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Report No: PADHI00470

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED CREDIT

IN THE AMOUNT OF US$500 MILLION
OF WHICH US$357 MILLION FROM SCALE-UP WINDOW-SHORTER MATURITY LOAN

TO THE

FEDERAL GOVERNMENT OF NIGERIA

FOR A

RURAL ACCESS AND AGRICULTURAL MARKETING PROJECT - SCALE UP

NOVEMBER 21, 2024

Transport Global Practice
Western and Central Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 31, 2024)

Currency Unit =	Nigerian Naira (NGN)
NGN 1643.25 =	US$1.00

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Ousmane Diagana
Regional Director:	Franz R. Drees-Gross
Country Director:	Ndiamé Diop
Practice Manager:	Jean François Marteau
Task Team Leaders:	Rakesh Tripathi, Rima Aloulou

ABBREVIATIONS AND ACRONYMS

AFD	*Agence Française de Développement* (French Development Agency)	**HDI**	Human Development Index
AFW	Western and Central Africa	**HEIS**	Hands-on Expanded Implementation Support
AM	Accountability Mechanism	**IDA or Association**	International Development Association
ARMP	Annual Road Maintenance System	**IDP**	Internally Displaced Person
ASLR	Accelerated Sea Level Rise	**IFR**	Interim Financial Report
CAAFS	Consolidated Annual Audited Financial Statement	**IPF**	Investment Project Financing
CERC	Contingent Emergency Response Component	**iRAP**	International Road Assessment Programme
CO_2	Carbon Dioxide	**Km**	Kilometer
CPF	Country Partnership Framework	**LT-LED**	Long-term Low-emission Development Strategy
CSO	Civil Society Organization	**M&E**	Monitoring and Evaluation
EIB	European Investment Bank	**MCA**	Multi-criteria Analysis
EIRR	Economic Internal Rate of Return	**MoU**	Memorandum of Understanding
ESCP	Environmental and Social Commitment Plan	**MTR**	Mid-term Review
ESF	Environmental and Social Framework	**NADF**	National Agriculture Development Fund
ESMF	Environmental and Social Management Framework	**NATIP**	National Agricultural Technology and Innovation Policy
ESMP	Environmental and Social Management Plan	**NC**	Northcentral
ESS	Environmental and Social Standard	**NDC**	Nationally Determined Contribution
FCT	Federal Capital Territory	**NGACP**	Next Generation Africa Climate Business Plan
FM	Financial Management	**NGN**	Nigerian Naira
FMAFS	Federal Ministry of Agriculture and Food Security	**NiRTIMS**	Nigeria Rural Transport Infrastructure Management System
FMoF	Federal Ministry of Finance	**NPV**	Net Present Value
FMWH	Federal Ministry of Works and Housing	**OP/BP**	Operations Policy/Bank Procedure
FPFMD	Federal Project Financial Management Department	**PAD**	Project Appraisal Document
FPMU	Federal Project Management Unit	**PDO**	Project Development Objective
FRSC	Federal Road Safety Corps	**PFMU**	Project Financial Management Unit
GBV	Gender-based Violence	**PHC**	Primary Health Care
GDP	Gross Domestic Product	**PIM**	Project Implementation Manual
GEMS	Geo-Enabling Initiative for Monitoring and Supervision	**PPSD**	Project Procurement Strategy for Development
GHG	Greenhouse Gas	**RAAMP**	Rural Access and Agricultural Marketing Project
GIS	Geographic Information System	**RAI**	Rural Access Index
GM	Grievance Mechanism	**RAMP-1**	Rural Access and Mobility Project Phase 1
GRS	Grievance Redress Service	**RAMP-2**	Second Rural Access and Mobility Project

RAP	Resettlement Action Plan	**SORT**	Systematic Operations risk Rating Tool
RARA	Rural Access Road Agency	**SPIU**	State Project Implementation Unit
RED	Road Economic Decision	**SRF**	State Rural Fund
RPF	Resettlement Policy Framework	**SRMP**	Security Risk Management Plan
RSSAT	Road Safety Screening and Appraisal Tool	**STEP**	Systemic Tracking and Exchanges in Procurement
SEA	Sexual Exploitation and Abuse	**TA**	Technical Assistance
SEP	Stakeholders Engagement Plan	**ToR**	Terms of Reference
SH	Sexual Harassment	**WBG**	World Bank Group

TABLE OF CONTENTS

DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Nigeria	Rural Access and Agricultural Marketing Project - Scale Up		
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P180640	Investment Project Financing (IPF)	Moderate	

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[✓] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[✓] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternative Procurement Arrangements (APA)	[ ] Hands-on Expanded Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
13-Dec-2024	31-Dec-2030
Bank/IFC Collaboration	
No	

Proposed Development Objective(s)

The project objective is to improve rural access and climate resilience of communities in targeted rural areas and strengthen institutional capacity for management of the rural road network and in case of an Eligible Crisis or Emergency, respond promptly or effectively to it.

Components

Component Name	Cost (US$)
Component A: Improvement of Resilient Rural Access	379,000,000.00
Component B: Climate Resilient Asset Management	158,000,000.00
Component C: Institutional Strengthening and Project Management	63,000,000.00
Component D: Contingent Emergency Response	0.00

Organizations

Borrower:	Nigeria		
Contact	Title	Telephone No.	Email
Stanley Nyeso George	Director, IERD	+12022038763	george.stanley@fmf.gov.ng
Implementing Agency:	Federal Ministry of Agriculture and Food Security		
Contact	Title	Telephone No.	Email
Aminu Mohammed	National Coordinator	08036110055	aminbod@yahoo.co.uk

PROJECT FINANCING DATA (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)? No

Is this project Private Capital Enabling (PCE)? No

SUMMARY

Total Operation Cost	**600.00**
Total Financing	**600.00**
of which IBRD/IDA	**500.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Development Association (IDA)	500.00

IDA Credit	86.00
IDA Shorter Maturity Loan (SML)	414.00
Non-World Bank Group Financing	
Counterpart Funding	100.00
Sub-borrower(s)	50.00
Borrower/Recipient	50.00

IDA Resources (US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
Scale-Up Window (SUW)	0.00	0.00	357.00	0.00	357.00
National Performance-Based Allocations (PBA)	86.00	0.00	57.00	0.00	143.00
Total	**86.00**	**0.00**	**414.00**	**0.00**	**500.00**

Expected Disbursements (US$, Millions)

WB Fiscal Year	2025	2026	2027	2028	2029	2030
Annual	50.00	100.00	150.00	150.00	50.00	0.00
Cumulative	50.00	150.00	300.00	450.00	500.00	500.00

PRACTICE AREA(S)

Practice Area (Lead)
Transport

Contributing Practice Areas
Agriculture and Food

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Moderate
8. Stakeholders	Moderate
9. Overall	Substantial

POLICY COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

ENVIRONMENTAL AND SOCIAL

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Relevant

ESS 10: Stakeholder Engagement and Information Disclosure	Relevant
ESS 2: Labor and Working Conditions	Relevant
ESS 3: Resource Efficiency and Pollution Prevention and Management	Relevant
ESS 4: Community Health and Safety	Relevant
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
ESS 8: Cultural Heritage	Relevant
ESS 9: Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

LEGAL

Legal Covenants

Sections and Description
Financing Agreement, Schedule 2, Section I.C.1: No later than ninety (90) days after the Effective Date, the Recipient shall prepare and adopt, and cause each Participating State to adopt, and thereafter maintain throughout Project implementation a Project Implementation Manual ("PIM") in form and substance satisfactory to the Association.
ESCP, 1.1: The Security Advisor will be hired no later than three months after effectiveness.

Conditions

Type	Citation	Description	Financing Source
Effectiveness	Financing Agreement, Article IV, Section 4.01 (a)	The Recipient and at least two (2) of the Participating States have executed a Subsidiary Agreement in accordance with the provisions of Section I.B of Schedule 2 to the Financing Agreement.	IBRD/IDA
Effectiveness	Financing Agreement, Article IV, Section 4.01 (b)	The Recipient and at least two (2) Participating States have (i) prepared terms of references for the external	IBRD/IDA

		audit satisfactory to the Association, (ii) assigned financial management and supporting staff to the Project, and (iii) deployed accounting software acceptable to the Association.	
Disbursement	Financing Agreement, Schedule 2, Section III.B.1 (b)	No withdrawal shall be made under Categories (1), (2), (3) and (5) for payments to any Participating State unless and until: (i) the respective Participating State has entered into a Subsidiary Agreement with the Recipient in accordance with the provisions of Section I.B of this Schedule 2; and (ii) the respective Participating State has prepared and adopted a state-level Security Management Plan satisfactory to the Association.	IBRD/IDA
Disbursement	Financing Agreement, Schedule 2, Section III.B.1 (c)	No withdrawal shall be made under Category (4) unless and until the National Agricultural Development Fund (Establishment) Act 2022 has been duly amended, in form and substance satisfactory to the Association, to include rural road access to the NADF's mandate, enabling the NADF to finance rural roads.	IBRD/IDA

I. STRATEGIC CONTEXT

A. Project Strategic Context

1. Nigeria possesses substantial untapped economic potential as Africa's most populous country (population greater than 218 million) and the continent's largest economy with Gross Domestic Product (GDP) of approximately US$472 billion in 2022. Fueled by abundant resources, a vibrant private sector, and a youthful and entrepreneurial populace across a federation of 36 autonomous states, Nigeria has the capacity to become a prominent global economic player. However, despite these prospects, the country faces significant challenges, including stagnant economic growth.[1]

2. Weakening overall growth performance has made it significantly harder to reduce poverty. Between 2015 and 2020, the number of poor Nigerians rose from 68 million to over 82 million in 2020, and currently, over 40 percent of Nigeria's population live in poverty and are disproportionally rural.[2] Moreover, Nigeria houses the world's second-largest population of people living in extreme poverty and ranks 163 out of 191 countries on the most recent Human Development Index (HDI) report[3], highlighting its status as one of the least developed nations globally. In terms of gender inequality, the country is ranked 165th out of the same number of countries according to the Gender Inequality index (2022) by UNDP, with maternal mortality ratio and adolescent birth rate being key contributors to this ranking. As such, Nigeria is central to the World Bank Group (WBG)'s mission of eliminating poverty globally.

3. Despite a modest recovery from the COVID-19 pandemic in 2021, the Nigerian economy lost momentum in 2022 and 2023. GDP growth halved from an average of 7.7 percent between 2000-2009 to 3.6 percent from 2010 to 2019 as a result of weaker economic fundamentals and lower oil prices. In 2020, the impact of COVID-19 and the associated global oil price shock was severe, with output contracting by 1.8 percent (-4.4 percent in per capita terms). While growth rebounded to 3.6 percent in 2021, growth slowed to 3.3 percent in 2022 and further to 3.1 percent by Q3 2023. This most recent deceleration was driven by weak oil production along with a disruptive currency demonetization policy that took effect in Q1 2023, adversely affecting non-oil industrial and service sectors and the construction industry.

4. Recognizing the need to change course, the new administration, taking office in May 2023, has undertaken bold reforms to restore economic fundamentals for inclusive growth. The Nigerian Government officially removed an increasingly costly, opaque, and regressive gasoline subsidy that amounted 2.2 percent of GDP in 2022, alongside adopting major exchange rate policy reforms to address the previous overvaluation of the official exchange rate[4]. The new exchange rate policy regime centers around a unified rate with transparent, market-reflective pricing, and is expected to contribute to macroeconomic stability and support new prospects for inclusive and sustainable growth.

5. Nigeria is highly vulnerable to the impact of natural hazards and climate change. Nigeria ranks 152 out of 187

[1] Between 2001 and 2014, Nigeria was a rising economy in West Africa, with an average growth rate of 7 percent per year. This ended in 2015 due to: (i) a decline in oil prices; (ii) increased insecurity; (iii) a reversal of macroeconomic reforms and heightened unpredictability of economic policies; and, more recently, (iv) the adverse effects of the COVID-19 pandemic.

[2] "World Bank. 2022. A Better Future for All Nigerians: Nigeria Poverty Assessment 2022. Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/37295 License: CC BY 3.0 IGO."

[3] UNDP (United Nations Development Programme) 2022. Human Development Report 2021/2022: Uncertain Times, Unsettled Lives; Shaping our Future in a Transformative World. New York.

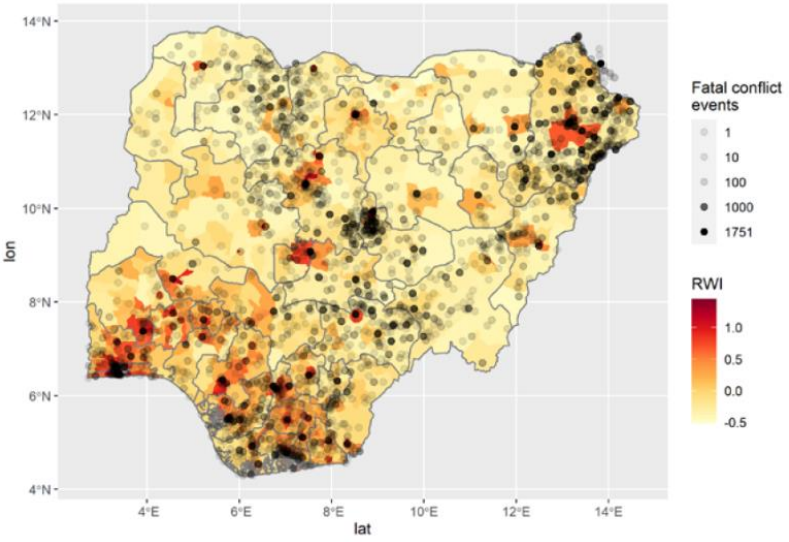
[4] In recent years, the Central Bank of Nigeria (CBN) maintained more than ten foreign exchange (FX) windows, with different price discovery mechanisms, and heavily managed the official Nigerian Autonomous Foreign Exchange Rate Fixing (NAFEX). This severely limited FX supply at the official rate, pushed economic agents into a parallel market to meet their FX requirements, and generated arbitrage and rent-seeking opportunities. In June 2023, the CBN unified the multiple exchange rates by collapsing the Foreign Exchange (FX) windows into the Investors and Exporters (IEFX) window and announced that market-reflective pricing based on genuine willing-buyer willing-seller transactions would be restored. Almost immediately, this caused the official and parallel market rates to converge, and the Nigerian Autonomous Foreign Exchange Fixing (NAFEX) rate adjusted up from 472NGN/US$ to 768 NGN/US$ (as of July 20, 2023), a depreciation of 39 percent.

countries on the Notre Dame GAIN Index[5], indicating high exposure and sensitivity and low ability to adapt to the negative impacts of climate change. The country's exposure to climate change related hazards varies by region and state. Coastal states face risks from high storm surge and the Niger Delta region faces considerable risks from inland flooding, and wildfires. In the northern part of Nigeria, drought is exacerbating already severe cases of extreme land degradation and speeding desertification where aridity and climate change are causing significant disruption. As the risk and intensity of flooding increases in some states, the central and eastern parts will experience increased aridity and drought.

6. **Climate change also puts the entire country at an increased risk of extreme events.** For example, the 2012 floods affected 7 million people in 30 of the 36 states, killing 363 people and displacing 2.3 million people. The cost of this single event for the economy was US$17.3 billion or 1.4 percent of GDP. In 2018, large floods affected 12 states, impacting 2 million people, causing 199 deaths and injuring 4,000 people, and displacing 600,000 people.[6] The risk of such events will continue to rise with climate change due to projected increases in temperatures and rainfall variability. Climate change related hazards can have severe implications for livelihoods, resulting in infrastructure damage and loss of connectivity, harvest and post-harvest losses, water scarcity in some regions and increased food insecurity, famine, population displacement, conflicts, and biodiversity loss. Climate inaction could cost Nigeria between 6 and 30 percent of GDP by 2050, equivalent to a loss of US$100–460 billion.[7]

7. **Alongside increasing climate shocks, conflict events have proliferated, displacing populations, disrupting markets, and interrupting livelihoods, further hampering efforts to reduce poverty (Figure 1).** Fatal conflict events have become more widespread across Nigeria in the past two decades, especially in the country's north. This corresponds with the onset of the Boko Haram insurgency in 2009 in the Northeast (NE) region, the rise of criminal gangs and banditry in the Northwest (NW) region, and farmer-herder conflicts, inter-communal wars, and boundary disputes in the Northcentral (NC) region. As a result of these conflicts and natural events, Nigeria has one of the largest and fastest-growing populations of internally displaced persons (IDPs) in the world. According to UNHCR, as of November 2021, conflict has pushed around 3 million Nigerians out of their homes, especially in the North of Nigeria and the country's middle belt[8].

Figure 1: Overlap between conflict and poverty in Nigeria



Source: World Bank, Nigeria Poverty assessment 2022

8. **Periodic droughts and floods, deepened insecurity, and rising inflation have also had an adverse impact on agriculture output in Nigeria and exacerbated food insecurity, especially in more isolated rural areas.** According to the World Food Organization (WFO), over 26.5 million people across the country are projected to face acute hunger by August 2024, relative to 18.6 million people at the end of 2023[9], most of them are vulnerable women and children.

[5] ND GAIN Index, Consulted on 19th November 2024. URL: https://gain.nd.edu/our-work/country-index/rankings/
[6] Nigeria's Nationally Determined Contribution; July 2021. Available at the URL.
[7] Climate Risk Country Profile – Nigeria. World Bank Group. URL: https://climateknowledgeportal.worldbank.org/sites/default/files/2021-07/15918-WB_Nigeriapercent20Countrypercent20Profile-WEB.pdf
[8] https://www.unhcr.org/ng/idps
[9] https://www.wfp.org/countries/nigeria

9. The outlook for Nigeria's growth will depend on continued implementation of macro-fiscal and inclusive structural reforms. Growth is expected to remain above population growth in 2023–2025, averaging 3.4 percent, higher than the average of 1.4 percent in 2015-2022. However, the projected recovery is threatened by: (i) the impact of the Russia's invasion of Ukraine on the global economy; (ii) lower-than-expected oil production or inability to ramp-up non-oil revenues quickly; (iii) increased insecurity; and (iv) unilateral food export bans and climate events. The authorities can boost growth by sustaining the ongoing reform momentum and addressing structural barriers to growth such as building infrastructure, reducing trade restrictions, and improving delivery of public services.

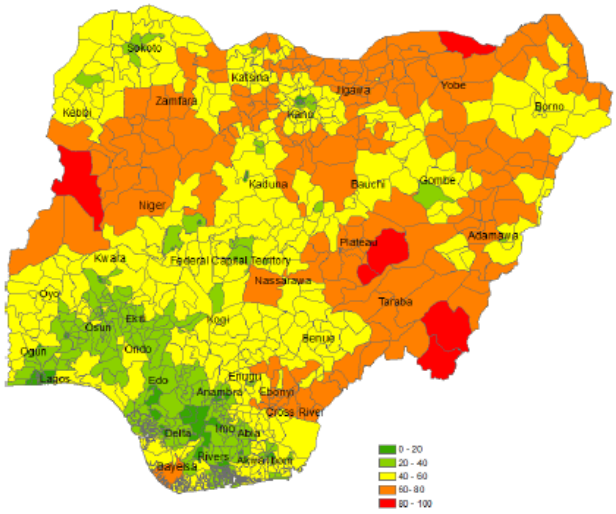
B. Sectoral and Institutional Context

10. Nigeria has poor infrastructure, especially its rural road network. The World Economic Forum's Global Completeness Report of 2021 ranked Nigeria 125 out of 137 countries in infrastructure. According to the National Bureau of Statistics, the transport sector contributed about 2.1 percent to GDP in 2021. Road Density is estimated at 22 km per 100 square kilometers (sq. kms.); this density is below a sixth of that of India (142 km per 100 sq. kms.), despite having slightly lower gross national income per capita (US$1,880 in 2017 against Nigeria's US$2,100). The World Bank estimated (2018), Nigeria's Rural Access Index (RAI) at 25.5 percent as a measure of the proportion of the rural population living within two kilometers of an all-season road. This means approximately over 40 percent of Nigeria's rural population (estimated at roughly 100 million people) do not have access to a road network.

11. Roads account for over 90 percent of passenger and freight movements. Notwithstanding the heavy reliance on road networks, only 30 percent of the Nigeria's road network[10] is paved, and an overwhelming majority are in poor condition. The inadequacy and poor quality of road infrastructure constitutes a major bottleneck for Nigeria's development. Rural roads serve vulnerable rural communities and support the non-oil sector, but they are underfunded and neglected.

