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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

AND

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A
PROPOSED LOAN

IN THE AMOUNT OF US\$100 MILLION

AND A
PROPOSED CREDIT

IN THE AMOUNT OF SDR 7.3 MILLION
(US\$10 MILLION EQUIVALENT)

TO

MONGOLIA

FOR A

MONGOLIA TRANSPORT CONNECTIVITY AND LOGISTICS IMPROVEMENT PROJECT

May 4, 2022

Transport Global Practice
East Asia And Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective March 31, 2022)

Currency Unit = Tugrik (MNT)

MNT 2,955 = US\$1

US\$ 1.3824 = SDR 1

FISCAL YEAR

July 1 – June 30

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
CBA	cost-benefit analysis
CERC	Contingent Emergency Response Component
CPF	Country Partnership Framework
E&S	environmental and social
EIRR	economic internal rate of return
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
FDI	foreign direct investment
FM	financial management
GoM	Government of Mongolia
GDP	gross domestic product
GHG	greenhouse gas
GRM	Grievance Redress Mechanism
IA	Implementing Agency
IBRD	International Bank for Reconstruction and Development
IRI	International Roughness Index
JICA	Japan International Cooperation Agency
M&E	monitoring and evaluation
MOF	Ministry of Finance
MOFALI	Ministry of Food, Agriculture and Light Industry
MRTD	Ministry of Road and Transport Development
NDA	National Development Agency
NPV	net present value
NTC	National Transport Center
PAD	Project Appraisal Document
PDO	Project Development Objective
PMO	Project Management Office
POM	Project Operations Manual
PPP	public-private partnership
PSC	project steering committee
RAM	road asset management
RMC	road maintenance company
RSSAT	Road Safety Screening and Appraisal Tool
RTDC	Road and Transport Development Center
TA	technical assistance
VOC	vehicle operating cost
WEF	World Economic Forum



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The World Bank

Mongolia Transport Connectivity and Logistics improvement project (P174806)

ANNEX 8: Logistics and Logistics Hubs.....101



DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Mongolia	Mongolia Transport Connectivity and Logistics improvement project	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P174806	Investment Project Financing	Substantial

Financing & Implementation Modalities

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input checked="" type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	<input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
23-May-2022	01-May-2028

Bank/IFC Collaboration
No

Proposed Development Objective(s)

The project development objective is to improve climate-resilient transport connectivity and logistics efficiency for the meat value chain in Mongolia.



Components

Component Name	Cost (US\$, millions)
Infrastructure Investments	80.00
Transport and logistics services	50.00
Technical assistance and capacity building	2.00
Contingent Emergency Response Component (CERC)	0.00

Organizations

Borrower:	Mongolia
Implementing Agency:	Ministry of Road and Transport Development

PROJECT FINANCING DATA (US\$, Millions)

SUMMARY

Total Project Cost	132.00
Total Financing	132.00
of which IBRD/IDA	110.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	100.00
International Development Association (IDA)	10.00
IDA Credit	10.00

Non-World Bank Group Financing

Counterpart Funding	2.00
Borrower/Recipient	2.00
Commercial Financing	20.00



Unguaranteed Commercial Financing	20.00
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IDA Resources (in US\$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Mongolia	10.00	0.00	0.00	10.00
Crisis Response Window (CRW)	10.00	0.00	0.00	10.00
Total	10.00	0.00	0.00	10.00

Expected Disbursements (in US\$, Millions)

WB Fiscal Year	2022	2023	2024	2025	2026	2027	2028	2029
Annual	1.38	8.26	8.17	13.29	15.42	24.61	25.26	13.61
Cumulative	1.38	9.64	17.81	31.10	46.52	71.13	96.39	110.00

INSTITUTIONAL DATA

Practice Area (Lead)	Contributing Practice Areas
Transport	Agriculture and Food

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Substantial
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Low
5. Institutional Capacity for Implementation and Sustainability	● Moderate
6. Fiduciary	● Substantial



7. Environment and Social	● Substantial
8. Stakeholders	● Moderate
9. Other	● Substantial
10. Overall	● Substantial

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 Standards Relevance Given its Context at the Time of Appraisal**

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant
Cultural Heritage	Relevant
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 Covenants

Sections and Description

1. Implementation Arrangements

(i) Institutional Arrangements

Loan Agreement: Schedule 2, Section I.A

The Borrower shall:

(a) not later than one (1) month after the effective date, establish and thereafter, maintain a Project Steering Committee, chaired by MRTD with representation from the Cabinet Secretariat, MOFALI, MED, local governments from selected aimags, and MOF, which shall be responsible, inter alia, for overseeing the Project implementation and facilitating coordination among relevant agencies; and

(b) maintain a Project Management Office within the MRTD, which shall be responsible, inter alia, for the overall day-to-day implementation of the Project.



both with composition, functions, staffing and resources satisfactory to the Bank and set out in the Project Operations Manual.

(ii) Project Operations Manual

Loan Agreement: Schedule 2, Section I.B

The Borrower, through MRTD, shall ensure that the Project is carried out in accordance with the arrangements and procedures set out in the Project Operations Manual ("POM") and shall not amend, abrogate or waive any provision of the POM unless the Bank has provided its prior no-objection thereof in writing.

(iii) Annual Work Plans and Budgets

Loan Agreement: Schedule 2, Section I.C

The Borrower, through MRTD, shall prepare and furnish to the Bank for its no-objection not later than December 10 of each fiscal year during the implementation of the Project (or such later date as the Bank may agree), a consolidated Annual Work Plan and Budget ("AWPB") containing all Project activities and expenditures proposed to be included in the Project in the following fiscal year.

Sections and Description

2. Environmental and Social Standards

Loan Agreement: Schedule 2, Section I.D

The Borrower shall ensure that the Project is carried out in accordance with the Environmental and Social Standards, in a manner acceptable to the Bank.

Without limitation upon paragraph 1 above, the Borrower shall ensure that the Project is implemented in accordance with the Environmental and Social Commitment Plan ("ESCP"), in a manner acceptable to the Bank.

Sections and Description

3. Specific Implementation Arrangements for Part 2.1 of the Project

Loan Agreement: Schedule 2, Section I.E

The Borrower shall: (a) carry out feasibility studies of public-private partnership structures for the implementation of the Part 2.1 of the Project; (b) not later than 12 months from the effective date, furnish to the Bank the feasibility study report and incorporate a time bound action plan for the implementation of Part 2.1 of the Project as acceptable to the Bank in the POM.

The Borrower shall, not later than 9 months from the effective date, employ a consultant with qualifications, experience and terms of reference acceptable to the Bank to provide advisory services to the Borrower in relation to the financing, management, and operation aspects of the regional logistics hub supported under Part 2.1 of the Project.

The Borrower shall (a) not later than 24 months from the effective date (or such later date as established by the Bank), enter into a legally binding contractual arrangement with a partner, selected on a competitive basis in accordance with the criteria and requirements set forth in the POM and/or the Procurement Regulations, for the management and operation of the regional logistics hub supported under Part 2.1 of the Project; and (b) exercise its rights under the contractual arrangement referred to in the preceding paragraph (a) in such manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Project.



Sections and Description

4. Contingent Emergency Response

Loan Agreement: Schedule 2, Section I.F

In case of an Eligible Crisis or Emergency

Obligation of the Borrower to prepare and adopt a satisfactory CERC Manual and the Emergency Action Plan for Part 4 of the Project and, in the event of an eligible crisis or emergency, ensure that the activities under said part are carried out in accordance with such manual and plan and all relevant safeguard requirements.

Sections and Description

5. Project Monitoring Reporting and Evaluation

(i) Project Reports

Loan Agreement: Schedule 2, Section II.A

The Borrower shall furnish to the Bank each Project Report not later than forty-five (45) days after the end of each calendar semester, covering the calendar semester.

(ii) Midterm Review

Loan Agreement: Schedule 2, Section II.B

The Borrower shall, on or about the date twenty four (24) months after the effective date, prepare and furnish to the Bank a mid-term report in form and substance satisfactory to the Bank.

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	The Borrower has, through MRTD, adopted the Project Operations Manual in form and substance satisfactory to the Bank;
Effectiveness	IBRD/IDA	The Borrower has, through MRTD, established the Project Management Office with a mandate, composition, resources, and terms of reference satisfactory to the Bank;
Effectiveness	IBRD/IDA	The Financing Agreement has been executed and delivered and all conditions precedent to its effectiveness or to the right of the Borrower to make withdrawals under it (other than the effectiveness of this Agreement) have been fulfilled.
Disbursement	IBRD/IDA	The Borrower has determined that an Eligible Crisis or Emergency has occurred, and has furnished to the Bank a request to withdraw Loan amounts under Category (2); and (B) the Bank has agreed with



such determination, accepted said request and notified the Borrower thereof; and

The Borrower has adopted the CERC Manual and Emergency Action Plan, in form and substance acceptable to the Bank.



I. STRATEGIC CONTEXT

A. Country Context

1. **Mongolia is a landlocked, lower-middle-income country endowed with rich mineral resources.** Agriculture traditionally played a significant role in the economy, but mining has predominated since the discovery of large mineral deposits two decades ago and associated flow of foreign direct investment into the mining sector. The country's economy experienced rapid yet volatile growth over the past 15 years, creating a wave of economic prosperity through investments in infrastructure and social services. However, mining-led growth has also brought severe macroeconomic instability, vulnerability to external shocks, enclave development, excessive capital accumulation, and little innovation.¹ The poverty rate² dropped from 38 percent in 2010 to 28 percent in 2018 but remains high.³
2. **Challenges to the country's sustainable development have been exacerbated by climate change and the COVID-19 pandemic.** Overall, recent economic growth in Mongolia has come almost entirely through capital accumulation and the intensive use of natural capital rather than through growth in productivity. The elimination of extreme poverty owes more to the generous social transfer system than to job creation. Instead of using mineral wealth to gradually reduce its dependence on the mining sector, Mongolia has become more reliant on it. Such dependency is ill-timed. Demand for key minerals—especially coal—is likely to tumble owing to concerns about climate change, investors' growing preference for sustainability, China's goal to reduce coal consumption, and the persistence of economic shocks related to the COVID-19 pandemic. Deterioration of pastureland and desertification have also ensued because of climate change, threatening the sustainability of agriculture.
3. **The Government of Mongolia has a plan to diversify its economy and achieve sustainable economic growth. Fulfilling the plan will require investment in transport infrastructure and logistics improvement.** Development strategies—as set out in the Three-Pillar Development Policy of 2018, Mongolia Sustainable Development Vision 2030, Mongolia Vision 2050 and, more recently, the New Recovery Policy—propose to diversify Mongolia's economy. They identify agriculture, tourism, creative industries, and renewable energy as having the potential to become new drivers of the economy. Yet, while Mongolia has a competitive advantage in these sectors, the lack of *physical connectivity* remains a major constraint. The Global Competitiveness Index produced by the World Economic Forum ranked Mongolia's transport infrastructure 119 out of 141 countries in 2019. On the World Bank's Logistics Performance Index, Mongolia's overall country ranking was 130 in 2018, with similarly lower ratings for infrastructure (135), customs procedures (127), and logistics services (140). On the 2019 Global Connectedness Index produced by DHL, Mongolia ranked 85 out of 169 countries. To move primary and secondary products efficiently along a value chain requires the right infrastructure and logistics services.
4. **Mongolia's unique geospatial and demographic challenges require selectivity in infrastructure interventions.** With just over 3.2 million people inhabiting a territory of 1,564 million square kilometers (km^2) (more than six times the size of the United Kingdom but less than a third the population of London), Mongolia has a population density of 2.1 people per square kilometer. About half the population—some 1.6 million people—are clustered in the capital city, Ulaanbaatar. The rest of the population is spread across small urban centres and vast steppes. Mongolia's territorial expanse and low density create unique challenges for economic development in general and for infrastructure

¹ World Bank, *Mines and Minds: Leveraging Natural Wealth to Invest in People and Institutions*, Mongolia Country Economic Memorandum (Ulaanbaatar: World Bank, 2020).

² As calculated using the national poverty line:

http://www.rilsp.gov.mn/upload/2018/argazui//Yduurlin_Undsen_Uzuuletuudiig_Tootsoh_Argachlal.pdf.

³ National Statistics Office 2020.



investments in particular. Key economic activities, such as livestock herding and mining, occur far from cities. Although infrastructure can improve the viability of economic activities in remote locations, access to regional and international markets is also necessary. Market access remains a challenge for Mongolia.

5. The COVID-19 pandemic continues to sap the country's economy, threatening recent gains in poverty reduction.⁴ From 2017 through 2019, Mongolia's economy was recovering from the 2016 economic downturn on the strength of favorable global commodity prices, the recovery of private investment, and better coordination of macroeconomic policy. Then the COVID-19 crisis hit. As the pandemic's impact on public health continues to evolve, it has already shocked Mongolia's economy, public budget, and welfare system. Government support has not kept pace with the stagnation of household income as the pandemic has put the brakes on the labor market and pushed up food prices (the latter because of sluggish agriculture output, the disruption of food imports, and higher fuel prices.) The June 2021 household survey revealed rising food insecurity among the poor, raising concerns of increased household indebtedness and long-term effects on child nutrition and family health. Trade disruptions have surged since May 2021, following COVID cases at the border with China, leading to frequent closures of the border. This has affected Mongolia's exports and imports. Efforts to provide relief, respond to the health threat, and soften economic impacts have faced stiff challenges, including disruptions in supply chains; funding cuts for construction, repair, and maintenance of roads; and disruptions in public transport, making it harder for people to gain access to basic services. The silver lining is that Mongolia now has an opportunity to pursue a sustainable, inclusive, and resilient recovery, one that addresses fundamental development challenges. The post-pandemic *Economic Recovery Act* now being drafted emphasizes promoting public-private partnerships, reforming state-owned enterprises, promoting green development and digitalization, improving the country's terms of trade (by boosting exports and finding domestic substitutes for certain imports), and attracting foreign direct investment. In line with the World Bank's Green, Resilient, Inclusive Development (GRID) approach, this operation will support the Government of Mongolia to undertake improved, climate-resilient transportation and logistics services to help catalyse the post-pandemic recovery in one of Mongolia's key economic value chains.

B. Sectoral and Institutional Context

6. Transport connectivity and the logistics of the meat value chain are key to Mongolia's economic diversification. The Mongolia InfraSAP report⁵ assesses the prospective drivers of Mongolia's economic growth. In so doing, it analyses key value chains and transport corridors to identify the gaps and constraints that impede the development of essential economic sectors.⁶ The National Freight Flow Model⁷ developed for the InfraSAP study finds that the meat value chain accounts for the second-largest share of national freight (6 percent) after mining and related commodities (87 percent). With 10 percent of the country's 2020 population engaged in livestock production, the meat value chain can contribute much to economic diversification. Already, the Government of Mongolia—with the help of several partners, including the World Bank's Agriculture Global Practice—is addressing critical institutional constraints in the agriculture sector, such as animal health and nutrition, animal productivity, and livestock processing. But transport connectivity and logistics remain bottlenecks for market access.

⁴ World Bank, "Mongolia Country Partnership Framework Concept Note for Consultations," Washington, DC, December 22, 2020.

⁵ World Bank, *Mongolia InfraSAP: Infrastructure for Connectivity and Economic Diversification* (Ulaanbaatar: World Bank, November 2020) assessed the digital, transport, and energy infrastructure needed to support Mongolia's growth aspirations.

⁶ These include value chains needed for value-added mining, livestock, tourism, digital services, and renewable energy.

⁷ The National Freight Flow Model was developed based on national statistical data on commodities at the *soum* level. It produced a national freight flow dataset per road segment and per commodity (World Bank, *Mongolia InfraSAP*).



7. **Mongolia's size and low density shape the proposed approach to infrastructure development.** A “*build and they shall come*” approach, in which the objective is to develop *all* transport infrastructure, is not feasible, because the physical and economic geography of Mongolia makes such an investment strategy neither affordable nor justifiable. Rather, the Mongolia InfraSAP study recommends that infrastructure should be improved first where economic activity is most concentrated and freight flows are greatest. Given the country’s resource constraints, low population density, and vast territory, the report further recommends development of the meat supply chain as an anchor for the freight systems and a vehicle for economic diversification, with a focus on selected corridors and inefficiencies.

8. **Logistics costs in the value chains for livestock and meat account for nearly a third of the cost of end products, hindering Mongolia's competitiveness.** Half of the total logistics cost can be ascribed to poor or non-existent roads, which make it expensive to move products along the supply chain. Thirty percent are imputable to the lack of warehousing facilities or high inventory costs. The remaining 20 percent is due to information asymmetry and administrative costs arising from inefficient manual processing of long trails of paper documents.

9. **Mongolia's poor road connectivity stems from gaps in infrastructure, insufficient funding, and inefficient institutions.** Mongolia has only 1 km of road for every 100 km² of land, making travel within the country costly, lengthy, and hazardous. Because the average transport distance for freight is 600 km, transport costs are a considerable proportion of overall logistics costs. At the national level, transport and logistics costs make up approximately 30 percent of gross domestic product (GDP), much higher than peers such as Uzbekistan, at 17 percent, and China, at 14 percent. A substantial part of this cost is due to poor road connectivity.

10. **Mongolia's widely dispersed population complicates infrastructure spending, as long distances must be covered from the budget of a relatively small economy.** Mongolia already spends about 10 percent of its GDP on public investment, but the dollar value of that spending is low given the country’s small GDP. Furthermore, Mongolia’s public-debt-to-GDP ratio is relatively high, leaving limited space for additional public borrowing. The public investment management suffers from inefficiencies driven by poor project selection, appraisal, and implementation. In this context, selecting the right projects through systematic planning is even more crucial if the government is to derive the greatest value from its limited public resources and attract more private financing.

11. **Although investments in the road network have risen substantially since 2010, the productivity of the network remains low.** As of 2019, Mongolia’s national road network covered 15,172 km. Most new roads were commissioned between 2013 and 2016 under the Millennium Road Project, the goal of which was to create horizontal and vertical axes across Mongolia. However, owing to the country’s geographic expanse and the locations of productive centres, traffic on nearly half of the national network is less than 250 vehicles per day; only 7 percent of roads carry more than 2,500 vehicles a day. Because of the country’s unique spatial and demographic characteristics, the central north-south corridor (along Asia Highway 3) is heavily utilized, with average daily traffic reaching 4,430 vehicles. Most of the horizontal axis, meanwhile, remains underutilized (with average daily traffic as low as 164 vehicles). Only a few other segments have significant traffic, mostly in the Ulaanbaatar–Darkhan–Erdenet economic triangle

12. **Transport infrastructure is poorly managed, cutting asset values and shortening the lifetime of physical assets.** The latest inventory of road assets was conducted through an Asian Development Bank (ADB) technical assistance project in 2016; however, efforts to assess inventory and condition were not sustained beyond the project.⁸ The lack of updated data results in inefficient spending on road maintenance and rehabilitation, further restricting connectivity. Poorly maintained parts of the network are likely to be more vulnerable to the impacts of extreme weather than well-built or well-maintained assets.

