening of environmental governance in relevant institutions and, to a lesser extent, to improved and resilient livelihoods in urban and rural communities.

39. **Specific outcomes contributing to achieving the PDO** can be broken down, based on the Results Framework, and assessed, as: (1) targeted soil erosion sites; (2) area under bioremediation; (3) land area under sustainable landscape management; (4) reduced vulnerability; and (5) GHG emission reduction. Each is discussed below.

Targeted gully complexes and other erosion sites treated

40. **Erosion sites**: Consistent with the original design, the project was initially implemented in seven states located in southern Nigeria and subsequently expanded in 2017 to an additional 16 mostly central and northern states in the country through the US$ 300 million additional financing. Of these, civil works were only implemented in 13 additional states, for a total of 20 states with active interventions throughout the life of the project.

41. **Interventions**: The main project activity was civil works to control erosion or flooding and to recover affected public and private infrastructure, for which almost 70% of total funds were allocated. By applying strict pre-established eligibility and prioritization criteria set forth in the PIM (see next para), the number and location of different erosion sites to be intervened in the 20 participating states were selected mainly taking into consideration the severity of existing damage through a participatory planning process.

42. **Suitable physical and biological interventions** in each sub-watershed were identified based on the particular agroecological conditions (topography, rainfall patterns) and the existing degradation levels (Table 4).

Table 4: Site prioritization criteria table developed based on GRASS criteria[4]

Criteria	Categories	Total possible weighting
State of erosion/problem	Stable (0%); Slight (7.5%); Moderate (15%); Severe (22.5%); Catastrophic (30%)	30%
Size of affected population (disaggregated by poverty rate)	0-99 people (5%); 100-999 people (10%) 1000+ people (15%)	15%
Risk to human life	None (0%); Slight (7.5%); Moderate (15%); Severe (22.5%); Catastrophic (30%)	30%
Risk to physical assets	None (0%); Slight (7.5%); Moderate (15%); Severe (22.5%); Catastrophic (30%)	10%

[4] In addition to the criterion considered in the PAD, the mission recommended the inclusion of community participation (including an official request for the project intervention) as one of the selection criterion – as YES/NO

Risk to natural assets	None (0%); Slight (7.5%); Moderate (15%) Severe (22.5%); Catastrophic (30%)	10%
Replicability potential of the site	Yes (5%) No (0%)	5%
Total		**100%**

Is the state ready to cover the cost of resettlement (if required)? YES/NO

43. **Reduced vulnerability**: Applying the above rating system, stabilization and recovery measures were implemented in 105 sub-watersheds in 20 participating states, surpassing the Results Framework target of intervening in 50 sites. Due to the severity of the baseline situation, most sites selected were in urban or peri-urban areas, where the size of affected population and the risk to human lives and physical assets was considerably higher, therefore limiting the project's interventions aimed at prevention of gully formation in rural areas.

44. **Success factors**: Although the design of works considered the specific needs and conditions of each eligible site, it also included a series of common features which contributed positively to the successful outcomes generated in most sites (see Box 1). This included (i) using a sub watershed approach to assess contributing factors and needs in the broader landscape; (ii) a decentralized strategy, allowing for the active participation of relevant state agencies in project implementation; (iii) bio-remediation measures (i.e., nature-based solutions), wherever applicable; and (iv) support to communities located within treated sites, either to compensate for lost productive assets/activities (through the implementation of 83 Resettlement Action Plans (RAPs), benefiting 9,471 affected people) or to promote more sustainable livelihood practices compatible with the improved infrastructure implemented.

Box 1: NEWMAP Process

1. Initial studies were conducted by a local consultant firm appointed by the State Project Management Unit (SPMU), including the Engineering Reconnaissance Surveys, Monitoring and Evaluation (M&E) baselines, GIS studies, Environmental and Social Management Plan (ESMP) and the Resettlement Action Plan (RAP)
2. Design of the gully erosion control structures was conducted by a local consulting firm
3. Verification of design was done by state design & supervision consultants, and checked by a national Quality Assurance (QA) firm appointed by the Federal PMU (FPMU)
4. Final approval of the designs was by the World Bank team, based on prior international QA.
5. Appointment of contractors was done by each SPMU based on responses to tenders
6. Sensitization, advocacy and awareness creation was organized by the focal NGO appointed by the State Project Management Unit (SPMU) and was carried out by youth groups, women groups, traditional and religious leaders, as well as community elders, including State and Local Government Area (LGA) stakeholders, in the area affected by the gully erosion control work undertaken by the project.
7. Compensation payments were made by the SPMU, as necessary, to those affected by the remediation work at each selected gully erosion site.
8. Supervision of construction was conducted by the State design & supervision consultants appointed by each SPMU.to ensure that it matched design.
9. Livelihood support was provided in the form of grants to community interest groups (CIGs) formed to provide alternative employment to people whose activities contribute to soil erosion (e.g., sand mining, unsustainable agriculture, deforestation) or whose livelihoods were affected by the soil erosion (e.g., farms or livelihoods damaged or washed away).
10. Physical tracking of progress was done by the SPMU, FPMU, World Bank, as well as other critical stakeholders using a percentage system based on the scope of work of each contract.
11. Exit Strategy was worked out on completion of the physical works, including the sensitization of local communities, emphasizing the responsibility of key stakeholders in sustaining project-created assets.
12. Handover of site for post-project operation and maintenance to State Government agency responsible –the newly-formed State Erosion and Watershed Management Agency in 8 states and the State Ministry of Environment in the other states.

45. **PDO Indicators**: All PDO indicators related to this outcome were fully achieved and surpassed (details in Annex 1). Table 5 illustrates the main features of the types and location of works implemented by the project.

Table 5: Types and locations of project interventions

Tier[5]	States	Erosion Control	Flood Control	Both	Urban	Semi-Urban	Rural	Sites with Bio-remediation	Assisted CIGs
1	7	43	8	15	35	9	23	55	337
2	6	8	5	5	5	5	3	12	29
3	5	3	1	6	7	2	1	6	26
4	2	3	2	4	7	-	2	2	4
Total	**20**	**57**	**16**	**30**	**54**	**16**	**29**	**75**	**396**

46. **Achievement**: Almost all sites were completed or achieved a substantial level of effectiveness through a well-coordinated management process involving Federal, State, and Bank experts. Sites were fully restored using global best practices for engineering design and construction designed to withstand a 1-in-50-year flood event, with the quality of large-scale masonry construction ensured by robust international procurement and strict quality assurance systems. For quality assurance, a two-step process was established to systematically ensure the quality of designs, involving a review by the quality assurance team of experts at the FPMU, mostly through independent consulting firms, and a second review by international experts provided by the World Bank. As a result, the capacity of SPMU and FPMU for erosion control, including construction management has improved through this process.

Area under bioremediation in targeted sub-watersheds

47. **Innovative approaches**: Design and construction of erosion and flood control works was not only effective but also innovative. Adoption of 'soft' nature-based measures that complement the 'hard' engineering solutions applied (e.g., reno mattresses, gabions, drainage lines, etc.) was encouraged. As such, gully control, urban drainage, and dam construction included innovative approaches and technologies, such as surface protection by bioengineering and bioremediation, green areas, and tree planting using productive species. Such approaches, implemented in 75 different sites, contributed to a variety of co-benefits, including the provision of community amenities such as leisure areas (e.g., Akwa Ibom flood control site), and a significant contribution to the GHG emission reductions achieved under NEWMAP.

48. **Area under bioremediation**: As detailed in the Results Framework (Annex 1), a total of 2,164 hectares is the land bioremediated by the project (PDO Indicator #3), calculated as the Area of Influence (AoI) around the 103 project sites (an average of ~21 hectares per site). This is different from the area under sustainable landscape management practices (PDO Indicator #5), estimated to be 27,593 hectares, which is the area covered by the catchment management plans created for each site (an average of ~268 ha per site).

49. **Green infrastructure**: Innovation is expected to be further applied in future undertakings of Federal and State agencies. Urban planning is highly encouraged with bio-engineering and green measures made integral parts of any future designs (i.e., planning to incorporate green spaces, spaces dedicated for free-flow of storm water, and promoting the use of bio-friendly materials). Such innovative approaches could also have a cost-savings co-benefit.

Land area under sustainable landscape management practices

50. **Support provided**: Complementing the implementation of works in the selected sites, the project supported households located within the intervened sub-watersheds. This support was provided around two main purposes: (i) improved or alternative livelihoods to people previously engaged in activities contributing to soil erosion, such as

[5] Participating states were categorized into four tiers, based on the order in which they joined the project.

sand mining, and (ii) promoting the adoption of environmental practices and initiatives associated with the efficient operation of project infrastructure and the prevention of erosion processes.

51. **Direct Beneficiaries**: An estimated 35,977 households have benefitted directly from these activities, surpassing the expected target of 12,000 households. In terms of livelihood enhancement, according to the project's M&E System and information provided by the BCR, the project supported a total of 4,532 households, organized under 396 Common Interest Groups (CIGs) located within the treated sub- watershed area, by providing grants for the implementation of productive subprojects. In rural areas the main activities supported were poultry, fish farming, piggeries, oil palm production and processing, and cassava processing, while urban CIGs obtained assistance for small commercial and service businesses such as petty trading, gabion box welding, block molding, chair and canopy rentals, hair styling, car repairs, ICT centers and fashion designing. In terms of distribution, most CIGs were engaged in animal husbandry (47%) and small businesses (31%), and fewer in crop production and agri-businesses (11%).

52. **Environmental initiatives**: Using SCCF and GEF funding, NEWMAP piloted climate change mitigation and adaptation demonstration subprojects, including afforestation, solar-powered dryers (for *kilishi*, a local dried meat product), fuel-efficient kilns, solar powered boreholes (for drip irrigation), and solar-powered efficient cookstoves to 8,199 households. A significant initiative was to provide equipment to 54 CIGs established to undertake community-driven waste management micro-enterprises to help maintain constructed structures by keeping solid waste from clogging drains and water channels - a relevant contribution to the O&M of project infrastructure.

53. **Training and Advisory services**: Apart from direct technical and financial assistance, a significant number of beneficiaries received project-supported advisory support services in integrated land/water management practices, innovative technologies (e.g., solar bore holes, drip irrigation, solar panel installation and maintenance), afforestation (e.g., raising of seedlings, vetiver grass),prevention of sheet or gully erosion at early stages, and climate smart agriculture practices. Project M&E records show that 1,827,885 persons (of which 300,000 were female) received NEWMAP training and advisory services, exceeding the planned target of 90,000 beneficiaries.

Reduced Vulnerability

54. **Enabling environment:** Beyond reducing vulnerability to the harms of soil erosion and flooding in the sites intervened, NEWMAP also contributed significantly to develop an enabling environment to consolidate and expand the reduction of vulnerability achieved through the successful physical interventions completed during the life of the project. In addition to the establishment of three NCEs in erosion control, and the strengthening of capacity of the EIA Agency (as part of the AF), erosion planning and prevention were considerably strengthened by improving key information systems and awareness among stakeholders, as well as developing a series of highly relevant policy, regulatory and operational instruments for improved institutional performance at federal and state level:

55. Erosion and Watershed Management Agencies. As part of the project's exit strategy, State authorities were encouraged to establish erosion and watershed management institutions created. As a result, at project closing, eight state agencies had been established and fully operational (initially envisaged to function with staff and resources from the State NEWMAP PMUs), while another 12 agencies were at different stages of legislative approval process in the respective State Assembly.

56. Catchment Management Plans. 85 catchment management plans (CMP) were developed in a participatory manner to reduce new erosion on restored gully sites and prevent the formation of new gullies. In each case, stakeholder and community consultations and problem identification were carried out, complemented by detailed technical assessments across lower and upper sections of the catchment through topographic surveys, soil analyses, water balance, hydrological survey, population density, etc. The resulting CMP included detailed site-specific investment plans as well as requirements for livelihood support training and capacity building.

57. Flood Early Warning Systems: to improve the capacity of River Basins Development Authorities, 116 automated

weather and flood early warning systems were installed in five major river basins to provide data for integrated catchment planning, rainfall predictions, flood forecasting and monitoring

58. Stormwater Management: A method for Stormwater Master Planning was developed and piloted in Anambra and Ebonyi States to stop gully formation, better manage flood risks and adapt to more intense rainfall.

59. Policies: the project supported initiatives to reduce GHG emissions, including a Liquified Petroleum Gas Framework to reduce dependence on wood & kerosene, Feasibility research for (1) utility-level grid-connected solar power plants; and (2) a transportation system based on compressed natural gas; and digitized Environment Impact Assessments that reduced environmental license processing times by six months.