12. Nigeria loses up to 25 percent of farm produce due to lack of access to markets, among others. As illustrated by Figure 2, due to the very poor condition of rural roads, people and businesses are limited by spatial remoteness, poor connectivity and post-harvest loss of agricultural produce. Despite efforts deployed over the past decade, Nigeria's investment in transport infrastructure is grossly inadequate. The 2015 infrastructure master plan recommends an average investment of US$25 billion per year over a 30-year period, which has not materialized. In addition, road maintenance is limited to the paved road network and often done on an ad-hoc basis, further hampering road conditions.

Figure 2: Lagging Index (combining lack of Market Access, Lack of economic activity and low living condition standards)



Source: World Bank -Triangulating Inclusive growth in Nigeria, 2017

13. Rural roads play a critical role in connecting agricultural land to market infrastructure, thereby helping to improve food security. As such, rural road interventions enable socioeconomic development for isolated areas and act as a catalyst for creation of growth centers. Available evidence demonstrates that such interventions result in improved access to market—leading to increased volume of traded agricultural products, farm gate prices and household income,

[10] 40 percent of the federal roads, 78 percent of state roads and 87 percent of rural roads were in poor condition in 2017-Systematic Country Diagnostic (SCD) 2020.

along with reductions in post-harvest losses. This evidence also showcases that improving access to markets via rural roads creates jobs (generating non-farm income) and lowers the cost of inputs. These interventions also have a disproportional impact on lowering transport costs for rural Nigerian women who are more severely impacted by travel and transportation constraints[11].

14. Inadequate financing and unclear institutional architecture have led to undefined ownership and permanently poor conditions for rural roads. Federal, state, and rural roads are each the responsibility of the Federal Ministry of Works and Housing (FMWH), state ministries of works, agriculture, rural development or transport (depending on the state institutional architecture), and local governments, respectively. States focus on higher level roads (urban roads and state highways) and conduct limited maintenance only on the paved road network. At the state level, maintenance and management of rural road assets lack clear institutional ownership and dedicated funding mechanisms. In addition, state level roads lack appropriate classification, which creates confusion and, sometimes, leads to inefficient use of scarce resources.

15. Climate change already impacts agricultural value chains and rural connectivity, with associated risks expected to increase. Nigeria's Nationally Determined Contribution (NDC)[12] identifies agriculture as one of the sectors most sensitive to the impact of climate change due to decreasing rainfall levels, variable rainfall patterns, limited irrigation systems, and poor access to markets and inputs like fertilizers. Agriculture activities and rural infrastructure (e.g., rural roads and bridges, markets, storage facilities, schools, and clinics) are already being impacted by rising temperatures and extreme weather events, both of which are expected to intensify with climate change.

16. Roads in Nigeria are vulnerable to climate change impacts in several ways. High temperatures cause road pavements to soften and expand, leading to pavement rutting and cracks, particularly when used by heavily loaded vehicles. Thermal expansion causes damage to joints in bridges and flyovers. Vehicles become susceptible to overheating, especially on unpaved roads. In addition, increased rainfall intensity, floods and dissolved salt in flood water undermine asphalt pavements, resulting in potholes, deterioration of road concrete, and damage to concrete culverts, curbs, and road embankments. All these lead to an increase in maintenance and road asset management costs.

17. Nigeria faces substantial road safety challenges, which requires to be addressed at federal level. These challenges are evidenced by high rates of road crash fatalities and injuries. According to the World Health Organization (WHO) Global Status Report on Road Safety 2021, Nigeria ranks among the countries with the highest road crash records with 36,722 estimated total road traffic fatalities, equivalent to 17.2 fatalities per 100,000 population. Furthermore, statistics from the Federal Road Safety Corps (FRSC) indicate that Nigeria recorded over 6,205 road traffic deaths and 38,037 injuries in 2021 alone.

18. Nigerian children under the age of 15 account for over 40 percent of road traffic disabilities. About 41.2 percent of all road traffic disabilities, and 34.3 percent of all road traffic injury fatalities are children[13]. The estimated annual cost of crashes involving Nigerian children under the age of 15 may be as high as US$10 billion[14]. Younger children are more likely to be accompanied by an adult either as pedestrians or as passengers in a vehicle. Older children have increased independent mobility, particularly as pedestrians and cyclists. The Nigerian Child Road Safety Strategy 2030 aims to reduce infant and child mortality on the road. Ensuring children are safe while travelling to and from school is of paramount

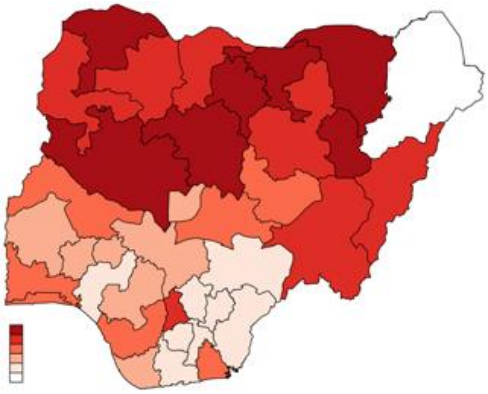
[11] World Bank SSATP Country Report 10: Nigeria. https://www.ssatp.org/sites/ssatp/files/publications/HTML/Gender-RG/Source%20%20documents/Technical%20Reports/GRTI%20Reports/TEGRT12%20Country%20Report%2010%20Nigeria.pdf
[12] Nigeria's Nationally Determined Contribution; July 2021. Available at the URL.
[13] Nigerian Child Road Safety Strategy to 2030.
[14] Ibidem

importance to achieving this objective since children are most at risk as pedestrians, passengers, and on motorcycles. This particularly impacts girls, who generally have access to fewer educational opportunities, especially in the North of Nigeria[15].

19. Gender gaps in access to basic services such as health services, especially maternal care remain a challenge in Nigeria, particularly rural areas due to poor road infrastructure. Maternal mortality is very high, with one of the highest maternal mortality rates worldwide after India.[16] Nigeria's maternal mortality rate is also higher than the regional average; 1,047 women per 100,000 die due to pregnancy-related causes compared to a regional average of 536 based on 2020 data.[17] This accounts for over one quarter of all estimated global maternal deaths in 2020. This situation is even more dire in rural Nigeria—where the health care system is poor and overstretched, compounded by high poverty levels and poor rural roads connecting villages to maternal health centers. Geography and physical challenges, among others, are underlying causes of such deficiencies, including remote and hard-to-reach villages with poor road infrastructure.

20. Access to employment in the road sector is limited for women. Women represent only 3.43 percent of the transportation, storage and communication sector workforce according to 2022 data from the International Labor Organization (ILO)[18]. Low representation of women in the sector is primarily due to the low supply of women equipped with appropriate technical skills to perform medium and high skilled jobs in the sector, along with social norms dictating what jobs are considered suitable for women. The World Bank new Gender Strategy 2024-2030[19] refers to the transportation sector as one of the key enabling services that could contribute to enhanced human capital and increase women's participation in the labor market. In addition, gender-responsive interventions can help narrow gender gaps in access to economic opportunities.

Figure 3: Gap between the share of women and men working



Source: World Bank, Nigeria Poverty assessment 2022

21. Improved rural roads will reinforce economic and social inclusion of beneficiary communities by increasing access to markets and socio-economic infrastructure, especially in geographic areas more vulnerable to conflict and food security. Such interventions are likely to enable socioeconomic development, allowing some localities to become catalysts for the creation of growth centers. Available evidence on such interventions demonstrates that improved rural roads increase the volume of marketed agricultural products, thereby increasing farm gate prices and reducing post-harvest losses, finally resulting in higher household income and improved food security. This evidence also demonstrates that improved access to markets creates jobs (generating non-farm income) and lowers the cost of inputs, along with lowering transport costs for rural Nigerian women, who tend to be more severely impacted by travel and transportation constraints[20].

C. Relevance to Higher Level Objectives

22. The project is in line with the World Bank's Country Partnership Framework (CPF) for Nigeria for the period of

[15] Project Appraisal Document Adolescent Girls Initiative for Learning and Empowerment. file:///C:/Users/wb603675/Downloads/Nigeria%20-%20Adolescent%20Girls%20Initiative%20for%20Learning%20and%20Empowerment%20Project.pdf
[16] Factors influencing maternal mortality among rural communities in southwestern Nigeria. National Library of medicine, 2017. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5396940/
[17] World Bank gender data portal. https://genderdata.worldbank.org/countries/nigeria
[18] ILO Statistics, 2022. https://www.ilo.org/shinyapps/bulkexplorer45/?region=AFRICA&lang=en&segment=indicator&id=EAP_2WAP_SEX_AGE_RT_A
[19] https://www.worldbank.org/en/topic/gender/brief/gender-strategy-update-2024-30-accelerating-equality-and-empowerment-for-all
[20] *World Bank SSATP Country Report 10: Nigeria. https://www.ssatp.org/sites/ssatp/files/publications/HTML/Gender-RG/Source%20%20documents/Technical%20Reports/GRTI%20Reports/TEGRT12%20Country%20Report%2010%20Nigeria.pdf*

FY 21-FY25 (Report No. 153873-NG) and fully supports the AFW regional strategy (2021-2025) and World Bank's Next Generation Africa Climate Business Plan (NGACP), 2020-2026.[21] The project promotes (i) economic transformation and inclusive growth with more and better jobs; (ii) enhanced climate resilience of critical road infrastructure to enable year-round access to basic social services and markets; and (iii) reinforced institutional capacity to manage climate risks. As such, the project aims to support a climate-resilient road network, enhance maintenance protocols, sustainable financing of the sub-sector and strengthen planning and climate and disaster risk management.

23. Decentralizing road maintenance reforms is essential for Nigeria's economic recovery and sustainable development. According to lessons learned from the 2024 Performance and Learning Review (PLR) have shown that improving operations and maintenance at the state level can be effective in delivering results, improving ownership, and enhancing accountability. Moreover, state-level reforms were reported to showcase feasibility before extending these reforms nationally.

24. Supporting Nigeria's sustainable development is also intertwined with the WBG's mission of eliminating poverty globally and promoting shared prosperity on a livable planet. The project is well aligned with the World Bank's Global Corporate Priorities. For example, the project will support improved food security by enabling farmers to better access agricultural market services and inputs like fertilizers. As such, the project contributes to agro-business development with both backward and forward linkages, in addition to stimulating future private investment.

25. The RAAMP scale-up will continue to serve isolated and underserved rural areas. The project will reinforce economic and social inclusion of beneficiary communities by increasing access to market services and jobs nationwide. This will have a particular impact in fragile geographic areas, thereby contributing to a more positive state presence and wider stability within a fragile context.

26. The ongoing RAAMP Project (P163353) is currently the main capital funding source for the rural road network, serving 44 percent of the population (WBG Data 2021)[22]. As such, the RAAMP SU will play a significant transformational role in addressing structural barriers, notably building road infrastructure and improving its sustainability in participating states.

27. The project is intended to implement locally led adaptation interventions to enhance inclusion, participation, and empowerment of local stakeholders to respond better to climate impacts. Building on the achievements and lessons learned from previous rural roads projects in Nigeria, the scale-up intends to (i) strengthen the climate resilience of the roads and infrastructures to be implemented; (ii) enhance federal and state level capacity to identify climate risks; and (iii) build preparedness to deal with these risks. In addition, this scale-up project introduces new institutional reforms at both the federal and state levels to enable integration and enhancement of climate adaptation and resilience actions with regard to road asset management.

28. The project will support the Government's National Agricultural Technology and Innovation Policy (NATIP 2022-2027). The NATIP aims to develop end-to-end value chain solutions and highlights the importance of an integrated approach for rural infrastructure development and strengthening value chains. Inadequate and costly transport infrastructure, including rural transport, is one of the major constraints identified in the policy document. To fully realize the country's agricultural potential, this project aims to support the policy aims of the government by addressing infrastructure challenges, thereby reducing post-harvest losses and tackling rural transport and market access issues—in sum, unlocking untapped economic potential.

[21] Next Generation Africa Climate Business Plan. World Bank 2020. Available at: https://www.worldbank.org/en/programs/africa-climate-business-plan/reports
[22] https://data.worldbank.org/indicator/SP.RUR.TOTL?locations=NG

29. The project is consistent with Nigeria's climate change policies and strategies, namely Nigeria's NDC[23], the 2050 Long-Term Vision for Nigeria (LVT-2050)[24], and Nigeria's Long-term Low-emission Development Strategy - 2060 (LT LEDS)[25]. The project contributes to the NDC adaptation goals by enhancing climate resilience of rural agricultural communities through enhanced rural connectivity, improved access to climate-resilient infrastructure, and improved access to water resources for irrigation (by adopting the "Green Roads for Water" concept in relevant road segments). The project also contributes to greenhouse gas (GHG) emissions mitigation objectives and targets defined in the NDC through deployment of non-motorized transport facilities, street lighting, and nature-based solutions that deliver on both mitigation and resilience objectives. The project also advances implementation of the LVT-2050 and LT LEDS by mainstreaming adaptation into transport planning and decision making, improving connectivity both within rural areas and between rural and urban areas by supporting year-round access to climate-resilient transport options, and strengthening climate resilience of agricultural value-chains.

Synergies with rural accessibility programs and projects

30. The World Bank has supported the rural road agenda in Nigeria since 2007 over three projects, including the Rural Access and Mobility Project Phase 1 RAMP-1 (P072644), the Second Rural Access and Mobility programs or RAMP-2 (P095003), and the ongoing Nigeria Rural Access and Agricultural Marketing Project (RAAMP, P163353) financed by the World Bank and the French Development Agency (*Agence Française de Développement*, AFD). To-date, the ongoing RAAMP project has achieved major milestones in supporting the reform agenda among the 19 participating states. All 19 states have placed the bill establishing the State RARA (Rural Access Road Agency) and SRF (State Road Fund) in their respective assemblies, while 15 have passed this bill and established it into law. Currently, around 3,500 km of rural roads and 29 agro-logistical centers are being implemented under the ongoing RAAMP project.

31. The current RAAMP project is part of a larger program[26] [27]at the Ministry of Agriculture level, with a range of interventions, involving rural roads, agricultural marketing, construction and marketing of agro-logistical centers, and other agricultural initiatives. Various donors such as the European Investment Bank (EIB), AFD, etc. are assisting the government on a number of initiatives within this realm. Given the vast need for rural roads in a country as large as Nigeria, these projects have had a limited impact across the 200,000 km of rural road network.

32. The proposed RAAMP-SU operation has a comparative advantage in focusing on the reform agenda and building sustainable institutional capacity for rural roads, alongside improving rural climate resilience with construction and maintenance of additional rural roads. Thus, the RAAMP-SU investments are focused on establishing and accelerating sector reforms to ensure rural road sustainability. Additional initiatives related to agriculture, food security, etc. will continue to be supported via other programs under the Ministry of Agriculture and development partners. The RAAMP SU design also incorporates lessons learned from these preceding projects and leverages gains already y made through this support. In addition to onboarding additional states into the rural accessibility program, the RAAMP SU will have a significant transformational role in addressing structural barriers, notably improving sustainability of the rural road network.

33. Furthermore, RAAMP SU will support the Nigerian Child Road Safety Strategy (2030) through implementation of the Safe Access to Schools initiative[28] for education facilities identified along the rural roads to be rehabilitated and

[23] Nigeria's Nationally Determined Contribution; July 2021. Available at the URL.
[24] 2050 Long-Term Vision for Nigeria (LTV-2050) Department of Climate Change, Federal Ministry of Environment, Nigeria. November 2021. Available at URL.
[25] Nigeria's Long Term Low Emission Development Strategy – 2060. Information on the launch at URL.
[26] Government's National Agricultural Technology and Innovation Policy (NATIP 2022-2027)
[27] Nigeria's Agriculture promotion policy (2016-2020)
[28] https://starratingforschools.org/

maintained. The project will also support institutional strengthening for the FRSC to address national road safety challenges, along with supporting Nigeria's road safety agenda and reducing infant and child mortality.

II. PROJECT DESCRIPTION

A. Project Development Objective

34. **The Project Development Objective** is to improve rural access and climate resilience of communities in targeted rural areas and strengthen institutional capacity for management of the rural road network and in case of an eligible crisis or emergency, respond promptly or effectively to it.

35. **Project support to institutional reforms: As part of its eligibility criteria, the project will support critical institutional reforms to improve institutional arrangements and provide sustainable funding for rural roads.** At the federal level, creation and operationalization of the Rural Roads Directorate under the National Agriculture Development Fund (NADF) is a prerequisite for project financing. This will ensure institutional anchoring and sustainability of the rural road network. At the state level, all 36 states and the Federal Capital Territory (FCT) are eligible to participate in the RAAMP-SU project if they meet the following criteria: (i) States will have to demonstrate that the bill to create the state RARA and SRF has been passed into law, with appointed boards and staff, and that these have both received an allocation in the state budget for at least one year; and (ii) State and federal counterpart funding are also required to be 10 percent each, respectively, alongside project financing (80 percent). Setting these institutional reforms as eligibility criteria to access funds under the RAAMP-SU places the reform agenda front and center, thereby enabling a more sustainable rural road sector. States which meet the minimum eligibility criteria at effectiveness will receive a US$20 million allocation which must be committed within two years. If this allocation is not fully committed, this budget will be reallocated to states which have demonstrated implementation readiness. An annual review of the program will be conducted to calibrate programming amounts depending on the increase in number of eligible states, and project readiness in eligible states. In addition, two years from effectiveness, financing not yet allocated will be directed to participating states with demonstrated implementation performance on top of the initial US$20 million. This shall ensure optimal disbursements for the project to meet its development objectives.

Project Development Objectives (PDO) Level Indicators

36. The following key results will measure progress toward achieving the PDO in participating states:

a) Improved Rural Access
- Direct users that benefit from improved access to sustainable transport infrastructure and services (number of people, of which women and youth) (Corporate Scorecard Indicator).

b) Improved climate resilience of communities in targeted rural areas[29]
- People benefitting from climate-resilient infrastructure (number of people) (Corporate Scorecard Indicator)
- Participating states with enhanced climate resilience planning, preparation, surveillance and/or response (percentage)

c) Strengthened institutional framework for rural road network management
- Rural road sector reforms adopted at national level (number)

[29] This is to be achieved through resilient infrastructure.

- Participating states with enhanced road asset planning and management systems (at state level) (percentage)

B. Project Components

37. Component A: Improvement of Resilient Rural Access (US$379 million). The aim of this component is to ensure year-round rural access to socio-economic services, agriculture markets and job opportunities through the rehabilitation[30]/upgrading[31] of selected rural roads and their resilience to climate change impacts in participating states. The component is comprised of three subcomponents.

38. Subcomponent A.1: Climate-informed Rural Roads Rehabilitation/Upgrade (US$350 million). About 3,000 km of rural roads to and from socio-economic community infrastructure will be rehabilitated or upgraded by the project; to enhance resilience of the rural road network to climate change impacts and ensure year-round connectivity. Road safety considerations will be integrated into the road design and implementation (see paragraph 49).

39. Selection criteria will follow a two-stage process to prioritize state commitments to institutional reform. In addition to the base eligibility criteria for states to participate in the RAAMP-SU (paragraph 35), roads will be prioritized and selected using a multi-criteria analysis (MCA). The MCA includes climate change considerations (e.g., hazard levels, exposure and vulnerability of the rural roads), access to social and economic infrastructure and ancillary assets, and level of population served, detailed in paragraph 42b. Rehabilitation works include climate resilience and flood protection measures, such as repairing and strengthening of bridges and culverts, slope stabilization, erosion protection improvements, road surface repairs, or resurfacing and other engineering solutions. As much as possible, the project will adopt technical considerations to (i) rapidly capture flood waters and (ii) facilitate water flows from surface and drainage of the main and upstream to recycle them into agriculture activities. The project will also explore techniques from the Green Roads for Water approach and any additional physical measures, as needed (see Annex 7). The envisaged civil works will also focus on local resource-based solutions and materials that are compatible with the local context and conditions.

40. Subcomponent A.2 *(US$27 million). Supplemental Technical Support for Rural Roads Rehabilitation/Upgrade* required for the successful implementation of subcomponent A.1. including: (a) support to ensure high-quality technical design (including consulting services for incorporating nature-based solutions and “Green Roads for water” approach), environmental and social safeguards instruments, and bidding documents for project related activities; and (b) monitoring and supervision of the implementation of the civil works, including the Occupational Health and Safety plan and Road Safety Management during works.