⁸ ADB (Asian Development Bank), *Mongolia: Road Sector Development to 2016* (Manila, Philippines: ADB, 2011).



13. **Current road and rail maintenance procedures are not adapted to the management of a large, strategic transport network, and maintenance is still carried out on a project-by-project basis.** For example, maintenance of national roads, managed by the Road Transport Development Center, are maintained by 22 small, mechanized units, 18 of which are state owned. Because the payments they receive do not cover the full costs involved, particularly the costs of capital, companies suffer losses and require frequent capital infusions in the form of new equipment. Works are limited to basic routine maintenance (e.g., clearing side drains) and some minor repairs (e.g., filling potholes and cracks) but do not include preventive maintenance. In general, budgeting is based on top-down historic estimates instead of the actual condition of assets. Provincial and municipal road assets are managed by the corresponding provincial or municipal agencies. The institutional arrangements for maintenance do not reflect internationally accepted practices.

14. **Climate change adds to the challenges facing Mongolia's infrastructure.** More frequent severe weather events and other natural hazards are likely to accelerate the loss of road assets and cause more frequent travel disruptions unless climate resilience is integrated into planning and management. The country is already exposed to extreme weather during much of the year: road surfaces deteriorate under the effects of summer floods and winter freezes; climate change will increase these hazards. Occasional heavy snowfalls make roads impassable or extremely dangerous, and the lack of snow removal and de-icing practices leaves rural roads slippery and unsafe in winter. Overall, annual mean temperatures rose by 2.24 degrees Celsius between 1940 and 2018; and weather events increased in frequency and magnitude.⁹ Mongolia's permafrost has been melting at an alarming rate, shrinking from 63 percent of the national territory in 1971 to just over 29.3 percent in 2016. Strengthening the resilience of Mongolia's road and bridge network through improved maintenance, more resilient design and construction, and greater connectivity is needed to avoid disruption of value chains.

15. **Coupled with upgrades to the road network, improvements in logistics for the meat supply chain would raise both the quantity and quality of production.** The current supply chain productivity is cyclical. Meat production peaks in the four-month slaughtering season from August to late November, as livestock fattens. However, many producers in Mongolia are not able to enter into long-term supply contracts because of extreme weather events (including *dzud*), the high incidence of disease, and the lack of formal cooperatives to manage bottlenecks along the value chain. Under these circumstances, cold storage is essential to ensure year-round supply and not be overwhelmed during the short slaughtering season. Refrigeration and freezing facilities would raise meat-processing capacity before winter; the products could then be stored and released throughout the year.

16. **Inadequate warehousing and cold storage facilities lower the value of meat and may have health implications.** Currently, close to 97 percent of the country's meat is processed at informal facilities with poor hygiene standards. This is true whether the meat is handled by herders, herder cooperatives, or agents and intermediaries for large wet markets. Small and partially loaded trucks without temperature control transport meat from slaughter to wholesalers and consumers. Consumers often store meat products in household basements or on balconies. Most wholesalers and merchants operate substandard facilities without proper temperature control, leading to significant loss of product quality, health problems among consumers, and lower demand. Proper warehousing and storage would increase not only the supply of meat, but also its quality throughout the year. A logistics hub would also allow regulatory oversight of provenance, quality, packaging, and storage.

17. **The logistics of the meat value chain are highly fragmented and marked by outdated processes.** To stay competitive, logistics firms must adopt digital technologies to reduce inefficiencies in documentation and improve better management and planning through greater coordination all along the supply chain. The logistics chain for meat is also marked by information asymmetry between various parties in the chain—herders, transporters/truckers, warehouse operators, public entities, and end consumers. The factors that prevent actors from optimizing their segment of the supply chain include lack of reliable data to improve performance, planning, and forecasting; unwillingness to share data owing to distrust; and the absence of standards for data and common processes. To address this gap, the proposed



project would develop and deploy a semi-open but secure digital platform offering core data and logistics services for willing participants in the supply chain.

18. **This project complements efforts by the World Bank and the Government of Mongolia to remove constraints in the meat value chain and digital development, thereby raise the quality of meat products.** An ongoing World Bank project (Livestock Commercialization Project, P165945) is tackling the obstacles to greater animal productivity and value. The upcoming Agriculture Clusters Project is being developed for FY23 by the Bank's Agriculture Global Practice. It will define several livestock clusters in which services will be developed to improve the quality and supply of meat products at their origin (such as livestock feedlots, veterinary services, and an agriculture laboratory). These interventions are being planned and implemented in response to the Government of Mongolia's program - in place since 2015 - to increase meat exports and ensure a stable supply to the domestic market. The World Bank has two other ongoing and pipeline engagements with Mongolia on the digital development front (Assessment of Digital Infrastructure and Services Design, P176424 and Smart Government II Project, P176631) which aim to improve the usability and efficiency of online public services to citizens and businesses as well as to inform the GoM possible policy options and actions to assist their investment decisions in digital infrastructure and services.

19. **The proposed pathbreaking project identifies infrastructure gaps based on value chain analysis and designs critical interventions in transport infrastructure and connectivity.** The project has three priorities:

20. Priority 1: Remove critical bottlenecks in the road network and improve maintenance

Connectivity between the selected eight Aimags which are critical for the meat value chain and last-mile connectivity between herding communities and the core transport network will be supported. Out of 15,172 km of roads, 2,300km of national roads will be the priority. Most of this priority network, constructed since 2010 with funding from several international development partners, such as the ADB and Japanese International Cooperation Agency, alongside the Government of Mongolia, has deteriorated and needs rehabilitation or upgrading. These significant investments are critical for connectivity between herders and markets. A key priority is to develop and preserve existing national roads that are the backbone for the physical connectivity of the meat supply chain, supported by appropriate frameworks for asset management. This is critical to preserve the asset value of roads that have recently been upgraded, thereby avoiding the vicious cycle of build-neglect-rebuild, as well as premature failures. Such an asset management approach would help to manage the strategic network on a "life-cycle cost-planning" basis and to implement evidence-based maintenance planning and investment decisions.

21. Priority 2: Deliver infrastructure and logistics services effectively to unlock potential of meat supply chain

To achieve maximum potential from the livestock sector, ongoing initiatives aimed at improving its productivity must be supplemented with well-organized warehousing and transportation services. The key to unlocking the economic potential of Mongolia's livestock is the availability of efficient terminals and logistics services to extend the cold chain, as well as facilities to add value to livestock products. The eight selected *Aimags* will form a network of logistics hubs in a hub-and-spoke pattern.

22. Priority 3: Address information asymmetry and administrative barriers by delivering timely information to the right parties

COVID-19 has accentuated the need for digitalization in many sectors of the economy, including logistics. Through an open digital platform, logistics firms serving the meat supply chain will be able to achieve end-to-end visibility of supply chain activities and gain access to the data and information they need to unlock innovation and create new commercial value. The project will also help firms adopt digital solutions and train their workforce. In addition to the technological interventions, the project will also seek to develop guidelines and regulations to spur the growth of contract logistics services and enhance the role of existing players.



23. **Embedded within the activities will be an explicit mandate to respond to the impacts of climate change.** Mongolia's transport network is highly vulnerable to heavy rainfall, severe winters, and floods. The unit costs for new construction are relatively high and have been increasing with climate change. The Ministry of Road and Transport Development (MRTD) has begun to devise strategies and guidelines to integrate climate resilience into the road sector. These strategies and guidelines are designed to avoid premature failures and extend the life of road infrastructure; to make the best use of existing roads and bridges; to promote the use of local materials; and to adopt climate-smart solutions, including improved drainage and road surfacing, and innovative and climate-resilient bridge designs. The proposed project will reinforce these initiatives and update MRTD's guidance to reflect international best practice in livestock supply chains.

C. Relevance to Higher Level Objectives

24. **The proposed project is well aligned with the applicable Country Economic Memorandum and with the Country Partnership Framework for FY21–25.** The framework aims to shift the World Bank Group's engagements in Mongolia toward the productive sectors of the real economy to strengthen economic governance, raise competitiveness, and improve the quality of life. The proposed project, in turn, is designed to support strategic value chains that have the potential to boost competitiveness. This will be achieved through improved connectivity between key regions, more reliable and efficient logistics to enable an unbroken cold chain of transport of meat products, and institutional and funding mechanisms that promote innovation and private sector investment in logistics and transport. The project also proposes to improve the MRTD's capacity to plan transport investments and to manage its assets more efficiently. As such, the project is well aligned with the FY21–25 Country Partnership Framework.

II. PROJECT DESCRIPTION

25. **The project will make optimal use of World Bank support by ensuring that interventions are highly selective, as recommended in the InfraSAP study.** By introducing and implementing an evidence-based approach to asset management, the project will lay the foundation for nationwide asset preservation. It will also take a major step toward addressing Mongolia's logistical challenges. By tackling the shortfalls in physical connectivity, cold chain storage, and information asymmetry in logistics and supply chains, the project will begin to disassemble the stubborn impediments to the country's efforts at economic diversification. It will also deploy technical assistance and capacity building to make transport services and logistics more efficient over the long haul.

A. Project Development Objective

PDO Statement

26. The project development objective is to improve climate-resilient transport connectivity and logistics efficiency for the meat value chain in Mongolia.

**PDO Level Indicators**

27. Achievement of the project development objective will be measured by the indicators set forth below. Each indicator is detailed in the Results Framework.

1. Improved transport connectivity:

Travel time on project corridors, with sub-indicators measuring travel time along targeted national and local roads.

2. Improved logistics for the meat value chain:

Logistics cost on identified corridors associated with meat value chain.

3. Improved climate resilience of the road network:

Road users with access to climate-resilient roads along the project corridors.

4. Corporate Commitment: Improved citizen engagement:

Road users satisfied with road transport and logistics, and with related services in selected transport corridors.

5. Corporate Commitment: Reduced gender gap in women's participation in livestock commercialization:

Share of transport and logistics platform female herder users relative to the total number of active herder users.

B. Project Components

28. **The proposed project consists of a complementary set of interventions to address the three major drivers of logistics costs in the meat value chain:** poor physical connectivity, badly situated and/or inefficient logistics hubs, and information asymmetry among actors in the supply chain, with consideration to gender gaps in information access.

29. **The project has four components:**

Component 1. Infrastructure investments (estimated total cost: US\$80 million; IBRD loan⁹ US\$70 million, IDA credit US\$10 million)

30. This component will improve transport connectivity for a more efficient meat supply chain. The investments and activities focus on roads in *aimags* with the highest concentrations of livestock, where freight flows for meat are also concentrated. The interventions will be based chiefly on the recent profile of the national road network in the selected *aimags* as determined by the International Roughness Index (IRI).¹⁰ The interventions will also focus on last-mile connectivity to complete the missing links in the meat value chain. To ensure longer-term benefits, the component will support development of the national road asset management (RAM) framework that is expected to be adopted as part of the national government's process of transport investment planning and management.

31. The activities to be financed under this component are listed below:

32. **Subcomponent 1.1. Results-based maintenance of key sections of the strategic network.** This subcomponent will finance maintenance of 311 km of roads now in poor or very poor condition.

⁹ A front-end fee of \$250,000 will be capitalized and deducted from this component

¹⁰ The MRTD, in collaboration with the Road Transport Development Center, assessed the asphalt-paved national road network in 2019, using the IRI. The assessment was complemented by field inspections of roads with poor and very poor IRI scores by the respective road maintenance companies in June 2021.

**Table 1. Road Sections Identified for Repair and Rehabilitation**

Road	Route Code	Road Sections for Periodic Repair (km)	Road Sections for Rehabilitation (km)
Ulaanbaatar–Arvaikheer	A0301	72	33
Ulaanbaatar–Undurkhaan	A0501	-	68
Kharkhorin–Tsetserleg	A0602	13	27
Bulgan–Murun	A0902	-	13
Tsetserleg–Tosontsengel (Arkhanghai)	A0603	40	10
Arvaikheer–Bayankhongor (Uvurkhangai)	A0302	-	35
Total			311km

33. The results will be measured against maintenance planning and budget allocations. In line with recommendations of the InfraSAP, the link between budgeting and conditions of physical assets will be a critical aspect of the project. The project will help develop a strategic investment plan that informs decisions, and metrics that respond to road users. The proposed activities involve repair and rehabilitation of road links now in poor and very poor condition to achieve year-round connectivity on the strategic network linking the eight selected *aimags*. These roads have been carefully selected and are key parts of the national network that connects *aimags* heavily involved in meat production. The activities will include the following types of interventions:

1. *Winter and severe weather maintenance*—activities to fight extreme cold, high winds, mudslides, and flooding.
2. *Reactive and emergency response*—repair of potholes, patching, clearing incidents, and traffic management.
3. *Routine maintenance*—periodic maintenance, including inspections for minor repairs, clearing of drains, repair of road signs, and restoration of road markers.
4. *Planned renewals*—interventions to prevent water ingress, improve drainage, reseal surfaces, and preserve crash barriers.

34. **Subcomponent 1.2. Last-mile connectivity for local herders.** This subcomponent will finance upgrades to approximately 51 km of high-priority local road sections to improve last-mile connectivity.

Table 2. Road Sections to Be Upgraded to Improve Last-Mile Connectivity

Road	Availability of Detailed Design	Length (km)
Bulgan, Arkhangai <i>aimag</i>	No	35
Yosonzuil, Ovorkhangai <i>aimag</i>	No	16
Total		51 km

35. These activities will improve local roads that link herdsmen to the national road network. In the context of Mongolia's meat supply chain, this final leg constitutes a major constraint for the livelihoods of herders and drives costs along the entire chain of operators, processors, transporters, retailers, and exporters. The World Bank has recently developed a multicriteria decision-making framework¹¹ for low-volume local roads that will be applied to selecting

¹¹ World Bank To Pave or Not to Pave: Developing a Framework for Systematic Decision-Making in the Choice of Paving Technologies for Rural Roads, Mobility and Transport Connectivity Series (Washington, DC: World Bank, 2021).



appropriate interventions. Some will include improvements in horizontal and vertical road alignment, safety improvements, drainage works, pavement strengthening, and resealing.

36. ***Subcomponent 1.3. Road-asset management.*** This subcomponent will finance development of an asset-management plan and decision-support system for road infrastructure, while also updating technical standards and specifications to meet the new challenges imposed by climate change. It will build on a road inventory system¹² currently under development. The system will be used to implement asset delivery and preservation under Subcomponents 1.1 and 1.2.

Component 2. Transport and logistics services (estimated total cost: US\$50 million; IBRD loan US\$28 million, Counterpart funding US\$2 million, and Commercial finance US\$20 million)

37. This component aims to improve the service side of logistics. The MRTD has a mandate to address both physical connectivity and logistics services, and this component provides an entry point to tackle some longstanding bottlenecks. The investments and activities to be implemented under this component are limited in scope and scale, considering limited readiness and resources. Nonetheless, these interventions will complement others on which the MRTD is working with the ADB, the Japanese International Cooperation Agency, and the European Bank for Reconstruction and Development to improve roads, warehousing, and trucking through major investments in public transport. Activities under this component include:

38. ***Subcomponent 2.1. Model regional logistics hub.*** This subcomponent addresses the lack of a “hub-and-spoke” configuration for logistics activities. The regional hub to be financed will provide facilities for consolidation and warehousing of goods to tackle the fragmentation that currently constrains the meat value chain. In so doing, it will make possible a year-round supply of high-quality meat to the Ulaanbaatar market. The intervention will reduce the use of small, partially loaded trucks lacking temperature control, which currently causes significant loss of product quality. Eventually Mongolia will need a complete network of hubs and spokes to serve both the domestic and export markets. The regional hub in Ovorkhanghai *aimag* will be financed under this project for demonstration purposes. It will provide a direct link to the domestic market in Ulaanbaatar. It was chosen based on multicriteria related to location, volumes, connectivity, and alignment with the Government of Mongolia’s development plans. The activities to be financed under this subcomponent include:

- Approximately 4–5 km of internal roads within the hub
- Electricity, water supply, and solid waste disposal
- Access to information and communication technology
- Access to land already owned by the Government of Mongolia (approximately 28 hectares to be developed in phases)

39. The model regional hub is expected to be operated by a public-private partnership (PPP), with the Government of Mongolia providing the infrastructure listed above and the partner building and operating the facilities for packaging, warehousing, and procuring, operating cold storage as well as other needed superstructure such as offices. The PPP partner is also expected to procure, operate, and maintain a modern trucking fleet to carry frozen goods to markets throughout the year. The private partner will function under a performance-based contract that encourages efficiencies

¹² With the ongoing ADB TA-9544, a road asset management system is being reestablished to improve maintenance planning, implementation, and prioritization of national road assets at the MRTD and the Road Transport Development Center. A pavement maintenance management system called Paver™, developed by the Colorado State University, is currently being piloted for deployment (ADB, “Loan Agreement between Mongolia and Asian Development Bank: Regional Road Development and Maintenance Project,” July 23, 2018, <https://www.adb.org/sites/default/files/project-documents/48186/48186-005-Ina-en.pdf>).



and economies of scale in the project; it will operate the hub on an open-access basis to promote competition. Additional government support in the form of capital grants or viability gap funding may possibly be needed to support the financial viability of the hub. However, if such private financing is unavailable on the local market, the financing will be done through the Project, and a partner will be competitively procured and enter into a long-term management contract to operate and manage the hub. Annex 7 includes a detailed discussion of the potential PPP structure.

40. The model regional logistics hub will complement ongoing and upcoming projects supported by the World Bank in the agriculture sector. Specifically, the Livestock Commercialization Project (ongoing, P165945) and Agriculture Clusters Project (under preparation for FY23) will support upstream supply to the regional hubs through interventions that improve animal health.

41. ***Subcomponent 2.2. Logistics and supply chain platform.*** This subcomponent will finance the development of a digital platform for the meat supply chain, one accessible to all willing players in the supply chain—herders, warehouse operators, transporters, key government departments, auctioneers, retailers, wholesalers, and exporters.¹³ The project will study current industry “pain points,” identify problems faced by stakeholders in the meat and logistics supply chains and conduct a gap analysis. From there, the project will determine the data and services to be provided by the new platform. Industry and user engagement will be tested through workshops and focus group sessions, which will include women-led logistics businesses and herders. The platform will function as a public, open to registered members, shared logistics platform sponsored by the MRTD but developed in cooperation with functional departments, research institutes, software developers, logistics companies, the Mongolia Logistics Association, and other parties. A governance framework for operation of the platform will also be developed to ensure that data access and sharing are governed by legislation on data protection, enabling parties to coordinate their actions with the assurance that their privacy and data are protected. The presence of the platform will lay the foundation for development of innovative commercial applications—for example, the Internet of Things (IoT), blockchain, and big data. Logistics firms, especially small and medium enterprises and women-led herders and logistics firms will be provided with digital tools, skills, and knowledge to ensure inclusive participation.