60. Manuals: With NEWMAP support, several key manuals were produced, to support the newly established Erosion and Watershed Management Agencies, and other relevant Federal and State Institutions, including:

a. *Bioremediation Manual***,** specific to different areas in Nigeria
b. *Climate Change Guidance Manual*, providing standard practices for the implementation of climate change activities in Nigeria and including seven guidelines/reports on promoting low carbon development, thereby enhancing climate resilience.
c. *Engineering guidelines* for regulation, design, approval, budgeting, construction and maintenance of drainage structures and roads.
d. *Environmental Impact Assessment (EIA) guidelines,* two were fully developed, improving the effectiveness of the environmental assessment process conducted by the EA Department in the country.
e. *Harmonized Guidelines for Road Design, Construction and Maintenance* were developed, providing standard practices for road and drainage designs, construction, and maintenance.
f. *Climate Smart Agriculture Guidelines***,** providing CSA best practices to farmers, to address climate change challenges in the six distinct agro-ecological zones of Nigeria.
g. *Solar power benchmarking tool* for prospective investors - adopted by the Nigerian Ministry of Power.

61. Capacity building: Nearly 200,000 local government officials and community members (of which 42% were women) received training in environmental management (land degradation, soil and water conservation, catchment management planning, sustainable farming, waste management, etc.).

62. Environmental Education. NEWMAP raised awareness of school children and youth through a series of initiatives, including the *Global Space Week* (part of South-South Knowledge Exchange), the *Catch Them Young* program and support to *Conservation Clubs* across Nigeran secondary schools.

63. Knowledge Generation: The Project has also financed the establishment of three NCEs within the Federal University of Technology, Owerri (FUTO) in Imo State, the University of Lagos (UNILAG), Lagos State, and Kano State University of Science and Technology, Wudil. All NCEs are registered with the Nigeria Universities Commission, the regulatory body within the Nigerian University system, and are designed to be operationally self-sustaining through internally generated revenue and corporate sponsorships.

Greenhouse Gas Emission Reduction

64. **GHG emission reduction methodology**: A detailed GHG inventory was conducted for NEWMAP using a special methodology created in accordance with UNFCCC and IPCC guidelines. Being the first of its kind, the methodology has been adopted by the Federal Ministry of Environment as a prototype for future nation-wide application. This analysis showed that NEWMAP had annual GHG emission reductions of 149,554 tons of CO2 equivalent (CO2e). This annual emission reduction originates from afforestation, through tree plantations in the arid Northern Zone to

combat deforestation and to help local beneficiaries earn income from fruit and other economically-important trees that sequestered the equivalent of 198,908 tons of CO2 (tCO2e), and energy savings using solar power technologies (93,284 CO2e), which offset GHG emissions from civil construction work for gully restoration (142,618 CO2e) – which was much lower than normal due to bioremediation and other measures included in civil works design and construction processes. GHG emission reduction estimates are conservative, however, as they do not account for avoided land erosion (under a BAU scenario) due to all actions combined (i.e., afforestation, bioremediation, use of solar-power, etc.).

65. **Technological innovations**: A range of technologies to reduce GHG emissions, deforestation and the dependence on fossil fuels and fuelwood were demonstrated (e.g., fuel-efficient cookstoves, and solar-powered equipment for Primary Health Centers, borehole pumps, meat-dryers and small agro-processing plants) while pioneering virtual reality 360-degree cameras, and drones were used to monitor progress without site visits, saving GHG emissions and travel costs (estimated at around USD 400,000 during the COVID pandemic in 2020 and 2021).

GEF Contribution to the Achievement of Project Outcomes

66. **The GEF funding was fully mainstreamed into project implementation**, as the GEO and PDO were identical. As such, NEWMAP was consistent with the GEF's biodiversity, climate change, and land degradation focal area strategies. However, specific contributions from the GEF's included the support to sustainable sub watershed management and adaptation strategies through (a) afforestation of degraded land; and (b) distribution of efficient cookstoves to minimize forest degradation from collection of fuelwoods and decreasing pressure on natural forests.
67. **GHG Emission reduction, climate change and the PDO:** Component 3 sought to strengthen Nigeria's defenses against climate change, including more frequent and more intense flooding, that could cause more severe soil erosion even in the 103 targeted and treated gullies (see para 14). Apart from the economies of scale of country-wide climate change adaptation activities (e.g., through afforestation that could help reduce land degradation), the broader, nation-wide scope of this component would also be useful for mitigation activities to reduce GHG emissions from the country as a whole - the objective of initiatives such as piloting solar-powered alternative technology, exploring the viability of a solar-powered grid, guidelines to increase the use of LPG (see para 50), and of course afforestation (through carbon sequestration benefits).

C. EFFICIENCY

Rating: Substantial

Assessment

68. **Justification**: The rating is based on implementation efficiency (e.g., disbursement and use of project funds), economic efficiency analysis (e.g., NPV, IRR), value for money (e.g., USD/ha or site) and administrative efficiency.

69. **Implementation efficiency:** The project design and implementation led to an overall high implementation efficiency, as reflected in several factors, chief being the full disbursement and use of project funds, including more than US$ 50 million in counterpart funding allocated by each State to finance 100% of resettlement-related compensations. Overall efficiency was also helped by the training of nearly 200,000 people at local, state and national levels, in climate change adaptation, and strong state government support to project implementation, beyond providing counterpart funds. Prior to the final extension of the project in June 2021, state governments with unspent funds greater than commitments returned these 'surplus' funds so that they could be reallocated to states with commitments greater than available project funds. This rare occurrence was symptomatic of the strong state support which helped the project achieve and surpass all results indicators, including nearly double the number of

gully erosion sites originally targeted.

70. Innovative technology: During the period of restrictions imposed by COVID-19, implementation efficiency was also helped by the use of innovative technology (see para 53 above) which allowed to remotely maintain efficient supervision of field work, and thus process USD 245 million worth of pending payments and save around US$ 400,000 in avoided travel costs.

71. Inefficiencies: The project however experienced some procurement-related inefficiencies - including delays in obtaining clearances (which in turn delayed the commencement work or caused the scope of work to be changed, as in Niger State), delays in getting ESMP approval (which slowed work in Ondo State) – while processes to be followed for community mobilization and engagement caused delays in Katsina and Kano. Further, a lack of proper training on safeguard issues affected the pace of work (e.g. in Ondo), while delayed arrival of funds to some State PMUs delayed compliance monitoring site visits, and also led to the slowdown of work by contractors (e.g., in Anambra). Avoiding procedural and funding delays and providing adequate training could have increased the efficiency NEWMAP resources. Nevertheless, the project has laid strong institutional foundations for continuing project activity post closure, and thus for extending the efficient use of project funds - albeit in ways that are not easily measurable. Apart from the individual capacity enhancement, these include the setting up of 3 national and 8 state-level institutions on soil erosion and watershed management; technical support (e.g., setting up 116 hydrological and meteorological stations to support flood early warning systems); and formulating new policies, guidelines and manuals (detailed in the Efficacy Section).

72. **Economic efficiency analysis**: Using a 30-year BCA with a social discount rate of 10% (as in the BCA at appraisal), the BCA at completion (2022) show better economic feasibility of project interventions than those done at appraisal (2012) and at the AF (2019), based on conventional economic efficiency parameters (Table 6; details in Annex 4).

Table 6: Comparison of BCA findings (2012, 2019 and 2022)

Details	BCA 2012	BCA 2019	BCA 2022
Period considered	2013-42	2013-47	2013-22
Social discount rate (%)	10	6	10
Net Present Value of benefits (million USD)	44	540	317
Economic Internal Rate of Return (%)	12	16	15
Benefit-Cost Ratio	1.1		1.4

73. Benefits considered: The end BCA estimates all potential benefits measured during the 2019 BCA, including 3 from the 2012 BCA (Income losses and asset damage from soil erosion avoided; Untimely deaths avoided; Time wasted due to road conditions reduced), 3 benefits added in 2019 (Avoided displacement of people; Afforestation benefits; GHG emission reduction), and 1 new benefit (increase in value of previously erosion-prone land)

74. Sensitivity analysis: The analysis of the sensitivity of BCA results to changes in assumptions about benefit and cost streams shows that the project is viable even assuming decreased benefits and increased costs. Even the most stringent combination of assumptions, an 8% decrease in benefits and an 8% increase in costs (as done in the 2012 BCA), return an NPV of US$ 136 million, an IRR of 12% and a benefit-cost ratio of 1.15. These results compare favorably with the 2012 sensitivity analysis: NPV of US$ 3 million, IRR of 11% and benefit-cost ratio of 1.1 (details in Annex 4).

75. **Value for money:** The 92 completed NEWMAP sites cost an average of USD 7.25 million per site, according to a crude estimate of dividing the actual Component 1 cost (USD 665.94 million) by 92. If the 11 sites that are more than 50% complete are also completed, the average spend per site will come down to around USD 6.5 million per site.

76. **Administrative efficiency:** Even though the Additional Financing increased the overall project size to USD 908 million, and the actual administrative costs rose to USD 124 million, the ratio of administrative to actual project costs remained at 13.65%, well within the accepted range of 15%.

D. OVERALL OUTCOME RATING

Rating: Satisfactory

Assessment

77. **Justification**: This overall outcome rating is based on the High rating allocated to the relevance of the PDO, the Substantial efficacy in reaching intended results, and the Substantial efficiency achieved by the project, which surpassed the estimates made at appraisal. The relevance of the project's outcomes is further demonstrated by the decision of FGN to pursue the further expansion and upscaling of NEWMAP interventions by requesting World Bank support for implementation of the recently approved ACRESAL operation. In general terms, the ample evidence available from project-related evaluations, information provided by the BCR, and the sample of sites visited and interviews conducted by the ICR team, suggests that the PDO was fully achieved. Throughout the ten years of project implementation in 23 states, the coordinated implementation of NEWMAP's three components fully contributed to the efficient achievement of the overall PDO and its contributing outcomes and generated significant benefits fully attributable to the project. In addition to the livelihood enhancements to direct beneficiaries achieved by the project throughout the sub-watershed, benefits from stabilized erosion sites in the immediate command area of gully systems and soil and water conservation measures in the sub-watershed, have been estimated to reach more than 12 million indirect beneficiaries. These benefits derive from reconnected transport corridors, better access to markets and services such as schools and health centers, reduced flooding and siltation, improved storm water planning, and improved disaster risk preparedness.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

78. **Gender**: In general, project outcomes are expected to improve the overall wellbeing of women in beneficiary communities. Women were major beneficiaries of NEWMAP with about 300,000 benefitting from resettlement, livelihood enhancement and capacity building activities. The project improved the income of local women by providing sub-grants for livelihood enhancement activities such as livestock farming, cassava processing, palm oil production and processing, and trading. The project also distributed improved cookstoves to over 8,000 households, which is expected to reduce women's exposure to air pollution from cooking and save time spent on firewood collection. The provision of portable drinking water systems in selected communities has also improved access to drinking water and reduced the time women spent on fetching water thereby freeing up time for other productive and household related activities.

79. **Institutional strengthening**: This was one of NEWMAP's key outcomes and pillars of the expected sustainability of project outcomes. NEWMAP provided a comprehensive package of capacity-building resources that strengthened the technical and administrative capacity of institutions at all levels of the implementation structure. The project provided equipment and training to public officials at the national, regional, and local levels, including improved construction management, as well as training and TA to community members in all project watersheds. The project has strengthened the ability of relevant government ministries, departments, and agencies (MDAs) at federal and state levels to address erosion and land degradation, watershed, and climate change issues. The project specifically enhanced data generation, accuracy, and dissemination as well as geospatial monitoring of erosion and flood risks by the Nigeria Meteorological Agency (NIMET), Nigeria Hydrological Services Agency (NIHSA), Department of Erosion, Flood and Coastal Zone Management and the National Space Research and Development Agency (NASRDA). The

project provided training and technical support to over twenty (20) MDAs at the state level thereby increasing the capacity to implement erosion-related projects in all participating states. In addition, the project supported the creation of NCEs in three (3) nationally acclaimed universities, which serves as a platform for knowledge sharing and research on soil management, erosion control, GIS mapping and watershed management in Nigeria.

80. Further, NEWMAP supported the Nigeria's Green Bond Secretariat (see paras 78 and 80 for more details).

81. **Private sector financing**: The main project contribution to mobilize private sector engagement to help reduce vulnerability to erosion and floods was to support the process of issuing corporate Green Bonds (see para 80 for details). After the FGN issued the first five-year Green Bonds, two bonds were created for the corporate green bond market. Access Bank PLC issued the first certified corporate green bond in Africa, raising USD 35 million through 5-year 15.50% yielding bonds to fund flood control infrastructure, refinance projects in agriculture, energy efficiency and renewable energy; while North South Power issued a 15-year USD 20 million Fixed Rate Senior Green Infrastructure Bond, yielding 15.60% and due in 2034. The latter is guaranteed by the Infrastructure Credit Guarantee Company and is the longest-tenured corporate bond in the Nigerian credit market. Also, although many contractors were non-Nigerian construction companies, the involvement of local subcontractors is expected to strengthen the capacity of the local private sector.