41. Subcomponent A.3: Support for Social Inclusion *(US$2 million)* will be fully integrated into the project through the establishment of an apprenticeship program within the RARAs to train young men and women, with a particular focus on gender inclusion and defined indicator on female participation. As part of the program, participants will be provided a stipend complemented by a mandatory rotation within several departments of the institution and mentorship by senior engineers. A non-binding Memorandum of Understanding (MoU) between the RARAs, several engineering universities and contractors will be signed to facilitate the school to work transition.

[30] Rehabilitation of unpaved roads with high potential of attracting more traffic axle load vehicles after works access to markets and areas of high socio-economic activities. Depending on the detailed design, the rehabilitation works will consist of but not limited to (i) provision/reinforcement of subgrade, sub-base and base; (ii) provision of adequate surfacing in double coat bituminous of asphalt, (iii) provision of cross/access culverts and slabs, (iv) provision of adequate drainage and when applicable improve access to water resources for irrigation as well as enhancement of the road’s safety.

[31] Upgrading of roads in poor physical condition from long-term lack of maintenance and with high socio-economic value. Depending on the detailed design, the upgrading works will consist of but not limited to (i) reinforcement of subgrade, provision of sub-base and base; (ii) provision of adequate surfacing in single or double coat bituminous; (iii) provision of cross/access culverts and replacement of failing ones, (iv) provision of drainage as well as enhancement of the road’s safety.

42. States Selection, Roads Prioritization and Selection criteria: State selection and prioritization of rural roads to be rehabilitated and/or upgraded under the project will follow a methodology as described in the following tiered approach:

a) States selection (stage 1): All 36 States and FCT are eligible to participate in RAAMP-SU if they meet predefined criteria (paragraph 35). This approach incentivizes states to commit to institutional reforms and bring sustainable federal and state counterpart funding to the project. (See Annex 2 and Annex 3 -Figure 3.2).

b) Roads Master Plan (Long list) and MCA (stage 2). Eligible states will prepare a long list of candidate rural roads based on their specific needs and respective rural communities in collaboration with the Federal Ministry of Agriculture and Food Security (FMAFS). Associated socio-economic and climate vulnerability data along with a local climate risk assessment will be collected for each candidate road to conduct a MCA around three main criteria. The NiTRIMS system enables states to prioritize and select road investments according to the MCA (socio-economic and climate vulnerability data) noted above. This system has already been rolled out in the 19 states participating in the current RAAMP project, and the remaining states are eligible to request support in implementing this system. The recommended MCA criteria and their respective weights (in percentage) are economic (35 percent), social (25 percent), and climate vulnerability (40 percent), subject to state-specific considerations. Sub-criteria include number of beneficiaries served, projected traffic, average yearly tonnage of agricultural products transported on the road, number of markets and agricultural facilities served by the road, number of basic social services served by the road (Primary Health Care (PHC), schools, and administrative facilities), climate vulnerability of candidate roads and served areas, and potential reduction in GHG emissions. The highest-ranking candidate roads totaling about 3,000 km will be included under the project, where a Road Safety Assessment and Appraisal (using World Bank Road Safety Screening and Appraisal Tool (RSSAT)) will be carried out for these highest-ranking roads before selection is finalized. Details on state eligibility and road prioritization criteria are shown in Annexes 3 and 4.

43. The project will build climate resilience of road infrastructure and ancillary assets, and in doing so, of served communities. By actively targeting roads serving areas with higher vulnerability to climate risks (higher temperatures, droughts, excessive rainfall, etc.), the project will deploy adaptation measures for increased resilience and help adapt to and manage risks related to water scarcity, and agricultural productivity losses in these areas. All road infrastructure financed by the project will also improve climate resilience and incorporate additional physical adaptation components (drainage, food storage, shading, etc.) at the local level, as needed. Moreover, as part of the institutional support for rural road management, the project will build capacity in RARAs to conduct climate and disaster risk assessments as well as incorporating climate considerations in the decision-making criteria of these entities.

44. Additionally, the proposed interventions on rural roads (rehabilitation and upgrade) may exacerbate road safety concerns. Without adequate road safety measures, improvement of road infrastructures often leads to an increase in average vehicle speeds, thereby heightening the risk of road crashes. To address this imminent challenge, the project will conduct a road safety appraisal through RSSAT and integrate a comprehensive road safety audit, drawing on methodologies endorsed by international road safety organizations. Road safety audits will identify critical safety measures tailored to the unique rural road conditions in Nigeria. The project prioritizes several key safety interventions based on best practices such as adopting effective speed management strategies, including implementation of speed limits and traffic calming measures, dedicated pedestrian walkways, raised pedestrian crossings, marked facilities for bicyclists and motorcyclists, and installation of roundabouts at community centers crossed. These measures have been proven to enhance road safety and minimize the risk of road traffic crashes and fatalities.

45. Component B: Climate-Resilient Asset Management *(US$158 million).* The aim of this component is to carry out climate-informed maintenance activities to enhance resilience of the rural road network, building on sector and institutional reforms established by the previous project, and to establish and enhance climate-resilient road asset

management using the established NiTRIMS[32] system in newly established state road authorities (RARAs).

46. Subcomponent B.1: Asset Management Improvement and Resilience Scale up *(US$155 million).* This subcomponent will finance: (a) climate-risk informed routine and periodic maintenance of 3500 km of rural roads identified through the Annual Road Maintenance system (ARMP) by established RARAs in participating states (as noted under component A); (b) technical design, environmental and social safeguards instruments, and bidding documents for project related maintenance activities; (c) monitoring and supervision of the implementation of maintenance works.

47. Roads to be selected for routine and periodic maintenance will be identified within the Annual Road Maintenance Plan (ARMP) generated yearly by the established road asset management tool NiTRIMS. The Nigeria Rural Transport Infrastructure Management System (NiTRIMS) is a comprehensive rural transport management system developed by the RAAMP and implemented in the project's nineteen (19) participating states. System features include: (a) state-wide complete inventory and condition data of rural transport infrastructure; (b) a cost module for automatic estimation of sub-project costs; (c) an investment prioritization module that will prioritize road maintenance and investments using objective criteria –under both limited and unlimited budget constraints; (d) a display module for visual assessment of rural transport infrastructure assets and their conditions using Geographic Information Systems (GIS) visual tools; (e) a contract management module supporting contract management project costs; and (f) the programming of the Annual Road Maintenance Plan (ARMP). The system adopts MCA in investment prioritization and an operational strategy for selection of interventions.

48. Subcomponent B.2: Development and Implementation of a Climate Risk-Informed Road Asset Management System *(US$3 million).* This component entails: (a) Revision of road maintenance protocols to integrate climate resilience considerations in rural road maintenance activities; (b) Development and integration of a climate risks module in the NiTRIMs system, along with compilation and collection of required data (including establishment of data collection and compilation protocols, establishment of inter-agency cooperation agreements, and other provisions for continued system updates); (c) Addition of poverty, health, and education data (collected through satellite imagery and other sources of geospatial Big Data) to the NiTRIMS system layered with climate considerations for most climate vulnerable population segments, in road prioritization for rehabilitation and maintenance; (d) Roll out of NiTRIMs in all 36 states (building on activities from previous RAAMP phases); and (e) RARAs staff training and strengthening their capacities for adoption of NiTRIMS (with additional climate and social considerations).

49. The project will also support safe access to schools' initiative along the roads to be maintained. In addition to incorporating road safety consideration into the roads supported under Component A, following the International Road Assessment Programme (iRAP[33]) Star Rating, the project will conduct a risk assessment of schools along the roads to be maintained under Component B. The objective would be to assess the identified school's risks and bring the iRAP star rating per school to at least 3 stars (where 1 is the least safe and 5 is the safest school) by addressing problematic areas through physical improvements (speed humps; pedestrian crossings; speed management traffic signs; etc.), which will be accompanied by road safety awareness campaigns for pupils.

50. Component C: Institutional Strengthening and Project Management (US$63 million). The component comprises of two subcomponents:

(i) **Subcomponent C.1: Project Management *(US$28 million).*** This subcomponent will support project

[32] Nigeria Rural Transport Infrastructure Management System (NiTRIMS) is a comprehensive rural transport management system for appropriate management of rural roads assets based on an asset life-cycle management costing approach, that has been designed and is under implementation under the RAAMP (See Annex 7).
[33] International Road Assessment Programme (iRAP) is a registered charity dedicated to saving lives by eliminating high risk roads throughout the world.

operating costs, training, project monitoring and impact evaluation activities. It will also cover Technical Assistance (TA) to provide support to the Federal Ministry of Finance (FMoF) and implementing ministries, departments and agencies at the state level. This subcomponent will also support project risk mitigation activities including third party monitoring for sexual exploitation and abuse (SEA)/sexual harassment (SH), gender, and the Project Grievance Mechanism (GM).

(ii) **Subcomponent C.2: Institutional Strengthening and Sector Reforms *(US$35 million)*.** This includes an allocation of US$20 million to the NADF to support the sustainable maintenance of rural roads in the states. In addition, this subcomponent entails the provision of technical advisory services and capacity strengthening activities, building on previous state-level sector reforms (RARAs and SRFs) supported in earlier stages of the RAAMP program to ensure sustainability of these institutions. Specifically, it will aim to cover:

a. **Continuation of state-level road sector reforms activities,** including identification, evaluation, and implementation of measures to improve institutional and financial sustainability of the newly established entities (RARA & SRF) in participating states.

b. **TA to develop a climate risk assessment and management framework for the rural road network** to inform transport planning and the selection of priority roads for investment (rehabilitation and upgrading). This component will also entail development and operationalization of a climate risk management plan for rural roads (and served rural communities) at both the state and federal levels for mapping possibilities to adopt the "Green roads for water" approach. This subcomponent will also finance RARAs to build capacity to conduct local-level climate risk assessments to inform road civil works related to road rehabilitation, upgrading, construction, and maintenance. Provision of TA and training on the revision of procurement protocols to integrate climate risk and resilience considerations in road construction/rehabilitation/upgrading designs and the rural roads asset management system. Support will also entail development of national guidelines on climate-resilient design standards for rural roads, bridge construction, rehabilitation, upgrading/retrofitting, and maintenance as well as the development of climate-resilient technical standards.

c. **Institutional strengthening related to road safety at both the federal and state levels.** This entails carrying out a road safety management review to strengthen the lead agency role (the FRSC), in coordination with the National Road Safety Advisory Council, as well as build institutional capacity for road safety at the state level (for RARAs). This will build on prior engagements between the World Bank and the FRSC, in coordination with the Global Road Safety Facility (GRSF). These activities will be part of the institutional strengthening at both the state (RARA) and federal levels (NADF). The wider road safety activities in the sector will be based on a World Bank study carried out by the Global Road Safety Facility (GRSF) in coordination with FRSC to strengthen the Nigerian Road Safety Model. These activities will be implemented by the FPMU in coordination with the FRSC based on recommendations of that study and building on the current model that the Nigerian Government has put in place to address the devastating social and economic impact of road crashes.

d. **Initial contribution to the financial operations of the newly established NADF**, towards supporting the participating state road funds in managing and financing rural road rehabilitation and maintenance.

51. Component D: A Contingent Emergency Response Component (CERC) is included in the project in accordance with Investment Project Financing (IPF) Policy, paragraphs 12 and 13, for Situations of Urgent Need of Assistance and Capacity Constraints. This will allow for rapid reallocation of IDA financing uncommitted funds in the event of an eligible emergency as defined in OP 8.00. A CERC Manual will guide the activation and implementation of the CERC, and an Emergency Action Plan will be prepared to confirm activities and financing for a specific event".

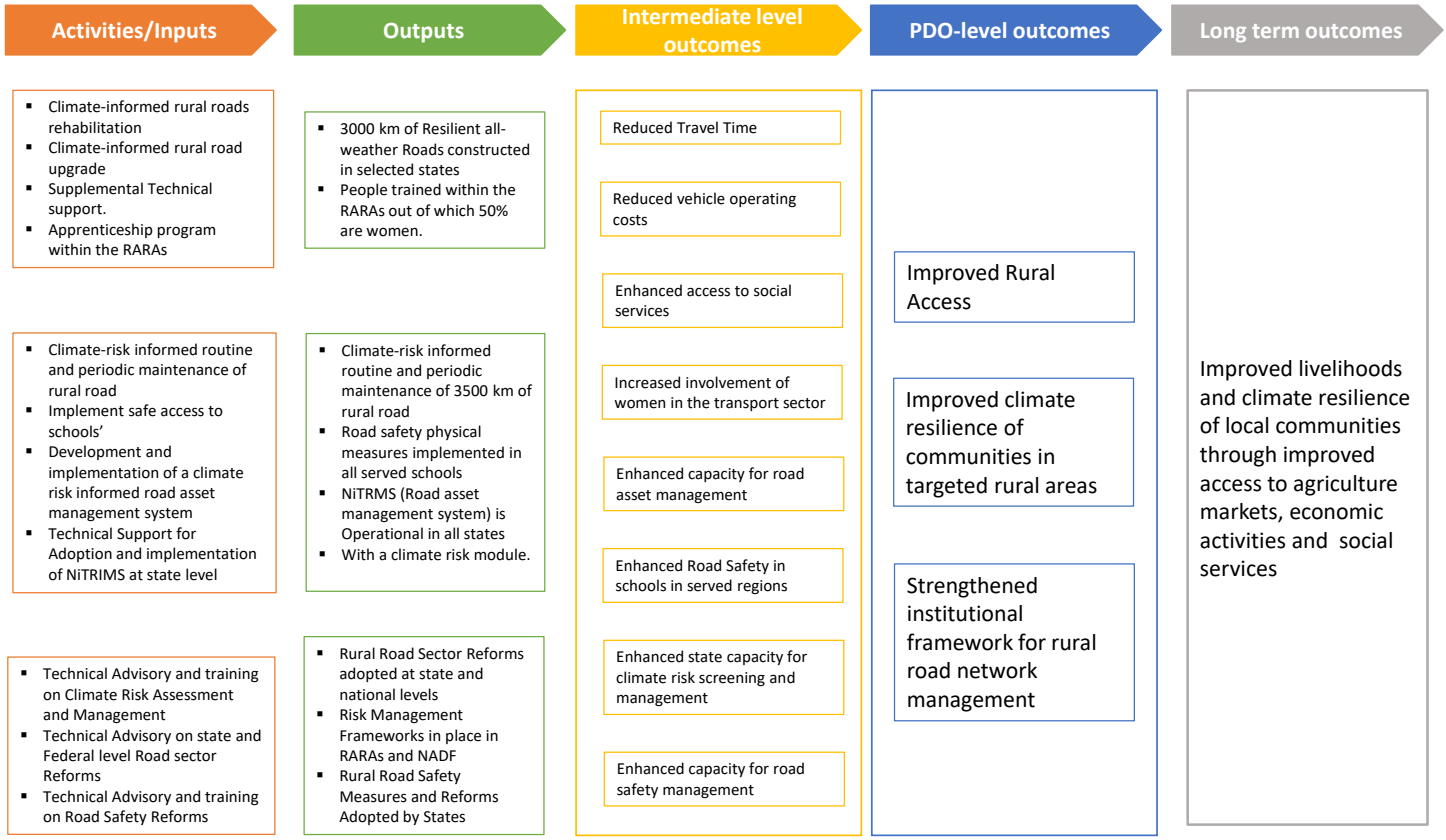
C. Project Beneficiaries

52. The project will finance rehabilitation, upgrading and maintenance of 6,500 km of rural roads, supplemental technical support, and targeted support to social inclusion and gender equality, serving an estimated 4 million rural beneficiaries. Primary project beneficiaries consist of road users and rural communities living in the project areas. These include rural farmers, transport operators (both freight and passenger), all buyers and sellers in the agriculture markets, and women, children, and persons who are dependent on rural roads and markets for their daily economic and social activities. Each of these beneficiaries will benefit from the improved and restored year-round access to social, economic, and life-enriching facilities and services with the upgrading and appropriate management of rural road assets. Indirectly, it will: (i) improve rural women's access to basic services such as maternity care, and children's access to schools; (ii) help reduce post-harvest losses for small farmers and improve business activities for the small and medium enterprises; (iii) enhance the volume of agricultural products traded; and (iv) enhance overall food security. In some states, several roads may even contribute directly to food security in areas with food shortage.

53. Project beneficiaries also include institutions at both the state and federal levels involved in managing and maintaining the rural road network. At the federal level, the project will support for the establishment and operationalization of the National Road Directorate under NADF. Similarly at state level, the project will provide targeted support to institutions to strengthen their capacity and promote sustainable financing via budgetary and formula funds. Further, by strengthening these institutions and their capabilities, the project will enable wider impacts of a more improved rural road network. As such, indirect project beneficiaries include residents along the wider rural road network given the project support to rural development and climate resilience.

D. Results Chain

Problem statement: Poor access to social services, high climate change vulnerability, and insufficient mechanisms and institutional capacity to manage the road network.



Critical Assumptions:

- Resilience measures (through roads design and rehabilitation) implemented properly.
- Reforms and frameworks adopted and applied properly at state and Federal levels.
- Adequate financial resources provided at state level to carry out rural network asset management.

E. Rationale for World Bank Involvement and Role of Partners

54. The World Bank has extensive expertise and longstanding experience in supporting the rural road sector over several decades. As such, the World Bank can leverage this global experience, including the use of innovative solutions. Additionally, the World Bank can build upon experience as one of the lead donors in Nigeria, especially past and current financing and implementation support of a series of rural accessibility and mobility projects including the ongoing RAAMP. In addition to technical expertise and project management in the transport sector, the holistic approach adopted by the World Bank will help ensure the use of technically robust and climate-resilient engineering design standards, proper quality control and supervision as well as efficient monitoring and evaluation (M&E) systems. Moreover, environmental and social safeguards standards will address and provide mitigation measures for identified risks, as well as reliable procurement and financial management (FM) procedures will ensure best value for money. Finally, the World Bank's experience in providing institutional capacity building in the roads sector and building climate resilience along with its work with local counterparts at both the state and federal levels is likely to mobilize more financing from development partners and help bring sustainable outcomes.

55. The World Bank has long-term relationships with numerous partners operating in Nigeria. A number of other partners have also approached the World Bank about participating in future RAAMP program.

56. The WBG's support through the RAAMP-SU will build on its proven track record in supporting institutional reforms related to sustainable rural road asset management. This specifically includes global experience in working with partners and client counterparts in the development of climate risk assessments in the transport sector.

F. Lessons Learned and Reflected in the Project Design

57. The project design incorporates lessons learned from previous engagements in Nigeria, including the previous RAAMP series, along with those from similar operations in the region and worldwide. Some of these key lessons are:

- **Focusing project resources where counterpart and state ownership is demonstrated**: While participation in the project is open to all states in Nigeria, eligibility is tied to carrying out recommended reforms and putting necessary arrangements in place to ensure effective project implementation, impact, and sustainable results. The RAAMP-SU will build on RAAMP's impact and improve its outcomes, leveraging the strengths of its implementation arrangements and raise the bar for required institutional reforms.
- **Federal participation in funding rural road sector**: The federal ministry of agriculture has played a coordinating role in the sector till now. This project envisions an increased role for the federal government as a funding partner providing federal counterpart funds, which can strengthen sectoral ownership at federal level and anchor the technical expertise within the Federal FMAFS.
- **Incorporating climate considerations and local community needs in design**: This is in line with best practices and was highlighted by the RAAMP Mid-term Review (MTR). The project is planned to incorporate climate considerations as appropriate at the local level (green roads for water, nature-based solutions, etc.), in addition to best practice climate proofing considerations as part of the design. This will be further reinforced through technical support to implementing agencies at both the federal and state levels on applying climate considerations to design and decision making.
- **Introduce more efficient and transparent procurement practices:** Due to the high number of future state project implementation units (SPIUs), the project will focus on long term, multiyear procurement planning to strategize and consolidate procurement activities to avoid a high volume of small value transactions. Transparency in procurement will be enhanced with business sounding events and anti-corruption awareness sessions for SPIUs, Civil Society Organizations (CSOs) and private sector. Procurement capacity of SPIUs will be strengthened with Hands-on Expanded Implementation Support (HEIS), if required, and TA consultancy support.
- **Monitoring and Supervision**: Monitoring of contracts in difficult to access and fragile areas to ensure proper implementation was flagged as a potential implementation challenge under the previous project. To ensure more dynamic and transparent implementation follow-up, the project will reinforce the use of Geo-Enabled digital systems for M&E using open-source systems allowing for various stakeholders, including third party CSOs or local entities to take part in the M&E process.

