KANO-MARADI RAILWAY PROJECT

Environmental and Social Impact Assessment (ESIA)

EXECUTIVE SUMMARY

This Environmental and Social Impact Assessment (ESIA) has been prepared in accordance with Nigerian Environmental Impact Assessment Act, Niger's environmental regulations, AfDB Integrated Safeguards System (ISS), and IFC Performance Standards. The assessment covers the entire 283.75 km railway corridor and associated facilities.

Key Environmental Findings:
• No critical natural habitats or protected areas directly affected
• Moderate impacts on air quality during construction (manageable)
• Positive long-term environmental benefits through reduced road traffic emissions
• Estimated annual CO2 reduction: 180,000 tonnes (Year 5)
• Water resources: No significant impacts identified
• Biodiversity: Minor impacts on common species; no endangered species affected

Key Social Findings:
• 847 households (approximately 5,082 people) require resettlement
• 1,240 hectares of land to be acquired
• 89% of affected land is agricultural
• No indigenous peoples or vulnerable groups disproportionately affected
• Significant positive impacts: 12,000 construction jobs, 2,500 permanent jobs
• Enhanced market access for rural communities

All identified impacts can be adequately mitigated through the proposed Environmental and Social Management Plan (ESMP).

1. PROJECT DESCRIPTION AND ALTERNATIVES

1.1 Project Components

The project comprises:

- 283.75 km standard gauge railway line
- 12 passenger stations
- 4 freight terminals
- 2 maintenance depots
- Associated infrastructure (power supply, telecommunications, access roads)

1.2 Alternatives Considered

Route Alternatives: Three route options were evaluated. The selected route (Option 2) minimizes environmental and social impacts while maintaining technical feasibility and economic viability.

Technology Alternatives: Standard gauge selected over narrow gauge for compatibility with Nigeria's railway modernization program and higher capacity.

No-Project Alternative: Rejected due to continued environmental degradation from road transport and missed economic development opportunities.

2. ENVIRONMENTAL BASELINE AND IMPACTS

2.1 Physical Environment

Climate: Semi-arid to sub-humid tropical climate. Annual rainfall 600-1000mm. Project design accounts for seasonal flooding risks.

Air Quality: Baseline measurements show good air quality in rural areas, moderate pollution in urban centers (Kano). Construction will cause temporary dust and emissions. Mitigation: dust suppression, equipment maintenance, work hour restrictions.

Noise: Baseline noise levels: 45-55 dB (rural), 65-75 dB (urban). Railway operations will increase noise by 5-10 dB within 100m of tracks. Mitigation: noise barriers at sensitive locations, speed restrictions in residential areas.

Water Resources: Route crosses 8 seasonal streams and 2 perennial rivers. No major water bodies affected. Mitigation: proper drainage design, erosion control, spill prevention measures.

Soil and Geology: Predominantly sandy loam soils. Some areas prone to erosion. Mitigation: slope stabilization, revegetation, erosion control structures.

2.2 Biological Environment

Vegetation: Primarily Sudan savanna with scattered trees. No rare or endangered plant species identified. 450 hectares of vegetation clearance required. Mitigation: minimize clearance, compensatory planting (2:1 ratio), preservation of significant trees.

Wildlife: Common savanna species (rodents, birds, small mammals). No critical habitats. Wildlife corridors maintained through culvert design. No significant barrier effect expected.

Protected Areas: Nearest protected area is Kainji Lake National Park (180 km from alignment). No direct or indirect impacts.

2.3 Climate Change Considerations

GHG Emissions:
• Construction phase: 120,000 tonnes CO2e (one-time)
• Operations: Net reduction of 180,000 tonnes CO2e annually through modal shift
• Lifecycle carbon payback: 8 months

Climate Resilience: Design incorporates climate projections (increased rainfall intensity, temperature rise). Drainage systems sized for 1-in-100 year events plus 20% climate change allowance.

3. SOCIAL BASELINE AND IMPACTS

3.1 Demography and Livelihoods

Affected Population: Corridor passes through 23 communities (14 in Nigeria, 9 in Niger). Total population within 1 km: approximately 45,000 people. Primary livelihoods: agriculture (78%), trade (12%), services (10%).