42. ***Subcomponent 2.3. Pilot projects for innovations in the supply chain.*** Aside from drastically decreasing manual work, digital integration makes it possible to optimize logistical processes and transport routes. It also enables real-time monitoring of flows of goods across the supply chain, greater cost-effectiveness, new business models based on real-time economics. The following activities are envisaged.

- *Real-time monitoring of deliveries, including radio-frequency identification (RFID) tags, quick-response codes, and track-and-trace blockchain.* The RFID tags use electromagnetic fields to automatically identify, and track tags attached to objects. Combining RFID technologies with quick-response codes and blockchains will improve the visibility and traceability of products (origin and authenticity). Private partners will be asked to design solutions for specific routes before scaling up.
- *Warehousing and smart trucks/containers.* Using simple technologies for machine learning, artificial intelligence, and robotics, solutions have been designed to reduce incidents of contamination, which are prevalent in Mongolia’s meat logistics services.
- *Integrating IoT sensors for environmental and animal monitoring.* Herders’ inability to monitor their animals continuously can be addressed by installing and integrating IoT sensors.

43. ***Subcomponent 2.4. Regulations and standards for contracted logistics services.*** This subcomponent includes a review and update of regulations pertaining to contracted logistics services. Compliance standards and regulations are

¹³ Similar to the Logink platform in China supported by the World Bank, which allows different actors to access information to improve supply chain efficiency.



critical to ensure the viability and successful monetization of contracted logistics in the value chain, particularly as they relate to subcomponent 2.1 on hubs.

Component 3. Technical assistance and capacity building (estimated total cost: US\$2 million, IBRD loan: US\$1.75million)

44. The activities of this component are designed to prepare for the rollout of the remaining regional logistics hubs, which will require feasibility studies, technical designs, and financing plans, among other things. The component will also advance (i) the enabling environment for meat exports and efficient transport systems beyond roads; (ii) institutional development; and (iii) capacity building for improved transport and logistics services and systems. Activities under the component are grouped in three subcomponents.

45. **Subcomponent 3.1. Preparatory work for logistics hubs.** The model hub is expected to form part of a future network of integrated regional hubs and, eventually, a central hub large and efficient enough to ensure meat supply along an unbroken chain for both the domestic and export markets. Market soundings and prefeasibility studies have revealed the private sector's concerns about the design and master plan for the hubs to ensure that they are "right sized"—not too big and not too small. This will depend on several factors such as volumes, activities in the hubs, existing production, and key actors for each *aimag*, and market demand. To ensure that the network of hubs is built to a suitable scale and market, and that the hubs are well integrated, the project will support preparatory works for the remaining hubs. The activities will include master plans, technical designs, assessment of appropriate governance, financing and PPP options, feasibility studies, and bidding documents.

46. **Subcomponent 3.2. Strategic studies for handling meat destined for export.** When the potential for meat exports picks up in Mongolia, specific studies for rail and air freight logistics will have to be designed. These strategic studies will lay the groundwork for export logistics and will include technical designs for terminal handling, intermodal operations, and business development for export logistics.

47. **Subcomponent 3.3. Capacity building and training.** The public sector in Mongolia is still in the early stages of building its capacity to support logistics and preserve existing physical assets. This subcomponent will support project management and implementation, including a project management office, technical designs, environmental and social (E&S) studies, public consultation and engagement, and monitoring and evaluation (M&E) for activities under the other components, while also developing the capacity to manage road assets, regulate contracted logistics services, and oversee PPPs. Capacity-building activities include workshops, trainings, conferences, and study tours for government departments and technical staff.

Component 4. Contingent Emergency Response Component (total cost: US\$0)

48. This component establishes an emergency-response contingency fund with a budget of zero that could be triggered in the event of a natural disaster through formal declaration of a national or regional state of emergency, or upon a formal request from the government in the wake of a disaster. Once triggered, funds from other project components could be tapped to finance emergency goods and services in the transport and agricultural/meat sectors.¹⁴ Eligible activities would include clearing and rehabilitation of road infrastructure, protection of infrastructure at regional logistics hubs identified or supported by the project, and purchases of eligible materials. An emergency response annex will be included in the Project Operations Manual, specifying the implementation arrangements for the component, including its activation process, the roles and responsibilities of implementation agencies, an indicative list of activities eligible for financing, E&S aspects, and fiduciary arrangements. When the Government of Mongolia has determined that

¹⁴If required, additional financing could be sought to restore funding to components from which funds are transferred.



a crisis or emergency has occurred, it can request and seek the agreement of the World Bank to draw on project funds for specific activities. In such situations, all E&S instruments required for the added activities need to be prepared, disclosed, and approved by the World Bank.

49. Overall project cost and financing. The total cost of the proposed project, including financing costs, is US\$132 million, of which the IBRD loan will finance US\$100 million, and IDA will finance US\$10 million. The Government of Mongolia and the MRTD will provide counterpart funding of US\$2 million. An estimated US\$20 million is expected from the private concessionaire in the regional hub.

Table 3. Breakdown of Project Costs

Component	Total Cost	IBRD	IDA	Counterpart	Private Financing
1 Infrastructure investments	80	70*	10	0	0
2 Transport and logistics services	50	28	0	2	20
3 Technical assistance and capacity building	2	2	0	0	0
4 Contingent Emergency Response Component	0	0	0	0	0
Total project costs	132	100	10	2	20

*A front-end fee of \$250,000 will be capitalized and deducted from this component

The proposed project is part of a bigger scheme to improve the connectivity and logistics across the identified network. In preliminary discussions with other development partners, Asian Infrastructure Investment Bank (AIIB) has expressed interest to support additional regional hubs and connectivity through parallel financing.

C. Project Beneficiaries

50. Direct beneficiaries of the project. The maintenance, rehabilitation, and construction of road and bridge works along strategic value chain corridors in Mongolia will improve the connections of eight provinces with Ulaanbaatar, one another, and the rest of the country. All users of the project corridors—including herders, residents, visitors and tourists, international and domestic transportation, and truckers—will benefit directly from decreased travel time, reduced vehicle operating costs, improved road safety, and reduced climate-induced delays and stops. The number of vehicles using these corridors was 9,300 for the year 2020. An estimated 146,711 herders (or 98,400 herder households) in the eight *aimags* will directly benefit from the improved livestock value chain. The project will also benefit meat producers (approximately 30) across the country, who source their meat and products from these *aimags*, through a more efficient transportation network and logistics services. Improvements in transport and logistics services brought about through the introduction of the digital supply chain platform will benefit all 298,789 herders¹⁵ in Mongolia (or 181,000 herder households), of whom approximately 42 percent are women,¹⁶ and all logistics and transport companies (1,612). Relevant staff of the MRTD and other national road agencies (160, of whom 80 are women) will directly benefit from project activities and outcomes from enhanced technical capacity for planning, managing, and maintaining the national road infrastructure.

51. The indirect beneficiaries of the project include (i) the entire population of Mongolia, who will benefit from better-quality meat products; (ii) local governments, once the RAM system is ready to be extended to them; (iii) road

¹⁵ National Statistics Office 2020.

¹⁶ ADB, *Mongolia: Gender-Responsive Sector and Local Development Policies and Actions* (Manila, Philippines: ADB, 2019).



maintenance and repair companies, as they enter into more commercial and market-based arrangements with the MRTD thanks to the new RAM framework; and (iv) local residents in the selected *aimags*, who will have better access to social services and markets.

D. Results Chain

52. The theory of change implicit in the project is that maintaining key national road links, upgrading selected local roads for last-mile connectivity, introducing the RAM framework in combination with better transport and logistics services, and raising government capacity will improve transport connectivity for strategic networks, reduce transport costs, and enhance access to markets and services—leading to increased economic productivity and competitiveness for a more diversified Mongolian economy. Figure 1 illustrates the process.

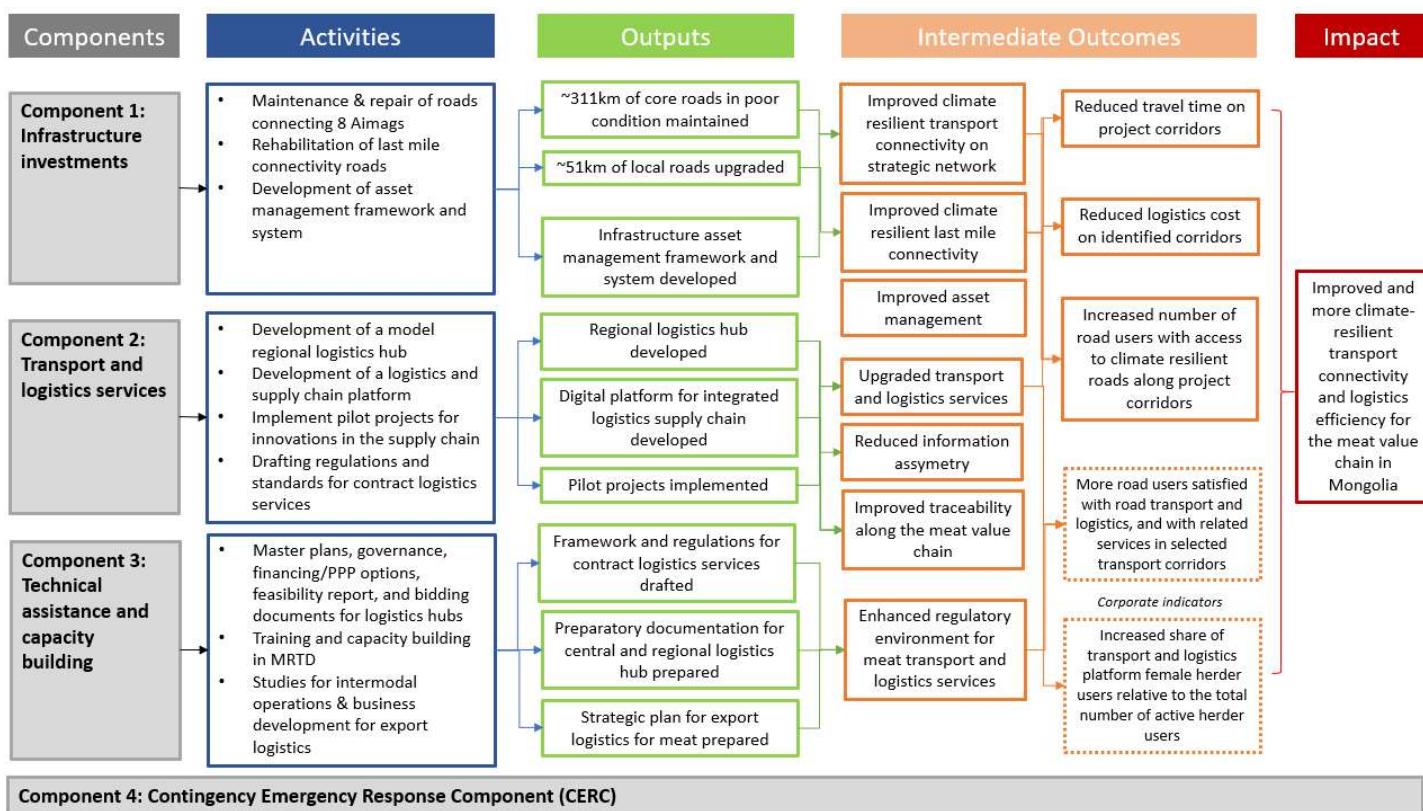


Figure 1. From Components to Impact—The Project's Results Chain

53. The critical assumptions underpinning the results chain are as follows:

- Funds will be disbursed according to plan.
- All agencies working to develop infrastructure to support key value chains will coordinate their activities.
- Obstacles greater private sector participation in logistics will be addressed collectively.
- The introduction of standards and regulations to improve meat quality will receive strong policy support.
- All government agencies, even those not directly benefiting from the World Bank loan, will cooperate fully.



E. Rationale for World Bank Involvement and the Role of Partners

54. Mongolia's unique spatial and demographic characteristics pose funding and financing constraints to infrastructure development. The vastness of the country's territory, the extremely low population density (the lowest in the world), and the scarcity of economic activities outside Ulaanbaatar make infrastructure relatively costly, especially when measured against demand. The average transport distance for freight in Mongolia is 602 km. Annual transport costs are estimated at US\$2 billion, and logistics costs are estimated at US\$3 billion. Logistics costs are high, making up an astounding 30 percent of Mongolia's GDP. Nevertheless, Mongolia must invest in its infrastructure—with a focus on building chains that can *create* value—if it is to grow, diversify its economy, and increase its fiscal base.

55. The World Bank brings expertise and knowledge to infrastructure planning that is focused on enabling more efficient transport and logistics services in key sectors. Building on the positive reception of the InfraSAP study and consensus across government ministries on the merit of a value chain approach, the World Bank is well positioned to add value to the government's reform and institutional development efforts by sharing its extensive global experience. This will benefit the current project and other value chains that the Government of Mongolia seeks to develop.

56. The World Bank has long been engaged in the transport sector, other relevant sectors, and overall governance and PPPs. The experience and lessons from those engagements form part of the analytical background of the current project. These engagements include Strengthening Governance in Mongolia (P168248), which studied the fiscal risks of Mongolia's nascent PPP program; the Ulaanbaatar Sustainable Urban Transport Project (P174007), which examined road transport systems in Ulaanbaatar; and the Livestock Commercialization Project (P165945), which aims to unblock the meat value chain from the perspective of agriculture and animal health.

57. Several development partners are active in the transport sector in Mongolia and have expressed interest in co-financing or otherwise supporting the project. Those prospective partners are the European Bank of Reconstruction and Development, the Asian Infrastructure Investment Bank, and the Abu Dhabi Fund for Development. The team will continue to explore co-financing or parallel financing opportunities with these partners, related particularly to financing for the regional and central hubs that may be developed based on the results of this project.

F. Lessons Learned and Reflected in the Project Design

58. The project draws on lessons learned from ongoing World Bank–financed projects in Mongolia and the recent Mongolia InfraSAP, World Bank–financed transport projects worldwide, and past and ongoing transport-related projects implemented by other international development partners in Mongolia. The most significant lessons learned are summarized below.

59. **Flexibility and simplicity** in project design are key to ensuring that objectives are achieved and that results of interventions are sustainable. The fragility of Mongolia's political economy has led to frequent changes in priorities. In response, the project's flexibility has been assured through the use of the framework approach to prioritizing and selecting investment activities. The investments described herein have been chosen based upon the priorities of the national development agenda, to be sure, but also upon the likelihood of efficiently enhancing existing assets, maximizing public benefits, and minimizing E&S risks.

60. **Getting a head start** by performing detailed preparatory work before a project enters into effect enhances readiness and lowers the risk of major delays during project implementation. Several other donor-funded projects in Mongolia have experienced delays because much of the preparatory work was left to much later stages. By contrast, effective implementation of World Bank projects has been associated with early project feasibility studies; advance preparation of bidding documents; and intensive capacity building on disbursements, procurement processes, M&E, and



environmental safeguards—all of which are present here. This project has been supported by international experts from the World Bank who have provided technical assistance and training to the MRTD's focal points. In addition, the capacity-building components have been discussed in detail with client counterparts. A prefeasibility study for the model hub was undertaken to provide some insights into the market and inform schematic designs.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

61. **The MRTD will be responsible for overall project implementation and oversight.** A project steering committee will be established to coordinate and align cross-sectorial activities under the leadership of the Ministry of Road & Transport Development with representation from the Cabinet Secretariat the Ministry of Food, Agriculture, and Light Industry; the Ministry of Economy & Development; local governments from target *aimags*; and the Ministry of Finance. The project steering committee will be responsible for overseeing and facilitating coordination among relevant agencies.¹⁷ A project management office (PMO) will be established within the MRTD. Its director will be appointed by the Minister of Road and Transport Development. The PMO will be responsible for the day-to-day implementation of the project, including (i) preparing annual work plans and budgets and periodical reports; (ii) managing procurement, finances, and environmental and social impact studies, including the implementation of a grievance redress mechanism; and (iii) conducting M&E. The PMO will be staffed with a coordinator, specialists, and consultants hired for the sole purpose of coordinating the proposed project, according to ministry guidelines.¹⁸ The PMO staff responsible for procurement and financial management will be selected and appointed by the ministry. The establishment of a PMO of which the composition, resources, and terms of reference are satisfactory to the IBRD is a precondition for project effectiveness. Details of the project's institutional and implementation arrangements, including the PMO's composition and financial resources, are further detailed in the Project Operations Manual and in annex 1.

B. Results Monitoring and Evaluation Arrangements

62. The PMO will be responsible for monitoring project implementation, the achievement of PDO result indicators, and reporting to the World Bank. The PMO will submit biannual progress reports to the World Bank for review. A midterm review will be carried out to assess overall project progress; identify critical implementation issues; and make any necessary adjustments to the project design, its components, or implementation schedule. This will be done in conjunction with World Bank's implementation-support missions. Detailed M&E arrangements for each component are further described in section VII hereof.

C. Sustainability

63. The project will support sustainability from several perspectives. It is designed to ensure effective and sustainable management of the national and local road network. Its components include not only the expansion, rehabilitation, and maintenance of the network, but also a sustainable approach to road construction and maintenance. The project team worked closely with the MRTD in selecting locations for new roads and in identifying existing roads for repair and

¹⁷ The composition, rights, responsibilities, and work processes of the project steering committee will follow Provision 7.6 of the "Regulation on the Use, Implementation, Monitoring and Evaluation of Projects Financed by International Loan," Ministry of Finance, Regulation #4, January 11, 2021.

¹⁸ Regulation on the Use, Implementation, Monitoring and Evaluation of Projects Financed by International Loan.



rehabilitation. Objective prioritization criteria were used to ensure the highest technical, social, and economic return on interventions. The project will develop a road asset management framework and system for the MRTD under Subcomponent 1.3. The framework will introduce an evidence-based, preventive RAM approach that is based on a life cycle costing methodology for more efficient asset preservation. The project's Component 3 will complement the physical investment component by developing institutional capacity and processes for the sustainable development, maintenance, and management of rural roads in Mongolia. The project will also work with the MRTD to establish "area maintenance committees," comprised of community members who will participate in decision-making on road maintenance and operations and in monitoring state-owned enterprises' performance in road maintenance.