III. PROJECT IMPLEMENTATION

A. Institutional and Implementation Arrangements

58. Implementation Arrangements:

a. **Federal level:** As with the RAAMP project, the FMAFS will continue to be the project federal counterpart, ensuring project implementation at the federal level through an Entity to be created within the newly established NADF. To capitalize on existing capacity and ensure adequate staffing, the Federal Project Management Unit (FPMU) of the ongoing RAAMP will be embedded within the proposed federal implementing entity.

b. **State RARAs will be responsible for project implementation at the state level.** RAAMP-SU will require each state to have a fully functional RARA and SRF with appointed boards and staff, along with provisions for administrative costs in the state budget. Established SPIUs in beneficiary states under the previous project will be embedded within the respective State RARA. The RAAMP-SU operation intends to expand from the 19 states under RAAMP to a nationwide program covering all 36 states, subject to each state's commitment to institutional reforms and sustainable financing. To help support this, the federal entity will provide technical support to new states to ensure well-established RARAs with technically qualified staff, including provisions for in-house staff training—all of which will be required to properly manage the project.

59. Institutional and implementation arrangements of RAAMP-SU will support integration of the previous project RAAMP implementing entities (FPMU and SPIUs) within federal and state institutions to ensure sustainability and readiness. RAAMP-SU will build on strengths of the previous project's implementation arrangements and at the same time set higher thresholds for required institutional reforms to promote competition between states to access available funds. RAAMP-SU institutional design is illustrated in Annex 3, with key aspects highlighted below.

60. The FMAFS will be the project federal counterpart, via the NADF. To capitalize on existing capacity and ensure adequate staffing, the FPMU, which has implemented the ongoing RAAMP Project, will be embedded within the proposed federal implementing entity.

61. State RARAs will be responsible for project implementation at the state level. As noted in paragraph 35, RAAMP-SU will require each state to have a fully functional SRF and RARA with appointed boards and staff, along with provisions for administrative costs in the state budget. All states will be eligible to participate in the RAAMP-SU operation if they meet this criterion. To help support this, the federal entity will provide technical support to new states to ensure well-established RARAs with technically qualified staff, including provisions for in-house staff training—all of which will be required to properly manage the project. Established SPIUs in beneficiary states under the previous project will be embedded within the respective State RARA.

62. To ensure implementation readiness at the state level, the current RAAMP project is providing TA to support the institutional reforms required to participate in the RAAMP-SU and implement the NiTRIMS system to be used to prioritize and select road investments according to the MCA. This TA is available to all states expressing interest, beyond the 19 states participating in RAAMP. All 19 states participating in the current RAAMP have placed the bill establishing the State RARA and SRF (State Road Fund) in their respective assemblies, while 15 have passed this bill and established it into law. Thus far, two states have completed all the required RAAMP-SU eligibility criteria, and six states are expected to achieve the minimum criteria by June 2025. NiTRIMS has also already been implemented in all 19 states participating in RAAMP. Each of these states also has existing SPIUs which will be embedded within their respective RARAs. Design packages and environmental and social instruments can also be initiated ahead of effectiveness, allowing for contract signature and commencement of civil works at project effectiveness.

63. To ensure institutional sustainability, RAAMP-SU will continue to offer opportunities for capacity building in rural road planning, development, maintenance and management, safeguards, fiduciary and M&E at both the federal entity under NADF and RARAs at state level. In addition, these entities will offer an opportunity to foster women's representation in the country's transport sector through the apprenticeship program.

B. Results Monitoring and Evaluation Arrangements

64. The results framework (RF) will serve as the core tool for M&E in the project. The FPMU (embedded within NADF) in coordination with the SPIUs (embedded under RARAs) will be responsible for preparing a semi-annual report on

the technical, physical, and financial progress of the project, including updating values of RF indicators through relevant means. M&E specialists in these units will be responsible for aggregating data from the various sources agreed on, ensuring data validity and accuracy, as appropriate. Responsibilities for data collection for each indicator are defined in the M&E table in Annex 1.

65. Geo-Enabling Initiative for Monitoring and Supervision (GEMS) and Mapillary: GEMS[34] will be widely used for project monitoring and progress reporting. The use of GEMS will enable timely reporting and close follow up of project activities implementation and progress in the field. Given the wider geographic coverage of the project, the diversity of regions and the large number of local stakeholders potentially affected and benefiting from the project (various social, agricultural, economic activities served, etc.), this digital open-source system will enable timely reporting on various implementation fronts, along with other open-source system Mapillary[35]. Use of these systems (accessible through various digital means and devices) will enable use of geo-linked photographs, and videos with time and date stamps. All project implementation entities at both the federal and state level will utilize both the GEMS system throughout the project cycle. Capacity-building activities will anchor their use for project monitoring and beyond. Use of these digital systems will enable close follow-up and supervision even for difficult to access and fragile areas, considering their ease of access and reliance on open-source platforms.

66. Implementation support missions and reports. The project will conduct regular (at least biannual) implementation support missions to assess progress and promptly troubleshoot challenges. Moreover, use of digital systems by implementing agencies, as outlined above, will enable more frequent and regular remote supervision and progress reporting, as needed. Monitoring and supervision reports will cover all aspects of project implementation including design, construction, environmental and social standards, gender-based violence (GBV), and TA provided. Further, a midterm review will be conducted at the start of year 3 involving all major stakeholders. Regular reporting will also be done by the federal entity on reforms supported by the project and prerequisites for state eligibility.

C. Sustainability

67. The project is designed to target environmental, social, and operational sustainability of results. In addition to minimizing any adverse environmental impacts (which are expected to be minimal) through implementation of the World Bank's environmental and social framework (ESF), the project is expected to reduce GHG emissions (climate mitigation). Additionally, the project targets enhancing the resilience of the rural road network and communities served, thereby supporting climate adaptation, as one of its main objectives. Climate vulnerability is one of the main criteria for selection of roads to be rehabilitated under the project and building institutional capacity for climate risk management at both the federal and state levels is critical to achieving this objective. On the social side, the ESF will ensure adequate consultations and involvement of local communities for project design and implementation, most notably for roads where nature-based solutions and "Green Roads for Water" are to be applied, paving the way for local ownership and social sustainability of the project.

68. The project will ensure institutional sustainability by building relevant institutional capacity. This includes embedding the FPMU in a permanent new entity in the FMAFS, and the SPIU in RARAs, to ensure operational sustainability of road asset management improvements. Supporting institutional reforms in the rural roads sector, at both the state and federal levels along with building local expertise, are expected to yield long lasting results. The project also supports sustainable funding sources for rural road management, building on lessons learned and experiences from previous engagements in Nigeria and other countries with similar circumstances.

[34] https://www.worldbank.org/en/topic/fragilityconflictviolence/brief/geo-enabling-initiative-for-monitoring-and-supervision-gems.
[35] https://www.mapillary.com/

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

69. An economic analysis was carried out for the project based on traffic data from sample roads from the previous RAAMP phases, and it fully justifies the Scale-up program. The sample used includes 25 rural roads in 6 states totaling 412.5 km, mostly consisting of unpaved roads in poor condition with average annual daily traffic of 57 vehicles per day in 2022. The average speed on rehabilitated roads is expected to increase from a current average of 26 km/hr to around 50 km/hr after project completion. In addition, road works will improve resilience of these roads to climate-related events such as heavy rain. The economic analysis and CO_2 emissions results of the sample roads were pro-rated to cover 6,500 km of roads, of which 3,000 km will be rehabilitated/upgraded under Subcomponent A.1 and 3,500 km will receive periodic maintenance under Subcomponent B.1.

70. The Road Economic Decision (RED) Model was used to undertake economic analysis. RED computes annual road agency and user costs for each project alternative over the evaluation period, comparing the proposed project investment program with the conditions without such investment. The quantities of resources consumed, and vehicle speeds are calculated first and then multiplied by unit costs to obtain total vehicle operating costs, travel time costs and CO2 emissions costs. Project road works will result in reduced travel time and vehicle operating costs, thus reducing travel costs. Road safety benefits from the project will also generate additional economic returns. Nevertheless, considering the difficulty of getting representative data from road samples before the actual road selection under the project, road safety benefits will be incorporated in the economic analysis carried out after specific roads are selected, and will generate additional economic return.

71. Cost-benefit analysis indicates that the Economic Internal Rate of Return (EIRR) for the project roads is 19.4 percent. The Net Present Value (NPV) is US$467.46 million at a discount rate of 8 percent, indicating that the project is economically justified. Sensitivity analysis shows that for the scenario with a 20 percent increase in construction costs, the EIRR is 16.2 percent. With a 20 percent decrease in benefits, the EIRR is 15.6 percent. If both scenarios are combined, the EIRR is 12.8 percent. Details of the economic analysis are given in Annex 5.

72. Public sector financing is appropriate to this project because actual traffic volumes on rural roads[36] are too low to make cost recovery possible for private investors. In addition, public investment in road infrastructure is a way for the government to play a key role in rural economic development and social cohesion by enhancing access to markets and social services and improving food security. As a whole, these investments will also contribute to demonstrating a more positive state presence in geographic areas that are particularly fragile to conflict.

Paris Alignment

73. The project is aligned with the goals of the Paris Agreement on both adaptation and mitigation.

74. Assessment and reduction of mitigation risks: The project is not at material risk of having a negative impact on the country's low-carbon development pathways. Most activities financed by the project are universally aligned (UA), while one activity presents low risk from a mitigation perspective. The project supports climate-informed rural road rehabilitation, upgrading and maintenance without capacity expansion or risk of contributing to deforestation, which are therefore UA. TA and training activities aimed at building the adaptive capacity of institutions are also considered UA. The

[36] It is expected that traffic volumes would have to be ten times the existing levels or higher to make the project financially bankable as a toll road.

project includes a CERC – all eligible activities included in the CERC Manual/CERC Annex of the Project Implementation Manual will be aligned with the Paris Agreement.

75. Assessment and reduction of adaptation risks: The main climate risks for the project are riverine floods, extreme temperatures, drought and land degradation, and high storm surge and sea level rise in coastal areas. The full description of climate risks and risk reduction measures is provided in Annex 6. The project is expected to mitigate identified climate risks and effectively increase adaptative capacity at both the community and institutional levels for implementing agencies. The project invests in climate risk-informed rural road rehabilitation, upgrading and maintenance of rural roads, and deploys targeted measures to enhance climate resilience, including the Green Roads for Water approach where possible. The project also invests in TA and training activities to integrate climate risks and resilience considerations in rural road asset management systems, maintenance protocols and practices. Climate resilience and adaptation design considerations reduce the project's exposure and vulnerability to climate hazards. As such, residual physical climate risks are reduced to an acceptable level.

Climate Change Mitigation and Adaptation

76. Interventions financed by the project were identified based on their potential to enhance resilience of the rural transport network and of the communities served to the impacts of climate change, as described below and further detailed in Annexes 4 and 6:

- **Under Component A**, the project will finance rehabilitation and upgrading of rural roads and ancillary infrastructure (e.g.: bridges, drainage systems). These roads will be selected primarily based on level of exposure to climate change related hazards, thereby supporting climate change adaptation. Other criteria include roads criticality to enhance resilience of the communities served. The road rehabilitation and upgrading works will further integrate climate resilience considerations to ensure year-round connectivity and provide access of communities to basic services like schools, clinics, and markets. Design of the roads and bridges will be based on a climate and natural hazard vulnerability risk assessment carried out at the local level that will identify climate resilience measures to be incorporated into the design, rehabilitation and upgrading of roads and bridges—thus supporting climate change mitigation. These include, for example, raising the road embankment in flood-vulnerable locations, adopting climate-resilient bridge designs, and improving drainage systems. In addition, the project will adopt the "Green Roads for Water"[37] approach and nature-based solutions[38], where possible. The "Green Roads for Water" approach and climate resilience nature-based solutions are also expected to result in additional roadside works and infrastructure beyond those supported under the project. Examples include water storage structures, erosion control, and vegetation cover measures, that may escalate costs by 15 percent. These measures will be fully dedicated to enhancing resilience of the road infrastructure and wider communities in areas served by these roads. Furthermore, investments will also be made in non-motorized transport facilities (e.g. sidewalks and pedestrian crossings) in roads near communities.
- **Under Component B**, the project will finance a range of activities to enhance road maintenance and climate resilience. These activities will support more targeted road rehabilitation works and more resilient design works, thereby supporting both climate change adaptation and mitigation.
- **Under Component C,** the project will finance TA for development of a climate risk assessment of the rural road network to inform transport planning and a climate risk management framework for rural roads at the state level. Component C also finances development of national guidelines and climate-resilient design standards for rural roads and bridges, and capacity building of RARAs to conduct local level climate risk assessments. All of these

[37] Van Steenbergen, Frank W. M.; Arroyo Arroyo, Fatima; Rao,Kulwinder Singh; Hulluka,Taye Alemayehu; Woldemariam,Kifle Woldearegay; Deligianni, Anastasia. Green Roads for Water: Guidelines for Road Infrastructure in Support of Water Management and Climate Resilience (English). International Development in Focus Washington, D.C.: World Bank Group. Available at URL

38 Nature-based Solutions for Climate Resilience and Adaptation. Climate and Development Brief. World Bank Group. Available at URL.

activities will inform road civil works and revisions of procurement protocols to integrate climate considerations (including nature-based solutions and the "Green Roads for Water" approach) in rural road construction, rehabilitation, upgrading and maintenance. As such, the institutional support provided under this component will also support both climate change adaptation and mitigation.

- **Component D** is a CERC to allow for rapid reallocation of uncommitted project resources to cover emergency response, including to natural hazards and climate change impacts.

GHG Emissions Assessment

77. An assessment was carried out for GHG emissions resulting from the project using the WBG's approved methodology and the RED Model[39] [40]. This assessment indicates the project support (rehabilitation and maintenance of roads) will result in a decrease in carbon dioxide (CO_2) emissions. Baseline CO_2 emissions for the project (without project scenario) are 1.6 million tons (over 20 years) and the project gross CO_2 emissions (with project scenario) are 1.4 million tons. The total and annual reduction in CO_2 emissions due to project activities are 209,976 tons and 10,499 tons per year, respectively. The decrease in CO_2 emissions is attributed to the decrease in fuel consumption with the project due to the increase in vehicle speeds. Additional components such as vegetation covers, where “Green Roads for Water” measures will be applied, which are expected to result in additional emissions reductions.

B. Fiduciary

78. Financial Management: Given the RAAMP-SU will be implemented by entities existing under the ongoing RAAMP, namely FPMU at Federal level (under NADF) and SPIUs at the State level (under RARAs), an assessment[41] was conducted to determine the capacity of these entities to carry out the project FM functions. The FM assessment revealed that these entities have adequate FM arrangements in place to ensure project resources are used for their intended purposes, and for which financing is provided with due attention to economy, effectiveness, and efficiency. For newly joining State RARAs, a capacity assessment will be conducted ad-hoc as part of their onboarding to the project; this assessment will help ensure their readiness and identify any gaps which need to be addressed. For details on the FM assessment and mitigation actions, please refer to Annex 3.

79. FM arrangements:

a. FM functions will be provided by the Federal Project Financial Management Department (FPFMD) and the state Project Financial Management Units (PFMUs), respectively. The existing department/units in the Office of the Accountant General of the Federation and State Office of the Accountant Generals have well-qualified, trained FM staff in place, who are experienced in the implementation of IDA supported operations. Specifically, the FPFMD/PFMUs will assign project accountants and project internal auditors from the pool of professional accountants and other qualified accounting personnel from the Treasury for the project, with terms of reference (ToR) and CVs acceptable to IDA.

b. The following actions will need to be implemented by the RAAMP-SU’s implementing entities at both the Federal and State levels: (i) preparation and submission unaudited interim financial report (IFR) after the end of each calendar semester. The review of unaudited IFRs delivered to the World Bank by the current RAAMP project during MTR was acceptable; (ii) recruitment of qualified, experienced, and independent external audit firms to prepare consolidated annual audited financial statements (CAAFS) for the project to IDA six months after the end of the fiscal year, based on ToRs acceptable to IDA. During MTR, RAAMP audited financial statements for the

39 Guidance Manual: Greenhouse Gas Accounting and Shadow Price of Carbon for Transport Investment Operations. World Bank Group. January 2022.
40 Archondo Callao, Rodrigo. Roads economic decision (RED) model: software user guide and case studies (English). Sub-Saharan Africa Transport Policy Program (SSATP) working paper series, no. 78 Washington, D.C.: World Bank Group. Available at URL.
41 In accordance with the Directives and Policy for Investment Project Financing (IPF) and the World Bank Guidance - Financial Management Manual in World Bank IPF Operations issued on September 7, 2021.

year ending on December 31, 2022. These statements were found acceptable by the World Bank and no major issues were identified in the management letter; (iii) opening of designated accounts (US$ and NGN) and the NGN counterpart account at the Central Bank of Nigeria for the FPMU and a designated account (US$ and NGN) and NGN counterpart account in a commercial bank acceptable to IDA for each implementing entity at the state level; (iv) acquisition and deployment of accounting software to record project transactions; (v) appointment of qualified, experienced FM staff (project accountants and internal auditors) for the implementing entities, with ToRs and CVs acceptable to the World Bank; and (vi) drafting of a financial procedure manual for the project.

80. Retroactive Financing: The design of the RAAMP-SU project provides a window to carry out Advance Contracting and Retroactive Financing in accordance with the World Bank Procurement Regulations for IPF Borrowers. On request of the Borrower, the World Bank will allow retroactive financing up to US$12 million of the total financing for payments made prior to signature date but on or after December 16, 2024, for eligible expenditures under Category (1) of the negotiated Financing Agreement.

81. Overall, the FM risk of the RAAMP-SU is assessed as Substantial because of the following risks: (a) possibility of using the financing proceeds for unintended purposes; (b) possibility of interference in deployment of FM staff for the project; (c) weak capacity of FM staff in preparing IFRs and internal audit reports and delivering these to IDA in a timely manner; (d) possibility of fraud and corruption; and (e) use of funds for expenditures that may not meet fiduciary requirements. These risks will be mitigated by drawing up a robust action plan and implementation support arrangements for the implementing entities. To mitigate the risks arising from implementing entities of newly joining states, which have no experience in managing IDA funds/World Bank supported operations, FM staff who are well-qualified and experienced in IDA project implementation and robust internal control knowledge will be put in place. FM risks will be reassessed and reviewed during project implementation and updated as appropriate. As such, the FM assessment concludes that the FM arrangements in place, including the mitigation measures for the project, meet minimum IDA FM requirements and are, therefore, adequate to provide reasonable, accurate, and timely information on the project status as required by IDA.

82. Procurement for the project will be carried out in accordance with World Bank's "Procurement Regulations for IPF Borrowers" dated September 2023 and subsequent amendments, under the "Procurement Framework, and the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006 (revised in January 2011 and July 1, 2016), and other provisions stipulated in the agreement with the government will be applied for all project procurement activities.

83. Procurement delays have been experienced in implementation of the ongoing project Rural Access and Agriculture Marketing (RAAMP, P163353). A major cause of these delays in procurement and contract management is low procurement capacity of procurement officers in many beneficiary States. In addition, SPIUs follow inefficient practices of annual procurement planning rather than multiyear, strategic planning, which leads to very high number of small value procurement activities, rather than combining and grouping priority activities and implementing multiyear contracts. Due to a high number of procurement activities subject to post-review, there are risks of fraud, collusion, and misrepresentation of bidders' qualifications especially at the State level. Based on lessons learned from implementation of previous similar projects, the RAAMP-SU will implement the following key actions to enhance capacity of the implementing entities at the federal and state level:

a. Multiyear procurement planning ensures a smaller number of procurement activities and grouping of activities.
b. Hiring of TA consultants to help SPIUs with climate resilience designs and preparation of bidding documents and provide support during bids evaluation stage.
c. Conducting business sounding events before tenders are launched for better competition and transparency of procurement processes and to inform the private sector about key provisions in bidding documents.

d. Attending procurement and contract management training at World Bank recognized training institutes.
e. Engaging qualified consultants for supervision of civil works contracts and the preparation of environmental and social instruments.
f. Strengthen internal control mechanisms during the procurement process and during contract execution.
g. Conduct due diligence on bidders' qualifications in order to effectively implement the project.
h. Conduct anti-corruption awareness sessions for SPIUs, CSOs, as well as private sector.
i. The procurement and contract management capacity of the newly joining states implementing entities (RARAs) will be assessed during project implementation, as they are admitted into the Project.
j. HEIS will be deployed when and where low capacity is identified for newly joining implementing entities, subject to the request from the Borrower and approval from the World Bank.