82. **Poverty reduction and shared prosperity**: Although poverty reduction was not a primary objective of the project, poverty was identified as one of the root causes of land degradation and soil erosion, The participatory approach for project implementation in targeted rural areas, combined with the introduction of improved land management practices, contributed to sustainably reduce the vulnerability and degradation of watersheds and provided beneficiary communities with opportunities to improve their livelihoods through crop and livestock productivity gains and expanding income-generating alternatives. Despite being reduced in number proportional to the entire potential beneficiary population, empirical evidence from relevant case studies, and the surveys conducted as part of the BCR process suggest improvements in the overall quality of life of both urban and rural beneficiaries.

Other Unintended Outcomes and Impacts

83. **Green Bonds:** NEWMAP support, incorporated into the project as part of the Additional Financing, assisted Nigeria in becoming the first country in Africa and the fourth globally to issue Sovereign Green Bonds (SGB). The Green Bonds sold by the Federal Government of Nigeria in December 2017 raised money for 'green investments' in climate adaptation and mitigation to meet Nigeria's NDC to the UNFCCC. Africa's first fully certified SGBs raised USD 25.46 million equivalent, while a second issue on June 11, 2019, raised USD 35.7 million. These are the first two tranches of a USD 357 million bond issue program planned to support 'green' projects in agriculture, water, energy, forestry, and transport. NEWMAP also assisted the Department of Climate Change (DCC) of the Federal Ministry of Environment to establish and operate the Green Bond Secretariat, and supported the Inter-Ministerial Committee on Climate Change (ICCC), which identifies projects eligible for Green Bond funding, as well as the Green Bond Program Technical Advisory Team (GBPTAT), which analyzes the credentials and eligibility of project proposals. Funding from the first issue supported (i) the Energizing Education Program, designed to strengthen electricity distribution to 37 Federal Universities and 7 Teaching Hospitals through the country; (ii) the Renewable Micro Utility (REMU) Program, to showcase the technical and commercial feasibility of off-grid connected micro-grids by supplying reliable power to 1,750 people in 85 households and 14 small businesses; and (iii) the National Afforestation Program, to plant environmental and productive tree species in over 800 hectares of land, thus expanding forest cover and improving the livelihoods of poor communities. The second issue supported 23 projects selected from the 2018 National Budget, in the sectors of Afforestation, Renewable Energy, Transport, Agriculture and Water, contributing to both mitigation and adaptation, creating 45,000 jobs, while reducing more than 75,000 tons of carbon dioxide equivalent (tCO2eq).

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

84. The request for World Bank support for the project was sent by the highest level of FGN, President Goodluck Jonathan, based on the recognition that the erosion problem was beyond what the country could do with its own resources as the problem defied all solutions attempts to find a permanent solution in the past. Accordingly, the country requested the financial and technical support of the Bank and importantly the science required to deliver the solution that would reverse the devastation caused by soil erosion in the country. In addition, during the preparation of this project, both the Bank and Borrower did not identify any prior or current successful intervention country-wide despite huge government expenditures via the Ecological Fund. This triggered a dedicated and concerted effort by the Bank and the FGN, mobilizing significant multidisciplinary technical resources which conducted the necessary assessments and surveys leading to the detailed and innovative NEWMAP proposal.

B. KEY FACTORS DURING IMPLEMENTATION

85. Strong political support at the highest level of state and federal governments, commitment by the State PMUs, and commendable Bank dedication and proactivity helped the project successfully overcome implementation challenges posed by insurgency and security concerns (in Borno, Imo, Niger and Plateau States), political upheaval (including three political changes in Imo State, forcible closure of work on Mondays in Akwa Ibom, Abia, and Anambra States), weather extremes (heavy downpours, runoff and floods in Abia, Anambra, Enugu, Imo and States), COVID imposed restrictions, increase in input prices (e.g., of diesel, bitumen, and cement) that caused input shortages (mainly in Abia, Akwa Ibom, Ebonyi and Anambra States) and disputes between States and contractors (Anambra and CRS), as well as other procedural and contractual delays.

86. **Demonstration effects helped spur demand for NEWMAP intervention in States.** The spiking increase in interest shown by State Governors and Governments in being part of NEWMAP was exemplified, post MITR and AF, by the state of Borno requesting to be part of the project in 2021 – and completing the work in time. This interest was spurred by the initial demonstrations of effective gully erosion control by high-quality construction, for the first time in many states. While the stringent Bank procurement processes ensured that the quality was maintained even while nearly 70 sites were completed in the last two years of the project, this enormous effort to complete sites would not have been possible without the increased interest shown by state governments and governors. While some increase in political support was anticipated during the AF – which was indeed for new sites in new states - the scale of demand was not anticipated, as reflected in the RF targets, which now appear relatively modest and unambitious in hindsight. However, the increased disbursement following the scale-up in work sites appears to have led to a capacity overload, causing implementation progress to slow down, and ISR ratings to drop to Moderately Satisfactory for a short period.

87. Essential factors such as coordination, engagement, commitment, and leadership of the participating States and the implementing entities were commendable features during the implementation of NEWMAP. Similarly, the existing legal and regulatory framework as well as the governance structures at both national and state levels were adequate to support and/or improve the project's technical and operational strategies. Equally commendable is the fact that the implementation structure largely comprised public employees at all levels. The project is furthermore considered innovative as it emphasized a multisectoral landscape approach that allows Nigeria in general, and the participating States in particular, to effectively address efforts on land degradation and management.

88. **Security and political unrest could affect sustainability:** While the project successfully battled through delays and disruptions due to the volatile security situation in certain states, and closed in June 2022, these issues – along

with the more conventional problems of budgets for adequate and timely O&M - will continue to affect the post-project sustainability of built infrastructure. Against this backdrop, the 8 State Erosion and Watershed Management Agencies (created by Acts of Legislature and funded by the State Annual Budget), the enhanced local capacities, and the new policies and guidelines, will play a key role in sustaining key project benefits.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

89. The M&E system designed during preparation and described in the PAD was expected to address input-output, process, and outcome monitoring, as well as monitoring of targets established for the indicators included in the Results Framework. M&E system design and implementation, including mid-term assessments, were adequately budgeted as part of project management costs, and impact evaluations were planned to be used to reinforce and help build a multi-state learning platform on erosion and watersheds and inform adaptive project management and improvement of next- generation site intervention designs that could be replicated inside and outside the project.

M&E Implementation & Utilization

90. NEWMAP's M&E system was fully functional throughout the life of the project, generating reliable and valuable information for use by government, project management and the Bank. The system reflected the highly decentralized nature of the project, by comprising individual M&E units in the PMU of each participating state, all collecting and feeding technical, financial, and fiduciary information to the adequately staffed central M&E platform operating at the Federal PMU, where all data was consolidated and utilized for regular reporting, as well as providing valuable inputs for supervision missions, preparation of Action Plans and restructuring-related assessments.

91. It should be noted that the M&E system went beyond numerical information, as it also included a comprehensive image database, documenting the situation of project sites and communities before, during and after project interventions. In addition, during the period in which field missions were restricted due to COVID, pioneering virtual reality (VR) 360-degree cameras and drones were adopted to allow for remote monitoring of project progress.

92. Despite the positive features described above, as well as an intensive monthly monitoring and trouble-shooting effort conducted during the last 12 month of the project, the limited connection between physical progress and contractual obligations of the M&E system resulted in significant difficulties in keeping track of actual and pending payments for individual contracts. As described in the FM section, this situation was adequately addressed and resolved during the Grace Period.

Justification of Overall Rating of Quality of M&E

93. **The rating for quality of M&E is Substantial**. The M&E system was designed and implemented to adequately fulfill the state-level and consolidated information requirements of project management and supervision, as well as to assess the achievement of results. M&E information was broadly utilized for dissemination and communication purposes, as well as to provide important inputs to external evaluations (such as the MTR and the impact evaluation conducted in 2022), the BCR and the ICR.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Environmental Safeguards

94. **The project was classified as a Category A project, in view of its scale and the types of problems it addressed and potential significant adverse impacts.** The Environmental safeguards policies triggered by the project were Environmental Assessment (OP 4.01), Natural Habitats (OP/BP 4.04), Forests (OP/BP 4.36), Pest Management (OP 4.09) Physical Cultural Resources (OP/BP 4.11) and Safety of Dams (OP/BP 4.37).

95. **Appropriate instruments, namely ESMF, RPF and PMP were prepared, disclosed, and adequately implemented.** The project had in place a checklist used in screening sub projects to ensure compliance with Bank social and environmental safeguards policies. Furthermore, all site-specific interventions identified for funding by the project had ESMPs prepared and disclosed and were fully implemented. A total number of 136 ESMPs/ESIAs were prepared and disclosed during project implementation. The project also deployed 360-degree cameras for environmental and safeguards compliance performance monitoring and incident investigations, even in remote areas. All civil works contracts had ESMP prepared to further enhance the management and monitoring of the identified potential risks and impacts of the project activities.

96. **In terms of safeguards, no major deforestation occurred or was reported at the project sites** except for the minor clearance needed for micro project structures/campsites. No cases of air, water and land pollution were reported across the project's locations. However, OHS issues were reported during project implementation, three fatalities were recorded and ESIRT were triggered. For all these incidents, root cause analysis was carried out, whose findings showed that they were not systemic issues but one-off cases. To address the OHS issues, the projects conducted a series of capacity building in OHS/CHS for FPMU/SPMU staff and all contractors.

97. **Environmental specialists were employed by the project at national and state levels**, responsible and accountable for all safeguard's compliance and enforcement, providing monthly and quarterly reports to the FPMU/PIUs. Two environmental and social audits were conducted by third party consultants to further access the level of compliance with respect to environmental and OHS mitigations measure. The audits findings were both satisfactory which corroborated the various mission findings during project supervisions.

98. **There were environmental trainings at international level** especially at the early stage in preparation for project implementation and step-down trainings to the grassroots structures were reported. In addition, as part of the contribution to the establishment of NCEs, the technical support to UNILAG included the supply of ICT/GIS equipment and the development of a NCE website which will serve as a platform for knowledge dissemination on environmental sustainability and social inclusion in Africa.

99. **Capacity building and contribution to project sustainability:** A tracking tool is available at Federal and State levels to manage all safeguards instruments prepared and how they are being implemented, which is also considered a project best practice for managing E&S issues. The project was commended for the strong commitment in the management and enforcement of E&S mitigation measures as well as OHS mitigation measures, which are usually weak to enforce in the country. The project helped prepare two thematic EIA Guidelines on Environmental Safeguards that have been fully adopted and implemented by the Directorate of Environmental Assessment.

100. **Incomplete sites:** Some sites were not fully completed by the project closing date. From an environmental perspective, as these sites could pose OHS and environmental issues, individual risk analyses were conducted. Mitigation measures were identified for these sites and included in the Letters of Comfort provided by individual States, indicating compliance with these measures, at all sites except in Imo State.

Social Safeguards

101. **At preparation, the project social classification/rating was High (requiring full assessment)**, with anticipated significant social benefit such as improvement in degraded land, safeguarding of lives and properties and livelihood restoration.

102. **Social safeguard policies triggered by the project**: These include OP 4.01 Environmental Assessment and OP.4.12 on involuntary resettlement due to the potential loss of land and assets. In compliance with all triggered policies, the Project prepared all safeguards instruments, which were timely disclosed both in-country and through the Bank site.

103. **The additional financing did not trigger any new safeguards policies**, and the existing instruments were all updated accordingly to reflect the new set of activities and inclusion of additional states. To strengthen the government institution and support client capacity, the project developed guidelines for social safeguards consideration in projects and programs for the federal ministry of environment. In addition, the project provided training and built the capacity of social and livelihood officers across all 23 participating states on managing land acquisition and resettlement.

104. To a large extent, the project complied with OP 4.01 and OP 4.12 by preparing a Resettlement Policy Framework and an Environmental and Social Management Framework at project preparation. The corresponding applicable resettlement action plans (RAP) and Environmental and Social Management Plans (ESMP) were prepared to address site-specific social risks.

105. Given the multiple intervention sites and the need to ensure effective tracking of RAPs implementation and grievance resolution, a database of the status of all RAPs per state was developed. Each state's implementation progress was monitored against this database to improve implementation progress. Cumulatively as of October 31st 2022, an impressive 9,696 PAPs were compensated and 94 RAPs fully implemented over the 10 years of project implementation.

106. **At project closing, 21 states had fully implemented their RAPs**. Two states (Abia and Imo states) could not locate some PAPs (32) for which an escrow account has been opened and funded with counterpart funding for the compensation payment, while one state (Imo) was still implementing its RAP with the compensation fund lodged in an escrow account.