64. Roads are the primary transport infrastructure enabling transportation of livestock products, mobility of herders, trade, delivery of public services, governance, and tourism in the project's target *aimags*. Parts of the road network considered under the project investment are vulnerable to changing weather patterns because of climate change, including drastic temperature variations between seasons, flooding, and earthquakes. These require enhanced emphasis on the resilience and sustainability of the project-financed road infrastructure. In this regard, the project will help integrate climate adaptation measures into the road design. The road construction will incorporate climate-resilient design and engineering measures to withstand changing climatic conditions and to improve resilience of the infrastructure to the impacts of climate change.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis (if applicable)

Technical analysis

65. **Technical designs.** The road interventions under Subcomponent 1.1 will be limited to rehabilitation and repairs. They will follow existing alignments with only slight improvements in geometric alignment. Widening may occur where necessary to improve safety and climate resilience (to reduce the risk of flooding). Under Subcomponent 1.2, local earth roads carrying major traffic will be paved to improve safety and climate resilience. The project will also repair and upgrade drainage facilities, small bridges, and culverts as needed, and repair above-ground and below-ground facilities to reduce the risk of flooding. With respect to roads to be repaired and rehabilitated under Subcomponent 1.1 and requiring technical designs, the MRTD is preparing technical designs (meeting national road design guidelines) for 103 km of the A0501 Ulaanbaatar-Undurkhaan and A0302 Arvaikheer-Bayankhongor (only covering road sections in Uvurkhangai) corridors for completion by the end of 2022. Technical designs for the remaining roads to be rehabilitated under Subcomponent 1.1, and two local roads under Subcomponent 1.2 will be prepared by the client during the first year of project implementation. The designs include or will include safety features (e.g., guardrails and speed-reduction measures) on roads passing through residential areas.

66. **Road selection.** The project's road interventions, including repairs and rehabilitation, were or will be identified and selected through a data-driven prioritization exercise based on analysis of national freight flow and a georeferenced IRI profile of the national road network, as specified in the InfraSAP study. For the last-mile connectivity roads, the MRTD, in collaboration with the World Bank, has performed a multicriteria analysis of all potential local road links in the selected *aimags*. Specifically, the local roads are prioritized and selected based on eight criteria, including the size of the population to be connected, the number of livestock, the lengths of proposed local roads, the proximity to potential regional hubs, freight volumes, potential travel demand, availability of detailed designs, and relevance to higher-level



national policies. Additional considerations include resource limitations, the MRTD's plans for the development of the local roads, and potential economic activities on the local roads.

67. **Technical capacity and readiness.** The MRTD is responsible for all national road construction, rehabilitation, repair, and maintenance. It has the strongest technical capacity to plan, design, and supervise the implementation of road upgrade projects in the country. Based on the Mongolia InfraSAP and its national freight flow model, the MRTD has identified key road links in the meat value chain (detailed in annex 2) and carried out a georeferenced IRI assessment. The World Bank team used data from the national freight flow model and IRI assessments for technical appraisal and found them technically sound, feasible, and economically viable. The MRTD has selected the first two-year road program, consisting of 103 km of roads to be rehabilitated. This program is ready to be implemented as soon as the project becomes effective. They represent an estimated investment of US\$23.5 million.

68. **Economic analysis.** Economic analysis was carried out for the 362 km of roads in the project, including all project roads to be repaired and rehabilitated under Subcomponent 1.1 and two local roads under Subcomponent 1.2. The analysis was performed in accordance with the World Bank Guidelines of Economic Analysis of Investment Operations and the Economic Analysis Guidance Note (1998). The project will bring substantial economic benefits to the transport users of the affected roads, mainly through reductions in vehicle operating costs and travel time due to improved road conditions. The project will also bring moderate economic benefits from reductions in road accidents. The project's estimated economic internal rate of return is 20.8 percent, and its estimated net present value is US\$124.9 million at a 6 percent discount rate. Sensitivity analysis indicates that the internal rate of return remains higher than 6 percent even for the worst-case scenario (20 percent increase in costs and 20 percent reduction in benefits). Annex 3 provides details of the economic analysis.

69. **Road-safety assessment.** The World Bank's Road Safety Screening and Appraisal Tool (RSSAT)¹⁹ was used to assess the project safety impact of all road repair and rehabilitation interventions to be performed under Subcomponent 1.1. The preliminary design features of 311 km of roads slated for repair and rehabilitation have been tested to determine the project's safety impact. These segments are specified in table 1 and repeated here—A0301 Ulaanbaatar-Arvaikeer: 72 km for repair and 33 km for rehabilitation; A0501 Ulaanbaatar-Undurkhaan: 68 km rehabilitation; A0602 Kharkhorin-Tsetserleg: 13 km repair, 27 km rehabilitation; A0902 Bulgan-Murun: 13 km rehabilitation; A0603 Tsetserleg-Tosontsengel (only covering road sections in Arkhangai): 40 km repair, 10 km rehabilitation; A0302 Arvaikeer-Bayankhongor (only covering road sections in Uvurkhangai): 35 km rehabilitation. The annual fatality rates on these roads ranged from 0.23–0.55, 0.22, 0.38–0.78, 0.65, 0.32–1.33, and 0.28 respectively, based on 2020 crash data. These are high and substantial fatality rates per kilometer based on international standards. The RSSAT yields the following project-safety-impact scores once the project roads open for public use after repair and rehabilitation in 2024 and 2025: 0.99 for the A0301 Ulaanbaatar-Arvaikeer road; 0.98 for the A0501 Ulaanbaatar-Undurkhaan road; 0.98 for the A0602 Kharkhorin-Tsetserleg road; 0.97 for the A0902 Bulgan-Murun road; 0.98 for the A0603 Tsetserleg-Tosontsengel (only covering road sections in Arkhangai); and 0.99 for the A0302 Arvaikeer-Bayankhongor (only covering road sections in Uvurkhangai). The safety features built into the project design (at the time of preparation of this document) are expected to reduce the crash fatality rate by 1.2 percent on the A0301 Ulaanbaatar-Arvaikeer road, 2 percent on the A0501 Ulaanbaatar-Undurkhaan road, 1.9 percent on the A0602 Kharkhorin-Tsetserleg road, 2.7 percent on the A0902 Bulgan-Murun road, 1.5 percent on the A0603 Tsetserleg-Tosontsengel (only covering road sections in Arkhangai), and 0.7 percent on the A0302 Arvaikeer-Bayankhongor (only covering road sections in Uvurkhangai). Annex 5 provides the detailed results of the RSSAT assessment of the project interventions under Subcomponent 1.1.

¹⁹ An internal tool developed by the World Bank Transport Global Practice to estimate the road safety outcome as the result of the project design as measured by crash deaths and serious injuries.



70. **Climate risk screening.** The overall climate risk of this project is *Moderate*. A tool for in-depth screening of climate and disaster risk was used to identify the major climate risks affecting the project and to identify mitigation measures. Mongolia has a strongly continental climate, with four distinct seasons, large temperature fluctuations, low precipitation, and clear climate differences depending on latitude and altitude. Extreme temperatures that result in droughts and *dzuds* are recurring natural hazards with negative consequences for the economy, agriculture, and livestock sectors. Perishable commodities such as meat are proven to be some of the most vulnerable commodities in the face of climate impacts.

71. Transport infrastructure assets are prone to rapid deterioration during freeze-and-thaw cycles and permafrost melting, which may increase in the future because of climate change. The climate change risks of the project can be mitigated if adequate adaptation measures are incorporated into the design of the project's infrastructure interventions. All road rehabilitation and construction designs will incorporate climate adaptation standards and engineering solutions. A capacity-building component will raise the Government of Mongolia's capacity to respond to climate hazards and mitigate their impact through preventive maintenance. The project also enhances cross-sectoral coordination by working with the transport and agricultural sector to enhance the resilience of the supply chain of meat products. In addition, the inclusion of technical assistance will build the capacity of the road authority to manage road assets and prepare climate-resilient engineering designs and master plans, while also enhancing the income-earning potential of the target population.

72. **Climate Co-Benefits.** The project seeks to address current and future climatic vulnerabilities. The following physical and nonphysical interventions are intended to have substantial climate adaptation and mitigation co-benefits. Specifically, Subcomponent 1.1 will incorporate measures to make key sections of the strategic network more climate resilient by adding grids to protect roads against extreme cold, along with other solutions to resist high winds, mud slides, and flooding. Other planned interventions will prevent water ingress, improve drainage, reseal road surfaces, and preserve crash barriers. Provisions for repairing potholes, patching, clearing incidents, managing traffic, and performing routine maintenance for minor repairs will contribute to climate adaptation. Asset-management plans and updated technical standards to be developed for the RAM framework under Subcomponent 1.3 are also expected to mitigate risks emerging from climate change.

73. Overall, works planned under Components 1 and 2 will reduce greenhouse gas emissions through increases in fuel efficiency achieved as a result of improved road conditions, reduced travel times, and a more efficient supply chain. Specifically, the improved road conditions along the project's last-mile connectivity corridors will cut travel time for vehicles traveling through the corridors by an average of 0.27–0.58 hours per vehicle, which is estimated to reduce emissions by 17,585 tons of carbon dioxide over the economic lifetime of the project. However, the emission reductions from the last-mile connectivity corridors are offset by emissions increases resulting from the higher speeds made possible by the improved road conditions in the A0301, A0501, A0602, A0603 and A0302 corridors (there are no changes for the rehabilitations of A0603 and A0902 corridors), resulting in a net increase of carbon dioxide emissions of about 60,753 tons, or 3037.6 tons per year.²⁰ With the establishment of a logistics network, the frequency of meat-transport travel between origin and destination points is expected to drop by 30 percent owing to the agglomeration of meat supply in regional hubs. Subcomponent 3.1 also provides essential support related to environmental and social safeguards. Subcomponent 3.2 on the development of green performance indicators and guidelines for the construction, management, and operation of the logistics hubs will contribute toward reducing emissions. Overall, Component 3 will yield adaptation co-benefits by building the capacity of infrastructure-management entities to improve climate resilience. Annex 3 contains a detailed analysis.

²⁰ Based on calculations of emissions under different speed scenarios and vehicle operating costs in project corridors using HDM-4's road user cost model.



74. **Gender. Female herders have less decision-making ability on the commercialization of livestock compared to men herders within the same household (43% transactions decided by the husband vs 31% decisions by wife²¹).** Female herders' ability to make commercial transactions for the household livestock is constrained by limited access to livestock information and decision-making tools (i.e., venue) for sales arrangements, transportation, and logistics. The gap in access to information and decision-making venue between men and women results in participation of fewer herder women in commercialization of livestock, despite women's essential roles in herder households who carry a heavier burden of workload compared to men²². Currently, community and pasture user group (PUG) meetings are reported to be the main source of information after television and radio²³ and the decision-making venue for herder men and women. Herders attend PUG meetings where they discuss and make decisions regarding livestock production (i.e., grazing locations and timing) and commercialization (i.e., choosing merchants, making sales, and making logistics arrangements) collectively for own households based on available information. However, women are underrepresented²⁴ in these meetings due to inability to delegate household responsibility²⁵ and mobility impairment²⁶. The development of alternative avenues to get relevant information and make decisions offers an opportunity to overcome this constraint effectively, while addressing social norms and other barriers to women's participation in PUGs will remain critical part of the long-term gender equality agenda. Women's limited access to information and ability to make informed decisions on the commercial side of livestock management result in increased vulnerability at home, where men earn more livestock income than women and take control of the household spending, purchase, and disposal of major household assets²⁷. In the case of female-led households, these households do not benefit from livestock sales activities as much as male-led households, due to unfair pricing and expensive or inefficient logistics.

75. **To close the gender gap in decision-making of livestock management among herder women and men, the project will develop a digital transport and logistics platform focusing on the livestock value chain.** The Platform will provide up-to-date market information and tools to directly connect with other market players for sales and logistics arrangements. This digital solution will address physical constraints to accessing information, and it will be tailored to ensure women herders benefit from equal access to information critical for livestock marketization decisions. The activity will be supplemented with training sessions for herder women to ensure uptake and support their commercial decision making. Women specific features of the platform will include, but will not be limited to: i) women – women information exchange blog/chat/information exchange room module, ii) module for dairy product sales, because women herders are the sole producers of dairy products within the household, iii) livestock commercialization tutorial modules, including basic accounting and marketing tools targeted to women, iv) search/sort feature by “women owned/posted/provided” filters to enable searching and booking for female herders/merchants/transporters, v) ensure the platform membership is not limited to the household head (as the current case for PUG membership) but is extended to both partners, and vi) module that helps women (especially female-led households) arrange door to door pick-up drop off. During project

²¹ From a 2015 survey of approximately 240 households, husbands made 43% of the decisions to choose markets for selling livestock products, while wives 31.1%, sons 15.7% and daughters 10.2%. Source: Swiss Agency for Development and Cooperation, Gender Analysis in Pastoral Livestock Herding in Mongolia. 2015

²² Reported 11.2 hours per day workload versus 9.1 hours of workload by men

²³ Swiss Agency for Development and Cooperation, Gender Analysis in Pastoral Livestock Herding in Mongolia. 2015

²⁴ From a survey between March 2014 and February 2015 of 242 individuals from 8 aimags, male participation in community meetings (bagh, cooperative, APUG/PUG) was 58% higher than female participation.

²⁵ 33.2% of surveyed women

²⁶ 19.6% reported location being too far. 21.3% reported unavailability of transport means or mobility

²⁷ The same survey found that involvement of family members in money management differed between 34.9% by men versus 26.4% women, when not managed together. When money management was made together (30% of the respondents), 7% reported that the money management is done together but husband dominant and 1.7 together but wife dominant. Survey also found that as the herd size expands, the involvement of husbands in money management increases (i.e., when the number of livestock is more than 1500, all respondents answered all decisions were made by the husband).



implementation, a survey (focus groups with equal representation of women and men) will be carried out among target users of the Platform to prepare the design the Platform. The survey will include additional questions for women participants, to identify women-targeted design features and functionalities. The objective of women-focused modules is to ensure women's access to livestock value chain information and decision-making tool is improved, and results in increased number of women making livestock commercial decisions. The gender activity will be measured by the following indicator: Share of transport and logistics platform female herder users relative to the total number of active herder users. Annex 6 provides the gender results chain of the Project.

76. **Citizen engagement.** Public consultation and citizen engagement were emphasized during project preparation and will continue during implementation to strengthen accountability and achieve the PDO. Nationwide logistics and transport surveys will be conducted before, during, and after project implementation to gauge satisfaction with infrastructure and logistics services among road users in the project corridors. The results of the surveys will be used to inform preliminary and detailed designs of local road construction and national road repair and rehabilitation works. The survey results will also establish a baseline for monitoring project outcomes. Consultations have already been held with targeted local governments to understand demand from local and herder communities for better transport and logistics services to improve access to markets for livestock and its by-products. The results of these consultations were incorporated into the project design. In addition, grievance redress mechanisms will be established to process complaints related to the construction and operation of project roads, including gender-based violence and personal-safety-related complaints. The mechanism will operate through multiple channels (in-person visits, emails, letters, phone calls, and online).

77. **Maximizing finance for development.** The project is expected to mobilize US\$20 million of private capital, primarily under Component 2 on the model regional hub and innovation platform. It is expected that a model regional hub will be developed using a PPP. The private sector is most likely to generate efficiencies if incentivized to do so through a performance-based contract, sensitive de-risking, and an open and competitive procurement process. The project is also expected to catalyze indirect private investment through improved infrastructure, removing one of the key bottlenecks to investment in the country. For more on private sector involvement in the project, see annex 7.

B. Fiduciary

(i) Financial Management

78. **The MRTD will be responsible for overall project implementation and oversight.** A project steering committee will be established under the leadership of the Cabinet Secretariat to provide high-level guidance to the project. In addition, a PMO will be established under the MRTD to carry out day-to-day implementation and coordination of the project activities. Financial management of the project, including the handling of IBRD loan proceeds through the project's designated account will be managed by the PMO with proper oversight and approval from both the MRTD and the Ministry of Finance. The designated account, along with other required local currency subaccounts, will be opened under the treasury account managed by Ministry of Finance.

79. **The project's financial management and disbursement arrangements,** residual financial management risk, and mitigation measures to strengthen the financial management capacity of the PMO and implementing agencies will be detailed in the assessment of the borrower's financial management capacity. With the implementation of the proposed mitigation measures, the project's financial management will meet the World Bank's minimum requirements as specified in the Bank directive on Financial Management Manual for World Bank Investment Project Financing Operations. A project financial management manual will be developed and finalized by the borrower before project effectiveness as an integral part of the overall Project Operations Manual.



80. **Advance contracting and retroactive financing.** Retroactive financing in an aggregate amount not to exceed US\$20 million of the IBRD loan and SDR 1.46 million (US\$2 million) IDA credit will be allowed for payments made for eligible expenditures on or after July 1, 2021, but before the signature date of the Loan Agreement. Payments will be made only for project expenditures incurred in accordance with applicable World Bank procurement rules and procedures.

(ii) Procurement

81. **Applicable procurement rules and procedures.** Procurement for the project will be carried out in accordance with the World Bank's Procurement Regulations for Investment Project Financing Borrowers, dated November 2020, as required by the provisions of the Loan Agreement. Also applicable to the project are the World Bank's Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and International Development Agency Credits and Grants. In this project, the World Bank's planning and tracking system (Systematic Tracking of Exchanges in Procurement) will be used to prepare, clear, and update procurement plans and conduct all procurement transactions. Accordingly, all the procurement activities under the proposed project will be entered into, tracked, and monitored online through the system.

82. **Project procurement strategy for development.** In accordance with the World Bank's procurement regulations, a Project Procurement Strategy for Development has been developed by the MRTD. The major procurement activities under the project are as follows.

- Component 1: Infrastructure investments, including results-based maintenance of priority road sections along 2,300 km of strategic roads connecting 8 *aimags*, last-mile connectivity to the national road network for local herder community, and the RAM framework and system
- Component 2: Transport and logistics services, including a logistics and supply chain platform, pilot projects for innovations in the supply chain, regulations and standards for contract logistics services, and logistics for cold-chain storage
- Component 3: Technical assistance and capacity building
- Component 4: Contingent Emergency Response Component (CERC).

83. Based on the information available at this stage, the national market will be interested in the infrastructure contracts, and local contractors are capable of doing the work included in the project. International contractors are welcome to participate in the procurement process. For other activities, such as procurement of the logistics and supply chain platform and consulting services for various studies, both national and international markets may show interest. Here, however, international suppliers, manufacturers, and consultants will be more competitive and better able to execute the contracts, given their capacity for analysis, design, supply, and installation. The MRTD's Project Procurement Strategy for Development will address individual government decisions pertaining to emergency situations (e.g., COVID-related road and border closures. Unpredictable increases in fuel and transportation costs may negatively affect project procurement.