C. Environmental, Social and Legal Operational Policies

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Area OP 7.60	No

D. Environmental and Social

Environmental Safeguards:

84. The project will focus on civil works for rehabilitation and upgrading and periodic rural road maintenance. Road works will include climate resilience and flood protection measures, such as, repairing, and strengthening of old bridges and culverts, slope stabilization. The potential environmental risks and impacts associated with the proposed activities during both civil works and operation stages could include deterioration in air quality, dust, vibration, and noise pollution, impacts on water, and occupational health and safety risks. The works could also, potentially result in the clearing of vegetation along the road right-of-wayduring construction, causing vibration and soil contamination in the event of oil leakage from storage containers, or during accidental spills. There could be traffic congestions if the road is not accessible while it is under construction. Sand mining from excavation sites/burrow pits could further cause land degradation. There is the likelihood of nearby water bodies being polluted by run offs from the project site. Onsite wastes may include hazardous waste (asphalt, bitument etc) generated from construction materials, human waste from the site workers, and food waste/garbage, etc. Overall, the risks and impacts are expected to be moderately significant, temporary and mostly site specific. Mitigation of the potential risks and impacts will be addressed using the Environment and Social Management Plan (ESMP) which will be prepared as soon as the specific sites are identified, and the commitments based on information provided in the Environmental and Social Commitment Plan (ESCP).

85. **The environmental risk and impacts have been assessed and rated Moderate,** considering the type of project, the nature and magnitude of the potential environmental risks and impacts, the sensitivities and Borrower's capacity on ESF implementation to manage the environmental risks and impacts. The project is not complex; potential adverse risks and impacts of the project on human populations and/or the environments are likely to be moderately significant. The project does not involve activities that have a high potential in harming people or the environment, The project shall not support rural roads that are likely to pass through forests or requiring forest land diversion, passing through wildlife

sanctuaries, national parks, critical/natural habitats, eco-sensitive zones etc. Only vegetation within the right of way will be affected. The envisaged risks and impacts mostly can easily be mitigated considering they are temporary and localized. This assessment also builds on the Borrower's capacity and some experience gained with implementing World Bank safeguards policies under the previous project. Although, unfamiliar with the World Bank ESF requirements, the Borrower has implemented some projects which could translate to lessons learnt and hands-on experiences for the project teams especially for the current 19 participating states and the federal implementing entity of the previous RAAMP Project.

86. Rural roads will be selected for rehabilitation, upgrading and maintenance across the participating States and will be potentially exposed to climate related natural hazards like extreme temperature, water scarcity, drought, erosion, floods, and landslides. In the coastal areas, storm surge and sea level rise are also expected to cause erosion, land and infrastructure degradation. Climate projections indicate an increase in temperatures, number of hot days, and in precipitation variability, further rising potential climate risks. However, the future impact on the project's physical infrastructure and assets is rated as potentially moderate because the project focuses on the rehabilitation and upgrading of rural roads to climate-resilient standards and deploys climate informed spot improvements to reduce climate risks. The project will mitigate climate risks further by deploying soft measures to build institutional capacity, integrate climate risk considerations in road asset management systems, develop climate resilience guidelines and technical standards, among others. As a result, the residual climate risk to the project's outcome is rated as low.

87. Environmental Risks Management using GEMS, though not part of the previous project could be helpful in overcoming the limitation posed by insecurity in the rural areas during implementation of the RAAMP SU. GEMS can be used to track implementation progress on safeguards and the ESF with a focus on the ESMP implementation for civil works and other related tasks such as monitoring of security risks rising on project affected communities as well as contractor's compliance monitoring with regard occupational health and safety, and road traffic management during construction.

Social Safeguards

88. The project by design will benefit rural poor who are dependent on rural roads for their daily life, transport operators (both freight and passenger), all type of buyers, and improve rural access and other income-generating sources for women, children, and rural communities along the roads, in all the participating States.

89. The social risk for the RAAMP-SU is currently rated moderate. This rating is based on the type of intervention, scope/scale of the intervention and the envisaged impacts. Based on the last Implementation Support and Results Reports (ISR), the previous project has made substantial progress meeting its social risk mitigation obligations under the safeguards policy. Before the implementation of works under the previous project, the project developed and implemented several safeguards measures for all the demonstration roads and selected roads in Katsina, Bauchi, Sokoto, Ogun Abia etc., with implementation ongoing in other participating states as well. Like the previous project, most social risk associated with the RAAMP-SU relates to the rehabilitation of climate resilience upgrading of rural roads, linking to and from socio-economic community infrastructure, repair and strengthening of old bridges and culverts, slope stabilization, erosion protection improvements, surface repairs or resurfacing and other engineering solutions. In addition, under Component A, the RAAMP SU propose to adopt effective speed management strategies, including implementation of speed limits and traffic calming measures, dedicated pedestrian walkways, raised pedestrian crossings, marked facilities for bicyclists and motorcyclists, and installation of roundabouts at community centers crossed. These proposed interventions could lead to involuntary land acquisition, potential economic displacement, losses of crops and agricultural products, impact on livelihood, restriction of access to land including agricultural land, disruptions and loss of harvests, labor influx and impact on worship/religious centers during the rehabilitation of these rural roads. However, the envisaged land acquisition will be minimal, localized, and limited to setbacks within the existing right of way with proven implementation capacity at federal and state levels. Mitigation of these potential risks and impacts will be addressed using the applicable ESF

instruments e.g., ESMP including chance find procedure, Resettlement Action Plan (RAP) which will be prepared as soon as the specific sites are identified, and labor management procedures in line with the commitments specified in the ESCP. In addition, the FPMU and state implementing unit have successfully implemented RAMP 1 (P072644) and RAMP 2 (P095003) and the ongoing RAAMP (P163353) and are well staffed with TA social specialists. Considering the current security dynamic in the country and the rural location of the project, the draft Security Risk Management Plan (SRMP) being developed under the ongoing RAAMP Project will be revised and finalized to address potential security risks before commencement of project interventions in participating states. The recommended mitigation measures will be reflected and included in the relevant contract documents.

90. Status of ESF instruments. As required, all the relevant ESF documents (Environmental and Social Management Framework (ESMF), Resettlement Policy Framework (RPF), Labor Management Procedures, Stakeholder Engagement Plan (SEP), ESCP) have been disclosed in the country and in two national newspapers (Leadership Newspaper and Guardian Newspaper) on June 6, 2024, as well as the World Bank' External website[42] on October 3, 2024.

91. SEA/SH: SEA/SH risk screening was conducted using the screening tool for major civil works for the RAAMP-SU and the risk is rated moderate. The ongoing RAAMP Project conducted significant work on SEA/SH/GBV risk mitigation measures, and established mechanisms (developed GBV Action Plan / Accountability and Response Framework, and mapping of service providers) in some states to address SEA/SH/GBV risk. This has been revised and will be integrated into the RAAMP-SU and used as appropriate. Similarly, broad GBV training will be implemented as part of capacity building activities to all participating states (including new states) to ensure effective risk management throughout the project lifetime as captured in the updated GBV Action Plan/Accountability and Response Framework.

92. Citizen Engagement: The RAAMP SU Project will adopt and implement a robust citizen engagement activity across all project components throughout implementation. All sub project activities will be implemented with active involvement of all stakeholders and beneficiaries as indicated in the SEP. Consultations and participatory planning will include women, vulnerable groups and ethnic minority groups to ensure full participation in the process of road selection and design of the local interventions such as safety measures. The citizen engagement process will align with the SEP and will ensure equal access for all. As part of citizen engagement activities, to improve participation, the project will conduct annual beneficiary satisfaction surveys of rehabilitated road users to measure participation and satisfaction levels. Feedback gathered from the satisfaction surveys will be used to directly inform and improve implementation and close the feedback loop. These surveys will pay specific attention to the most frequent road network users such as transporters, passengers, and community users from other adjoining communities. Citizen engagement will be tracked in the results framework with the indicator 'People reporting improved experience with rural connectivity supported by the project', which targets an 80 percent satisfaction rate.

93. The project will also strengthen the already existing GM system to respond to complaints throughout the project life cycle. The GM will establish potential avenues for users to submit their grievances to project implementation units at the subnational and national level through various channels such as in person, by phone, email, or letter, including Information Communication Technology (ICT) based GM and social media platforms. In addition to consultations and GM, RAAMP SU will explore targeted support for engagement of local communities/farmer groups/cooperatives in determining priorities, and as part of institutional development, build capacity of relevant departments/agencies to engage with these local community groups. The project will leverage Nigeria's civil society platform - Partnership for Amplified Voices (PAV)[43] to monitor and provide feedback on project activities during the implementation.

[42] https://operationsportal4.worldbank.org/esms/projects/P180640/documents
[43] PAV: Civil Society Platform Developed under the Nigeria Social Inclusion and Citizen Engagement PASA.

94. Gender. The RAAMP-SU project will address some of the gender gaps identified in physical access to and from socio-economic community infrastructure and jobs opportunities, including in the transport sector. Rural roads to be built and rehabilitated will be selected based on their potential to increase physical access to health centers especially roads linking public health centers that deliver basic obstetric services (PHC) and facilities that deliver comprehensive emergency obstetric and newborn care (CEMONC), schools, and markets, using a prioritization approach as outlined above in Subcomponent A.3 and Component B. The design of these roads will incorporate gender considerations such as safety features like walking infrastructure and proper lighting to foster personal safety especially for women. In addition, the project through the creation of the new RARA will establish an apprenticeship program for young engineers with a particular focus on women, to progressively provide them with exposure and experience in the sector, therefore creating a pipeline of skilled men and women able to take on technical roles within the RARAs over the long run.

V. GRIEVANCE REDRESS SERVICES

95. ***Grievance Redress.*** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of non-compliance with World Bank's policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of World Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's GRS, visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank's AM, visit https://accountability.worldbank.org.

VI. KEY RISKS

96. Overall project risks are rated substantial, in line with the Systematic Operations Risk Rating Tool (SORT) risk calibration and reflecting mitigation measures already implemented in the ongoing project RAAMP (P163353). Details on this risk assessment are outlined below:

(a) **Political and governance risks are substantial.** Nigeria's 2023 presidential and regional elections were peaceful, and the new administration has prioritized putting the economy on a sustainable and inclusive growth path. Key measures under this operation reflect the determination of Nigeria's new leadership to reorient the economy; these measures also show a wider consensus than existed in the past that difficult reforms such as removing the gasoline subsidy are urgently needed. However, given the recent change in administration, political dynamics remain fluid, which could result in disruptions in reform implementation or policy reversals. Escalating security concerns could also impact specific states participating in the RAAMP-SU. Although these risks are beyond the project's control, they are mitigated by ongoing, intensive dialogue with government counterparts, and the broad consensus across all tiers of government around the need and urgency of supported reforms. In addition, complementary World Bank projects help address the risk of policy reversals. This complementary project portfolio could also support progress in developing and implementing more detailed, medium-term action plans to build on the initial reform momentum and strengthen performance in critical areas.

(b) **Macro-economic and fiscal risks are substantial**. While the new administration has undertaken crucial reforms to improve macroeconomic stability, several economic risks could weigh on project implementation

and expected results. For example, failure to contain increases in inflation and a depreciation in the currency may further result in volatile project costs. Although the above assessment includes no immediate project risks to finance compensation for project-affected people and counterpart funding for road maintenance activities at federal level, some states have demonstrated difficulties to provide counterpart funding for road maintenance in the ongoing RAAMP project. Potential inflation and currency impacts were considered in project costing and design.

(c) **Sector Strategies and Policies risks are rated substantial.** In addition to the inadequate policy framework and resources for maintenance of the improved rural infrastructure, strategies for the rural transport sector are absent or not well articulated at state level. The project will support efforts to better ensure sustainable rural road asset management and financing at both the federal and state levels; this is expected to ignite policy dialogue and involvement of financial partners to support the sector.

(d) **Institutional Capacity for Implementation and Sustainability risks are rated substantial.** Fragmentation in rural asset management between various institutions across the country without clear definitions of roles and lack of ownership at the state level. Funding for rural road development and maintenance is also inadequate. In addition, there is limited capacity for road safety, road asset management, climate resilience, and implementation of environmental and social standards (ESS). The RAAMP-SU aims at building institutional capacity at both the federal and state levels. Moreover, institutional reforms and capacity building will be supported through the project to ensure ownership and sustainable set up for rural road asset management.

(e) **Fiduciary Risk is rated substantial** due to the risk of: (a) using financing proceeds for unintended purposes; (b) interferences in deployment of FM staff to the project; (c) weak fiduciary capacity; (d) poor procurement planning practices and delayed procurement implementation; (e) the high number of participating SPIUs and high volume of procurement activities subject to the World Bank's procurement post-review; (f) fraud and corruption; and (g) use of funds for expenditures that may not meet fiduciary requirements. These risks will be mitigated by drawing up a robust action plan and implementation support arrangements, along with introducing more efficient and transparent procurement practices. For example, RAAMP-SU will focus on long-term, multiyear procurement planning to strategize and consolidate procurement practices, thus avoiding a high volume of small value transactions and reducing fraud and corruption risks. These measures are detailed in fiduciary section and Annex 3 Implementation Arrangements and Support Plan.

(f) **Other risks related to *Conflict and Violence* are rated 'Substantial'**. Security risks have increased in recent years and are a major constraint on supervision. To mitigate these risks, implementation of the geo-enabling and remote supervision monitoring tools such as GEMS and Mapillary, as well as third-party monitoring, will be emphasized for successful project implementation. GEMS will also facilitate dissemination of project-level results, promoting communities' ownership over the project, as well safeguarding proper use of project funds. In addition, and in line with the ESCP a Security Advisor will be hired no later than three months after effectiveness.

ANNEX 1. RESULTS FRAMEWORK

PDO Indicators by PDO Outcomes

Baseline	Period 1	Closing Period
Strengthened Institutional Capacity for Management of the Rural Road Network		
Rural Road Sector Reforms adopted at national level (Number)		
Dec/2024	Jun/2028	Dec/2030
0	1	3
Participating States with enhanced road asset planning and management systems (at state level) (Percentage)		
Dec/2024	Jun/2028	Dec/2030
0	50	100
Improved Rural Access		
Direct users that benefit from improved access to sustainable transport infrastructure and services (Number of people) CRI		
Dec/2024	Jun/2028	Dec/2030
0	500,000	1,800,000
➢Direct users that benefit from improved access to sustainable transport infrastructure and services - Female (Number of people) CRI		
Dec/2024	Jun/2028	Dec/2030
0	247,000	890,000
➢Direct users that benefit from improved access to sustainable transport infrastructure and services - Youth (Number of people) CRI		
Dec/2024	Jun/2028	Dec/2030
0	350,000	1,260,000
Improved climate resilience of communities in targeted rural areas		
People benefiting from climate resilient infrastructure (Number of people) CRI		
Dec/2024	Jun/2028	Dec/2030
0	2,000,000	4,000,000
➢People benefiting from climate resilient infrastructure - Female (Number of people) CRI		
Dec/2024	Jun/2028	Dec/2030
0	950,000	1,978,400
➢People benefiting from climate resilient infrastructure - Youth (Number of people) CRI		
Dec/2024	Jun/2028	Dec/2030

0	1,400,000	2,800,000
Participating states with enhanced climate resilient planning, preparation, surveillance, and/or response (Percentage)		
Dec/2024	Jun/2028	Dec/2030
0	50	100

Intermediate Indicators by Components

Baseline	Period 1	Closing Period
Component A: Improvement of Resilient Rural Access		
Climate resilient roads constructed/rehabilitated (Kilometers)		
Dec/2024	Jun/2028	Dec/2030
0	1,000	3,000
Beneficiaries of the apprenticeship who report being employed 12 months after completing the program (Number)		
Dec/2024	Jun/2028	Dec/2030
0	75	150
➢Women (Number)		
Dec/2024	Jun/2028	Dec/2030
0	50	90
People reporting improved experience with rural connectivity supported by the project (Percentage)		
Dec/2024	Jun/2028	Dec/2030
0	40	80
Component B: Climate Resilient Asset Management		
Rural roads maintained considering climate risks (Kilometers)		
Nov/2024	Jun/2028	Dec/2030
0	1,000	3,500
Schools benefitting from road safety measures and installations (Number)		
Nov/2024	Jun/2028	Dec/2030
0	150	350
Component C: Institutional Strengthening and Project Management		
NiTRiMS integrating climate risks module and operational in all supported states (Percentage)		
Dec/2024	Jun/2028	Dec/2030
0	50	100
New operational policies and measures adopted by NADF new National Rural Roads Directorate (Yes/No)		
Dec/2024	Jun/2028	Dec/2030

0	0	YES
Road sector reforms and measures completed and adopted for RARAs in participating states (Percentage)		
Dec/2024	Jun/2028	Dec/2030
0	50	100
Climate risk management framework in place and adopted in participating states (Percentage)		
Dec/2024	Jun/2028	Dec/2030
0	50	100
Road safety measures and reforms in place and adopted in participating states (Percentage)		
Dec/2024	Jun/2028	Dec/2030
0	50	100
Component D: Contingent Emergency Response		

Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

Strengthened institutional framework for rural road network management.	
Rural Road Sector Reforms adopted at national level (Number)	
Description	Climate Risk Screening (at National Level) - Related to Road Asset Management - Related to Road Safety Operational Manual Prepared and applied in NADF
Frequency	Once
Data source	NADF
Methodology for Data Collection	Documentation
Responsibility for Data Collection	FPMU
Participating States with enhanced road asset planning and management systems (at state level) (Percentage)	
Description	Climate Risk Screening (at National Level) - Related to Road Asset Management - Related to Road Safety Operations Manual prepared and updated in all RARAs (with sustainable funding sources/mechanisms identified)
Frequency	Once
Data source	RARAs
Methodology for Data Collection	Documentation
Responsibility for Data Collection	FPMU
Improved Rural Access	
Direct users that benefit from improved access to sustainable transport infrastructure and services (Number of people) CRI	
Description	The indicator measures the number of direct beneficiaries that experienced improved access to sustainable rural roads and transport services. Accordingly, these beneficiaries will have enhanced access to social services and markets.
Frequency	Annual
Data source	NiTRiMs and GEMs
Methodology for Data Collection	This indicator is calculated using GIS to locate the services combine with a population map layer 2 km around the services to calculate the number of beneficiaries
Responsibility for Data Collection	RARAs and FPMU
Direct users that benefit from improved access to sustainable transport infrastructure and services - Female (Number of people) CRI	
Description	The indicator measures the number of direct female beneficiaries that experienced improved access to sustainable rural roads and transport services. Accordingly, these beneficiaries will have enhanced access to social services and markets. Number of females will be calculated using percentage of females in rural areas in Nigeria.
Frequency	Annual
Data source	NiTRiMs and GEMs + Surveys
Methodology for Data Collection	This indicator is calculated using GIS to locate the services combine with a population map layer 2 km around the services to calculate the number of beneficiaries + Surveys
Responsibility for Data Collection	RARAs and FPMU
Direct users that benefit from improved access to sustainable transport infrastructure and services - Youth (Number of people) CRI	
Description	The indicator measures the number of direct youth beneficiaries that experienced improved access to sustainable rural roads and transport services. Accordingly, these beneficiaries will have enhanced access to social services and markets. Number of youth will be calculated using percentage of youth in rural areas in Nigeria.
Frequency	Annual
Data source	NiTRiMs and GEMs + Surveys
Methodology for Data Collection	This indicator is calculated using GIS to locate the services combine with a population map layer 2 km around the services to calculate the number of beneficiaries + Surveys
Responsibility for Data	RARAs and FPMU