Livelihood Support and Grievances

107. The project implemented various livelihood enhancement activities to improve the livelihood of communities around project intervention areas. These activities range from distribution of sub-grants where beneficiaries engaged in several businesses such as waste management, livestock farming, plant nurseries, gabion box welding, block moulding, and renting of chairs and canopy etc. At project closing the total number of these beneficiaries was reported to be 35,977 out of which 15,977 are male and 20,509 are female.

108. **Grievance redressal:** A project GRM was developed at each state level to address beneficiaries' and stakeholders' concerns and complaints related to project activities. Over the life of the project, over 1160 complaints were received across all 23 participating states, all of which have been resolved.

Uncompleted Civil Work and Associated Social Risks

109. **While project funding has closed, unfinished civil works remained in 3 states**, which have potential social and reputational risk to the Bank if left unaddressed. These could lead to the destruction of properties or displacement of people or public risk. To mitigate these risks, all affected states except Imo developed and

implemented an exit plan with appropriate E&S actions to safeguard communities and the sites, and to mitigate these risks. These actions include (but not limited to) cordoning off the uncompleted site with appropriate signages, ensuring effective communication to beneficiaries of potential risk, particularly where risk is highest. The project also required the state to ensure effective communication to the communities of government's responsibility in completing the outstanding works, including resolving complaints related to the project in the state and securing a binding commitment from the state to complete the implementation of the uncompleted works as part of the borrower's responsibility. Overall Safeguard's rating is Moderately Satisfactory.

Financial Management (FM)

110. **The project relied on the existing Federal Project Financial Management Department (FPFMD) and State Project Financial Management Unit (SPFMU) structures for FM arrangements**, leveraging on existing capacity and experience within the Government. During project implementation, adequate FM arrangements were consistently in place, and well-qualified staff with knowledge of the Bank's FM/disbursement procedures were engaged to perform FM functions. Furthermore, approved annual work plans formed the basis for the implementation of project activities.

111. **Accounting and financial reporting improved over the life of the project**. The project always submitted IFRs to the Bank although occasionally late. During the early part of project implementation, the consolidated interim financial reports (CIFRs) were submitted on time, however, the quality was unacceptable to the Bank and needed improvement. Within-the-job capacity building support provided to the project by the Bank's FM team, the IFR quality has improved over time. The final CIFR of the project was delivered to the Bank on August 26, 2022, and the report was found acceptable. Also, the project always submitted annual audited financial statements to the Bank, and on time. The auditors issued an unqualified opinion on the audited financial statements for all years of implementation. The performance of the auditors was found acceptable to the Bank. The Bank's FM team conducted annual and regular FM supervision and implementation support missions and provided reports including regular capacity-building FM support to the project teams. Issues identified during implementation, such as unretired advances, inadequate documentation, and questionable expenditures, were consistently rectified and, at project closure, there are no outstanding issues relating to project transactions. While the challenges were resolved, the project closed its grace period with unexpected demands for funding post-closure as four states did not provide accurate and timely information on commitments.

112. **Implementation and closure challenges: S**ome states had more funds in their designated accounts (DA) than commitments, while others did not have enough. As a result, an enormous team effort was required to claw back the excess funds and redirect them to other states. Some of the challenges include:

- Large advances parked in Designated Accounts**:** Although the project began by disbursing based on SOE/transactions, it shifted mid-way to disbursing based on a (6-month forecast) report covering the current and next reporting period. This shift resulted in funds either being parked in designated/drawdown accounts or being used for expenditures not documented.
- Large expenditure by the FPMU: In comparison to the federal PMUs of other project, that of NEWMAP had unusually high expenditures, because the FPMU coordinated the implementation of activities related to institutional strengthening under components 2 and 3.
- Poor monitoring of disbursement: Without processes to check delays in signing contracts after Bank clearances, the Task Team faced severe challenges in speeding up implementation from Jan 2021 to June 2022, when the bulk of construction sites were completed. During this time, the Task Team developed a tracking system to tract all activities under implementation. However, the project was phased with unexpected demands for funding

post-closure.

- Unexpected demands for funding post-closure: Possibly due to the systemic challenges outlined above, some States did not provide accurate and timely information on commitments, even up to the Fiduciary Workshop of June 6-10, 2022. Four states that had earlier indicated that they had sufficient funds, later sent in payment requests post-closing far in excess of available funds. The project therefore closed with a cost overrun of around USD 16 million.

113. The Financial Management (FM) rating is **Moderately Satisfactory**.

Procurement

114. **The overall performance with regards to procurement planning, implementation and staffing were in accordance with the PAD**. The quality of the procurement documents; bidding documents, RFP and evaluation reports improved over the lifetime of the projects. This is as a result of the capacity building, including hands on training, provided by the Bank's team. Since the projects was implemented by several states, procurement performance varied initially across the states, but states with higher capacity were asked to support other states to improve their capacity through a system of peer learning.

115. **Systematic Tracking of Exchanges in Procurement (STEP) was introduced during project implementation,** and made mandatory for the processing of procurement implementation of all IPF projects by the Bank. The initial challenges of migrating all procurement activities that were in-process were addressed by training/capacity building and support on regular basis, and through procurement planning clinics organized by the Bank's team. A major challenge was the non-implementation of post procurement review activities in STEP. The Bank followed up with SPMUs to ensure that these activities were uploaded into STEP as required in the Procurement Regulations. At project closure, the implementation in STEP of all procurement, including post procurement activities were substantially achieved.

116. **A regular check-in on procurement implementation was initiated to address challenges faced by the State and Federal PMUs**. These check-ins were used to resolve activities that were pending with Bank and the PMUs. They also provided the needed guidance to the project teams on procurement and contract management issues. This led to substantial improvement in procurement capacity of the procurement officers and consultants and the overall procurement performance of the project. At project closure, no mis-procurement had been recorded despite a few INT cases. The overall procurement risk rating was assessed as Moderate, while the procurement performance was rated Satisfactory.

C. BANK PERFORMANCE

Quality at Entry

117. **Project preparation followed an ambitious approach** supported by a combination of proven and innovative methodologies and successful results of similar Bank projects, adequately adapted to Nigeria's ecological, socioeconomic, and institutional conditions. All components and activities included in project design was adequately justified by comprehensive assessments, many of which were included as annexes of an unusually detailed PAD.

118. **All fiduciary and safeguard-related elements of project preparation were adequately addressed**, as well as the design of the M&E system. Although the design of the Results Framework was solid and included a set of adequate indicators to monitor project performance and results, the majority of the proposed targets were significantly modest, and largely surpassed during implementation, possibly reflecting the high implementation risks

envisaged at appraisal.

Quality of Supervision

119. **World Bank supervision was intensive, timely and proactive**, representing a key factor to the overall performance of the project. Formal, adequately staffed joint implementation support missions (21 in total) were regularly conducted on a semiannual basis. As a result, comprehensive and informative Aide Memoires, Action Plans and ISRs were produced with no major delays. In addition, technical field missions were conducted by World Bank staff from the country office to supervise specific project activities or locations. Throughout the project, the composition of the supervision teams reflected the significant technical and fiduciary requirements of the project, with locally based specialists on financial management, procurement, and safeguards participating in all missions.

120. **An important element of the Bank's supervision was the commendable performance of the Borrower**, being responsible in large measure for the successful results achieved by the project. The commitment and ownership both at Federal and State level was evident throughout the life of the project. These features were demonstrated by the timely allocation of the necessary counterpart fund for payment of compensations; the selection of participating states and intervention sites that was conducted in a transparent manner; the establishment and operation of the agreed institutional arrangements; the absence of ineligible expenditures or mis-procurement in spite of the large number of transactions and complexity of procurement packages at national and subnational levels, and the commissioning of numerous project reviews and evaluations, including a comprehensive and objective Borrower Completion Report. The constant high-level engagement by the Bank team resulted in a maturing of the dialogue and relationship with the Borrower.

121. The task team leader responsible for leading supervision efforts during the last years of the project was based in the country office. Beyond regular supervision tasks, close Bank oversight of project physical and financial progress was required and instrumental in addressing the highly decentralized nature of the project (with more than 100 sites under implementation), particularly after the expansion of the scope and number of States incorporated as part of the Additional Financing. This facilitated regular contact with the Federal PMU, State PMUs and authorities, other agencies, and beneficiaries, and was important to deal with issues such as underperforming States delays in the contract award process, and limited engagement and collaboration of some MDAs with the project.

122. Most implementation support missions included field visits and workshops with national and State entities responsible for project implementation, except during the COVID period. As highlighted previously, during the period in which COVID-related restrictions limited regular supervision activities, virtual reality (VR) 360-degree cameras and drones were used effectively to monitor project progress, mainly at individual construction sites. Effective collaboration between the World Bank team and the Project Implementation Unit, the dialogue arising from these missions, and the close adherence and monitoring of the Bank's recommendations were all factors that benefited project performance.

123. Following the encouraging performance and results verified in the first seven States, the Bank supervision team and management demonstrated responsiveness to client requests and conducted a comprehensive review process that resulted in a well justified considerable expansion of the project's scope through the increase in the number of States and the allocation of additional financing.

124. **A detailed exit strategy process was conducted over the last 12 months of project implementation** through monthly monitoring of individual State physical progress and disbursements (and regular reporting to Bank management and the CMU), contributing to accelerate site completion, resolution of outstanding GRM complaints and RAPs, and identification of measures to reduce occupational health and community risks in ongoing construction sites. Despite the considerable workload associated with the preparation of the follow-on operation conducted by

the same team. As a result of this intensive supervision effort, Letters of Comfort were obtained from all states with unfinished activities, temporary closure of incomplete civil works sites was implemented, and excess funds from certain States were returned for reallocation to States with financing gaps.

125. **Exemplary support was provided by both Bank management and staff to the supervision of the NEWMAP project,** reflected in a number of well-deserved awards received. This included not only the Sustainable Development Award in 2022, where project features such as impact, innovation, and transformative results, together with Bank-related values and contributions such as integrity, respect, and teamwork were recognized, but also one RVP award and three CMU Portfolio Awards for results, innovation, and financial performance.

126. **Bank Performance Rating and Justification:** Overall, the World Bank's performance is rated **Satisfactory**, given only minor shortcomings that can be attributed to the Bank during preparation, supervision, and completion, although systemic challenges for large, complex projects such as NEWMAP were encountered, and overcome.

D. RISK TO DEVELOPMENT OUTCOME

127. **The design of NEWMAP identified several risk factors to project success and outcome and possible mitigation measures**. Although the project did not conduct systematic and regular assessments of risks, relevant mitigation measures for these pre-identified risks were adequately taken into consideration, while emerging risks such as the security situation in certain project areas were appropriately reflected in revisions to project implementation plans.

128. Project implementation has highlighted a number of features which could influence the overall risk of not sustaining project outcomes, some of which were adequately addressed as part of the exit strategy. These include the level of adoption of improved livelihood and land management practices by beneficiaries, the potential risk of inadequate operation and maintenance of project-financed infrastructure, and the political and institutional commitment, mainly at State level, to allocate the necessary human and financial resources to sustain and expand the achievements reached by NEWMAP, including a stronger focus on erosion prevention and gully stabilization. This would require public policies and interventions at the national and state levels that provide the necessary assistance to address systemic issues which could challenge project outcomes, including the operation of the newly established State Watershed Agencies and the alignment/mainstreaming of extension services with conservation-based production systems and the promotion of SLM-oriented governance structures, such as Watershed User Associations.

129. The World Bank decided to support FGN's efforts to further consolidate and expand the NEWMAP success through the implementation of the ACReSAL operation. This decision should also be instrumental in addressing some of the abovementioned risks at the national level and in those states where the new project is expected to provide continuity. This, combined with the demand-driven, participatory, and highly decentralized approaches implemented by NEWMAP should be conducive to medium- and long-term sustainability of actions.

V. LESSONS AND RECOMMENDATIONS

Project planning

130. **Use an integrated watershed (or sub-watershed) approach** to achieve meaningful and sustainable results and outcomes in projects aimed at addressing land degradation/erosion control objectives. This requires considerably more preparatory work (and associated readiness), a thorough assessment of the root causes of existing erosion or degradation processes, adequate identification, engagement and support to public and private

stakeholders, and development of a sound intervention strategy that goes beyond the remedial civil works.

131. **Address key project design and implementation factors** to achieve satisfactory results, include (i) *appropriate and fit for purpose institutional arrangements*, taking into consideration Federal and State mandates, roles and responsibilities, as well the requirements for implementation of transboundary activities; (ii) *adequate project duration* which acknowledges the challenges and processes required to deliver effective solutions and consolidate transformational changes; and (iii) an *implementation strategy based on proof of concept and scalability of results*, allowing to gradually phase-in additional states once the design and approach of the project has worked and can be scaled up or replicated in other regions of the country.