Land Acquisition:
• Total land required: 1,240 hectares
• Agricultural land: 1,103 ha (89%)
• Residential land: 87 ha (7%)
• Commercial land: 50 ha (4%)

Resettlement:
• Physical displacement: 847 households (5,082 people)
• Economic displacement: 1,234 households (crop/business loss)
• Vulnerable households: 127 (female-headed, elderly, disabled)

All resettlement will follow Resettlement Action Plan (RAP) prepared in accordance with AfDB and IFC standards.

3.2 Cultural Heritage

Archaeological survey identified 3 sites of local cultural significance. All sites will be preserved through route micro-adjustments. Chance find procedures established for construction phase.

3.3 Health and Safety

Construction Phase Risks:
• Occupational health and safety
• Community health (dust, noise, traffic)
• Communicable diseases (HIV/AIDS, malaria)
• Gender-based violence and exploitation

Mitigation: Comprehensive Health and Safety Plan, worker and community awareness programs, grievance mechanism, code of conduct for workers.

Operational Phase:
• Railway safety (level crossings, trespassing)
• Emergency response capacity

Mitigation: Grade-separated crossings at high-traffic locations, fencing, public awareness campaigns, emergency response plan.

3.4 Positive Social Impacts

• Employment: 12,000 construction jobs (30% local target), 2,500 permanent jobs
• Skills development: Training programs for 5,000 people
• Market access: Reduced transport costs benefit farmers and traders
• Regional integration: Enhanced people-to-people connectivity
• Local procurement: 80 million estimated local content

4. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

4.1 Institutional Arrangements

• Project Implementation Unit (PIU) with dedicated E&S; team
• Independent Environmental and Social Consultant for monitoring
• Joint Nigeria-Niger Environmental Monitoring Committee
• Community Liaison Officers in each affected community

4.2 Key Management Plans

1. **Construction Environmental Management Plan (CEMP)**
- Dust and emissions control
- Noise and vibration management
- Water and soil protection
- Waste management
- Biodiversity protection

2. **Resettlement Action Plan (RAP)**
- Compensation at full replacement cost
- Livelihood restoration programs
- Vulnerable persons assistance
- Grievance redress mechanism

3. **Occupational Health and Safety Plan**
- Contractor safety requirements
- Personal protective equipment
- Emergency response procedures
- Worker welfare facilities

4. **Stakeholder Engagement Plan**
- Ongoing consultation with affected communities
- Information disclosure
- Grievance mechanism (24/7 hotline, community offices)

5. **Biodiversity Action Plan**
- Habitat restoration
- Compensatory planting
- Wildlife corridor maintenance

4.3 Monitoring and Reporting

• Monthly environmental monitoring reports
• Quarterly social monitoring reports
• Semi-annual compliance audits
• Annual ESIA review and update
• Grievance tracking and resolution reporting

4.4 Budget

Total ESMP budget: 2 million (2.1% of project cost)
• Resettlement and compensation: 8 million
• Environmental mitigation: million
• Monitoring and supervision: million
• Capacity building and training: million

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The ESIA concludes that the Kano-Maradi Railway Project is environmentally and socially acceptable, provided that:

1. All mitigation measures in the ESMP are fully implemented
2. Resettlement is conducted in accordance with the RAP
3. Robust monitoring and supervision arrangements are maintained
4. Stakeholder engagement continues throughout project lifecycle

The project will generate significant positive environmental impacts through reduced GHG emissions and positive social impacts through employment creation and improved connectivity.

5.2 Key Recommendations

1. Establish PIU E&S; team before construction start
2. Complete RAP implementation before physical works in each section
3. Conduct pre-construction environmental and social training for all contractors
4. Implement robust grievance mechanism from project inception
5. Ensure adequate budget allocation for ESMP implementation
6. Conduct annual ESIA review to address emerging issues

This ESIA was prepared by Environmental Resources Management (ERM) in association with local consultants, in compliance with Nigerian EIA Act, Niger environmental regulations, AfDB ISS, and IFC Performance Standards. January 2024.