Collection	
Improved resilience of communities in targeted rural areas	
People benefiting from climate resilient infrastructure (Number of people) [CRI]	
Description	This indicator measures the number of people benefiting from increased climate resilience due to investments by the project in climate resilient road infrastructure and road asset management systems, improving rural and urban-rural connectivity and ensuring year-round access to basic social services (for example schools, health clinics) and markets.
Frequency	Annual
Data source	NiTRiMs and GEMs
Methodology for Data Collection	This indicator is calculated using spatial analysis methods (e.g. ArcGIS or equivalent) to estimate the number of people residing in the area of influence (within a 2km buffer zone) of the rehabilitated/upgraded roads, with climate resilience measures to ensure year-round connectivity.
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
People benefiting from climate resilient infrastructure - Female (Number of people) [CRI]	
Description	This indicator measures the number of women benefiting from increased climate resilience due to investments by the project in climate resilient road infrastructure and road asset management systems, improving rural and urban-rural connectivity and ensuring year-round access to basic social services (for example schools, health clinics) and markets. Number of females will be calculated using percentage of females in rural areas in Nigeria.
Frequency	Annual
Data source	NiTRiMs and GEMs + Surveys
Methodology for Data Collection	This indicator is calculated using spatial analysis methods (e.g. ArcGIS or equivalent) to estimate the number of people residing in the area of influence (within a 2km buffer zone) of the rehabilitated/upgraded roads, with climate resilience mearures to ensure year-round connectivity.
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
People benefiting from climate resilient infrastructure - Youth (Number of people) [CRI]	
Description	This indicator measures the number of youth benefiting from increased climate resilience due to investments by the project in climate resilient road infrastructure and road asset management systems, improving rural and urban-rural connectivity and ensuring year-round access to basic social services (for example schools, health clinics) and markets. Number of youth will be calculated using percentage of youth in rural areas in Nigeria.
Frequency	Annual
Data source	NiTRiMs and GEMs + Surveys
Methodology for Data Collection	This indicator is calculated using spatial analysis methods (e.g. ArcGIS or equivalent) to estimate the number of people residing in the area of influence (within a 2km buffer zone) of the rehabilitated/upgraded roads, with climate resilience measures, to ensure year-round connectivity.
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Participating states with enhanced climate resilient planning, preparation, surveillance, and/or response (Percentage)	
Description	A State is considered to have an enhanced capacity for climate resilient planning under - Risk Screening - Integrated in Decision Making - Early Warning Systems
Frequency	Annual
Data source	RARAs
Methodology for Data Collection	Documentation
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)

Monitoring & Evaluation Plan: Intermediate Results Indicators by Components

Component A: Improvement of Resilient Rural Access	
Climate resilient roads constructed/rehabilitated (Kilometers)	
Description	Length of roads constructed (entailing adaptation elements as designed)
Frequency	Monthly
Data source	RARAs + FPMU progress reports
Methodology for Data Collection	Site Visits + NiTRiMs and GEMs
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Beneficiaries of the apprenticeship who report being employed 12 months after completing the program (Number)	
Description	Number of people who report they've been employed within 12 months from their internship
Frequency	Annual
Data source	Internship beneficiaries
Methodology for Data Collection	Surveys
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Women (Number)	
Description	Number of women who report they've been employed within 12 months from their internship
Frequency	Annual
Data source	Internship beneficiaries
Methodology for Data Collection	Surveys
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
People reporting improved experience with rural connectivity supported by the project (Percentage)	
Description	Percentage of benefieries interviewed/surveyed that report improved connectivity through the project
Frequency	Annual
Data source	Direct project beneficiaries
Methodology for Data Collection	Surveys
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Component B: Climate Resilient Asset Management	
Rural roads maintained considering climate risks (Kilometers)	
Description	Length of roads maintened through the project (entailing adaptation elements as designed)
Frequency	Monthly
Data source	RARAs + FPMU progress reports
Methodology for Data Collection	Site Visits + NiTRiMs and GEMs
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Schools benefitting from road safety measures and installations (Number)	
Description	Number of schools where road safety measures were implemented
Frequency	Annual
Data source	RARAs + FPMU progress reports
Methodology for Data Collection	Site Visits + NiTRiMs and GEMs

Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Component C: Institutional Strengthening and Project Management	
NiTRMS integrating climate risks module and operational in all supported states (Percentage)	
Description	Percentage of states that use and integrate NiTRMS incorporating climate risks modules
Frequency	Annual
Data source	RARAs + FPMU progress reports
Methodology for Data Collection	Documentation
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
New operational policies and measures adopted by NADF new National Rural Roads Directorate (Yes/No)	
Description	Policies and measures related to roads asset management and maintenance, in addition to implementation of road safety action plan/recommendations supported by the project.
Frequency	Annual
Data source	FPMU progress reports
Methodology for Data Collection	Documentation
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Road sector reforms and measures completed and adopted for RARAs in participating states (Percentage)	
Description	Reforms and measures will be the ones produced by the TA component provided to RARAs, including but not limited to, road safety and road asset management.
Frequency	Annual
Data source	RARAs + FPMU progress reports
Methodology for Data Collection	Documentation
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Climate risk management framework in place and adopted in participating states (Percentage)	
Description	To ensure that climate risk screening (using appropriate tools) is carried out for all new assets and that reliable data sources and methods are identified, and that climate risks mitigation measures are incorporated in designs.
Frequency	Annual
Data source	RARAs + FPMU progress reports
Methodology for Data Collection	Documentation
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Road safety measures and reforms in place and adopted in participating states (Percentage)	
Description	To ensure road safety measures and reforms are being implemented in participating states.
Frequency	Annual
Data source	RARAs + FPMU progress reports
Methodology for Data Collection	Documentation
Responsibility for Data Collection	RAAMP-SU (RARAs + FPMU)
Component D: Contingent Emergency Response	

ANNEX 2: Project Costs

Project components	Total amount in million US$	IDA amount in million US$	Counterpart funding in million US$		IDA percentage
			State funding	Federal funding	
Component A: Improvement of Resilient Rural Access	**379.0**	**312.0**	**34.0**	**33.0**	**82%**
A.1: Climate-informed Rural roads rehabilitation/upgrade	**350.0**	**285.0**	**32.0**	**33.0**	**81%**
A.2: Technical support for Rural Roads rehabilitation/upgrade	**27.0**	**25.0**	**2.0**	**0.0**	**93%**
(a) Technical design, environmental and social safeguards instruments, and bidding document for project related activities	9.0	7.0	2.0	0.0	**78%**
(b) Monitoring and supervision of the implementation of the civil works	18.0	18.0	0.0	0.0	**100%**
A.3: Infrastructure for Social Inclusion	**2.0**	**2.0**	**0.0**	**0.0**	**100%**
(a) Apprenticeship program within the RARAs.	2.0	2.0	0.0	0.0	100%
Component B: Climate Resilient Asset Management	**158.0**	**130.0**	**14.0**	**14.0**	**82%**
B.1: Asset management improvement and Resiliency Scale	**155.0**	**127.0**	**14.0**	**14.0**	**82%**
(a) Climate risk informed routine and periodic maintenance	140.0	112.0	14.0	14.0	**80%**
(b) Technical design, environmental and social safeguards instruments, and bidding document for project related activities	5.0	5.0	0.0	0.0	**100%**
(c) Monitoring and supervision of the implementation of the civil works	10.0	10.0	0.0	0.0	**100%**
B.2: Development and implementation of a climate risk informed road asset management system	**3.0**	**3.0**	**0.0**	**0.0**	**100%**
Component C: Institutional Strengthening and Project Management	**63.0**	**58.0**	**2.0**	**3.0**	**92%**
C.1: Project Management	**28.0**	**23.0**	**2.0**	**3.0**	**82%**
(a) Project management costs	28.0	23.0	2.0	3.0	**82%**
C.2: Institutional strengthening and Sector reforms	**35.0**	**35.0**	**0.0**	**0.0**	**100%**
(a) State-level Road sector reforms activities to the operationalization of the newly established institutions (RARA & SRF)	7.0	7.0	0.0	0.0	**100%**
(b) Climate and Resilience Capacity Building Activities and related reforms	5.0	5.0	0.0	0.0	**100%**
(c) Road safety institutional strengthening	3.0	3.0	0.0	0.0	**100%**
(d) Support to the financial operations of NADF in rural road maintenance	20.0	20.0	0.0	0.0	**100%**
Component D	**0.0**	**0.0**	**0.0**	**0.0**	**NA**
TOTAL	**600.0**	**500.0**	**50.0**	**50.0**	**83%**

ANNEX 3: Implementation Arrangements and Support Plan

1. Implementation arrangements:

a. **Federal level:** As with the RAAMP Project, the FMAFS will continue to be the project federal counterpart, ensuring project implementation at the federal level through an Entity to be created within the newly established NADF. To capitalize on existing capacity and ensure adequate staffing, the FPMU will be embedded within the proposed federal implementing entity.

b. **State RARAs will be responsible for project implementation at the state level.** RAAMP-SU will require each state to have a fully functional RARA and SRF with appointed boards and staff, along with provisions for administrative costs in the state budget. Established SPIUs in beneficiary states under the previous project will be embedded within the respective State RARA. The RAAMP-SU intends to expand from the 19 states under RAAMP to a nationwide program covering all 36 states, subject to each state's commitment to institutional reforms and sustainable financing. To help support this, the federal entity will provide technical support to new states to ensure well-established RARAs with technically qualified staff, including provisions for in-house staff training—all of which will be required to properly manage the project.

2. The NADF-FPMU and the FPFMD, including the RARAs-SPIUs and the PFMUs, will prepare and submit semi-annual unaudited financial reports (IFRs), each within 45 days after the end of the semester in a format agreed upon with the World Bank and CAAFSs which will be delivered six months after the fiscal year. The FPFMD/NADF-FPMU will be responsible for ensuring that consolidated annual audit reports are delivered to IDA within agreed timelines. Project Bank Designated (US$) accounts and drawdown (NGN) accounts will be opened with the Central Bank of Nigeria for the NADF-FPMU and Commercial Bank acceptable to the World Bank for the RARAs for execution of project activities.

3. Overall, the FM risk of the RAAMP-SU is assessed as Substantial because of the following risks: (a) possibility of using the financing proceeds for unintended purposes; (b) possibility of interference in deployment of FM staff for the project; (c) weak capacity of FM staff in preparing IFRs and internal audit reports and delivering these to IDA in a timely manner; (d) possibility of fraud and corruption; and (e) use of funds for expenditures that may not meet fiduciary requirements. These risks will be mitigated by drawing up a robust action plan and implementation support arrangements for the implementing entities. To mitigate the risks arising from implementing entities of newly joining states, which have no experience in managing IDA funds/World Bank supported operations, FM staff who are well-qualified and experienced in IDA project implementation and robust internal control knowledge will be put in place. FM risks will be reassessed and reviewed during project implementation and updated as appropriate. As such, the FM assessment concludes that the FM arrangements in place, including the mitigation measures for the project, meet minimum IDA FM requirements and are, therefore, adequate to provide reasonable, accurate, and timely information on the project status as required by IDA.

4. Planning and budgeting. Budget preparation will follow federal and states government's procedures as appropriate. On an annual basis, under the leadership of the director of FPFMD, state PFMUs, including project accountants will prepare annual budgets based on annual work plans in consultation with other key project team members. The annual work plan will be submitted to IDA for World Bank's approval/No objection. Detailed procedures for planning and budgeting will be documented in the financial procedure manual (FPM).

5. Staffing. The existing department/units in the Office of the Accountant General of the Federation and State Office of the Accountant Generals have well-qualified, trained FM staff in place, who are experienced in the implementation of IDA supported operations. Specifically, the FPFMD/PFMUs will assign project accountants and project internal auditors from the pool of professional accountants and other qualified accounting personnel from the Treasury for the project, with TORs and CVs acceptable to IDA.

6. Accounting. Project funds will be accounted for by the NADF-FPMU and SPIUs within RARAs using a computerized accounting system to prepare and record financial transactions for the project. The accounting system needs to be functioning well by effectiveness of the project. A separate book of records will be maintained to track commitment and assets. The accounting system will be kept in dual currencies (i.e., US$ and NGN). All accounting procedures will be documented in the FPM. The NADF-FPMU will be responsible for coordinating preparation of the FPM and ensuring it is updated regularly and on time, and shared with relevant stakeholders.

7. Internal control and internal audit. The assessment revealed the existing internal controls and control environment for the ongoing RAAMP project were adequate in the segregation of duties and functions. Internal auditors will conduct a risk-based review of project transactions and activities, and the project will prepare and deliver a consolidated quarterly internal audit report to IDA. The RARAs-SPIUs will each prepare a quarterly internal audit report and deliver it to the PFMUs 40 days after the end of the quarter. The NRRD-FPMU will consolidate its internal audit report with those of the RARAs-SPIUs and deliver the consolidated report to IDA 50 days after the end of the quarter. The NRRD-FPMU will be responsible for coordination and consolidation of IFRs and ensure these are delivered to IDA.

8. Financial reporting. The NADF-FPMU at the federal and each RARAs-SPIUs at the state level will prepare and submit every semester an IFRs within 45 days after the end of the semester in a format and content agreed upon with the IDA. Accounting software will be procured and deployed to prepare IFRs for the project. As with the ongoing RAAMP, the project will prepare and submits a consolidated IFR report each semester to IDA. Review of unaudited IFRs delivered to the World Bank by RAAMP during the MTR was acceptable, despite some minor issues which the project has made consistent efforts to address.

9. Funds flow and disbursement arrangements:

(i) At Federal level: A Designated (US$ and NGN) and NGN counterpart accounts will be opened with the Central Bank of Nigeria. It will be managed by the FPFMD within the Office of the Accountant General of the Federation. Eligible expenditures incurred will be paid from the Designated Account (DA). Similarly, a current drawdown (NGN) account opened with the Central Bank of Nigeria will be credited for payment of incurred eligible expenditures. In addition, the counterpart fund account will be applied to finance the federal budget.

(ii) At State level: A Designated (US$ and NGN) accounts will be opened for each of the participating states with a commercial bank acceptable to IDA. The accounts will be managed by the respective PFMU-RARA under the Office of the State Accountant General. Similarly, a Current (NGN Drawdown) Account opened in commercial banks acceptable to the World Bank, will be credited for payment of incurred eligible expenditures by the participating States. In addition, a counterpart fund account will be applied to finance the state budget.

(iii) **Bank Account Signatories**. Authorized signatories will consist of panels (A and B). One signatory from each panel will jointly sign project financial instruments. The signatories for FPMU-NRRD and SPIUs-RARAs are provided below:

For RAAMP Federal Project Management Unit (FPMU-NADF)

Panel A

Project Coordinator, main, and an officer not below the rank of a director from the parent ministry as an alternate.

Panel B

The Director FPFMD as main, and Deputy Director/Sector Head FPFMD as alternate I, and Project Accountant as II.

For States Project implementing Unit (SPMUs-RARAs)

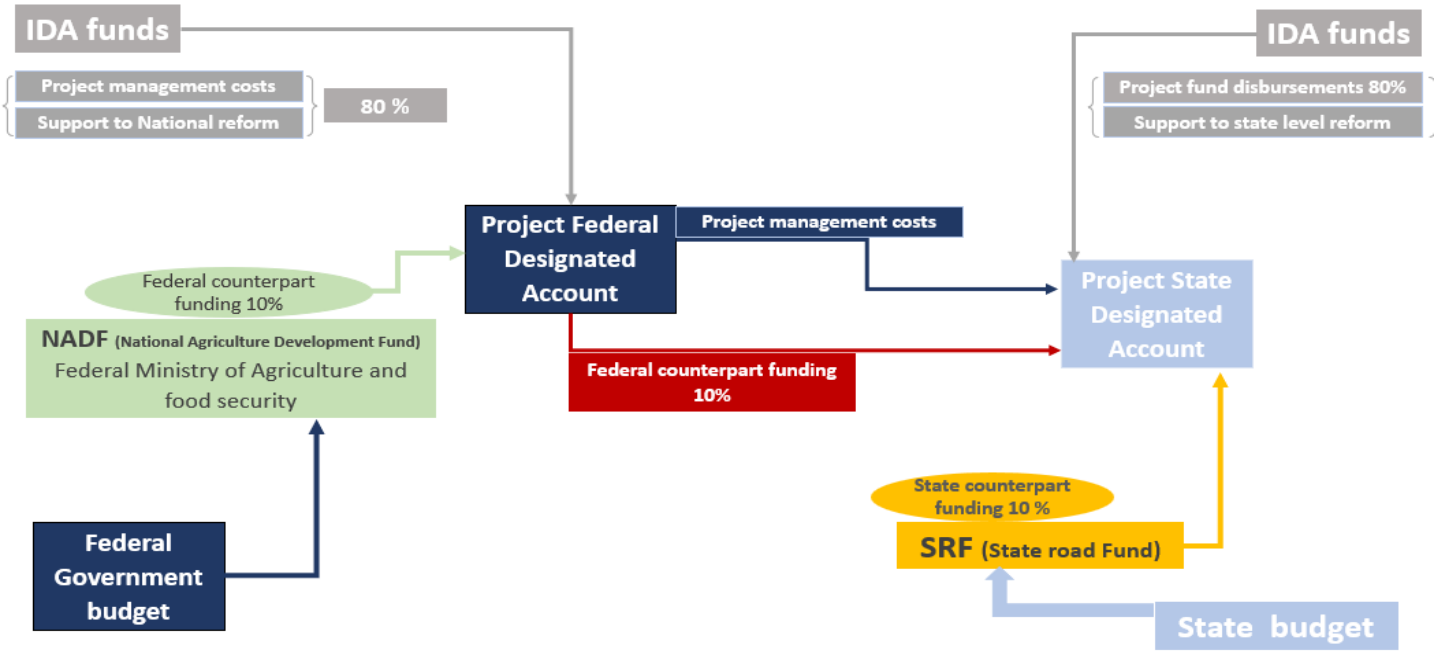
Panel A

Project Coordinator, main, and an Officer not below the rank of a director from the parent ministry as an alternate

Panel B

The Head PFMU, main, and Project Accountant, Alternate

Figure 3.1: RAAMP-SU: Funds Structuring and Flow



10. **Disbursement.** Upon project effectiveness, disbursements will be made through an initial advance to the Federal and State US$ Designated Accounts. The World Bank Loan and Disbursement department of the Association will determine the ceiling for this initial advance/disbursement. Replenishments of the Designated Account will be done against withdrawal applications supported by Statements of Expenditures. The option to

disburse against submission of IFRs (also known as report-based disbursement) could be considered based on the quality of IFRs, timeliness, and overall FM performance during implementation.

11. External auditing. The project will prepare and submit one annual consolidated audited financial statement to IDA. RARA-SPIUs will submit records of financial transactions 30 days after the end of the fiscal year to the NADF-FPMU for consolidation. The FPFMD/FPMU-NADF shall appoint relevantly qualified, experienced, competent, and independent audit firms for the project to prepare a consolidated audit report based on ToRs acceptable to IDA. The auditors will express an opinion on compliance of the annual financial statements with international auditing standards. In addition to the audit reports, the auditors will prepare a management letter providing observations, comments, and recommendations for improvement and management responses in compliance with financing covenants. The FPFMD/FPMU-NADF will ensure a copy of the consolidated audit report, including the management letter, is delivered to IDA six months after the end of each financial year. A copy of the CAAFS needs to be shared with each of the SPFMUs, SPIUs-RARAs when finalized. During MTR, the audited financial statements for the RAAMP for the year ending December 31, 2022, were found acceptable by the World Bank and no major issues were identified in the management letter.

Table 3.1: FM Action Plan

Action	Due Date (Timelines)	Responsible Entity
Agreed format for IFRs	Completed	FPFMD/FPMU-NADF and PFMUs/SPIUs-RARAs
External audit Terms of Reference (TOR)	Before effectiveness	FPFMD/FPMU-NADF and PFMU/SPIU-RARAs
Assign FM staff and supporting staff	Before effectiveness	FPFMD/FPMU-NADF, PFMUs/SPIUs, IDA
Deploy an Accounting software	Before effectiveness	FPFMD/FPMU and PFMUs/SPIUs-RARAs

12. FM implementation support mission plan arrangement. FM implementation support will be consistent with a risk-based approach. Implementation support frequency will initially be based on the FM risk rating assessed at appraisal, and subsequently will be updated on a continuous basis during implementation. Regular on-site reviews will cover key elements of FM, the overall fiduciary control environment, transaction review, and review of statements of expenditures. Desk review during implementation will also include IFR review, quarterly internal audit review, audited financial statements including management letters, and, most importantly, timely follow-up of FM issues that arise during implementation with regular updates to project FM risk and performance ratings as appropriate.

13. Procurement for the project will be carried out in accordance with World Bank's "Procurement Regulations for IPF Borrowers" dated September 2023 and subsequent amendments, under the "Procurement Framework, and the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006 (revised in January 2011 and July 1, 2016), and other provisions stipulated in the agreement with the government will be applied for all project procurement activities. The project will use the Systematic Tracking of Exchanges in Procurement (STEP) system to plan, record, and track procurement transactions.