132. **Detail interventions to support communities,** mainly through financing of improved livelihood subprojects to CIGs, as this is an essential part of an integrated landscape approach - provided the support is focused on addressing the causes or consequences of the degradation process being resolved through the civil works. This needs a thorough needs assessment at inception, followed by detailed planning and implementation procedures that ensure adequate eligibility, location, and coverage of beneficiaries, all most relevant in cases of predominantly urban communities. In addition, projects like NEWMAP need a specific, and considerable, allocation of budgetary resources for community support in CIG subprojects with an environmental scope.

133. **Focus site selection criteria** to not only prioritise degraded sites where current socioeconomic impacts are most significant (generally urban areas), as in the case of NEWMAP, but also to select sites to prevent erosion processes from creating a "pipeline" of downstream degraded areas which will need major investments in the near future.

134. **Create a comprehensive gender strategy** identifying relevant gender gaps, actions, and targets during project preparation, are needed for complex projects such as NEWMAP. The strategy should serve as a roadmap for implementing gender-related actions during the project lifecycle. Gender indicators should be adequately captured in the MIS, and tracked during implementation to strengthen gender outcomes.

Innovating for improved implementation

135. **Use an effective Monitoring System** to track physical and financial progress of a complex, decentralized project such as NEWMAP - in addition to tracking Results Framework indicators. Such a system should pay particular attention to the kind of information collected, reporting not only on 'static information' collected once – such as contract details, start and end dates, approved budget, contractor details, sites and planned schedules, but also on 'dynamic information' to be collected periodically – e.g., physical completion percentage, financial payments made, status of the community subproject cycle, etc., specifying responsibilities for collection, checking, and reporting of information.

136. **Integrate remote project supervision using cost-effective innovative technology**, such as 360-degree cameras, drones, and satellite imagery) with physical monitoring and supervision procedures throughout the life of the project, so as to supplement - not substitute - regular physical inspection of project implementation, as was learnt from the restrictions imposed by the COVID-lockdowns. In the case of NEWMAP, on-site supervision efforts were enhanced by regular workshops with all SPMU staff, which combined supervision aspects with valuable experience-sharing activities.

137. **Adopt appropriate innovative solutions** such as the installation of telemetric stations for ungagged watersheds, use of geo-referencing and geo-tagging of all intervention sites, use of satellite images to document assets for RAPs and ESIA (thus ensuring transparency in the resolution of claims among PAPs in terms of payment of compensation); the smart adaptation of project activities to the rainfall seasonality in Nigeria (which involved

preparation and review of engineering designs, E&S studies and launching bidding process during the raining season while undertaking civil works during the dry season); and the deliberate pairing of states for peer learning from each other – all of which were demonstrated effectively by NEWMAP.

Managing complex projects

138. **Have regular virtual monthly check-ins** organized by the Bank team with SPMUs and Bank management. In NEWMAP, this was done during final year of implementation and was a best practice that proved instrumental to completion. It helped monitor progress and delays in key project activities (issues affecting completion of contracts, resolution of pending GRM complaints and PAP compensations etc.) and also established a regular dialogue with state authorities on issues related to project short-term sustainability (Letters of Comfort , post-project institutional arrangements, etc.). However, the unexpected payment issues experienced after project closing clearly demonstrate a need for improved State-specific monitoring procedures to better align physical progress and contractual obligations.

139. **Devise a staged-system to reward States that utilize project funds**, to avoid potential problems in the management of commitments under projects that are implemented at the State level but do not have fixed allocations to each state. Based on this experience, the ACReSAL project, for instance, uses a pre-designed 3-stage investment funding allocation system with objective criteria that States must achieve in order to access progressively larger tranches of investment funds.

Effective financial management

140. **Use Statements of Expenditures (SoE) instead of Interim Financial Reports (IFRs)**: Faced with the problem of large DA balances lying unutilized in State bank accounts (as a result of giving large initial advances to states and then trying to follow up to obtain documentation and other details of how the funds were used), NEWMAP switched to a system of smaller instalments released on receipt of Implementation & Payment Certificates (IPCs). This gave states an incentive to spend their DA balances in order to receive additional funds. The lesson thus was that the release of project funds to States utilizing IFR-based disbursement should be allowed only when available resources in project accounts are adequately utilized for the purposes intended and documented.

141. **Focus counterpart funding on compensation of affected people** by each State, as this proved effective for NEWMAP in ensuring adequate and relevant financial commitment by the borrower.

Communication planning

142. **Allocate adequate resources** to develop extensive documentation related to the "before project" situation on a systematic manner, including not only imagery of degraded areas and data on specific impacts, but also testimonies of community members affected by the consequences of such degradation, for effective communication, awareness and dissemination as project results.

143. **Plan for generating success stories early on,** as these represent a powerful instrument with multiple purposes. Even if they do not seem relevant in the initial stages, they, they should be explicitly included and budgeted in the project's M&E component by setting up a mechanism to collect relevant information from project start; including a customized template with clear criteria for identifying success stories from different implementation activities, the nature of information to be collected --and how it will be used; and ensuring that the necessary information is being stored by the project MIS.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: To reduce vulnerability to soil erosion in targeted sub-watersheds.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Targeted gully complexes and other erosion sites treated with 100% of planned measures for targeted sub-watersheds	Number	0.00 08-May-2012	30.00 08-May-2012	55.00 27-Jun-2018	92.00 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 167% The number of targeted gully complexes and other erosion sites fully restored using an integrated and participatory approach is 92, exceeding the end-of-project target of 55.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Targeted gully complexes and other erosion sites with reduced severity level after	Number	0.00 08-May-2012	30.00 08-May-2012	55.00 27-Jun-2018	103.00 30-Jun-2022

treatment					

Comments (achievements against targets):
Target exceeded: 184%. The level of erosion severity was reduced in 103 gully complexes and erosion sites, exceeding the end-of-project target. Erosion at all sites were classified as Catastrophic, Severe, Moderate, and Low, and any site that has reached 50% completion is considered to have reduced in severity from catastrophic (i.e., causing deaths and loss of infrastructure, etc.) to at least Moderate, while 80-100% means that the erosion on that site has been stabilized. 102 gully complexes and erosion sites have reached at least 50% completion as at project closing.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Area under bio-remediation in targeted sub-watersheds	Hectare(Ha)	0.00 08-May-2012	400.00 27-Jun-2018	400.00 27-Jun-2018	2,164.02 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 541%. Erosion in gully erosion sites was stabilized by planting grasses and trees along civil work sites for a total area of 2,164 hectares.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Land area under sustainable landscape management practices	Hectare(Ha)	0.00 27-Jun-2018	400.00 27-Jun-2018		30,627.96 30-Jun-2022

Comments (achievements against targets):

Target exceeded: 7557%. A total area of 30,627 hectares were brought under sustainable landscape management practices. This was achieved through planting of indigenous, sustainable and viable grass and tree species.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Net Greenhouse Emissions (tones CO2 annually)	Tons/year	0.00 27-Jun-2018	2,411.00 27-Jun-2018		149,554.31 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 6203%. Afforestation and energy saving investments resulted in an annual GHG emission reductions of 149,554 tonnes of CO2 equivalent. This annual emission reduction is from afforestation (-198,908 CO2 e) and energy savings by using solar power (-93,284 CO2 e), which offset the GHG emissions from civil construction work for gully restoration (142,618 CO2 e) – which is much lower than normal due to bioremediation and other measures adopted during civil work.

A.2 Intermediate Results Indicators

Component: Component 1: Erosion and Watershed Management Infrastructure Investments

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Targeted land treated for erosion with selected measures in targeted sub-	Hectare(Ha)	0.00 08-May-2012	12,000.00 08-May-2012	20,000.00 27-Jun-2018	30,627.96 30-Jun-2022

watersheds					

Comments (achievements against targets):
Target exceeded: 155%. A total land area of 30,627 hectares was treated for erosion through several project interventions including civil works, bioremediation, and livelihood enhancement. GIS-based areas of interest (AoIs) were estimated by taking the coordinates of each site within the watershed and considering all project work done on the site.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Participatory sub-watershed Management plans developed under the project for targeted erosion affected sub-watersheds	Number	0.00 08-May-2012	30.00 08-May-2012	38.00 27-Jun-2018	65.00 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 171.05%. The project supported the development of participatory sub-watershed (or catchment) management plans for each gully erosion site. These plans covered all activities carried out in the catchment including the Investment Plan, livelihood support activities, training and capacity building.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
People receiving project-	Number	0.00	45,000.00	90,000.00	1,827,887.00

supported advisory support services in integrated land/water management practices, planning, and/or monitoring under the Project (of which 40% female)		08-May-2012	08-May-2012	27-Jun-2018	30-Jun-2022

Comments (achievements against targets):
Target exceeded: 2031%. At the end of the project, more than 1.8 million people benefitted from project-supported advisory support services including 310,616 women. Advisory support was provided on water harvesting, soil conservation techniques and practices, afforestation, good agricultural practices, waste management, erosion prevention/control, climate adaptation/mitigation, and weather forecast. The lower than planned percentage of female beneficiaries is due to higher percentage of men engaging in agriculture, waste management and the public sector as well as overall cultural norms in targeted sub-watersheds.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Households benefitting from livelihoods enhancement activities under the Project (of which 40% female)	Number	0.00 08-May-2012	9,200.00 08-May-2012	12,000.00 27-Jun-2018	35,977.00 30-Jun-2022

Comments (achievements against targets):
Target exceed: 216%. The number of households that benefitted from livelihood enhancement activities is 35,977 (of which 57% are female), exceeding end-of-project target. Beneficiary CIGs were supported with sub-grants for activities such as livestock farming, tailoring, plant nurseries, gabion box welding, block molding, renting of chairs and canopy (done by physically challenged), palm oil production and processing, and trading. Through the SCCF

and GEF, the project also piloted climate change demonstration initiatives by constructing and installing solar-powered meat dryers and fuel-efficient kilns (for making kilishi).

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Packages with detailed design for treatment of gully complexes and erosion sites in targeted subwatersheds prepared under the project that have received WBG No-Objection but not financed by NEWMAP	Number	0.00 27-Jun-2018	30.00 27-Jun-2018		61.00 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 203%. A total of 61 designs received the WBG No-objection but were not financed by NEWMAP. The cleared designs are part of the TA provided to participating states. A typical design review could range from 6 months to 2 years and thus, through this process, NEWMAP has built the required capacity and skills to design a climate proof engineering solution for erosion and watershed management. Since these designs are eligible for implementation, this TA will help to reduce time when funding is available for their implementation.

Component: Component 2: Erosion and Watershed Management Institutions and Information Services

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Spatial Knowledge Management Information System on erosion and watersheds operational	Number	0.00 08-May-2012	1.00 08-May-2012		1.00 30-Jun-2022

Comments (achievements against targets):
Target 100% achieved. An spatial MIS exists at the federal government level and current users include FPMU and SPMUs as well as the Department of Erosion, Flood and Coastal Zone Management of the Federal Ministry of Environment. The automated web-based MIS can easily sort, analyze, and report information using a dashboard mechanism. The MIS is also integrated with a GIS feature for tracking activities spatially as well as audit and monitoring capability for tracking user activities within the System for transparency. Upon project closure, the system migrated into the MIS for the Bank-supported ACReSAL project.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Upgraded and newly installed stations providing data for integrated catchment planning	Number	0.00 08-May-2012	100.00 27-Jun-2018	100.00 27-Jun-2018	116.00 30-Jun-2022

Comments (achievements against targets):
Target 116% achieved. 116 stations were upgraded or installed across Anambra, Cross River, Imo, Gombe, Abia, Nasarawa, Plateau, Kogi, Delta, Sokoto and Kano States to increase the density of the existing system. This improved the precision of the forecasts on weather impacts by MDAs such as the Nigerian Hydrological Services, which is responsible for flood forecasting, and NIMET, which provides weather forecasts.