84. **Procurement plan.** Based on the Project Procurement Strategy for Development, the procurement plan has been prepared and will be cleared by the World Bank during project negotiation. The plan includes the contract activities to be procured over at least for the initial 18 months. The plan will be updated annually or as needed to (i) reflect project implementation, (ii) accommodate changes, and (iii) add new packages as needed. All contract activities included in the plan will be procured in accordance with World Bank procurement regulations.



85. **Annex 1 describes the implementation arrangements and fiduciary assessments.** The MRTD will be responsible for the overall project implementation and oversight, and a Project Steering Committee will be established under the leadership of the Cabinet Secretariat to provide overall high-level guidance to the project. In addition, a PMO will be established under the MRTD to carry out day-to-day implementation and coordination of the project activities. The project's FM arrangements including the handling of IBRD loan proceeds through the project's Designated Account (DA) will be managed by the PMO with proper oversight and approval from both the MRTD and MOF. The project DA as well as other required local currency subaccounts will be opened with the Treasury Single Account managed by the MOF. The overall fiduciary risk was rated substantial because this would be the first World Bank project implemented by MRTD. The FM capacity assessment identified risks associated with the proposed implementation arrangements and proposed that the PMO should be filled with qualified fiduciary staff (preferably with experience in working on World Bank projects or projects financed by international financial institutions), who should be appointed early enough so that they can be trained in the World Bank's fiduciary and disbursement policies and procedures and be involved in the preparation of the FMM.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

86. The E&S risk of the proposed project is considered *Substantial* at this stage. Repair and maintenance of 311 km of roads and the upgrading of 51 km last-mile roads in selected *aimags* pose the following E&S risks during construction: fugitive dust; noise; construction waste; soil erosion and runoff; occupational health and safety (OHS) impacts on workers and communities; traffic and road safety problems; potential biodiversity risks ; potential restrictions on access to land; effects on livelihoods in some communities; potential impacts on ethnic minorities; risks related to gender-based violence, sexual exploitation, and abuse; and risks related to inclusion and stakeholder engagement. These risks are expected to be temporary, site specific, and manageable through the mitigation hierarchy²⁸.

87. The detailed design of the proposed model regional logistics hub will be developed during project implementation. Potential investment in the hub includes approximately 4–5 km of internal roads within the hub; truck parking space; space for offices and ancillary services such as hostels; and basic energy and water supply. The E&S risks during the hub construction will include those specified in the previous paragraph. The operation of the hub has been assessed to have the following potential negative impacts on the environment related to wastewater disposal, air pollution, noise, solid waste, and OHS hazards. These will have to be managed.

88. The project's technical assistance activities—studies and documents for project implementation, master plan and outline designs, strategic studies and business plans, and training and capacity building— will have to take into consideration the E&S impacts of any recommendations. While the studies do not necessarily present any E&S impacts, they will have to consider impacts when the outcomes are implemented.

89. The social risk of the proposed project is considered *Substantial* at this stage. The proposed activities include road maintenance, paving last-mile roads in selected *aimags*, and construction of a logistic hub. Risks and impacts are

²⁸ As per The Environment and Social Framework. The World Bank



identified in the following aspects: labor and working conditions, community health and safety, meaningful consultation about effects on livelihoods associated with restrictions to land use, the inclusion of ethnic minority groups, and overall stakeholder engagement process. All project activities will be implemented on existing roads or in locations that have no livelihoods impact. As a result, no land acquisition is envisaged. To confirm that no livelihoods impact will occur to local communities, stakeholder engagement will be key for the last-mile sections and the logistics hub. In addition to road alignment, the sourcing of materials will be studied to assess any possible impacts on livelihoods of gathering and transporting materials. A Resettlement Policy Framework (RPF) has been prepared for precautionary purposes to lay out steps in case livelihoods impact cannot be avoided.

90. The client has prepared a stakeholder engagement plan that lays out detailed steps to identify, consult, inform, and monitor stakeholders. Initial consultations gathered the views of related government departments, the private sector, and representatives of civil society. Consultation with local herders along the last-mile roads and in the areas surrounding the logistics hub, and with ethnic minority groups (if identified), are key to stakeholder engagement, inclusion, and the mitigation of social risks. Private sector engaging with project activities will be assessed ESF compliance track records and will required to develop ESMP in line with ESF standards. The stakeholder engagement plan has been included in the borrower's Environmental and Social Commitment Plan, which is time bound and to which financial resources have been allocated. Effective execution of the stakeholder engagement plan is contingent upon the ability to travel under COVID-19 restrictions.

91. As the exact location of the proposed hub will be decided during project implementation and due to limitations stemming from COVID-19 restrictions, detailed work on the Environmental and Social Impact Assessment (ESIA) will not be possible prior to appraisal. However, to ensure that an adequate risk-management mechanism is developed prior to appraisal, a preliminary ESIA for the model regional logistics hub has been prepared by the MRTD using available information and in compliance with both domestic regulations and the World Bank's Environmental and Social Framework.

92. An Environmental and Social Management Framework (ESMF) has been prepared to cover all project-supported activities, including repair and maintenance of existing roads, upgrading of last-mile roads, development of the model hub, technical assistance and CERC activities, and any associated facilities, all in compliance with both domestic regulations and the World Bank's Environmental and Social Framework. The ESMF, as described in Environmental and Social Standard 1, has spelled out the principles, rules, guidelines, and procedures for the assessment of E&S risks and impacts.

93. Due to COVID 19 restrictions, no field visit was conducted during project preparation. To mitigate the potential risks to wild animals and cultural heritage sites, field survey including biodiversity investigation and cultural heritage survey will be conducted when travel allows, and an ESMP/ESMPs for the last mile roads will be prepared and incorporated with mitigation measures to protect biodiversity and potential heritage sites including a Biodiversity Management Plan, if necessary, before bidding of the roads. The requirements of the ESMP(s) will be integrated into the bidding documents and the contracts, which have been incorporated into the ESCP. When the design for the model regional logistics hub becomes known at the implementation stage, a comprehensive ESIA covering all activities—including the public portion provided by the government and the private portion of the model regional logistics hub—will be prepared by the MRTD in accordance with World Bank guidelines on environmental health and safety and good international industry practice. The MRTD will disclose the ESIA with ESMP for the model regional logistics hub as per ESF requirements. For any technical assistance activities under the project, the MRTD should include relevant Environmental and Social Standards in the terms of references to ensure that activities and outputs are consistent with the requirements of the Environmental and Social Framework. These terms of reference will be cleared by the Bank prior to commencement of activities.



94. During preparation, the MRTD has developed an ESMF (including a social assessment, ethnic minority screening), labour management procedures, a stakeholder engagement plan, a resettlement policy framework, an environmental and social commitment plan, and a preliminary ESIA for the model regional logistics hub consistent with the requirements of the Environmental and Social Framework. The ESMF, preliminary ESIA, LMP, RPF, SEP and ESCP were disclosed at MRTD website on November 12, 2021. All these documents were disclosed on the Bank's website on February 18, 2022, and February 23, 2022.

V. GRIEVANCE REDRESS SERVICES

95. Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the 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 Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

96. **The overall risk rating for the project is *Substantial*.** This rating considers the political and governance risk, institutional capacity risk, fiduciary risk, and private sector residual risk as assessed at the concept stage. This rating will be adjusted during later stages of the project.

97. **Political and governance risk is *Substantial*.** The road investment elements are within the jurisdiction of the MRTD. Nonetheless, development of the hub requires inputs and interventions from several other government ministries—including Agriculture and Light Industries, Energy, Environment, and Finance. Local authorities and businesses are also important stakeholders. Aligning interests and budgets and obtaining inputs from multiple government departments presents a risk to progress of the project. Assurances have been given at various meetings about the Government of Mongolia's keen interest in advancing the project and addressing risks associated with aligning multiple ministries. Following discussions related to the political and governance risks, in December 2019 the Cabinet Secretariat—which is the highest-level ministry—intervened and will lead a project oversight committee comprising key ministries. The Cabinet Secretariat will play a coordinating role to ensure full and timely cooperation of key stakeholders.

98. **Institutional capacity risk is assessed as *Moderate*.** Although this will be the first IBRD lending to the MRTD in the transport sector, the client has long been engaged with other international development organizations, such as ADB, which has financed transport infrastructure projects in Mongolia for more than 10 years. Project implementation will draw on lessons from ongoing World Bank projects and from other international finance institutions with activities in Mongolia. Although Mongolia has had a Law on Concessions since 2012, the MRTD may require further capacity on PPPs and concessions, especially related to procurement and contract management. The necessary capacity building has been factored into the project under the technical assistance component. During the past 2.5 years, while preparing the InfraSAP, a close partnership has developed with the MRTD leadership, and the capacity gaps identified have been



included in the project's design. Overall, the capacity gap does not relate to technical ability to deliver the project, but rather to ensuring that the right people are assigned to the project and remain in place during the life of the project.

99. **Fiduciary risk is rated as *Substantial*.** The risk may be updated once the mitigation measures proposed below are taken. The project steering committee will coordinate and align cross-sectoral activities under the leadership of the Cabinet Secretariat, with representation from the MRTD; relevant local governments; the Road Development Center; the Ministry of Food, Agriculture, and Light Industry; the National Development Agency; and the Ministry of Finance. The MRTD will be responsible for the overall day-to-day project implementation and management through the PMO which will be newly established under the Ministry. The MRTD and PMO, as well as other implementing agencies, will be new to the World Bank's procurement procedures and other fiduciary requirements. These agencies' lack of experience with World Bank projects and procurement may cause a delay in preparing and implementing the project and provide less assurance on fiduciary management. The proposed mitigation measures are as follows:

- The PMO under the MRTD will be established with qualified staff including financial management and procurement staff and with proper segregation of duties.
- The participating implementing agencies will be required to assign qualified staff including technical and contract management to be responsible for implementation of their respective components and contracts and to work in close coordination with the PMO.
- The World Bank will provide training and guidance as needed throughout project preparation and implementation and maintain close and continuous coordination with project stakeholders.
- The PMO will prepare material on financial and procurement management to be included in the Project Operations Manual, which shall be finalized before project effectiveness.

100. **Environmental & Social risk.** Risk assessment, and mitigation measures are discussed in detail in the Environmental and Social Review Summary and summarized in Section D of this document. At this stage, the E&S risk of the proposed project is considered *Substantial*. Repair and maintenance of 311 km of roads and the upgrading of 51 km last-mile roads in selected *aimags* pose E&S risks during construction (such as dust; noise; construction waste; soil erosion and runoff; occupational health and safety (OHS) impacts on workers and communities; traffic and road safety problems; potential biodiversity risks ; potential restrictions on access to land; effects on livelihoods in some communities; potential impacts on ethnic minorities; risks related to gender-based violence, sexual exploitation, and abuse; and risks related to inclusion and stakeholder engagement. These risks are expected to be temporary, site specific, and manageable through the mitigation hierarchy. The social risk of the proposed project is considered *Substantial* at this stage. The proposed activities include road maintenance, paving last-mile roads in selected *aimags*, and construction of a logistic hub. Risks and impacts are identified in relation to labor and working conditions, community health and safety, meaningful consultation about effects on livelihoods associated with restrictions to land use, the inclusion of ethnic minority groups, and overall stakeholder engagement process. All project activities will be implemented on existing roads or in locations that have no livelihoods impact. In addition to road alignment, the sourcing of materials will be studied to assess any possible impacts on livelihoods of gathering and transporting materials. An RPF has been prepared for precautionary purposes to lay out steps in case livelihoods impact cannot be avoided. The client has prepared a stakeholder engagement plan that lays out detailed steps to identify, consult, inform, and monitor stakeholders. Initial consultations gathered the views of related government departments, the private sector, and representatives of civil society. Consultation with local herders along the last-mile roads and in the areas surrounding the logistics hub, and with ethnic minority groups (if identified), are key to stakeholder engagement, inclusion, and the mitigation of social risks. Private sector engaging with project activities will be assessed ESF compliance track records and will required to develop ESMP in line with ESF standards. The stakeholder engagement plan has been included in the borrower's Environmental and Social



Commitment Plan, which is time bound and to which financial resources have been allocated. Effective execution of the stakeholder engagement plan is contingent upon the ability to travel under COVID-19 restrictions.

101. Private sector risk is rated as *Substantial*. Experience with PPPs in Mongolia have revealed significant political and regulatory risks, including a history of cancelled contracts following political changes. There are also challenges to the PPP structure which will not be addressed under this project, such as high local financing costs. Therefore, there are relatively few examples of private concessions under a long-term design, build, and operate contract, as is being contemplated in this project. While the market has indicated an appetite for the scheme, a more detailed market demand study and a feasibility study for the pilot logistics hub and potential project structures will be required before the project's ultimate risk allocation and concession structure can be determined. As a mitigation measure, this study will not only assess the PPP option but also a public procurement option, under which the public sector will build the superstructure and the private company will enter the arrangement as an operator of the hub under a long-term operations and management contract. This mitigation measure will ensure that construction of the pilot hub will not be unduly delayed if there prove to be challenges in the procurement of the PPP partner and the reaching of financial closure.

102. Other risks. The unforeseen risks related to COVID-19 and emerging new variants such as Omicron continue to disrupt public, private sector, and the World Bank operations. Apparent risks from COVID at the time of the PAD preparation include: i) Frequent travel restrictions worldwide, which inhibit the World Bank team visiting Mongolia and the project sites for comprehensive due diligence, especially related to the Social and Environmental Safeguard assessments and for timely preparation and supervision of project activities; ii) The COVID Law of Mongolia²⁹ has been in effect since April 2020 and includes specific provisions related to exemptions in domestic procurement rules and regulations, and acquisition of public sector staff, among others; iii) Frequent closures of border crossings with China and Russia. This has resulted in disruptions in supply chain, both in terms of materials and human resource, particularly from China for construction works. It can cause delays in procurement and construction activities under the project. Mitigation strategies to offset risks associated with COVID include: i) Staffing of World Bank transport specialists based in Mongolia ahead of the project implementation for on-site and timely communication and supervision, ii) Collaboration with local consultants and use of local resources for E&S assessments, iii) Prior agreement with the GoM on the compliance with the World Bank procurement guidelines for counterpart funded activities, iv) Closely supporting the MRTD in planning for the construction activities and procurement of equipment and materials early on the project implementation.

²⁹ Full name of the Law: On prevention of COVID pandemic and reduction of COVID impact on society and economy, 2020 April 29.

**VII. RESULTS FRAMEWORK AND MONITORING****Results Framework****COUNTRY:** Mongolia

Mongolia Transport Connectivity and Logistics improvement project

Project Development Objectives(s)

The project development objective is to improve climate-resilient transport connectivity and logistics efficiency for the meat value chain in Mongolia.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Improved transport connectivity			
Travel time on project corridors (Percentage)		100.00	70.00
a. Travel time on project corridors along national roads (Percentage)		100.00	70.00
b. Travel time on last mile connectivity project corridors (Percentage)		100.00	50.00
Improved logistics for meat value chain			
Logistics cost on identified corridors (Amount(USD))		30.00	22.00
Improve climate resilience of transport connectivity			
Road users with access to climate resilient roads along the project corridors (Percentage)		0.00	90.00

**Intermediate Results Indicators by Components**

Indicator Name	PBC	Baseline	End Target
Transport Connectivity			
Last mile connectivity roads constructed or rehabilitated with climate resilience measures (Kilometers)	0.00		51.00
National roads repaired with climate resilience measures (Kilometers)	0.00		311.00
Bridges rehabilitated / constructed with climate resilience measures (Number)	0.00		7.00
Road asset management system developed (Yes/No)	No		Yes
Transport and Logistics services			
Model regional logistics hub developed (Yes/No)	No		Yes
Logistics and supply chain platform operational (Yes/No)	No		Yes
Pilot projects implemented for innovations in the supply chain (Number)	0.00		2.00
Regulations and standards drafted (Number)	0.00		5.00
Effective institution for transport planning and management			
Planned regional logistics hubs with preparatory studies and designs completed (Number)	0.00		7.00
Staff Trained (Number)	0.00		100.00
Theme: Private Sector Participation			
RFPs issued to private investors to develop the model regional logistics hub (Number)	0.00		1.00
Theme: Grievance Redress Mechanism			
Affected population who has access to information disclosure and project GRM (Percentage)	0.00		100.00
Corporate Commitment: Citizen Engagement			



Indicator Name	PBC	Baseline	End Target
Surveyed road users satisfied with road transport, logistics infrastructure and related services along selected transport corridors (Percentage)		50.00	85.00
Corporate Commitment: Gender			
Share of transport and logistics platform women herder users relative to the total number of active herder users (Percentage)		0.00	50.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Travel time on project corridors	<p>This is the average travel time of project corridors in both directions, normalized as a percentage of the baseline, weighted by the length of corridors included in the project. The indicator will have 2 sub-indicators, one measuring corridors along the national road; and one measuring the last mile connectivity corridors.</p> <p>The percentage change of</p>	Annual	Measurement by PMO	<p>The travel time on the project corridors are measured along each project corridor sections in both directions. The travel time for the subject corridor (i) is calculated taking the average of the 2 runs in each direction of a normal working week during both winter and summer. The baseline travel time for</p>	PMO



	<p>travel time on project corridors measures the improved connectivity aspect of the PDO for all vehicles travelling on the road.</p>		<p>the subject corridor is measured and calculated before project implementation, and the travel time on corridor is normalized as the percentage of the baseline. The measurement will include the entire duration of the time the vehicles spends on the road, including stops due to traffic/road conditions, delays, and running time. Designated vehicles tasked to measure time will drive on the entirety of the subject corridor. Running time, delay time, and stopped time should all be measured and marked. Average travel time in each direction will be added to get the total travel time for both directions. If the subject corridor has</p>	
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				a portion that is not passable before the project, the baseline measurement should take the nearest alternative route given the same starting and ending points. To get the weighted average of travel times of all corridors, the length of each corridor section will be used as weights. The indicator is calculated as: $\sum (\text{travel time on corridor } i \times \# \text{ length of corridor } i) / \sum (\text{length of corridor } i)$.	
a. Travel time on project corridors along national roads	This is the average travel time of project corridors along national roads in both directions, normalized as a percentage of the baseline and weighted by the km of each corridor sections included in the project.	Annual	Measurement by PMO	The travel time on the project corridors (along national roads) are measured along each project corridor sections in both directions: UB – Arvaikheer; UB – Undurkhaan; Kharkhorin – Tsetserleg; Bulgan – Murun, Arkhangai	PMO