14. Procurement implementation arrangements. Each state will set up its own implementing agency, which will be responsible for procurement planning, processing, contract management, and decision making. The SPIUs

should be staffed with qualified procurement officers/specialists. The appropriate World Bank Standard Procurement Documents will be used for all international open competitive procurements. For national open competitive procurement at the federal and state levels, the National Procurement Procedures in accordance with paragraphs 5.3 and 5.4 of the Procurement Regulations shall apply. In addition, the World Bank assessed electronic Government Procurement (eGP) system of Kaduna State and concluded that the system can be used along with other 15 States, which follow the same eGP system under World Bank financed projects for National Procurement Procedures. The project will involve the construction/rehabilitation of rural roads across all participating States in Nigeria. This implies several procurements activities for the selection of design consultants as well as consultants for preparation of the ESMP and RAP.

15. Experience under the ongoing RAAMP Project showed significant delays in the selection of these consultants and low-quality ESF instruments. To ensure an efficient way of selecting qualified consultants, a combined approach of hiring of international consultants knowledgeable in climate-resilient designs, ESMP and RAP, as well as support with preparation of bidding documents should be considered. Framework Agreements may be established for similar standard goods like procurement of computers, vehicles, and so on, that will be procured by almost all participating states. This will offer more efficiency, transparency and competition, better value for money through economies of scale, security of supply.

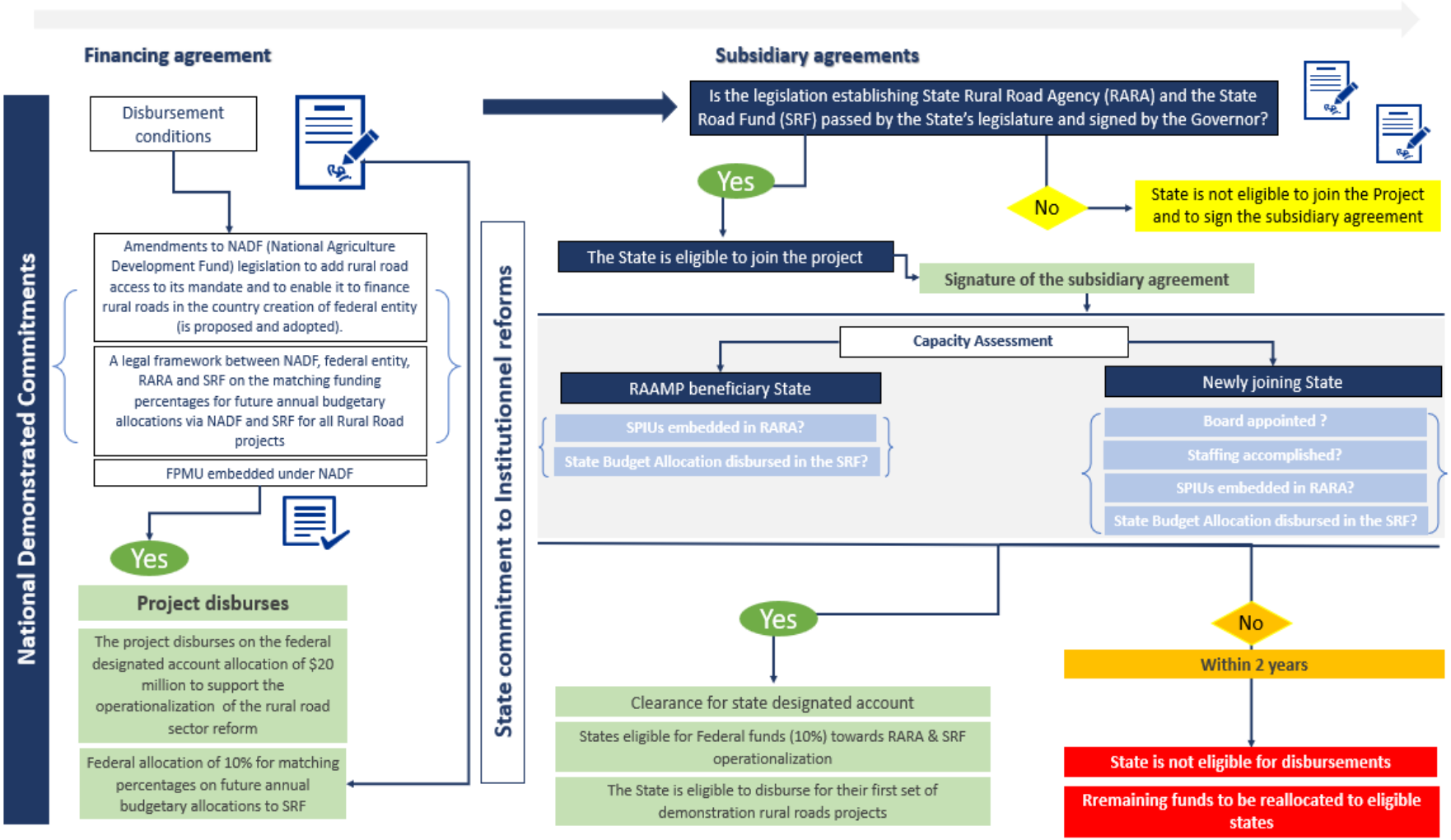
16. Project Procurement Strategy for Development (PPSD) and Procurement Plan: the PPSD and 18-months Procurement Plan for initial identified procurement activities involving consultancy services, goods and works have been finalized and agreed upon with the Borrower. Multiyear procurement planning should be implemented rather than annual, and procurement activities should be prioritized and combined and appropriately grouped allowing for smooth administration of procurement processes and contract management. SPIU Procurement Plans should be easily implementable with few critical activities and avoiding small value, multiply annual type of contracts. Major investments under the project will be similar to those in the ongoing RAAMP Project (P163353) which include rehabilitation and upgrading of rural roads and associated design and supervision as well as environmental and social consultancy services. The RAAMP-SU is designed as an evolving program with participating States being onboarded based on fulfillment of entry conditions. Therefore, detailed investment plans and specific contract packages in the States will be progressively identified during implementation, with the PPSD updated accordingly.

17. Procurement capacity assessment: Project implementation at the Federal level shall be coordinated by the FPMU established under the ongoing RAAMP Project. FPMU will be transformed into the Road Directorate under the NADF already established under FMAFS. The capacity of the FPMU to implement the project is generally satisfactory. At the State level, project implementation will be carried out by RARAs which have been established in many States in Nigeria. The RARA in each participating State will house the respective SPIU. The functions and capacity of each State RARA shall be assessed before joining the project. SPIUs shall be staffed with qualified procurement officers with prior experience working under World Bank financed projects. Notwithstanding the above, low procurement capacity of procurement officers in many states under the ongoing RAAMP project was identified as a major cause of delay in procurement; this needs significant strengthening with external consultancy support. There were indications of fraud, corruption, collusion and misrepresentation of qualifications among bidders participating in previous project tenders. To minimize the risks and to enhance the capacity of the Road Directorate and participating State RARAs to conduct due diligence on bidders' qualifications and to effectively implement the Project, the following key actions are recommended.

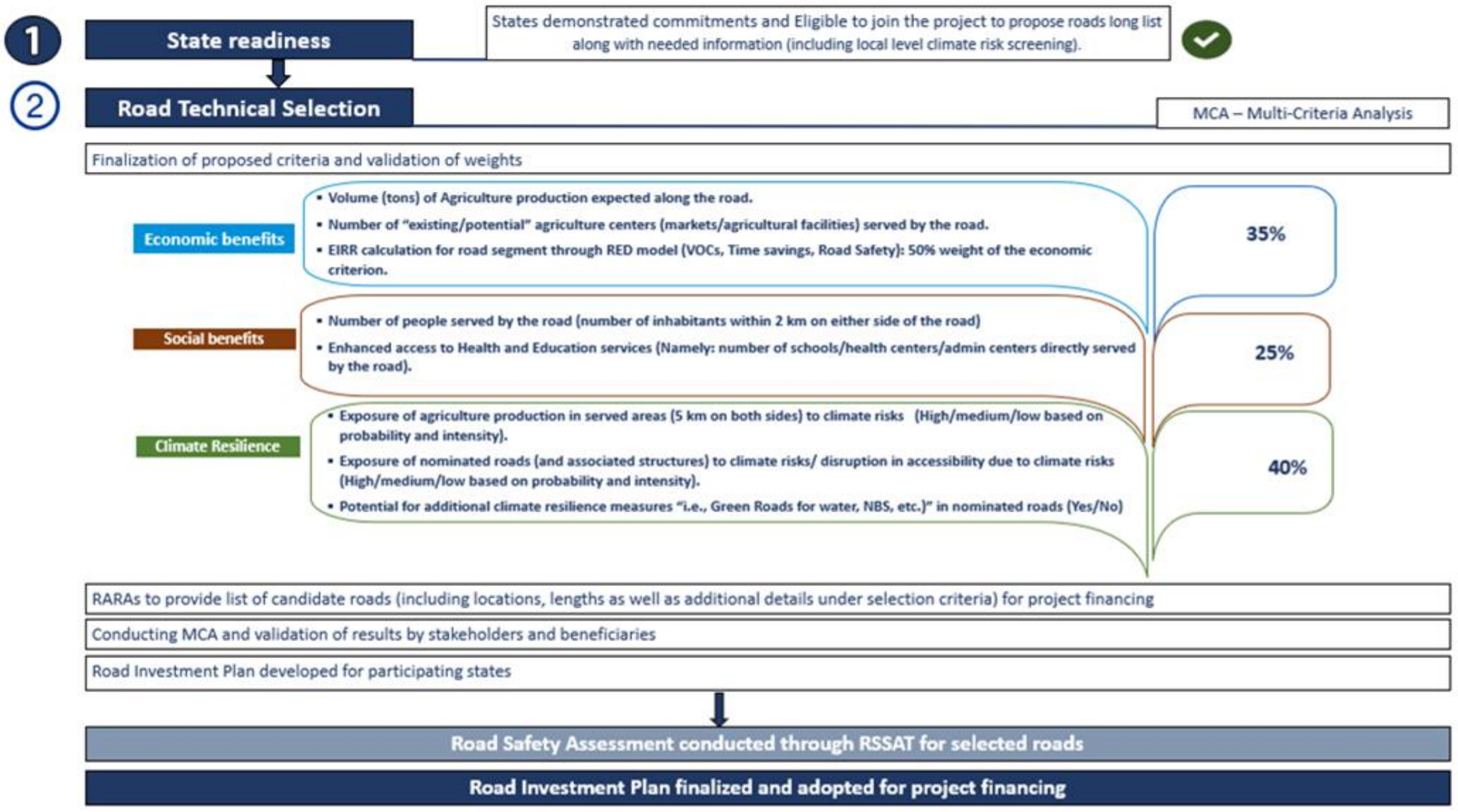
Table 3.2: Procurement Action Plan

Action	Due Date	Responsible Entity
Prepare PPSD and Procurement Plan for first 18 months of the project implementation focusing on multiyear contracts and grouping of activities.	Completed	FPMU-NADF RARA
Engage qualified TA consultants for the climate-resilient designs and preparation of bidding documents and support during bid evaluation stage including supervision services.	After project effectiveness	FPMU-NADF RARA
Conduct business sounding events to inform private sector of future tendering opportunities.	After first Procurement Plan finalization	FPMU-NADF RARA
Apply HEIS if requested.	As provided in the PPSD	FPMU-NADF RARA
Strengthen internal control mechanisms during the procurement process and contract execution.	After project effectiveness	FPMU-NADF RARA
Conduct anti-corruption awareness sessions for NADF, SPIUs and private sector.	After project effectiveness	World Bank

Figure 3.2: State Eligibility Framework, Disbursement Conditions



ANNEX 4: Road Prioritization and Selection



Key considerations:

- Thresholds for each of the sub-criteria to be set in consultation with FPMU *(and depending on the ranges received for proposed roads*).
- Road lengths (along with expected benefits) may be combined within a certain vicinity of each other. This allows for grouping and normalizing the lengths of roads as much as possible. Technical prioritization will be done for a group as appropriate.
- Minimum road lengths to be agreed with states as appropriate (if not grouped) for cost optimization and to avoid dispersion of efforts.
- If 1st Step (state Readiness) can't be completed before applying technical selection criteria (2nd phase), selection may be done over 2 phases/iterations. Namely: Phase 1: (selection of roads to consume 70 percent of budget under Component A, then with more states, remaining budget allocated).

ANNEX 5: Economic Analysis

A. Economic Evaluation Assumptions:

1. To ensure that the project generates sufficient economic benefits that warrant the investments, a Cost Benefit Analysis was conducted for a sample of project roads using the Roads Economic Decision Model (RED)[44] that computes annual road agency and users' costs for each project alternative over the evaluation period, comparing the proposed project investment program with the conditions without such investment. The quantities of resources consumed, and vehicle speeds are calculated first and then multiplied by unit costs to obtain total vehicle operating costs, travel time costs and CO_2 emissions. The resources consumed, and vehicle speeds are related to traffic volume and composition, and road surface type, geometric characteristics, and roughness. Normal traffic benefits consider a normal traffic growth and generated traffic benefits use half the associated vehicle operating and travel time cost savings, as is standard practice. Road safety benefits from the project will also generate additional economic return. Nevertheless, considering the difficulty of getting representative data from road samples before the actual road selection under the project, road safety benefits will be incorporated in the economic analysis carried out after roads under the program are selected.

2. The quantified net benefits computed by RED comprise changes with the project in vehicle operating costs, travel time costs, road maintenance costs due to the road's improvements, and CO2 emissions costs. For the RED calculations, the following assumptions were applied:

- A discount rate of 8 percent and an evaluation period of 20 years starting in 2025. All costs are stated in constant 2024 US$.
- The average daily traffic annual increase rate is 3.0 percent per year for all vehicles over the evaluation period, based on estimated GDP growth projections[45] and an assumed elasticity of 1.0.
- Social cost of carbon of US$56 per ton equivalent in 2025 increasing to US$87 per ton equivalent in 2044, based on the low scenario for the social cost of carbon derived from the 2017 World Bank guidance note on the Shadow Price of Carbon in economic analysis[46] and adjusted to the 2023 Consumer Price Index (CPI).[47]

3. Table 5.1 below presents the vehicle fleet economic unit, basic characteristics, and the average traffic composition on the sample project roads. The economic costs reflect the costs net of duties and tax.

4. The economic analysis was done for a sample 25 project roads of located on 6 states of Nigeria totaling 412.5 km, considering their road condition, traffic and rod works costs data. The sample roads are either earth or paved roads in poor or very poor condition with will current average travel speeds of 26 km/hour. On average, the 2022 traffic on the sample roads is 57 vehicles per day, composed of 34 percent trucks. Generated traffic was included in the analysis adopting a price elasticity of demand for transport of 0.5 corresponding on average the generated traffic being 25 percent of the normal traffic. No diverted traffic was considered in the analysis because there are no alternative roads to the project roads.

[44] RED is a software tool for the analysis and appraisal of road maintenance, improvements, and investment decisions on low volume roads.
[45] The GDP has grown on average at 3.3 percent per year from 2010 to 2023 in constant prices. The IMF predicts that the GDP will increase on average by 3.0 percent per year from 2024 to 2028.
[46] Guidance notes on shadow price of carbon in economic analysis, World Bank Group; November 2017. Available at: https://thedocs.worldbank.org/en/doc/911381516303509498-0020022018/original/2017ShadowPriceofCarbonGuidanceNoteFINALCLEARED.pdf
[47] The low scenario was used for the base case due to negative net CO_2 emission of the project. A sensitivity analysis was done considering the high scenario of social cost of carbon that is US$110 per ton equivalent in 2025 increasing to US$173 per ton equivalent in 2044. and for the scenario of not including the social cost of carbon in the analysis.

Table 5.1: Vehicle Fleet Economic Unit Costs, and Characteristics

	Car	Utility	Small Bus	Medium Bus	Small Truck	Medium Truck	Heavy Truck
New Vehicle Cost (US$)	2,465	23,077	12,308	19,231	17,692	27,495	40,500
New Tire Cost (US$)	23	32	32	32	46	62	96
Fuel Cost (US$/liter)	0.55	0.55	0.55	0.55	1.15	1.15	1.15
Lubricant Cost (US$/liter)	1.83	1.83	1.83	1.83	2.74	2.74	2.74
Maintenance Cost (US$/hour)	1.54	1.54	1.54	1.54	3.07	3.07	4.61
Crew Cost (US$/hour)	0.20	0.36	0.36	0.36	0.54	0.80	1.61
Overhead Cost (US$/year)	738	1,038	923	1,269	1,615	4,154	5,308
Interest Rate (%)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Work Time (US$/hour)	1.22	2.14	2.14	2.14	3.21	4.82	9.64
CargoTime (US$/hour)	-	9.62	-	-	14.42	72.11	72.11
Annual Utilization (km)	24000	31000	52000	73000	42000	52000	78000
Annual Utilization (hours)	560	1190	1580	1780	1290	1490	1980
Service Life (years)	7	15	15	15	12	12	10
Number Passengers (#)	6	2	10	18	0	0	0
Operating Weight (tons)	1.9	3.38	3.4	3.8	5.67	11.5	38
Typical Traffic Composition (%)	29%	26%	8%	3%	20%	13%	1%

Source: NiTRIMS data for selected roads and FPMU input.

5. The table below presents the basic current roads characteristics.

Table 5.2: Current Road Characteristics

Road No	Road Name	State	Length (km)	Terrain Type	Surface Class	Speed (km/hr)	Traffic (AADT
1	Amuvi-Amakofia-Ututu	Abia	5.30	Mountain	ST/Earth	25	65
2	Uzuakoli Mkt Junt -Ugwumba-Uzuitim	Abia	7.17	Mountain	ST	20	143
3	Uzoigwe Kenneth Rd-Obinikpa-Umada-Orie Ngodo Mkt	Abia	5.48	Flat	ST/Earth	20	156
4	Ukebe Jnctn Etiti Akanu Ngwa Ugwunagbo Hqs	Abia	6.93	Mountain	Earth	20	131
5	Charachara - Ragwam - Magwanshi - Lafiya	Bauchi	30.33	Rolling	Earth	20	53
6	Mainamaji - Badara - Kuka - Pali	Bauchi	25.80	Rolling	Earth	20	42
7	Akuyam - Gwaram - Hardawa	Bauchi	18.88	Rolling	Earth	25	45
8	Durum - Nahuta	Bauchi	15.00	Rolling	Earth	25	49
9	Garingami - Gadai - Madufa	Bauchi	25.00	Rolling	Earth	20	30
10	Ijana Alapako Oni, Mosa Junction Road, Off Ajebo Road	Ogun	13.10	Rolling	Earth	20	27
11	Agosasa - Idolorisa Road	Ogun	10.08	Rolling	Earth	20	50
12	Kataeregi - Badeggi Rd	Niger	23.00	Rolling	Earth	30	64
13	Luma - Shagunu	Niger	24.00	Rolling	Earth	25	37
14	Wushishi - Makusidi - Jagara	Niger	26.00	Rolling	Earth	20	76
15	Beji - Makera - Jagara	Niger	35.00	Rolling	Earth	30	112
16	Kunyi - Kampala	Niger	7.00	Rolling	Earth	30	28
17	Alasan - Faga - Bakaya - Romo	Sokoto	21.19	Flat	Earth	20	31
18	Kaffe - Gidan Gyado - Gidan Hashimu- Karangiya - Tsitse Spur Kaddi Arawa	Sokoto	21.80	Rolling	Earth	20	59
19	Buzulega - Lukuwa - Yardaga - Malikawa	Sokoto	14.70	Rolling	Earth	35	28
20	Tashar Gawo - Darhela - Badau - Sifawa	Sokoto	11.70	Rolling	Earth	35	28
21	Danja-Baznga-Nahuce With Spur From Baznga-Kokami	Katsina	24.40	Rolling	Earth	25	55
22	Dankama-Niger Rep Border	Katsina	4.54	Rolling	Earth	55	104
23	Kusada - Kafarda - Yaya	Katsina	10.24	Rolling	Earth	30	38
24	Bindawa - Shifdawa - Doro	Katsina	19.81	Flat	Earth	25	51
25	Gozaki - Dutsen Kura	Katsina	6.07	Rolling	Earth	35	44
Total			**412.52**			**26**	**57**

Source: NiTRIMS data for selected roads and FPMU input.