Indicator Name	Unit of	Baseline	Original Target	Formally Revised	Actual Achieved at

	Measure			Target	Completion
City storm water master plans developed which are informed by climate projections of increased rainfall intensity and risk assessments	Number	1.00 08-May-2012	2.00 08-May-2012	3.00 27-Jun-2018	3.00 30-Jun-2022

Comments (achievements against targets):
Target 100% achieved. While Edo already had a Storm Water Master Plan (SWMP) at project start, SWMPs were also developed in two other states (Ebonyi and Anambra) as part of the Exit Strategy - to strengthen institutional capacity to plan and implement measures to manage erosion, watersheds, disaster risk, and climate impact and storm water and flooding. These SWMPs were informed by climate projections and climate risk assessments, including the consideration of 100-year return period floods and maximum levels of rainfall over 100-years in hydraulic modeling (HEC Suite), and of a 20% increase in discharge diameter in drainage designs.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
EIA guidelines developed for targeted investment types that affect erosion (road cross drainage, urban water supply and drainage)	Number	0.00 08-May-2012	1.00 08-May-2012		2.00 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 200%. Two national EIA thematic guidelines were developed to improve the effectiveness of the Environmental Assessment process.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
National Centers of Excellence in erosion control established, operational and functional	Number	0.00 27-Jun-2018	3.00 27-Jun-2018		3.00 30-Jun-2022

Comments (achievements against targets):
Target 100% achieved. The Project supported the establishment of 3 National Centers of Excellence (NCEs) in the Federal University of Technology, Owerri (FUTO), Imo State, University of Lagos (UNILAG), Lagos State, and Kano State University of Science and Technology, Kano State. All NCEs are registered with University Commission of Nigeria, the regulatory body within the Nigerian University system, and were designed to be operationally self-sustaining through student fees and corporate sponsorship. These NCEs are expected to promote innovations and capacity building around HydroMet, E&S management and GIS and will support research and knowledge opportunities within Nigeria and Africa.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
States with improved erosion risk mapping	Number	0.00 27-Jun-2018	19.00 27-Jun-2018		19.00 30-Jun-2022

Comments (achievements against targets):
Target 100% achieved. Improved erosion risk mapping was conducted in 19 States (Abia, Anambra, Cross River, Edo, Enugu, Ebonyi, Imo, Akwa Ibom, Delta, Kogi, Plateau, Kano, Sokoto, Ondo, Katsina, Gombe, Ekiti, Niger, and Borno) as part of NEWMAP's national-level prototype for erosion control activities in other states. The erosion risk mapping helped states identify erosion prone and flooding/inundation prone areas and the specification of mitigation measures to address the resulting problems.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Community Interest Group collecting municipal solid waste in project intervention areas	Number	0.00 27-Jun-2018	50.00 27-Jun-2018		54.00 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 108%. 54 CIGs were established are part of the O&M aspect of the Project to manage municipal solid waste around the intervention areas. The CIGs are expected to be functional beyond project closure as the O&M responsibility lies with the Erosion and Watershed Management Agencies in states where they exist or with the ministry of environment (via the LGAs) in states where these agencies do not exist.

Component: Component 3: Climate Change Response

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Technical reports/ guidelines on promoting low carbon development or enhancing climate resilience completed	Number	0.00 08-May-2012	7.00 08-May-2012		7.00 30-Jun-2022

Comments (achievements against targets):
Target 100% achieved. Reports promoting low carbon development or climate resilience were completed including (i) NAMAS Report (National Appropriate Mitigation Actions on Climate Change) which provides a framework for developing actions, policies or projects for promoting a low carbon trajectory; (ii) Off-Grid Solar Power Feasibility Study Report, providing clear technical, financial, economic, social and environmental guidelines on grid-connected solar

power generation in green fields or co- generation with existing power generators; (iii) Climate data Management System Report, providing options for a World Meteorological Organization (WMO) standard for collaborative mechanism of data sharing amongst all MDAs that have relevant data; (iv) Baseline Survey of Clean Cook Stoves to understand the types of stoves that would be most acceptable in seven mover states, which led to the distribution of about 10,769 different types of fuel efficient cook stoves; (v) Report for installation of Low Carbon Bakery in Jigawa State, reduced the dependence on firewood for the production of bread, which is always on high demand especially in Jigawa State; (vi) LPG as a Low Carbon alternative to Firewood and Kerosene, providing a comprehensive framework looking at the value chains from LPG production to consumption, which has been approved for implementation by the Federal Ministry of Petroleum Resources; and (vii) Green Bond Impact Report, which enabled investments & capital raising for green projects in helping to meet Nigeria's NDC targets of 20% emission reduction by 2030.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Climate adaptation /low carbon demonstration projects completed	Number	0.00 08-May-2012	8.00 08-May-2012	10.00 27-Jun-2018	42.00 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 420%. NEWMAP has implemented 42 climate demonstration Projects, surpassing the target of 10 demonstration Projects. These carbon demonstration projects are considered to have strengthened capacity for climate action in participating states.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Development and Issuing of Green Bond Phases	Number	0.00 27-Jun-2018	1.00 27-Jun-2018		2.00 30-Jun-2022

Comments (achievements against targets):
Target exceeded: 100%. NEWMAP provided financial and technical support for the issuance of Nigeria (and Africa's) first sovereign Green Bond (USD 30 million) in December 2017. The first Green Bond was oversubscribed and a second Green Bond was issued (USD 40 million). The Green Bond program contributes to Program 47 of Nigeria's ERGP, striving to build a climate resilient economy. In addition to the targeted environmental impacts, the green bond program is expected to generate 20,000 direct jobs, 32,000 indirect jobs and positive impacts for around 4 million people.

Component: Component 4: Project Management

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Reports produced on project progress at federal and state levels	Number	0.00 08-May-2012	9.00 08-May-2012	18.00 27-Jun-2018	24.00 30-Jun-2022

Comments (achievements against targets):
Target 133% achieved. All 24 participating states and the FPMU submitted progress reports throughout the duration of the project.

B. KEY OUTPUTS BY COMPONENT

Reduced vulnerability to soil erosion in targeted watersheds	
Outcome Indicators	1. Targeted gully complexes and erosion sites treated 2. Targeted gully complexes and other erosion sites with reduce severity level after treatment 3. Land area under sustainable landscape management practices 4. Area under bioremediation in targeted sub-watersheds 5. Net Greenhouse emissions
Intermediate Results Indicators	1. Targeted land treated for erosion with selected measures 2. Participatory sub-watershed management plans developed 3. Number of people who received project-supported advisory support services in integrated land/water management practices, planning and/or monitoring 4. Number of households that benefitted from livelihood enhancement activities 5. Number of packages with detailed designs for treatment of erosion and gullies prepared (that received WBG No-Objection but not financed by the project) 6. Spatial knowledge management information system on erosion and watershed operational 7. Upgraded and newly installed stations providing data on integrated catchment planning 8. City storm water masterplans developed which are informed by climate projections of increased rainfall intensity and risk assessments 9. EIA guidelines developed for targeted investment types 10. National Centers of Excellence in erosion control established, operational and functional 11. States with improved erosion risk mapping 12. Community Interest Group collecting municipal solid waste in project intervention area 13. Technical reports/guidelines on promoting low carbon development or enhancing climate resilience completed 14. Climate adaptation / low carbon demonstration project completed 15. Green Bond phases developed and issued
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	1. 92 gully complexes and erosion sites treated 2. Reduced level of erosion severity in 103 gully complexes and erosion sites 3. 2,164 hectares of land bioremediated 4. 27,529 hectares of land under sustainable landscape management practices 5. 65 sub-watershed management plans developed

	6. 1,827,887 people benefitted for advisory support services including 310,616 women 7. 35,977 households benefitted from livelihood enhancement activities including 20,509 female households 8. One functioning spatial knowledge management information system 9. 116 upgraded and newly installed HydroMet stations 10. 3 city storm water masterplans developed 11. 2 EIA guidelines developed 12. 3 National Centers of Excellence established 13. Improved erosion risk mapping conducted in 19 states 14. 54 community interest groups (CIGs) established to collect municipal solid waste 15. 7 technical reports completed, including Low Carbon Technology Development and Climate Smart Agriculture Guidelines 16. 42 climate adaptation / low carbon demonstration completed 17. 2 phases of green bonds issued (US$30M and US$40M for the first and second phase respectively). 18. Erosion and watershed management agencies established in 8 states 19. South-South Knowledge exchange with China and India including study visits to China and USA by Nigerian government officials and technical experts 20. Institutional support to over 20 MDAs at the state level

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Amos Abu	Task Team Leader(s)
Mary Anika Asanato-Adiwu	Procurement Specialist(s)
Akinrinmola Oyenuga Akinyele	Financial Management Specialist
Joseph Ese Akpokodje	Environmental Specialist
Daniel R. Gross	Social Specialist
Caroline Mary Sage	Social Specialist
Thomas E. Walton	Social Specialist
Ogochukwu Joy Medani	Team Member
Olukemi Roseline Akinsola	Team Member
Jayne Angela Kwengwere	Team Member
Joyce Chukwuma-Nwachukwu	Team Member
Simeon Kacou Ehui	Peer Reviewer
Chukwudi H. Okafor	Peer Reviewer
Grant Milne	Peer Reviewer
Meena M. Munshi	Peer Reviewer
Joseph A. Gadek	Peer Reviewer
Supervision/ICR	
Joy Iganya Agene, Anupam Joshi	Task Team Leaders
Amos Abu	Task Team Leader
Adebayo Adeniyi, Bayo Awosemusi, Daniel Rikichi Kajang	Procurement Specialists
Akinrinmola Oyenuga Akinyele, Arigu Yusufu Kudu	Financial Management Specialists
Sanjay Srivastava	Program Manager
Benoit Bosquet	Program Manager

Maria Sarraf	Program Manager
Oznur Oguz Kuntasal	Environmental Specialist
Lucky Erhaze	Environmental Specialist
Chukwudi H. Okafor	Social Specialist
Elijah Abiodun Siakpere	Social Specialist
Nnneka Okereke	Social Specialist
Anas Abba Kyari	Procurement Team
Desta Wolde Woldearegay	Procurement Team
Mohammad Ilyas Butt	Procurement Team
Nikolai Alexei Sviedrys Wittich	Procurement Team
Joyce Chukwuma-Nwachukwu	Procurement Team
Frank Anthony Fariello	Counsel
Mei Wang	Counsel
George Ferreira Da Silva	Team Member
Alain Claude Cassard	Team Member
Nabil Antoun Joubran	Team Member
Emmanuel Chinedu Umolu	Team Member
Kenichiro Tachi	Team Member
Amballur Joseph James	Team Member
Stephen Danyo	Team Member
George Comair	Team Member
Rao Harshadeep Nagaraja	Team Member
Ilieva Nevena	Team Member
Ruth Jane Kennedy-Walker	Team Member
Jayne Angela Kwengwere	Team Member
Abiodun Elufioye	Team Member
Aurore Simbananiye	Team Member
Ugonne Margaret Wunyo	Team Member

Rohan G. Selvaratnam	Team Member
Joseph Asu Abang	Team Member
Halima Femi Pat Natson	Team Member
Faly Diallo	Team Member
Asha Narayan	Team Member
Ruth Tiffer-Sotomayor	Team Member
Asha Johnson	Team Member
Iretomiwa Olatunji	Team Member
Regina Uche Okonkwo	Team Member
Christine Makori	Team Member
Harriet Nattabi	Team Member
Harriet Chinemerem Igwe	Team Member
Jean Owino	Team Member
Eucharia Nonye Osakwe	Team Member
Mugambi Mugisha Mwendia	Team Member
Liaqat Ali Butt	Team Member
Hana Berhe Araya	Team Member
Renganaden Soopramanien	Team Member
Michael Carroll	ICR Author
Olamide Oluwaseyi Bisi-Amosun	ICR Team

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY11	21.611	215,964.61
FY12	44.865	524,871.71

FY13	0	1,216.11
FY17	.125	191.75
FY18	.438	3,807.13
Total	**67.04**	**746,051.31**
Supervision/ICR		
FY12	0	2,600.56
FY13	29.457	381,339.39
FY14	33.613	369,729.26
FY15	33.221	266,409.14
FY16	58.219	385,393.46
FY17	55.540	429,643.45
FY18	29.544	316,850.95
FY19	59.678	458,011.09
FY20	56.728	446,479.62
FY21	56.603	447,330.97
FY22	64.990	531,101.88
FY23	27.461	246,909.14
Total	**505.05**	**4,281,798.91**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$M)	Actual at Project Closing (US$M)	Percentage of Approval
Component 1: Erosion and Watershed Management Infrastructure Investments	405.57	652.11	160.79
Component 2: Erosion and Watershed Management Institutions and Information Services	39.70	74.99	188.89
Component 3: Climate Change Response	30.00	50.38	167.93
Component 4: Project Management	32.92	124.02	376.73
Total	**508.59**	**908.25**	**178.58**

ANNEX 4. EFFICIENCY ANALYSIS

BENEFIT COST ANALYSIS

1. **A benefit-cost analysis (BCA) was conducted as part of the NEWMAP Efficiency Analysis to assess the *post-hoc* economic viability of the project.** This was necessary because a BCA was done as part of the NEWMAP project appraisal in 2012 and also during the Additional Financing (AF) in 2019.[6] The present post-project BCA shows that the findings of the BCA done at appraisal and during additional financing are justified, on the basis of conventional measures of project viability.