				Corridor and Uvurkhangai Corridor. The details of the methodology is described in the parent indicator. To get the weighted average of travel times of all project corridors along the national roads, the length of each corridor section will be used as weights. The indicator is calculated as: $\sum (\text{travel time on corridor } i \times \# \text{ length of corridor } i) / \sum (\text{length of corridor } i)$.	
b. Travel time on last mile connectivity project corridors	This is the average travel time of last mile connectivity corridors in both directions, normalized as a percentage of the baseline, weighted by the km of each corridor sections included in the project.	Annual	Measurement by PMO	The travel time on the project corridors (along last mile connectivity) are measured along each project corridor sections in both directions: Bulgan, Yosonzuil, Alag-Erdene, and Gurvan Bulag. The details of the methodology is described in the parent indicator.	PMO



				To get the weighted average of travel times of all last mile connectivity corridors, the length of each corridor section will be used as weights. The indicator is calculated as: $\sum (\text{travel time on corridor } i \times \# \text{ length of corridor } i) / \sum (\text{length of corridor } i)$.	
Logistics cost on identified corridors	<p>Logistics costs measures the cost of all the activities required from the point where the animal is harvested up to the point when it is purchased or exported. It includes the cost of transport and the cost of storage.</p> <p>The logistics cost indicator will measure the “improved logistics efficiency” aspect of the PDO.</p>	At the beginning of the project, and annually during the implementation	Surveys by PMO, The National Statistics Office, the MRTD	<p>Logistics cost comprises of the total transport costs and storage costs.</p> <p>Data will be collected through surveys taken from logistics service providers carrying meat and meat products along the project corridors. The survey will ask respondents the cost associated with following variables, once a year. Repeat surveys don't need to approach previously surveyed respondents, but it is</p>	PMO



				<p>preferable, as long as the logistics provider is still operating along the corridor. Target sample size is 50. The baseline value will be updated once the survey is completed at the beginning of the project.</p> <p>Transport Costs (CR) (\$ per ton) is defined as the total cost rate of transport per ton per kilometer multiplied by the average distance transported: CR x Average Distance. The total cost rate of transport should include the labor, maintenance, and fuel costs. The survey will also ask the maintenance and fuel cost per km separately, because collection of such information will enable visibility of the fluctuation of these components.</p> <p>Storage costs (\$ per</p>	
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				ton) is calculated for all freight using the formula: HC+S*D. Handling Cost per tonne (HC), Storage cost per tonne per day (S), Days commodity is kept in storage per year (D) will be collected from the Regional hub's registry.	
Road users with access to climate resilient roads along the project corridors	Measures the percentage of the population along the project corridors benefitting from roads and related structures that become accessible all year round because of the project, thanks to the links provided along the project eight provinces to Ulaanbaatar, within one another, and with the rest of the country.	Annual	Project progress report prepared by supervision consultants of MRTD	At completion of each section of road works, the supervision consultant counts all the number of beneficiaries, esp. herders, along roads in the road completion report.	PMO



Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Last mile connectivity roads constructed or rehabilitated with climate resilience measures	Total length of the last mile connectivity corridor constructed or rehabilitated under the project. All road works' design will reflect climate resilience specifications; and climate resilience practices will be applied during construction.	Annual	Progress Reports	This indicator will be measured from progress reports produced by the contractor.	PMO
National roads repaired with climate resilience measures	Total length of the national road corridor repaired or maintained under the project. All road works' design will reflect climate resilience specifications; and climate resilience practices will be applied during construction.	Annual	Progress Reports	This indicator will be measured from progress reports produced by the contractor.	PMO
Bridges rehabilitated / constructed with climate resilience measures	This is the number of bridges rehabilitated or reconstructed with climate resilience considerations embedded in the design and implementation of bridge works.	Annual	Progress Reports	This indicator will be measured from progress reports produced by the contractor and the PMO.	PMO
Road asset management system developed	Defined by the Road Asset Management System is developed and	Annual	Progress Reports	The Ministry of Road and Transport Development will	PMO



	operationalized.			report whether the RAM System has been operationalized.	
Model regional logistics hub developed	Defined by one regional logistics hub is developed and operationalized.	Annual	Progress Reports	The Ministry of Road and Transport Development will report whether the model regional logistics hub is established and started operations.	PMO
Logistics and supply chain platform operational	Defined by the logistics and supply chain platform developed and operationalized.	Annual	Progress Reports	The Ministry of Road and Transport Development will report whether the logistics and supply chain platform is developed, tested, piloted, final version completed, deployed and operationalized.	PMO
Pilot projects implemented for innovations in the supply chain	The number of pilot, innovative projects implemented to improve the efficiency of the supply chain. It can include, but not limited to, real-time monitoring of deliveries (including RFID, QR-code, Track & Trace blockchain),	Annual	Progress Reports	The Ministry of Road and Transport Development will report the number of pilot projects initiated and implemented as pilot.	PMO



	and warehousing and smart trucks/containers using simple technologies for machine learning, AI and robotics, solutions.				
Regulations and standards drafted	This is the number of regulations, standards, draft laws and resolutions drafted to update the regulations to support the development of contract logistics sector.	Annual	Progress Reports	The Ministry of Road and Transport Development will report the number of draft legal documents prepared and considered for enforcement.	PMO
Planned regional logistics hubs with preparatory studies and designs completed	All necessary preparatory studies and designs prepared and handed over for financing and development of regional hubs, including market sounding assessments, feasibility studies, technical designs, PPP/financing options and bidding documents for seven logistics hubs.	Annual	Progress Reports	The Ministry of Road and Transport Development will report if the regional hub development can take-off based on the preparatory studies and designs prepared and handed over.	PMO
Staff Trained	The total person-days of staff and officials trained under the project, in all areas covered by the project including road asset management, logistics	Annual	Progress Reports	Person-days of total trained officials, staff and officers will be reported by the PMO.	PMO



	management, project management, road asset, climate resilience, investment planning, private sector mobilization, and policy and planning.				
RFPs issued to private investors to develop the model regional logistics hub	This is the number of Request for proposals (RFPs) issued to private investors on competitive selection basis for development of model regional logistic hub. The RFP will include a draft PPP agreement, and will be considered successfully issued if the RFP has received minimum of two bids.	Annual	Progress Reports	The PMO will report if the number of bids received, and whether the RFP is successfully issued on a competitive basis.	PMO
Affected population who has access to information disclosure and project GRM	This is the percentage of project affected population who has easy access to information disclosure and project grievance redress mechanism. Project affected population includes herders in remote areas of Mongolia who uses project corridors to reach major markets such as Ulaanbaatar or neighboring Province centers and logistics and transportation service	Annual	Progress Reports	The PMO will design a functioning information project information disclosure and grievance redress mechanism (GRM). The PMO will hire a third party monitoring team to update on GRM implementation status and statistics at least every six months. This third party team will compile and report the	PMO



	providers who travel along project corridors.			GRM statistics to the PMO. PMO will report the data in the M&E.	
Surveyed road users satisfied with road transport, logistics infrastructure and related services along selected transport corridors	<p>This indicator measures the satisfaction of road and logistics service users along project corridors.</p> <p>This indicator is intended to serve as a beneficiary feedback to measure the improved connectivity and logistics services as a result of infrastructure improvements.</p>	Before project implementation and three months after the completion of the project corridors	PMO	<p>Satisfaction survey to be conducted at the beginning and at the end of the project. The baseline value will be updated once the survey is completed at the beginning of the project. Surveys to be conducted on randomly selected road and logistics service users along projects corridors and logistics facilities. Survey must ask the respondents' gender and purpose of road usage – personal or commercial. Location of the corridors should be recorded or marked by GPS.</p> <p>User satisfaction could be measured using a 5-point Likert scale (1: unsatisfied; 2: moderately unsatisfied;</p>	PMO



				3: neutral; 4: moderately satisfied; 5: satisfied) in the questionnaire, asking whether the user is satisfied with the overall road quality and safety. Those who answer 4 or 5 will be counted as "satisfied." Survey instruments should be consistent for baseline and project years. Focus groups can be used to obtain a better understanding of user satisfaction. SMS or web-based (app) surveys could be used as complementary measuring tools.	
Share of transport and logistics platform women herder users relative to the total number of active herder users	This indicator is the share of female herder active users of the Transport and Logistics Platform relative to the total herder users	Annual	The Transport and Logistics Platform	Data on the user will be aggregated from the user statistics of the platform. Users will be prompted to create a profile when signing up to the platform, where gender and occupation will be asked. The indicator will be based	PMO



				on the number of active users, who has recorded activity – either training or transactions/ bookings – on the platform.	
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**ANNEX 1: Implementation Arrangements and Support Plan**

COUNTRY: Mongolia
Mongolia Transport Connectivity and Logistics improvement project

Project Management Office and Implementation Entities

1. A Project Management Office (PMO) will be established under the Ministry of Road and Transport Development (MRTD). The PMO director will be appointed by the Minister of Road and Transport Development. The PMO will be responsible for project management and coordination; the procurement and contract management of goods, works, and services; undertaking of financial management (FM), including disbursement processing and project audit; public relations; implementation of environmental and social (E&S) safeguards measures in compliance with the World Bank's requirements; preparation of periodical reports; monitoring and evaluation (M&E) and the submission of results to the World Bank; and implementation of the Grievance Redress Mechanism. The PMO will be staffed with a coordinator, specialists, and consultants hired for the sole purpose of coordinating the proposed Mongolia Transport Connectivity and Logistics Improvement Project, in accordance with the Ministry of Finance (MOF) guidelines.³⁰ The staff will include specialists in E&S safeguards, technical experts in road construction, and consultants as needed to provide services to support the model regional logistics hub. The PMO staff responsible for procurement and FM will be selected and approved by the MOF. Establishment of a PMO with the composition, resources, and terms of references satisfactory to the International Bank for Reconstruction and Development (IBRD) is a condition of effectiveness. Details of the project's institutional and implementation arrangements, including the PMO's composition and financial resources, are further detailed in the Project Operations Manual.

Monitoring and Evaluation

2. The PMO will be responsible for the M&E of project implementation, the achievement of the Project Development Objective results indicators, and their reporting to the World Bank. The PMO will submit biannual progress reports to the World Bank for review. A midterm review will be carried out to assess the overall project progress; identify critical implementation issues; and make any necessary adjustments to the project design, its components, or implementation schedule. This will be carried out in conjunction with World Bank implementation support missions. Detailed M&E arrangements for each component are further described in section VII of the Project Appraisal Document.

Financial Management

3. **The MRTD will be responsible for the overall project implementation and oversight**, and a Project Steering Committee will be established under the leadership of the Cabinet Secretariat to provide overall high-level guidance to the project. In addition, a PMO will be established under the MRTD to carry out day-to-day implementation and coordination of the project activities. The project's FM arrangements including the handling of IBRD loan proceeds through the project's Designated Account (DA) will be managed by the PMO with proper oversight and approval from

³⁰ "Regulation on the Use, Implementation, Monitoring, and Evaluation of Projects Financed by International Loan." Regulation #4, Ministry of Finance, January 11, 2021.



both the MRTD and MOF. The project DA as well as other required local currency subaccounts will be opened with the Treasury Single Account managed by the MOF.

4. **The project's FM and disbursement arrangements**, residual FM risk, and mitigation measures to strengthen the FM capacity of the PMO and project implementing agencies are detailed in the FM capacity assessment of the borrower. With the implementation of the proposed mitigation measures, it is deemed that the FM arrangements for the project will meet the World Bank's minimum requirements under the Bank Directive: Financial Management Manual for World Bank Investment Project Financing Operations. The Financial Management Manual (FMM) will be developed and finalized by the borrower before project effectiveness as an integral part of the overall Project Operations Manual.

5. FM risk is the risk that the loan proceeds will not be used for the purposes intended and is a combination of country-, sector-, and project-specific risk factors. The FM capacity assessment identified certain risks associated with the proposed implementation arrangements. The PMO will be filled with qualified fiduciary staff (preferably with experience in working on World Bank projects or projects financed by international financial institutions), who should be appointed early enough so that they can be trained in the World Bank's fiduciary and disbursement policies and procedures and be involved in the preparation of the FMM. Overall, the residual FM risk for the project is assessed as **Substantial**.

6. Day-to-day fiduciary responsibilities—including management of project funds as well as accounting and financial reporting duties under the proposed operation—will be carried out by the PMO. The PMO will be responsible for initiating payments, relevant payment requests, and supporting documentation, including delivery acceptance forms for responsible project activities, and processing and disbursement of project funds. All disbursement of project proceeds except for incremental operating costs will be processed by the PMO with the approval of two authorized signatories. One of the authorized signatories will be designated by the MRTD and the other by the MOF. Payments relating to incremental operating costs will be authorized by the PMO coordinator and accountant. The PMO will also be responsible for documenting all the project expenditures to the Bank in a timely manner based on the frequency indicated in the project legal agreements.

Weaknesses and Action Plan

7. As part of the assessment, certain weaknesses in project FM were detected and actions for addressing and mitigating these weaknesses have been identified as outlined in table A1.1.

Table A1.1 Actions to Address Weaknesses in the Project's Financial Management

Significant Weakness	Actions	Responsible Party	Completion Date
A PMO is not yet in place and no FM staff has been appointed	A PMO should be established with a qualified financial staff member who will help set up the project FM arrangements discussed in this document. The World Bank will help train this financial staff member in the relevant World Bank FM and disbursement procedures and practices.	MRTD and MOF World Bank	Before effectiveness



Project FM-related procedures and practices are not yet defined or ready for project implementation	The Project Operations Manual should be prepared along with an FM Manual on project FM procedures including, but not limited to, the following: <ul style="list-style-type: none">– FM roles and responsibilities of involved parties including the project FM system, other PMO staff, the MRTD, and IAs;– The chart of accounts including account descriptions;– The design of manual accounting registers for recording project transactions during the initial months of project implementation (these registers will be replaced by a suitable computerized accounting system within three months of effectiveness);– Formats of the project's Interim Financial Reports as agreed by the World Bank;– Other project FM arrangements.	MRTD and PMO	Before effectiveness
Lack of experience in World Bank-financed project implementation and operations at the project IA level	Close monitoring and guidance in terms of project implementation support for the project IAs.	PMO and World Bank	During project implementation
Language barrier at the project IA level	Strong support will likely be needed in terms of communication with the World Bank for the project IAs.	PMO	During project preparation and implementation
Lack of cross-sectoral coordination between the MRTD, PMO, and IAs	Strong coordination among participating stakeholders needed to ensure the intended outcome of the project.	PMO, MRTD, MOFALI, and other IAs	During project preparation and implementation

Note: FM = financial management; IA = implementing agency; MOFALI = Ministry of Food, Agriculture and Light Industry; MRTD = Ministry of Road and Transport Development; PMO = Project Management Office.

Risk Assessment and Mitigation

8. Several risks have been identified during the assessment. Along with corresponding risk mitigating measures, they are listed in table A1.2.

Table A1.2 Risk Mitigation Measures

Risk	Risk Rating (RR)	Risk Mitigating Measures Incorporated into Project Design	RR After Mitigating Measures
Inherent Risk			
• Country Level Potential changes in leadership and government officials involved in project activities due to election cycles and possible impact on PMO and FM staffing.	S	Collaborate with the reelected government and its officials to ensure that continuity around project implementation is maintained.	M



<ul style="list-style-type: none">● Entity Level <p>The key government agencies responsible for project implementation lack prior experience in and knowledge of procedures relating to Bank-financed projects and, therefore, may not be as efficient and effective in implementing project activities.</p>	H	<p>The MRTD has no prior experience in working on Bank-financed projects. Project Component 3: Technical assistance is aimed at strengthening capabilities of the government agencies to execute the project activities and ensure that they are timely and of acceptable quality.</p>	S
<ul style="list-style-type: none">● Project Level <p>Readiness of the project's FM arrangements: a PMO is not yet established and a qualified financial officer for the project is also to be appointed.</p>	S	<p>The PMO will be established under the MRTD to effectively coordinate daily activities of the project. A qualified project financial officer will be recruited and will work on the FM readiness matters including preparation of the FMM.</p> <p>A detailed FMM will specify adequate FM and disbursement procedures for successful implementation of the project from an FM perspective.</p>	M
Control Risk			
<ul style="list-style-type: none">● Budgeting <p>Poor budgeting: the project funds are not used for the intended purposes due to poor budgeting and budget controls. The project funds may not be spent in accordance with the project budget.</p>	H	<p>Annual project budgets will be prepared each year based on procurement and disbursement plans and approved by the Project Steering Committee and the Bank.</p> <p>The PMO shall conduct variance analysis between actual vs. planned expenses of the project regularly and communicate any issues with large discrepancies to the task team for resolution.</p>	S
<ul style="list-style-type: none">● Accounting <p>Reliability of the accounting system: there is a risk associated with the selection of software and its accuracy and reliability for the project accounting.</p>	S	<p>The PMO will work closely with potential software vendors and the Bank to identify the most appropriate accounting software for the project and make sure to meet specific project requirements.</p> <p>Before purchasing and utilizing the accounting software, manual accounting records can be maintained at the beginning of the project. These are to be replaced by a suitable computerized accounting system within 3 months of effectiveness.</p>	M
<ul style="list-style-type: none">● Internal Control <p>Weak internal controls: there are no FM policies and procedures related to internal controls yet established for the project.</p>	H	<p>The FMM will be prepared by the MRTD/PMO and approved by the Bank.</p> <p>The internal control procedures will be designed for the project and documented in the project FMM, which will include but not be limited to the following:</p> <ul style="list-style-type: none">- Proper authorization and approval procedures for payments- Appropriate segregation of duties and job description for each PMO staff member- Bank's no objection for significant project activities- Control mechanism for accounting and reporting- Regular bank reconciliation and periodic cash count- Suitable project documentation filing procedures for relevant documents	S



		<ul style="list-style-type: none"> - An annual internal audit of project activities conducted by the MRTD's internal control department. 	
<ul style="list-style-type: none"> ● Funds Flow <p>Delays and bottlenecks in the project funds flow arrangements that got complicated with the full transfer of project accounts to the Treasury Single Account.</p>	H	<p>Closely collaborate with the MOF and MRTD in ensuring project funds are managed as efficiently as possible through the government's Treasury system.</p>	S
<ul style="list-style-type: none"> ● Financial Reporting <p>Reliability and timeliness of financial reporting: the financial statements do not fully and accurately report on the project activities and usage of project funds.</p>	H	<p>The project will adopt financial reporting templates that satisfy the Bank's reporting requirements.</p> <p>Interim financial reports will be prepared and submitted to the Bank for review on a quarterly basis as specified in the legal agreement. These reports will be system generated from the software to be purchased under the project.</p>	S
<ul style="list-style-type: none"> ● Auditing <p>Audit quality: unqualified auditors may audit the project's financial statements.</p> <p>Poor follow-up on audit findings: PMO does not address audit findings noted by the auditors.</p>	S	<p>An independent external audit firm, acceptable to the Bank, will be appointed by the Mongolian National Audit Office to conduct the project's annual audit under the terms of reference approved by the Bank.</p> <p>The Bank's FM team will monitor the PMO's implementation of annual audit findings.</p>	M
Overall:	H	Residual:	S

Note: FM = financial management; FMM = Financial Management Manual; MOF = Ministry of Finance; MRTD = Ministry of Road and Transport Development; PMO = Project Management Office; Risk Rating: H = High, S = Substantial, and M = Moderate.