6. The sample project roads will be improved or rehabilitated to a paved standard and will receive periodic and routine maintenance during the evaluation period. With the project, the average travel speeds will increase to an average of 50 km/hour. The total financial improvement or rehabilitation costs for the sample roads is estimated at US$33.1 million, corresponding to an average unit cost of US$80,169 per km. The average periodic maintenance cost is US$3,635 per km. The table below presents the road works description and costs and resulting economic indicators.

Table 5.3: Road Works Economic Evaluation Indicators

Road N°	Investment Cost (US$$ M)	Investment Cost per Km (US$$/km)	EIRR (%)	NPV (M US$
1	0.43	82,059	33.60%	1.01
2	0.55	76,671	90.60%	5.54
3	0.48	87,860	93.90%	5.11
4	0.66	94,877	76.10%	5.14
5	3.81	125,594	8.50%	0.13
6	3.25	125,790	6.60%	-0.29
7	2.78	147,346	7.40%	-0.1
8	2.16	144,332	7.70%	-0.04
9	3.61	144,346	5.00%	-0.64
10	0.46	35,088	20.50%	0.46
11	0.36	35,501	24.60%	0.5
12	1.37	59,353	129%	0.47
13	0.61	25,542	20.30%	0.6
14	1.05	40,388	36.20%	2.76
15	1.32	37,851	34.20%	3.18
16	0.28	40,041	15.10%	0.15
17	1.39	65,770	12.80%	0.47
18	1.78	81,669	17.20%	1.22
19	0.90	61,267	10.60%	0.16
20	0.75	64,275	8.50%	0.02
21	1.61	66,056	20.50%	1.59
22	0.41	89,510	17.30%	0.29
23	1.16	112,930	12.00%	0.32
24	1.34	67,474	15.80%	0.77
25	0.56	92,640	18.30%	0.44
Total	33.10	80,169	19.40%	29.27

B. Economic Evaluation Results:

7. The overall EIRR of the project is 19.4 percent and the NPV is US$29.27 million. The economic returns indicate that the project is economically justified, with a positive NPV. Normal traffic benefits account for 89 percent of the traffic project benefits and generated traffic benefits for 11 percent. The table below presents the distribution of the project net benefits.

Table 5.4: Distribution of Net Benefits

Item	Net Benefits (M US$)
Capital Works	-25.49
CO2 Emissions	0.39
Maintenance Works	-4.75
Normal Traffic	52.39
Generated Traffic	6.73
Total Project	29.27

8. Sensitivity analysis was applied to the RED results to assess the impact of changes in capital costs and project benefits by increasing and decreasing them by 20 percent. The sensitivity analysis shows that for the scenario with a 20 percent increase in construction costs, the EIRR is 16.2 percent. For the scenario with a 20 percent decrease in benefits, the EIRR is 15.6 percent. If both scenarios are combined, the EIRR is 12.8 percent. Construction costs would have to be increased by 214 percent for the NPV to become zero. The table below presents the sensitivity analysis results

Table 5.5: Sensitivity Analysis Results

Scenario	EIRR (%)	NPV (M US$)
Base	19.40%	29.27
Costs +20%	16.20%	24.17
Benefits -20%	15.60%	18.32
Costs +20%, Benefits -20%	12.80%	13.22
High CO2 Shadow Costs	19.50%	29.65
No CO2 Shadow Cost	19.30%	28.88

9. Social Value of Carbon in Economic Analysis. Considering the high cost of the social cost of carbon, the EIRR increases to 19.5 percent and the NPV to US$29.65 million. Considering not including the social cost of carbon in the economic analysis, the EIRR decreases to 19.3 percent and the NPV to US$28.88 million.

C. GHG Accounting

10. The GHG emissions assessment was conducted for the project using the WBG's approved methodology and the RED Model[48, 49], and it showed that there will be a decrease in CO_2 emissions with the project interventions (rehabilitation and maintenance of roads).The baseline CO_2 emissions for the project (without project scenario) are estimated at 1.599,545 tons and the project gross CO_2 emissions (with project scenario) are 1.389,569 million tons, over the 20-year economic life of the project. The total and annual reductions in CO_2 emissions due to project activities are 209,976 tons and 10,499 tons per year respectively. The assessment considered normal and generated traffic projections and did not include estimations of diverted and induced traffic, for consistency with the economic analysis. The decrease in CO_2 emissions is attributed to the decrease in fuel consumption with the project due to the increase in vehicle speeds.

11. The GHG emissions assessment was conducted for activities under the project Subcomponents A.1 and B.1. The assessment for Subcomponent A.1 was done for the rehabilitation and upgrading of a sample of 412.5 km rural roads. The results were then pro-rated for 3,000 km. (Table 6).

48 Guidance Manual: Greenhouse Gas Accounting and Shadow Price of Carbon for Transport Investment Operations. World Bank Group. January 2022.
49 Archondo Callao, Rodrigo. *Roads economic decision (RED) model: software user guide and case studies (English).* Sub-Saharan Africa Transport Policy Program (SSATP) working paper series, no. 78 Washington, D.C.: World Bank Group. Available at URL.

Table 5.6. GHG Emissions Assessment

Project Subcomponent	A.1	
Road Length (km)	412.5	3,000
Baseline Emissions (tons)	101,129	735,484
Gross Emissions (tons)	87,728	638,022
Total Net Emissions (tons)	-13,401	-97,462
Annual Net Emissions (tons)	-670	-4,873

E. Public Sector Financing and World Bank Value Added

12. Private sector financing is not available to undertake a local roads project of this nature in Nigeria. Public sector financing is the appropriate vehicle for financing the proposed road works because the civil works costs cannot be recovered through tariffs due to the very low traffic of the project roads.

13. The World Bank's role is justified because of the project's economic and social benefits. The World Bank's engagement in Nigeria's road sector adds value in several manners, including: (i) bringing global experience on local roads investments planning; (ii) providing best practices in climate-resilient transport and sustainable maintenance solutions; and (iii) helping address environmental and social safeguards.

ANNEX 6: Climate Change Adaptation and Mitigation

Climate Change and Disaster Risk Screening:

1. Nigeria has three climate zones: (1) A tropical wet climate in the south, with heavy rainfall events occurring during the rainy season from March to October. (2) A tropical savannah climate for most of the central regions, with the rainy season from April to September and the dry season from December to March. (3) A Sahelian hot and semi-arid climate in the north of the country, with heavy rainfall events from June to September and a dry season for the rest of the year. The Northern areas have high rainfall variation, which results in floods and droughts.

2. Overall, precipitation levels in Nigeria have been decreasing since the 1960s with an increase in variability in the past few decades. Climate projections indicated continued high precipitation variability with heavy rainfall events projected to intensify. Nigeria's mean annual temperature is 27.2°C, ranging between 17°C to 37°C in the south to 12°C to 45°C in the north of the country. Temperatures across Nigeria are projected to increase between 2.9°C and 5.7°C and the duration of heat waves is projected to increase by 8 to 55 days annually, by the end of the century.

3. Nigeria is highly exposed to natural hazards like river, coastal and urban floods, water scarcity, extreme heat, and wildfires, and has medium level exposure to landslides. Land degradation, erosion, and desertification are expected to intensify with climate change. In the coastal areas, high storm surge and sea level rise are expected to cause erosion, land and infrastructure degradation. Global warming induced accelerated sea level rise (ASLR), anticipated to be 0.5 - 1m this century, would exacerbate the poor condition of the country's coastline. In the Niger Delta, it is estimated that with an ASLR of 0.5m, about 35 percent of the highly productive delta could be lost, and with an ASLR of 1.0 m about 75 percent of the delta could be lost.

4. Natural hazards and climate change have detrimental impacts on the transport and agricultural sectors, increasing risks of food insecurity and social instability. The agriculture sector, which contributes about 24 percent to the country's GDP and is largely rain-fed, is highly vulnerable to climate change induced extreme events, such as floods and droughts. Under a business-as-usual scenario, agricultural productivity could decline between 10 to 25 percent by 2080. In some parts of the north of the country, the decline in yield in rain fed agriculture could be as much as 50 percent. Extreme temperatures damage the road pavement and shoulders, and drought conditions can create cracks and uneven settlement of the pavement. Floods can damage road pavement, foundations, shoulders and drainage structures. Natural hazards not only damage transport infrastructure, raising maintenance and rehabilitation costs, but can also cause disruptions in the transport network, causing delays and ultimately having negative social and economic impacts.

5. The high-level Climate and Disaster Risk Screening (CDRS) conducted for the project rated hazard levels in Nigeria roads as high for extreme temperatures and drought, river and coastal floods, and wildfires and medium level for landslides and volcano eruption[50].

Integrating Climate Adaptation and Mitigation in the Project Design

6. Based on the high hazard levels outlined above, the project was designed to reduce the vulnerability and enhance resilience of rural roads, by integrating climate change resilience and adaptation considerations in rural roads

[50] ThinkHazard consulted on 23th April 2024. Available at URL.

rehabilitation and upgrading, in the rural road asset management system, in rural road maintenance, and other activities. The proposed project aims to enhance the climate resilience of the rural road network and of the communities served, in addition to strengthening institutional capacity of Federal and state agencies for climate risk management and incorporation of climate risks and considerations in decision making for road asset management. The project applies the transport asset life-cycle management framework[51] to identify climate resilience measures for deployment, covering (a) Systems Planning (i.e. considering climate risks as criteria in decision making on the location of critical transport assets), (b) Engineering and Design (i.e. enhancing infrastructure design and construction specifications to be resilient to current and future climate conditions), (c) Operations and Maintenance (i.e. developing and deploying climate risk module for integration in asset management systems, and revision of maintenance protocols to consider climate risks), (d) Contingency Programming (i.e. CERC), and (e) Institutional Capacity (i.e. capacity building on climate risk assessment for transport infrastructure). The climate-resilient measures to be deployed under each project component are summarized in table 6.1 below.

Table 6.1: Project's Climate Adaptation and Mitigation Interventions

Component A: Improvement of Resilient Rural Access (US$387 million)
Subcomponent A.1: *Climate-informed rural roads rehabilitation/upgrade* (US$340 million)
Adaptation: The project finances the rehabilitation and upgrading of about 3,000 km of rural roads to climate-resilient standards to ensure year-round connectivity and that road assets can withstand climate shocks. Given that building resilience of the road network and of the communities served is one of the primary objectives of the project, the rural roads will be selected for rehabilitation and upgrading mainly based on the level of asset exposure to climate change related hazards. Other factors include road criticality for access to basic social services and markets thus promoting the climate resilience of communities served. Additional interventions will be introduced through applying the "Green Roads for Water" approach and nature-based solutions to further enhance the resilience of the road network and of the wider community. The engineering designs will be adjusted to increase resilience of road and bridge assets to river floods, extreme rainfall events, landslides, soil erosion and extreme temperatures by: (i) right-sizing the drains and culverts to accommodate heavy precipitation and to limit road erosion; (ii) using retaining walls, dry stone walls, gabion walls and enhanced slope design parameters, as appropriate; (iii) using weather-resistant materials; and (iv) accounting for the temperature increment using expansion joints, as appropriate. Additional measures will be deployed, such as tree and grass planting for slope stabilization, and using the Green Road for Water approach to protect communities from flooding, save rainwater and make it available for agricultural activities, in drought prone areas. The "Green Roads for Water" approach and climate resilience nature-based solutions are expected to result in additional roadside works and infrastructure such as water storage structures, and vegetation cover measures, etc. These components would be fully dedicated to enhancing the resilience of the wider communities in areas served by these roads and will escalate costs of some roads by approximately 15 percent (additional to the typical costs of just climate-proofing the roads infrastructure). **Mitigation:** Sidewalks and pedestrian crossings will be incorporated in rural roads near communities, to promote NMT for short trips. Tree and grass planting as well as vegetative covers included as part of the nature-based solution and "Green Road for Water" interventions will provide carbon capture and sequestration.
Subcomponent A.2: *Technical Support Activities* (US$27 million)
Adaptation and Mitigation: This Subcomponent enables the implementation of Subcomponent A.1.
Component B: Climate-Resilient Asset Management *(US$158 million equivalent)*

51 Transport Sector Note on Applying the WBG Paris Alignment Assessment Methods. WBG. Available at URL.

Subcomponent B.1: *Asset Management Improvement and Resilience Scale up* (US$155 million)
Adaptation: The project finances climate risk informed maintenance of 3,500 km of rural roads and ancillary infrastructure (e.g.: bridges, culverts, drainage, slop protection, retaining walls, dry stone walls, gabion walls), using climate change resilience informed maintenance protocols, to ensure that these assets are functional and not obstructed in all seasons. This component also finances activities, like the preparation of technical designs, and monitoring and supervision of the implementation of maintenance works, which enable the deployment of climate-resilient maintenance activities. Similar to the road rehabilitation Subcomponent (A.1), exposure to climate change related hazards will be the main criteria for roads selection for maintenance given that building resilience is also one of the main objectives of these works. Roads selected will also include those that have been damaged by climate change related hazards, like floods. **Mitigation:** The improvement in road conditions from the deployment of climate risk informed road maintenance of 3,500 km of rural roads is estimated to improve vehicle speeds, reduce fuel consumption and reduce GHG emissions by an estimated amount of 112,514 tons of CO_2, over the 20-year economic life of the project.
Subcomponent B.2: *Development and implementation of a climate risk-informed road asset management system* (US$3 million)
Adaptation: The project finances the provision of TA to: (A) Revise rural road maintenance protocols and practices to integrate climate risks and resilience consideration to be applied under Subcomponent B.1. (B) Develop and integrate a climate risk module in NiTRIMs, which is a road asset management system that uses an asset lifecycle approach for the prioritization of rural road segments for maintenance, rehabilitation and upgrading activities. The TA will also provide data collection and compilation activities and protocols, as well as the establishment of inter-agency cooperation agreements for data and information sharing to ensure the climate-resilient NiTRIMs is kept updated. (C) Collection and compilation of socio-economic data such as poverty levels, health and education, as this will ensure that information on climate vulnerability and resilience of communities is factored in the asset prioritization process. (D) Rolling out use of NiTRIMs in all 36 states. (E) Training of RARAs staff on the use of NiTRIMs (with the updated climate resilience considerations).
Component C: Institutional Strengthening and Project Management (US$30 million equivalent)
Subcomponent C.1: *Project Management* (US$20 million)
Adaptation and Mitigation: This component enables the implementation of the project.
Subcomponent C.2: Institutional Strengthening (US$35 million)
Adaptation: The project finances the provision of technical advisory services and capacity strengthening activities to: (A) Support the continuation of state-level road sector reforms activities. (B) TA to develop a climate risk assessment of the rural road network to inform transport planning and the selection of priority roads for investment (rehabilitation and upgrading), and the development and operationalization of a climate risk management plan for rural roads at state and federal levels. The climate risk management plan will follow the road asset life-cycle management framework to identify suitable resilience interventions, including engineering, nature-based and hybrid solutions to enhance climate resilience. The climate risk management plan will map areas suitable for the adoption of the "Green Roads for Water" approach. This subcomponent will also finance capacity-building activities for RARAs to conduct local level climate risk assessments to inform road civil works related to road rehabilitation, upgrading, construction, and maintenance. TA and training will be provided for the revision of procurement protocols to integrate climate risks and resilience considerations in road construction/rehabilitation/upgrading designs, and incorporation of climate risks and resilience considerations in the rural roads asset management system. Support will also entail the development of national guidelines and climate-resilient design standards for rural roads, bridges construction, rehabilitation, upgrading/retrofitting, and maintenance as well as the development of climate-resilient technical standards. (C) Rural road safety's institutional strengthening both on Federal and state level, including for the management of climate related natural hazard emergencies. (D) Support for the operationalization

of the National Rural Road Directorate, including capacity building activities on climate risk management and incorporation of climate considerations in decision making.
Component D: Contingent Emergency Response (US$0.0)
The project also includes a contingency emergency response component to help rural transport infrastructure that may be affected by natural disasters in the participating states, thus enabling timely response in an emergency.

Climate Risk Management Frameworks for RARAs and NADF:

One of the key project deliverables in developing climate risk management frameworks in both the "envisaged" Rural Roads Directorate under the Federal Ministry of Agriculture and the in the RARAs at state level. **Key attributes of these frameworks entail:**

1. Systematically screening all roads (and potential projects) for physical climate risks and identify major risks early in project development.
2. Categorize physical climate risks in a consistent manner and identify roads where more detailed Climate Risk and Vulnerability Assessments are required.
3. Include appropriate adaptation measures into the project design to address the risks identified. Such measures include Nature-Based solutions measures and measures recommended from applying "Green Roads for Water" approach. This step will also build on TA under this project for development of a national guideline on climate-resilient design standards for rural roads and bridges construction, rehabilitation, upgrading/retrofitting, and maintenance.
4. Monitor the effectiveness of the selected adaptation measures.
5. Assess and monitor the residual risk to projects following the implementation of the adaptation measures.

Climate risk screening and assessment will be introduced as a standard procedure to NADF and RARAs to enable integrating physical climate risks mitigation measures in projects cycle. Part of the technical assistance to these institutions will be to strengthen procedures to further integrate physical climate risk management across the project cycle.

Tools and high-resolution data sources for climate risk screening will also be introduced. While a geo-layer is expected to be added to NiTRIMs entailing climate risks, sources with high enough resolution for data in Nigeria will be identified as part of the project activities.

ANNEX 7: Summary of Technical Considerations

Green roads for water

The project aims to integrate the innovative approach of **Green Roads for Water** into the project design to enhance the resilience of the project and through the project. The core idea of Roads for Water is that the negative impacts of roads on the surrounding landscape can be turned around, and roads can simultaneously become instruments of beneficial water management and climate resilience. Roads for Water approach consists in a smart integration of water management and road design to yield triple benefits: (i) to reduce water-related damage to the roads; (ii) to minimize or even reverse adverse impacts of roads on the surrounding landscape – such as flooding, waterlogging, or land degradation; and (iii) to manage water beneficially – either for the benefit of roadside water users, by improving the sustainability of water resources, by reduce disaster risks, or through some combination of benefits. Community engagement is at the heart of Green Roads for Water and Climate Resilience. While communities should be engaged at the earliest stages of any road development program, their engagement plays a stronger role in Green Roads programs that support water resource management and community development. Finally, implementation of Green Roads programs encourages changes in road sector governance to foster openness to cooperation, recognition of a multi-dimensional approach to sustainability, and promote trust and transparency among a larger group of collaborating stakeholders which is in line with strengthening trust towards institutions.

Water is the most damaging element for roads paved or unpaved and the Green Roads for water approach offers basic measures that can reduce water damage to roads by guiding water away from road surfaces to locations where it can be used productively or for recharge. This could be achieved by planning road alignments to avoid long and steep slopes, install proper drainage systems, place a well-vegetated buffer zone or stones at the edge of the road. The water can also be directed to farmland for productive use such as roadside ponds or farm ponds. Water can be harvested directly from the road pavement although it may have a high level of hydrocarbons or pollutants and may not be suitable for human or animal usage. There are numerous possibilities to evacuate water away from the road structures to groundwater recharge structures, for irrigation purposes or into storage reservoirs for livestock.

https://roadsforwater.org/guideline/

Examples of recent experiences that will be built on for building resilience through nature based solutions and applying “green Roads for Water Approach” include: (a) The collaboration with the Global Center for Adaptation (GCA) on the Climate Risks and Resilience and Adaptation Options Appraisal study to inform investment planning in Chad; (b) The collaboration with the Global Facility for Disaster Reduction and Recovery (GFDRR) to conduct a climate change and natural hazard risk assessment for the transport sector in Madagascar, development of a transport asset management diagnostic and adaptation strategy for the transport sector and conducting pre-feasibility study on engineering and nature-based solutions to enhance the resilience of roads, ports and airports in Madagascar; (c) The development of guidelines on Green Roads for Water: Road Infrastructure in Support of Water Management and Climate Resilience, in Mozambique, and assessment of opportunities in Mozambique for integrating climate change adaptation and water management in the design and construction of roads; (d) The collaboration with GFDRR in the development of a guidance note on nature-based solution to protect transport infrastructure assets in Haiti.

Ref 1: Van Steenbergen, Frank W. M.; Arroyo Arroyo, Fatima; Rao,Kulwinder Singh; Hulluka,Taye Alemayehu; Woldemariam,Kifle Woldearegay; Deligianni, Anastasia. Green Roads for Water: Guidelines for Road Infrastructure in Support of Water Management and Climate Resilience (English). International Development in Focus Washington, D.C.: World Bank Group. Available at URL
Ref 2: Nature-based Solutions for Climate Resilience and Adaptation. Climate and Development Brief. World Bank Group. Available at URL.