2. **Objective and methods:** The present post-project BCA checks if replacing numbers assumed for the BCA of 2012 and 2019 with actual post-project numbers changes the economic viability of the project. Concerning methods, while the 2012 BCA sought to measure 8 potential benefits, the 2019 BCA dropped 5 of these 8 and estimated only 3 of the original set while adding 3 new ones (Table 2). The BCA of 2019 dropped 5 benefits estimated by the original BCA presumably due to a lack of adequate data (e.g., on Port Calabar dredging costs). The current BCA also found data limitations and thus takes a similar approach to the BCA of 2019, re-estimating the same 3 original benefits and 3 additional benefits (avoided displacement of people, afforestation benefits, and GHG emission reduction), and estimating one more benefit (increase in value of previously erosion-prone land).

Table 2: Benefits measured by the BCA of 2012, 2019 and 2022

Measured benefits		BCA 2012	BCA 2019	BCA 2022
1	Income losses and asset damage from soil erosion *avoided*	Yes	Yes	Yes
2	Untimely deaths *avoided*	Yes	Yes	Yes
3	Time wasted due to road conditions *reduced*	Yes	Yes	Yes
4	Port Calabar dredging costs *avoided*	Yes		
5	Urban domestic water supply *improved*	Yes		
6	Decreases in agricultural yield *avoided*	Yes		
7	Unusable farmland due to erosion *avoided*	Yes		
8	Topsoil nutrient loss *avoided*	Yes		
9	Displacement of people *avoided*		Yes	Yes
10	Incremental profits from afforestation		Yes	Yes
11	GHG emissions *reduced*		Yes	Yes
12	Value of previously erosion-prone land *increased*			Yes

3. **Assumptions**: The present analysis used the same 30-year time horizon (2013 – 2042) as the original 2012 BCA but with 10 years of project implementation (2013 – 2022), the same 10 percent social discount rate, and a traditional "with and without project'' approach to assess the economic viability of the IDA resources invested in NEWMAP (Table 3).

[6] World Bank (2012) NEWMAP Project Appraisal Document, April 12, 2012. Report No. 67983-NG; and World Bank (2018) Project Paper on a Proposed Additional Credit to the Federal Republic of Nigeria for the Nigeria Erosion and Watershed Management Project (NEWMAP). May 31, 2018. Report No. PAD2621.

Table 3: Assumptions of the BCAs of 2012, 2019 and 2022

Parameter	Parameter values assumed		
	BCA 2012	BCA 2019	BCA 2022
Period (years)	30 (2013 – 2042)	30 (2018-2047)	30 (2013 – 2042)
Discount rate (% p.a.)	10%	6%	10%
Investment years	7 (2013 – 2022)	3 (2018-2021	10 (2013-2022)
O&M expenditure	2020 – 2042	2022 – 2047	2023 – 2042
Benefits	2017 – 2042	2022 – 2047	2023 – 2042

4. **Costs:** The present BCA considered all project expenditures over the 10 years of implementation, comprising the sanctioned IDA as well as counterpart funding (totaling USD 956 million)) as well as operation and maintenance (O&M) costs, estimated at 10 percent of total project costs (i.e., USD 95.6 million), effective from 2023, since the project closed on June 30, 2022 (Table 4).

Table 4: Actual project expenditure including counterpart funding (2013 – 2022)

Year	USD	Nigerian Naira
2014	15,462,248	2,479,711,495
2015	111,550,564	21,963,314,737
2016	61,881,911	13,314,483,743
2017	40,427,250	50,274,993,934
2018	46,617,552	18,363,512,148
2019	122,242,861	42,699,014,858
2020	133,852,644	53,013,451,272
2021	260,882,412	77,185,330,384
2022	163,449,106	47,318,289,941
TOTAL	**956,366,549.53**	**326,612,102,512.07**

Note: Project expenditures are in Naira, aggregated over the fiscal year, and converted to US dollars using the annual average exchange rate of the Central Bank of Nigeria.

5. **Benefits:** The estimation methods of the seven project benefits considered in the current BCA, and the annual value of each, are detailed below:

   - Benefit 1: Avoided infrastructure losses 'with project'**.** Without project intervention, gully erosion will worsen leading to further damage to assets and loss of agricultural income. The 2012 BCA used population estimates (rural population living 4 km around proposed erosion control sites in rural areas and 40% in proposed urban areas), damage estimates from a study,[7] and odds-ratio probabilities, to calculate potential losses avoided by the project as **USD 48 million per year**.[8] The

[7] Abegunde, A, S. Adeyinka, P. Olawuni and O. Oluodo. (2006). "An Assessment of the Socio- Economic Impacts of Soil Erosion in South-Eastern Nigeria." Shaping the Change XXIII FIG Congress. Munich, Germany, October 8-13.

[8] The actual annualized losses and damages per year were calculated as USD 28.6 million for the period 2017-26, USD 48.3 for 2027-36, and USD 81.0 for 2037-46, although only half of the third tranche of benefits was used in the economic analysis. See Table 6.7 of EFA in the NEWMAP PAD of 201. The figure of USD 48.3 million is the annual average for the period 2017 – 42.

2019 BCA considered only houses protected in the catchment area and used estimates from SPMUs in each state to calculate that 52,500 houses of an average size of 55 m2, valued at an average price of USD 187 per m2 of residential land (based on the NEWMAP Resettlement Action Plan (RAP) of Etim Uman), and representing a total value of **USD 18 million per year** as the infrastructure loss avoided due to the project.[9] The present analysis uses a similar methodology as the 2019 AF BCA, using estimates from the PMUs and the RAP Implementation Reports for 84 completed sites (in April 2022) to estimate that an additional 11,852 houses have been built since project start in the Areas of Interest (AoIs) defined around the gully erosion sites;[10] and that the average price of residential land in these sites is US$ 313 per m2. Using the same average house size of 55 m2 from the 2019 analysis (since average house size is unlikely to have changed), gives an average house price of US$ 17,215 and, extrapolating the additional houses from 84 to the 91 sites completed by June 30, 2022 gives an estimate of 12,840 new houses – which is an benefit of **USD 221 million per year**.

- Benefit 2: Avoided deaths 'with project'. Project intervention addressing severe gully erosion can prevent premature deaths, especially during landslides and heavy flooding. The 2012 BCA assumed 0.15% of premature deaths per year from unintentional injuries (including traffic accidents associated with the flooding, gully and landslide events, building collapse, etc.) diarrhea and malaria, which was 20 premature deaths per year in the original 7 NEWMAP states,[11] and a midpoint between the lower-bound of the Human Capital Approach (HCA) and an adjusted Value of Statistical Life (VSL) for Nigeria[12] to value each premature death at USD 127,789 in 2013 (increased 3% per year over the project period), to give an average value of **USD 27 million per year**. The 2019 BCA used the best estimate of each state PMU of lives that could be saved over the next 30 years, which was 2,600 deaths in 30 project intervention sites, valued at an adjusted VSL for Nigeria of USD 16,167, to get a value of **USD 41.8 million per year**.[13] The current analysis obtained best estimates from state PMUs of 100 premature deaths per year on average, in the 10 years prior to NEWMAP interventions in each of 84 sites, giving a figure of 123 deaths avoided per year across all 91 sites completed by the project closing date (on June 30, 2022). It also used the same VSL of USD 16,167 as the 2019 BCA (although a higher Africa-specific estimate of USD 489,000 is now available)[14] to get an benefit of **USD 1.612 million per year**.
- Benefit 3: Reduced time spent in bad roads ('with project'). Project intervention to construct new roads and to rehabilitate roads affected by erosion and gullies will increase connectivity and

[9] The project benefits are assumed to phase in @10% for 2022 (one year after estimated completion), @40% for 2023, and 100% from 2024 onwards. See BCA of the NEWMAP Additional Financing Approach Paper, p. 42 & 45.
[10] NEWMAP FPMU calculated AoIs for each of 103 gully erosion sites, ranging from 1.36 ha to 2266 ha and averaging 174.75 ha. Mukhtar Yakubu, M&E Officer, NEWMAP FPMU, personal communication, 27 April 2022.
[11] NEWMAP later expanded to 23 states, in two phases.
[12] The following process was used: 'The HCA is assigned one year of GDP/capita lost of US$2,601 in 2013 and increased by 3% over the course of the project. The VSL meta-analysis figure is used to which is applied a benefit transfer. In this particular case, the figure of US$3.5M in 2005 for the 27 countries forming the European Union is provided by Lindhjem and Navrud (2010) that was prepared for the OECD and transferred to Nigeria by using the PPP GDP per capita differential between the EU and Nigeria, deflating the figure to 2013 prices and considering the income elasticity to be equal to one. The VSL used for Nigeria is US$252,976 in 2013 and increased by 3% per year over the course of the project.' NEWMAP PAD (WB, 2012), p. 130.
[13] The 2019 BCA notes that 'no reliable revealed or stated preference of the VSL has been undertaken in Nigeria', the 2019 AF Project paper uses a meta-analysis using a US VSL adjusted for labor and income differences from
[14] Patenaude, et al (2019) The value of a statistical life year in sub-Saharan Africa: Evidence from a large population-based survey in Tanzania. Preference based assessments, 19, pp. 151-156, (*https://doi.org/10.1016/j.vhri.2019.07.009*).

mobility of people, which in turn will increase productivity. The 2012 BCA estimated that for 2 highways, 16 secondary roads and 20 rural roads in 7 states, with varying Annual Average Daily Traffic (AADT) of 650, 400 and 50 cars per day, with 3 persons per car on average (1 per cart for rural roads), losing 3 hours per person per day (equivalent to 433,437 8-hour days), at USD 3.38 per person per day (GDP/capita/day), will give a value of **USD 1.45 million per year** as the opportunity cost of time lost.[15] The 2019 BCA estimated that for 79.2 km of the 20 roads that the project rehabilitated, with the national Nigerian AADT of 1,772,[16] with 3 persons per car on average again, a total of 63,000 8-hour weekdays are lost (@12 min/40 km of road).[17] Valued at an average GDP of USD 6/person, the estimated time saved in traffic is about **USD 0.375 million per year**. The current estimate assumes the same loss of 12 min/40 km of road, but uses the actual 211.47 km of roads rehabilitated (yielding time savings of 183,381 weekdays) and the revised GDP/person/day of USD 15,[18] to derive a value of **USD 2.743 million per year**.

- Benefit 4: Avoided involuntary displacement of people 'with project'**.** The 2019 BCA calculated from estimates provided by state PMUs that 254,000 people would be able to avoid involuntary displacement due to NEWMAP interventions, and that the average cost of relocating persons was US$ 7,790 (based on figures from the Resettlement Action Plans (RAPs) provided by each state PMU), yielding a total benefit of **USD 65.9 million per year**.[19] The current estimate, based on the RAP Implementation Reports from 84 project sites shows that the project spent an average of USD 3,453 on resettling each of the 5,721 project-affected persons (PAPs) actually displaced by the project. Extrapolated to 81 sites, the total figure is 7,015 PAPs while, using an economic conversion factor of 0.84 to correct for domestic price distortions (as in the BCA of the 2012 PAD), yields a cost of USD 2900 per person, and a total benefit of **USD 20.347 million per year**.
- Benefit 5: Incremental benefits of afforestation 'with project': The 2019 BCA assumed that all reforestation would be done with mango trees, that 300 hectares would be reforested, and that the net economic benefit based on a study would be USD 780 per hectare,[20] and thus estimated a net return of **USD 0.234 million per year**.[21] The state PMUs estimate now that (1) 1025 hectares of land that were either barren or with vegetation of no economic significance prior to NEWMAP have been afforested under the project; and (2) the average revenue per hectare (using local market prices) across all tree crops (fruit and woodlots of acacia, cedrela, eucalyptus, gmelina, khaya, mango, neem, etc.) is USD 15,742. Using an economic conversion factor of 0.84 to correct for distorted domestic markets (as in the 2012 BCA) gives a value of USD 13,223 per hectare reforested by the project, and an incremental benefit estimate of **USD 13.558 million per year**.