Disbursement and Funds Flow Arrangements

9. Four disbursement methods will be available for the project including advance, reimbursement, direct payment, and special commitment. The primary method of disbursement for the project will be the advance method. Supporting documents for the Bank disbursements will be statements of expenditures and project account statements. The detailed requirements will be laid out in the project Disbursement and Financial Information Letter (DFIL) to be issued by the Bank and agreed with the Borrower.

10. As a pooled Designated Account in USD ("DA") has already been opened at the Bank of Mongolia for Bank financed projects, a segregated ledger account will be opened and maintained with the Treasury Single Account for the Smart Government 2 project to make transactions from the project DA. The ceiling of the DA will be discussed and agreed between the Bank and the Borrower and will be specified in the DFIL.

11. Funds will be disbursed from the Bank to the project DA in US dollars. The DA will mainly be used for US dollar transactions. For all other local currency payments, a Mongolian tugrik investment subaccount will be used that will be replenished from the DA. The project's investment subaccount will be opened with the Treasury. The disbursement against eligible project expenditures from the DA and the investment subaccount will be signed off by authorized officials from the MOF and MRTD. Specific project payment approval procedures will be documented in the FMM and will follow



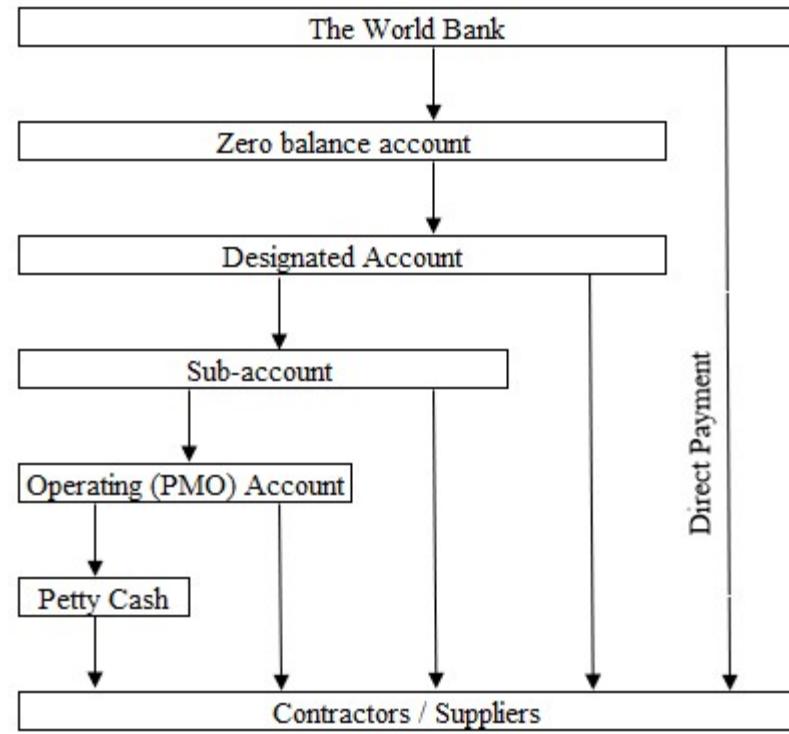
government requirements. Statements of expenditures will report the payments made by the project. The ceiling will not be established for the investment subaccount, but it will be dictated by the overall ceiling set for the DA.

12. The project will also utilize a separate Treasury Operating Subaccount (OA) for the PMO's incremental operating costs, with signing authority delegated to the project coordinator and accountant. This will ensure efficiency so that the MOF and MRTD will not have to review and sign off on all the incremental operating costs incurred by the PMO. The OA will be replenished from the investment subaccount based on quarterly operating budgets as approved by the MOF.

13. To receive funds from the Bank, the DA will make use of a zero-balance account. This account will be maintained separately at a commercial bank, the State Bank, and will be used to initially draw funds from the Bank. Once the funds are received in the zero-balance account, they will automatically get transferred to the project's DA. This renders the zero-balance account as a "pass-through account" through which funds from the Bank get transferred to the main project DA. The MOF has reached an agreement with the State Bank on the use of zero-balance accounts to accommodate the Treasury Single Account's needs as they pertain to project funds flow and disbursement.

14. The PMO may manage petty cash up to the ceiling to be approved under the project's internal control procedures.

15. Figure A1.1 shows the general flow of funds for the project.

**Figure A1.1 Diagram of Project Fund Flows**

16. The PMO will be directly responsible for the management, maintenance, and reconciliations of the designated accounts, sub accounts, operational accounts, and cash transactions, and will prepare withdrawal applications (WAs) for documenting project expenditures as well as requests for an advance or direct payment. The DA Reconciliation Statement will be prepared when submitting the WAs at the frequency stated in the project disbursement letter. The WAs will be reviewed and signed off by authorized representatives from the MOF and MRTD before being submitted to the Bank for review and processing.

17. Primary financial documents maintained for the project shall be made available for review by the Bank's supervision missions, external auditors, internal auditors, the MRTD, the MOF, and other relevant local inspections. If the auditors or the Bank find disbursements that are not justified by supporting documentation or made for ineligible expenditures, the Bank may request the funds spent on these to be refunded to the Bank or take other actions in line with relevant Bank policies.

18. The project proceeds will be disbursed against eligible expenditures (inclusive of taxes) as detailed in table A1.3.



Table A1.3 Project Proceeds to Be Disbursed

Category	Amount of IBRD Loan (US\$)	Amount of IDA Credit (US\$)	Amount of IDA Credit (SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, consulting services, non-consulting services, training and workshops, and operating costs under Parts 1, 2, and 3 of the Project	99,750,000	10,000,000 (Component 1.1 of the Project)	7,300,000	100%
(2) Emergency Expenditures under Part 4 of the Project	0	0		100%
(3) Front-end Fee	250,000	N/A	N/A	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
(4) Interest Rate Cap or Interest Rate Collar premium	0	N/A	N/A	Amount due pursuant to Section 4.05 (c) of the General Conditions
Total Amount	100,000,000	10,000,000	7,300,000	100%

Note: IBRD = International Bank for Reconstruction and Development. IDA = International Development Association

Advance Contracting and Retroactive Financing

19. Retroactive financing of an aggregate amount not to exceed US\$20 million of the IBRD loan and SDR1.46 million (US\$2 million equivalent) IDA credit will be allowed for payments made prior to the signature date of the loan and financing agreements, but on or after July 1, 2021, for eligible expenditures under Category (1). Payments will be made only for project expenditures and those against contracts procured in accordance with applicable World Bank procurement procedures.

Planning and Budgeting

20. The PMO will prepare an annual budget/disbursement plan based on realistic estimates with a quarterly timetable with inputs from the project implementing agencies. The annual budget/disbursement plan will be discussed and approved by the Project Steering Committee and the Bank and will be reflected in the relevant section of the state budget.

21. The PMO will conduct regular variance analyses and report the results in Interim Financial Reports (IFRs) during project implementation to explain reasons for any differences between planned (budgeted) and actual expenditures and necessary actions to be taken to ensure that the project can be implemented as planned.

Accounting and Financial Reporting



22. Separate administration, accounting, and reporting will be set up for this project in accordance with Bank requirements, which obligates the MRTD to prepare project financial statements in accordance with acceptable accounting standards. The PMO may adopt the cash basis of accounting for preparing the financial statements.

23. For the project's initial few months of implementation until setting up a computerized accounting system, the PMO may maintain manual accounting records and produce financial reports using MS Excel. After the initial three months, the project accounting and reporting should be done through a commercially available computerized accounting software package that will have to be procured by the project. Prior to the purchase and implementation of the accounting software, the project can consult with the Bank's FM team as needed. The FM team will plan a supervision mission shortly after the system is put in place to ensure its readiness to be used for the Project.

24. The Bank does not mandate a specific format for project financial statements. The project financial statements shall include the following in addition to the local reporting requirements:

1. Balance Sheet of the Project
2. Statement of Sources and Uses of Funds
3. Disbursement Report
4. Statement of Designated Account
5. Statement of Subaccount
6. Statement of Operating Account
7. Notes to the Financial Statements (for audit of annual financial statements)

25. The PMO will prepare IFRs, inclusive of the above reports, in accordance with pre-agreed formats as part of reporting on the project financial statements. These reports will be used to monitor and supervise project implementation. The IFRs will be submitted to the Bank within 45 days after the end of each reporting quarter.

26. The Bank task team will monitor the project's accounting and financial reporting processes during the project implementation to ensure complete and accurate financial information is available to the relevant project stakeholders in a timely manner.

Internal Control

27. To mitigate risks in internal control, regular oversight by the Project Steering Committee, periodic Bank supervision, internal audit by the MRTD, and annual external audits will serve as mechanisms to ensure that the project FM system is functioning properly. In addition, proper review and authorization for payment requests, segregation of duties, and other internal control mechanisms relating to the project will be defined and included in the FMM. The procedures in the FMM should be fully and adequately implemented by all parties involved in project implementation.

Audit Arrangements

28. The Bank requires the project financial statements to be audited in accordance with auditing standards acceptable to the Bank. The Mongolian National Audit Office will appoint an independent external auditor acceptable to the Bank to conduct an annual financial audit of the project's financial statements in accordance with International Standards on



Auditing and under terms of reference satisfactory to the Bank. The annual project audits will be financed from the project.

29. The auditors will: (i) express an opinion on the project financial statements; (ii) determine whether the project funds have (a) been correctly accounted for and (b) been used in accordance with the legal agreements; and (iii) determine the adequacy of the supporting documents and controls surrounding the use of statements of expenditures as the basis for disbursement. The auditors will also furnish a separate management letter, which will: (i) identify significant weaknesses in accounting and internal control as well as asset management; (ii) report on the degree of compliance with financial covenants of the loan agreement; and (iii) communicate matters that have come to the attention of the auditors and that might have a significant impact on the implementation of the project. The MRTD will submit the annual audit report on the project financial statements to the IBRD within six months after the end of the reporting period (by June 30 of each calendar year). This requirement will be stipulated in the DFIL.

Implementation Support Plan

Strategy and Approach for Implementation Support

30. Implementation is expected to begin in 2022 following Board approval and implementation support will begin as early as possible to prepare the MRTD and the implementing entities ahead of the first disbursement.

Implementation Support Plan

31. The World Bank team members for procurement, FM, and safeguards will be based in Washington, DC, the United States; Beijing, China; and Ulaanbaatar, Mongolia, and will coordinate to ensure timely support to the client. Formal supervision and field visits will be carried out at least twice a year.

Financial Management

32. The FM implementation support plan for this project will be based on its FM risk rating, which will be evaluated on a regular basis by the Bank's FM team in line with the Bank's FMM and in consultation with the task team leader. During the early implementation of the project, the FM team supervision will focus on the following areas:

- Appropriateness of procedures and policies included in the FMM.
- The project's adherence to the agreed FM arrangements stated in the FMM.
- Timeliness and accuracy of the manual accounting and financial reporting of the project.
- Proper and full recording of transactions through review of sample transactions.
- Timely adoption of an accounting software.

Procurement Support

33. Applicable procurement rules and procedures. Procurement for the project will be carried out in accordance with the World Bank's Procurement Regulations for IPF Borrowers, dated November 2020, as required by the provisions of the loan agreement. Also applicable to the project is the World Bank's Guideline on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants. In this project, the World Bank's planning and tracking system (Systematic Tracking of Exchanges in Procurement) will be used to prepare, clear, and update



procurement plans and conduct all procurement transactions. Accordingly, all the procurement activities under the proposed project will be entered into, tracked, and monitored online through the system.

34. Project Procurement Strategy for Development. In accordance with the World Bank's Procurement Regulations, a Project Procurement Strategy for Development (PPSD) has been developed by the MRTD. The procurement activities under the project mainly are Component 1: Infrastructure investments, including results-based maintenance of priority road sections in poor to very poor condition (approximately 311 km strategic roads connecting eight aimags), last-mile connectivity for the local herder community to the national road network, and the road asset management framework and system; Component 2: Transport and logistics services, including a model regional logistics hub, a logistics and supply chain platform, demonstration projects for innovations in the supply chain, regulations and standards for contract logistics services, and logistics for cold-chain storage; Component 3: Technical assistance and capacity building; and Component 4: Contingent Emergency Response Component (CERC) with zero dollars. Based on the information available at this stage, the national market will be interested in the infrastructure investment works contracts, and local contractors can execute the works contracts included in the project. International contractors are welcome to participate in the procurement process if they have interests. For other activities, such as procurement of the logistics and supply chain platform, and consulting services for various studies, both national and international markets may have interests. However, international suppliers/manufacturers and international consultants will be more competitive and capable to execute the contracts considering the size of the contracts and their capacity in design, supply, and installation of the abovementioned system and in carrying out the studies included in the project. The PPSD will also address relatively ad hoc government decisions in relation to emergency situations (COVID-19), for example, closure of roads in the region and borders; and a potential risk of random increase in fuel and transportation costs may negatively impact the project procurement.

Procurement Plan. Based on the PPSD, the Procurement Plan has been prepared and will be cleared by the World Bank at the project negotiation. The plan includes the contract activities to be procured at least for the initial 18 months. It will be updated at least annually or on an as-needed basis to (i) reflect project implementation, (ii) accommodate changes to be made, and (iii) add new packages as needed for the project. All the contract activities included in the Procurement Plan will follow the World Bank Procurement Regulations.



ANNEX 2: Detailed Project Description

1. Enhancing the competitiveness and productivity of Mongolia's economy requires diversification of its economy. As recommended by the Mongolia InfraSAP, given the resource constraints, low population density, and vast territory, the project introduces a new way to address the impediments to Mongolia's efforts to diversify its economy by targeting bottlenecks in physical connectivity and supply chain information asymmetry in strategic value chains. The project focuses on selective infrastructure interventions needed to unlock the potential of the meat supply chain as the anchor freight. The project will lay the foundation for nationwide asset preservation by introducing and implementing an evidence-based asset management approach. The project will also make an important start in comprehensively addressing the national logistics challenges. The project interventions will be supported and sustained by technical assistance and capacity building in improving transport services and logistics efficiency for the long term. The project will include the following four components: (i) infrastructure investments, (ii) transport and logistics services, (iii) technical assistance and capacity building, and (iv) the Contingent Emergency Response Component (CERC).

Component 1: Infrastructure Investments (estimated total cost: US\$80 million; IBRD loan US\$70, IDA credit US\$10 million)

2. Tackling physical connectivity bottlenecks including the long distances coupled with poor conditions and missing links in the key value chains that contribute to half of the logistics costs, this component aims to improve network availability, safety, and preservation of the national road assets.

3. The component will finance (i) improvements in the existing national road network on which the meat freight flows in the selected *aimags* with the largest livestock population and from where meat is sourced, and (ii) development of the national road asset management framework to provide the backbone for more efficient logistics systems. This component will include the following subcomponents:

Subcomponent 1.1: Results-based maintenance of key road sections

4. **This subcomponent will finance the results-based maintenance of the key road sections connecting the selected aimags.** This involves major repair and rehabilitation of road links in poor and very poor condition to achieve year-round connectivity on strategic road networks linking selected *aimags*. The works will be done within the existing right-of-way, and works will constitute periodic repair and rehabilitation of roadways, drainage improvements, and installation of road safety facilities such as signs, markings, and wildlife crossings. The major repairs of road links do not require major design works and can be completed within 12–18 months after the project is effective.

5. **The selection of the key road sections for results-based maintenance is based on a two-step analysis:** of the national freight flows and livestock concentrations, and the International Roughness Index (IRI)³¹ profile of the national paved-road network. The national freight flow analysis identifies where meat freight flows on the national road network and livestock population of *aimags* are sourced and concentrated (see figure A2.1). The IRI assessment of the national paved-road network, meanwhile, provides details including the location, condition, and magnitude of the needed interventions on the key road sections where freight flows are highly concentrated (see figure A2.1).

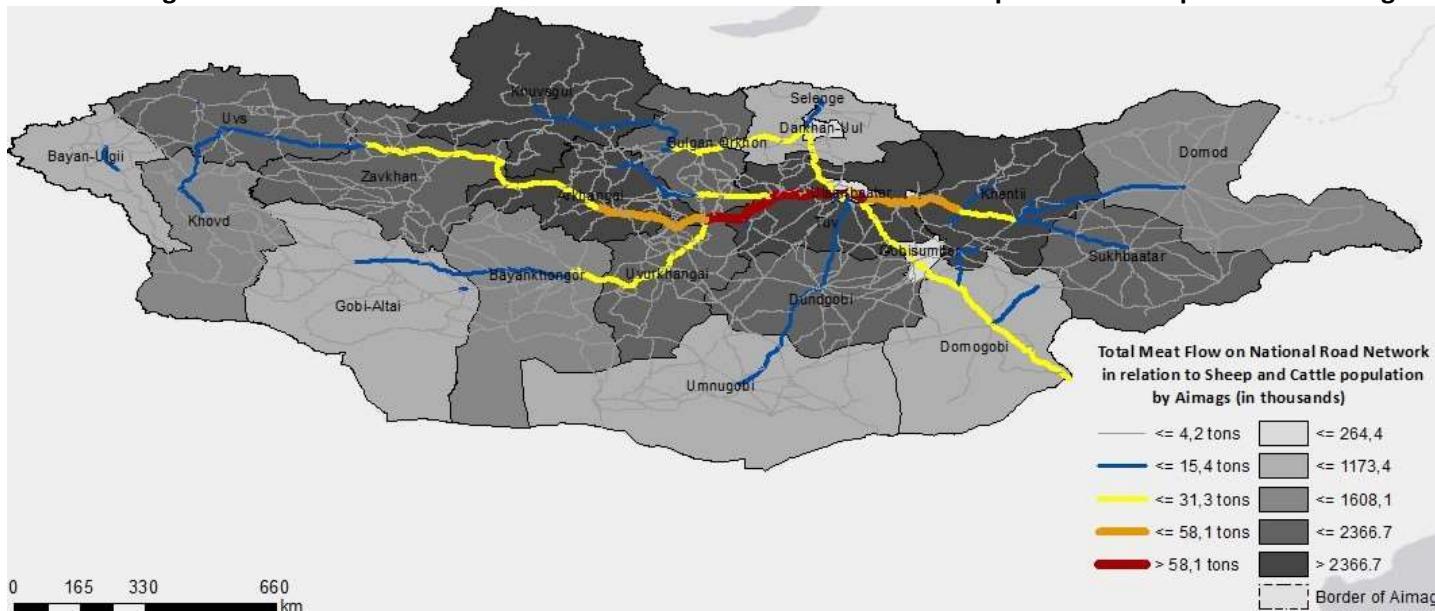
6. **The meat flows are concentrated in select aimags where the livestock population, namely sheep and cattle, is**

³¹ The IRI was developed by the World Bank and is used to define the longitudinal profile of a traveled wheel track and offer a standardized roughness measurement.



the highest. Figure A2.1 shows that meat is sourced from the entire country, but the flows significantly increase from 4.2 tons per km to 31.3 tons per km in the Uvs, Khuvsgul, Bulgan, Ovorkhanghai, and Sukhbaatar aimags and peak to 58.1 tons per km in the Arkhangai, Khentii, and Tuv aimags to be consolidated in Ulaanbaatar for domestic consumption and export. These aimags are endowed with the largest livestock, with 4 of them having a sheep and cattle population almost 10 times the size of that in the rest of the country.