[15] See Table 6.8 in the NEWMAP PAD BCA, which quotes M. Fasona (2011), Mapping Landuse and Landcover Change. World Bank Nigeria Erosion and Watershed Management Project. Abuja; and V. Foster and Pushak., N (2011), Nigeria's Infrastructure: A Continental Perspective. Policy Research Working Paper 5686. The World Bank.
[16] Foster and Pushak (2011), *op. cit.* the same study quoted in the BCA of 2012 along with Fasona (2011). See footnote 10 *supra.*
[17] Based on Ibitoye et al. (2012) Effects of Congestion and Travel Time Variability along Abuja-Keffi Corridor in Nigeria. Global Journal of Researches in Engineering. Volume 12 Issue 3 Version 1.0, quoted in the 2019 AF Approach Paper, p. 43 footnote 23.
[18] World Bank (2022), Nigeria GDP per capita 2021 (*https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=NG-CN*)
[19] USD 7,790 was an average of USD 3,200 from the 2017 RAP for Nnewichi, Anambra State, and USD 12,300 from the 2017 RAP for Ojoto, Anambra State. Also, as before, 10% of total benefits were assumed to accrue from 2022, one year after the project was scheduled to close, 40% from 2023 and 100% from 2024. (Table 5.4 of the 2019 Additional Financing Approach Paper, p. 45).
[20] S.O. Jekayfina, A.O. Adebayo, S.O. Afolayan, E. Daramola (2013) On-farm energetics of mango production in Nigeria. Renewable Energy 51 (2013) 60- 63. Science Direct. Elsevier.
[21] The 2019 BCA assumed phased benefits @10% in 2023, 40% in 2024 and 100% from 2025 onwards. See Tables 5.3 and 5.4.

- Benefit 6: Greenhouse gas (GHG) emission reduction: The 2019 BCA considered three scenarios (1) '*without project*' with zero emissions reduction; (2) '*with project – low*' with emissions reduction valued at a low shadow price of carbon; and (3) '*with project – high'* with emissions reduction valued at a high shadow price of carbon, and used a value of **USD 126.6 million per year** in the BCA.[22] The present analysis uses the methodology pioneered by NEWMAP following IPCC and UNFCCC Guidelines (and now adopted by the Federal Ministry of Environment), to calculate GHG emission reductions by NEWMAP as 149.554 tonnes of carbon equivalent (CEq) per year, and values it at USD 51 per tonne of CEq[23] to obtain a value of **USD 7.627 million per year**.
- Benefit 7: Incremental value of land 'with project': The increase in land values at the gully erosion sites treated under NEWMAP was an unexpected benefit. In Katsina State, for e.g., prices rose from ₦ 300,000 to ₦ 3 million per hectare after gully erosion control work was completed. State PMUs estimated that residential land prices increased by USD 105 per m2 subsequent to NEWMAP interventions, but found it difficult to obtain the exact land area where prices increased over the project period and *due* to project interventions (i.e., incremental numbers). Therefore, the number of additional houses built during the project period (11,852), averaging 55 m2 in size, was used as a proxy for the land area that witnessed an increase in prices. Extrapolating these findings from 84 to 91 completed sites and, noting that the difference in prices cancels out the price distortion effect, the estimated benefit is **USD 74.15 million per year**.

6. **BCA Findings:** The NPV of project benefits is USD 316.516 million, the economic IRR is 15% and the benefit cost ratio is 1.4 (Table 4).

[22] Benefits were again phase in @10% in 2023, 40% in 2024 and 100% from 2025 on. See Table 5.4

[23] 'The Biden administration has given the interim SCC a value of USD 51 using a discount rate of 3 percent … [the rate] the Obama administration used, adjusted for inflation.' Cho, R. 2021. Social Cost of Carbon: What is it and why do we need to calculate it? [online] State of the Planet, Columbia Climate School (*https://news.climate.columbia.edu/2021/04/01/social-cost-of-carbon/)*

Table 4. Benefit-Cost Analysis (USD million)

Year		Cost	Benefits							Net Benefit
			Avoided infrastructure loss	Avoided deaths	Reduced time lost in traffic	Avoided displacement	Afforestation	GHG Emission Reduction	Land Value Appreciation	
1	2013	0								0
2	2014	15								-15
3	2015	112								-112
4	2016	62								-62
5	2017	40								-40
6	2018	47								-47
7	2019	122								-122
8	2020	134								-134
9	2021	261								-261
10	2022	163								-163
11	2023	96	221	2	3	20	14	8	74	245
12	2024	96	221	2	3	20	14	8	74	245
13	2025	96	221	2	3	20	14	8	74	245
14	2026	96	221	2	3	20	14	8	74	245
15	2027	96	221	2	3	20	14	8	74	245
16	2028	96	221	2	3	20	14	8	74	245
17	2029	96	221	2	3	20	14	8	74	245
18	2030	96	221	2	3	20	14	8	74	245
19	2031	96	221	2	3	20	14	8	74	245
20	2032	96	221	2	3	20	14	8	74	245
21	2033	96	221	2	3	20	14	8	74	245
22	2034	96	221	2	3	20	14	8	74	245
23	2035	96	221	2	3	20	14	8	74	245
24	2036	96	221	2	3	20	14	8	74	245
25	2037	96	221	2	3	20	14	8	74	245
26	2038	96	221	2	3	20	14	8	74	245
27	2039	96	221	2	3	20	14	8	74	245
28	2040	96	221	2	3	20	14	8	74	245
29	2041	96	221	2	3	20	14	8	74	245
30	2042	96	221	2	3	20	14	8	74	245
Present value of net benefits (NPV)										**317**
Economic Internal Rate of Return (IRR)										**15%**
Benefit/Cost Ratio										**1.4**

SENSITIVITY ANALYSIS

7. **Decrease in benefits:** The 2012 BCA tested the viability of the project given a reduction of 10% per year of the benefits accruing to households, and the present findings are similar: the project is still viable (Table 5).

Table 5. Economic Indicator Sensitivity Scenario: Benefits reduced by 10%/year

Key Economic Indicator	Results		Interpretation
	BCA 2012	BCA 2022	
NPV/30 years (USD million)	13	205	Net benefits exceed cost
IRR/30 years (10%)	11%	14%	Positive and greater than 10%
PV Benefit/Cost Ratio/30 years	1.1	1.25	Discounted benefit > Discounted Cost
Result: Three criteria indicate that the project is economically viable			

8. **Increase in costs:** The 2012 BCA also tested the viability of the project when investments are increased by 15% over the project period and O&M costs are also increased by 15% per year till 2042, and the present analysis has similar results: the project is still economically viable with the PV benefit/cost ratio greater than 1 and economic IRR that exceeds 10% (Table 6).

Table 6. Economic Indicator Sensitivity Scenario: Costs increased by 15%

Key Economic Indicator	Results		Interpretation
	BCA 2012	BCA 2022	
NPV/30 years (USD million)	3	269	Net benefits exceed cost
IRR/30 years (10%)	11%	15%	Positive and greater than 10%
PV Benefit/Cost Ratio/30 years	1.1	1.32	Discounted benefit > Discounted Cost
Result: Three criteria indicate that the project is economically viable			

9. **Decrease in benefits and Increase in costs:** The 2012 BCA carried out a scenario analysis that concluded that, even with the Pessimistic Scenario (that reduced benefits by 8% and increased investment costs by 8% and O&M by 8% per year till 2042), the project remained viable. The present analysis also reached similar conclusions (Table 7)

Table 7: Scenario analysis of project economic analysis indicators

		BCA 2012 [Pessimistic scenario]	BCA 2022
Scenario	Increase in investment cost	8%	8%
	O&M cost increase till 2042	8%	8%
	Benefits decrease till 2042	8%	8%
Findings	NPV/30 years (USD million)	3	136
	IRR/30 years (10%)	11%	12%
	PV Benefit/Cost Ratio/30 years	1.1	1.15

FACTORS AFFECTING EFFICIENCY

10. **Efficiency reducing factors**: State PMUs reported a range of factors that hampered faster and more efficient project implementation, including the following (reporting state mentioned in parenthesis):

- Insurgency and security concerns: Civil work on gully erosion sites was restricted to only daytime (Borno). Insecurity concerns in Imo West (Orlu Zone) caused work to halt in affected sites (Imo), while they increased the costs of transportation to work sites (Niger). Construction work was stopped for 3-6 days as PAPs demanded additional compensation from contractors – culminating in the kidnapping of 2 expatriates that resulted in the closure of the site for three months (Plateau).

- Political upheaval: Imo has witnessed three changes in Government and having to deal with three different political parties directly slowed implementation at the Urualla project site (Imo). The forcible closure of work on Mondays due to political problems, prevented both local and especially, expatriate staff from moving about freely and delayed implementation and disrupted implementation timelines (Akwa Ibom, Abia, and Anambra).

- Weather extremes: Heavy downpour, runoff and floods during at least six months in a year affected construction (Abia, Anambra, Kogi, Enugu, Ondo, Ekiti), which consequently had to wait till the dry season – typically from December to May. Heavy rainfall affected slope stabilization and concrete works at Gully 1 at the Urualla site (Imo). Heavy rainfall and floods increased project costs because (1) poorly managed and broken drainages cause severe flooding and landslide; and (2) additional works becomes necessary in certain sites because flooding can negatively impact ongoing civil works if nothing is done (Anambra). Also, flood water had to be pumped out from all sites within water courses, causing delays (Ekiti). Droughts stunted the growth of grasses and planted trees (Enugu).

- COVID restrictions: COVID caused a slowdown in implementation (Anambra, Ondo, Enugu, Ekiti). Social distancing norms that had to be followed at work sites meant construction delays (Kogi) while restrictions on movement of goods and people during lockdowns affected the supply of raw materials to work sites (Kogi, Plateau, Delta). The senior management of the construction company engaged for the Urualla site flew out of the country during the COVID pandemic (Imo). Project deadlines were set back by almost a year on some sites (Anambra).

- Inflation: Increase in input prices (e.g., diesel, bitumen, cement) and input shortages slowed down civil work (Abia, Akwa Ibom, Borno, Sokoto, Niger), while the cost of earthwork was also increased (Nasarawa). Inflation led to cost disputes between the contractors and the project (Anambra).

- Stop Work Order: All civil work in Imo State was halted while the Bank conducted an audit into financial and other aspects of implementation and even after the SWO was lifted in January 2022, contractors have not reported for work as they had not been paid for work already done. Urualla site, in particular, has been badly affected and it is being rescoped currently as the original design cannot be completed before project closing on June 30, 2022.

- Procedural delays: Getting clearances caused delays in commencing work and when the scope of work had to be changed (Niger) while delays in getting ESMP approval slowed work (Ondo). Processes to be followed for community mobilization and engagement also caused delays (Katsina, Kano).

- Lack of training and delayed funds: Insufficient State PMU funds to support field Officers such as ESO, SLO, M&EO, PE, GIS, NRMO and Pilots during site visit for compliance monitoring and a lack of proper training by FPMU for SPC to understand safeguard issues on site affected the pace of work (Ondo). Delays in receiving funds (up to 6 months in some cases) led to the slowdown of work by contractors as uncertainties over the project finances impacted negatively on the ability and motivation of the contractors to execute critical works (Anambra).

11. **Efficiency enhancing factors**: When COVID 19 restricted field travel, there were around USD 553 million worth of contracts under implementation – requiring field visits to approve progress and authorize payments. NEWMAP used innovative technology - 360-degree Virtual Reality (VR) cameras, drones and satellite images - to remotely supervise field work, and allow USD 245 million worth of pending payments. According to the Federal PMU estimates, using digital tech during COVID times saved NEWMAP around USD 400,000 in avoided travel costs.

12. A major factor enhancing project efficiency, however, is the strong political support provided by state and central governments implementing NEWMAP. While a monetary indicator is the fact that State Governments contributed more than US$ 50 million in counterpart funding, the efficiency-enhancing support was evident in the more intangible ways in which the strong political support at the highest level of state and federal governments, and commitment of the State PMUs, helped the project achieve all project Result Framework indicators – including nearly double the target gully erosion sites (90 in place of 55) where erosion was successfully addressed.

EFFICIENCY ANALYSIS

13. **Assessment:** Despite severe challenges that delayed implementation, raised costs and disrupted project timelines, three conventional measures of efficiency measurement, i.e., NPV of net benefits, economic IRR and benefit/cost ratio, attest that project resources were efficiently used. While several challenges affecting efficiency were outside the control of project management (e.g., political factors, heavy rainfall, floods and droughts, inflation, insecurity), it is nonetheless true that avoiding procedural and funding delays, and providing adequate training. could have increased further the efficiency of resource utilization under NEWMAP.

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

NIGERIA EROSION AND WATERSHED MANAGEMENT PROJECT
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N/FPMU/ADM/003 T

18th April, 2023

Dr. Joy Iganya Agene,
Task Team Leader,
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NIGREIA EROSION AND WATERSHED MANAGEMENT PROJECT (NEWMAP)
IMPLEMENTATION COMPLETION AND RESULTS REPORT (ICR)

The above subject refers, please.

2. I wish to acknowledge receipt of the Implementation Completion and Results Report for the Nigeria Erosion and Watershed Management Project (NEWMAP).

3. Overall, the report provides a good assessment of the Project, showcasing results, successes and lessons learnt. We look forward to further engagements in the areas of environment and climate change.

4. Thank you and best regards.

Ayuba Y. Anda
National Project Coordinator

Assisted by: The world Bank Global Environmental Facility Trust Fund Special Climate Change Fund (SCCF)

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