Figure A1.1 Meat Flows on National Road Network in Relation to Sheep and Cattle Population in Aimags



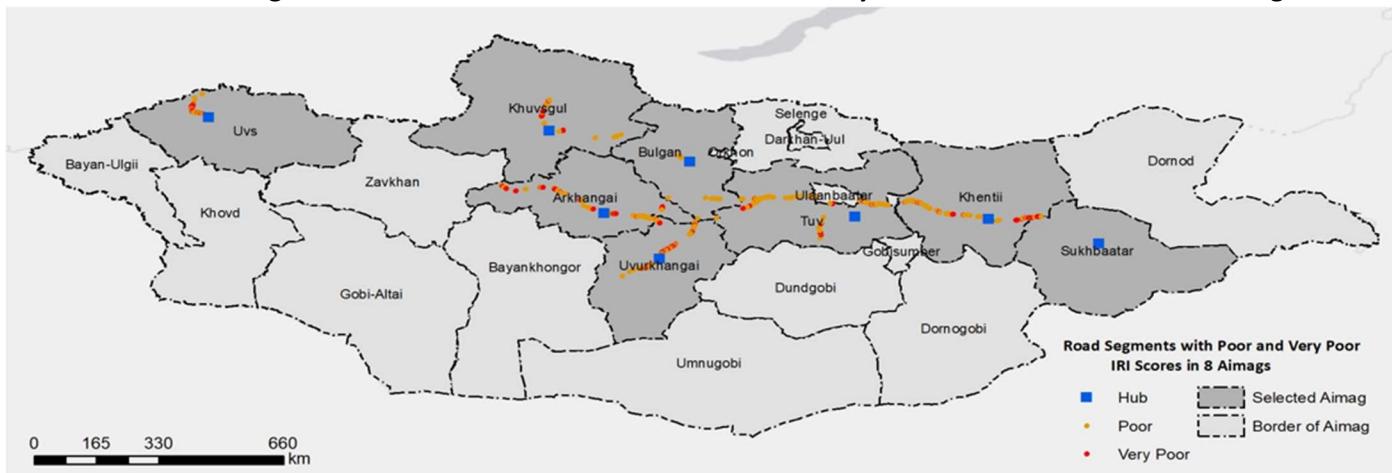
Source: World Bank team.

7. The key road sections in poor or very poor condition in selected aimags have been screened and selected for results-based maintenance. Most of the paved national road networks in the selected aimags were commissioned in 2013–16 to connect their centers to Ulaanbaatar. These networks span about 2,770 km, of which 19.9 percent and 51.3 percent are in excellent and good condition, respectively, and 19.5 percent are in fair condition, with roads in poor and very poor condition amounting to 3.2 percent and 6.1, respectively, as per the IRI assessment. The initial list/pool of the key road sections in poor and very poor condition is identified for further screening as shown in figure A2.2.

8. An estimated 311 km of road in poor or very poor condition is selected for immediate interventions. Complementing the IRI assessment of the paved national road network in the selected aimags, the MRTD, together with the Road and Transport Development Center and road maintenance companies, carried out field inspections of the key road sections identified in the initial pool/list to finalize the selection of the road sections for interventions under the project. The sections selected for results-based maintenance consisted of 125 km in poor condition (IRI = 6–8 millimeters (mm)/km and 186 km of roads in very poor condition (IRI > 8mm/km) on four national routes connecting the Khuvsgul, Bulgan, Arkhangai, Ovorkhanghai, Tuv, and Khentii aimags (figure A2.3).



Figure A2.2 An Initial List of Roads in Poor and Very Poor Condition in Selected Aimags



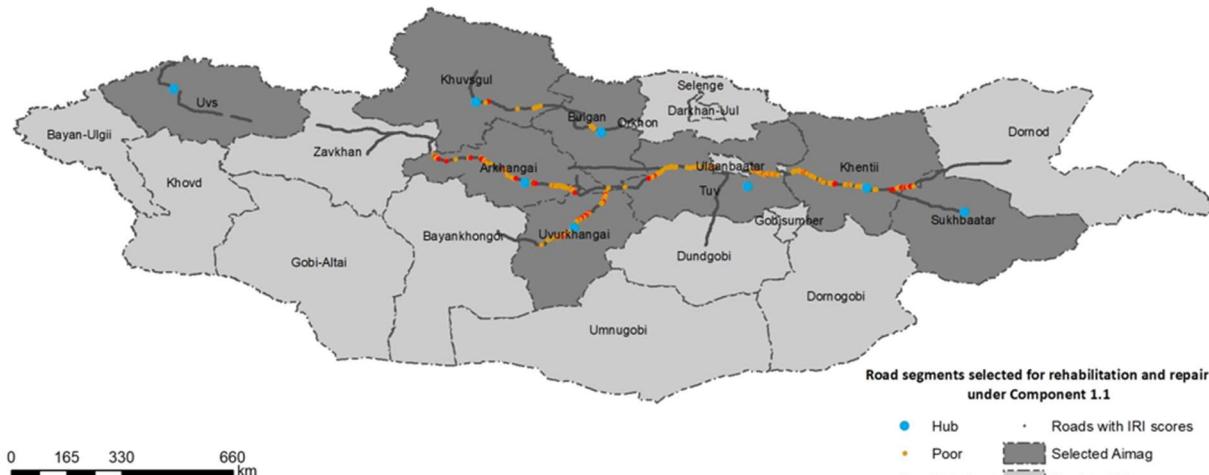
Subcomponent 1.1:

Initial pool of key road sections in poor and very poor conditions in the paved national road network connecting selected aimags for result-based maintenance.

Road code	A0301	A0601	A0602	A0902	A18	A27	A1702	A0603	A0502	A0501	A0302	A2001	A0201
Condition													
Very good	6.2	12.7	0.6	88.4	161.1	5.4	2.0	35.4	43.8	2.6	14.4	115.7	49.3
Good	187.1	62.0	53.5	209.6	9.9	149.4	44.5	154.3	104.6	96.4	71.0	63.2	76.3
Moderate	155.5	2.5	37.8	42.0	0.6	35.4	10.3	27.1	27.4	118.3	44.7	0.6	14
Poor	40.4	0.0	18.8	4.5	0.0	5.1	29.4	5.7	3.8	31.3	19.0	0.0	3.2
Very poor	21.1	0.0	6.5	98.4	0.0	0.6	27.6	4.4	4.8	5.8	5.0	0.0	1.2
total length (in km)	410.3	77.1	117.2	344.6	171.6	195.9	113.8	226.9	184.4	254.4	154.1	179.5	144.0

Source: World Bank team.

Figure A2.3 Key Road Sections Selected for Results-Based Maintenance in Selected Aimags



Subcomponent 1.1:

Key road sections in poor and very poor conditions in Khuvsgul, Bulgan, Arkhangai, Uvurkhangai, Tuv and Khentii aimags were selected for result-based maintenance.

Road Code	Road sections for periodic repair (in km)	Road sections for rehabilitation (in km)
A0301	72 km	33 km
A0501	-	68 km
A0602	13 km	27 km
A0902	-	13 km
A0603 (road sections in Arkhangai)	40 km	10 km
A0302 (road sections in Uvurkhangai)	-	35 km
Total road length		311km

Source: World Bank team.

*Subcomponent 1.2: Last-mile connectivity for local herders to connect to the national network*

9. **This subcomponent will finance the upgrade of approximately 51 km of high-priority local roads to connect the local herder communities to the national road network for last-mile connectivity.** In the context of Mongolia's meat supply chain, this final leg constitutes a major constraint not only for the livelihoods of herders but also crucially for the entire chain and drives up costs for operators, processors, transporters, retailers, and exporters. The works will include improvements in horizontal and vertical alignments, drainage, and pavement strengthening and/or resealing. The interventions will ensure the incorporation of climate resilience considerations specifically through the application of road design and practices for climate resilience. The road alignments will be selected to avoid land acquisition.

10. **Selection and prioritization of the priority local roads are based on a multicriteria decision-making framework for low-volume local roads.**³² The MRTD together with the Bank team has prioritized and selected priority local roads for interventions using the multicriteria analysis of all potential local road links in the selected aimags. Specifically, local roads are prioritized and short-listed based on eight criteria, including the size of the population to be connected, the size of livestock, the lengths of proposed local roads, the proximity to potential regional hubs, freight volumes, potential travel demand, availability of detailed designs, and relevance to higher-level national policies. The considerations for selection of priority local roads included the resource limitations, the MRTD's plans for development of the local roads, and potential economic activities (as shown in table A2.1).

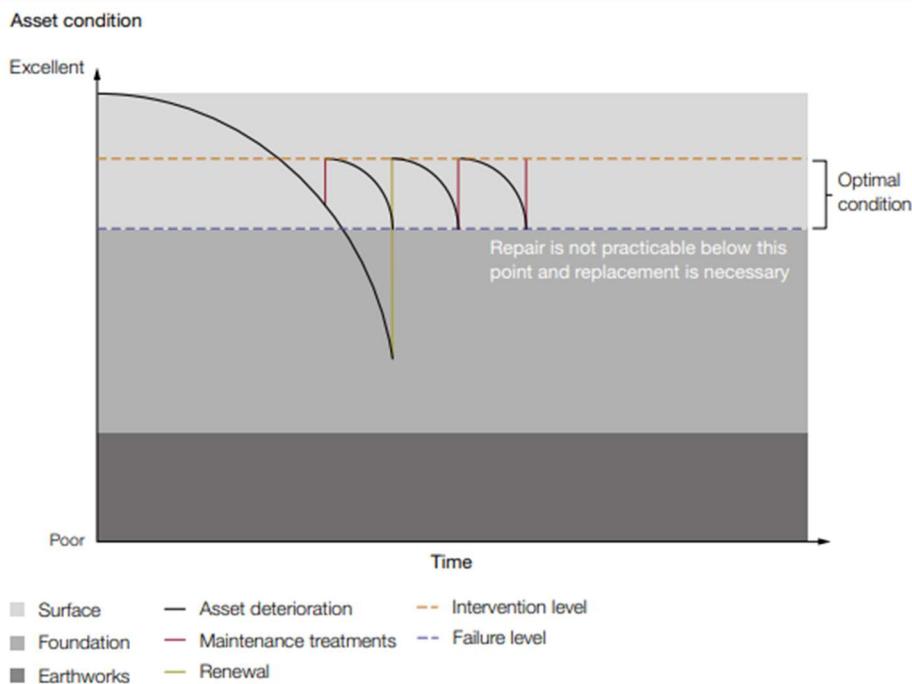
Table A2.1 Priority Local Roads Selected for Last-Mile Connectivity

Road	Availability of Detailed Design	Length (km)
Bulgan, Arkhangai <i>aimag</i>	No	35
Yosonzuil, Uvurkhangai <i>aimag</i>	No	16
Total		51

Subcomponent 1.3: Road asset management framework and system

11. **This subcomponent will support a road asset management framework and system.** It is critical to preserve the asset value of roads that have recently been upgraded, to avoid the vicious cycle of build-neglect-rebuild as well as premature failures, in addition to directing infrastructure investments to complete missing links along the strategic value chains. Figure A2.4 shows that timely maintenance is beneficial to public spending, because the costs of preserving a good-quality network are optimized in the long run by committing regular funding and taking regular action, rather than waiting for major decline in its condition.

³² World Bank To Pave or Not to Pave: Developing a Framework for Systematic Decision-Making in the Choice of Paving Technologies for Rural Roads, Mobility and Transport Connectivity Series (Washington, DC: World Bank, 2021).

**Figure A2.4 Timely and Regular Maintenance to Preserve Asset Value**

12. The road asset management framework to be developed under this subcomponent will integrate the asset management and planning processes (including relevant policies and technical standards, performance measurements, investment strategies, and work programs) with the asset management systems (including existing road asset inventory software and databases) to sustain the project interventions beyond the life of the project. This subcomponent will complement the MRTD's road inventory system³³ currently under development. The works will involve the development of an asset management plan for the road infrastructure and the updating of technical standards and specifications to reflect the reality of new challenges that have emerged due to climate change. In addition, asset valuation and accountability parameters will be developed as the basis for the decision support tool. The system will be used to implement asset delivery and preservation, which will contribute toward sustainability even after close of the project.

Component 2: Transport and Logistics Services (estimated total cost: US\$50 million; IBRD loan: US\$28 million, Counterpart funding: US\$ 2 million, Commercial finance: US\$20 million)

13. This component aims to develop the national logistics services and system for improved logistics efficiency. The MRTD has the mandate to address both physical connectivity and logistics services, and this component provides an entry point to tackle some of the longstanding information asymmetry and institutional bottlenecks. The investments and activities implemented under this component are limited in scope and scale, given the readiness considerations and resource constraints. Nonetheless, these interventions are complementary to others that the MRTD is working on with the Asian Development Bank, the Japan International Cooperation Agency, and the European Bank for Reconstruction and Development to implement major public transport investments in roads, warehousing, and trucking. The component will

³³ With the ongoing ADB TA-9544, a road asset management system is being reestablished to improve maintenance planning, implementation, and prioritization of the national road assets at the MRTD and the Road and Transport Development Center. A pavement maintenance management system called Paver™, developed by Colorado State University, is currently being piloted for deployment (<https://www.adb.org/sites/default/files/project-documents/48186/48186-005-Ina-en.pdf>).



finance a supply chain platform that will better link the herders, operators, and logistics companies to the market. This component will also support innovative pilot projects and provide institutional regulatory support to enable the development of contract logistics services, which will facilitate the development of the livestock value chain. It will include the following subcomponents.

Subcomponent 2.1: Model regional logistics hub

14. This subcomponent addresses the constraint related to lack of properly designed estates for logistics activities in a “hub-and-spoke” configuration. As shown in schematic design in Figure A2.5, the regional hub will provide logistics facilities for consolidation to address the fragmentation that currently exists, which constrains the potential of the meat value chain.

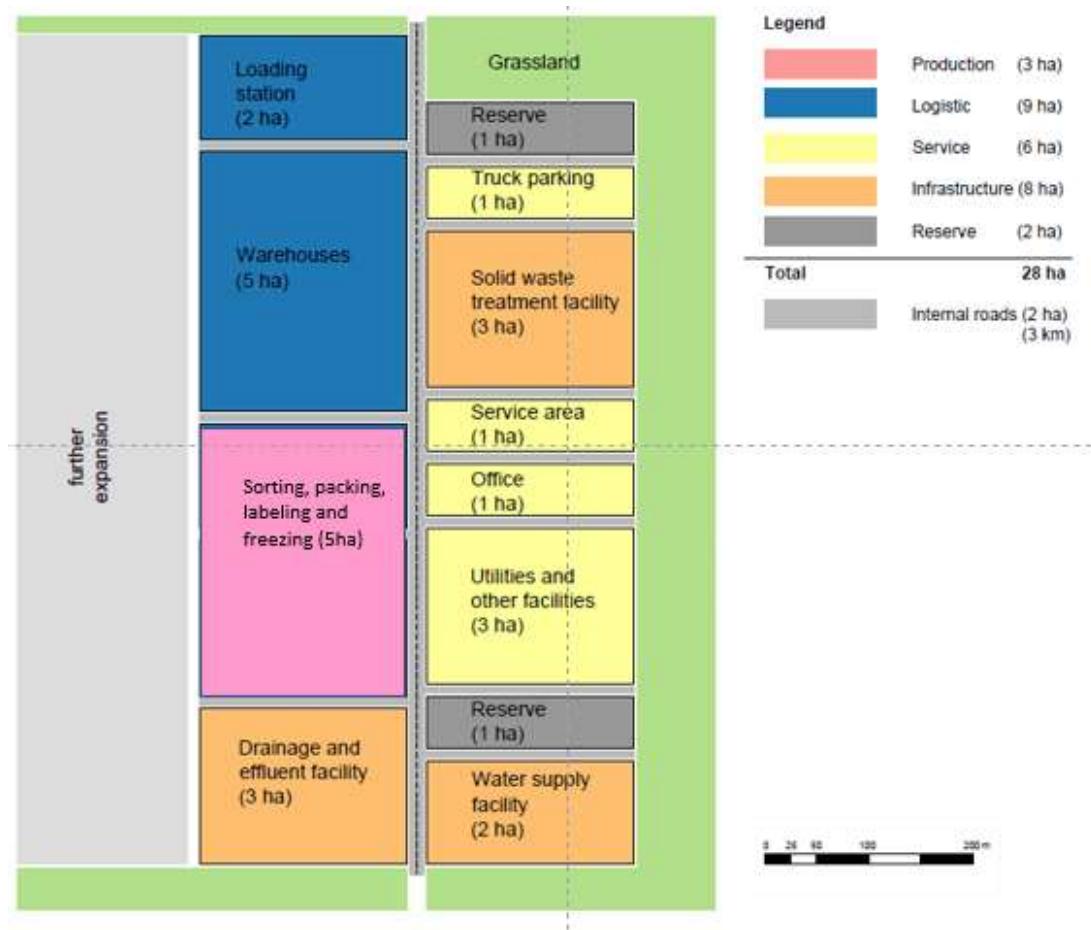


Figure A2.5 - schematic layout of proposed model regional hub

15. The intervention would reduce the need for small, partially loaded trucks without temperature control mechanisms, which currently lead to significant loss of product quality. Ultimately, Mongolia will need to have strategically located hubs to support an overall network of hubs and spokes to facilitate the domestic and export markets once the issues of consistent quality, quantity, and reliability of products are addressed. For demonstration purposes, the regional hub in Ovorkhanghai aimag is expected to be implemented under this project as a public-private partnership (PPP) and



provide a direct link to the market in Ulaanbaatar. The scope of activities to be financed under this subcomponent include the following:

1. Approximately 4–5 km of internal roads within the hub
2. Electricity, water supply, and solid waste disposal
3. Access to information and communication technology
4. Access to land already owned by the Government of Mongolia (approximately 28 hectares to be developed in phases)

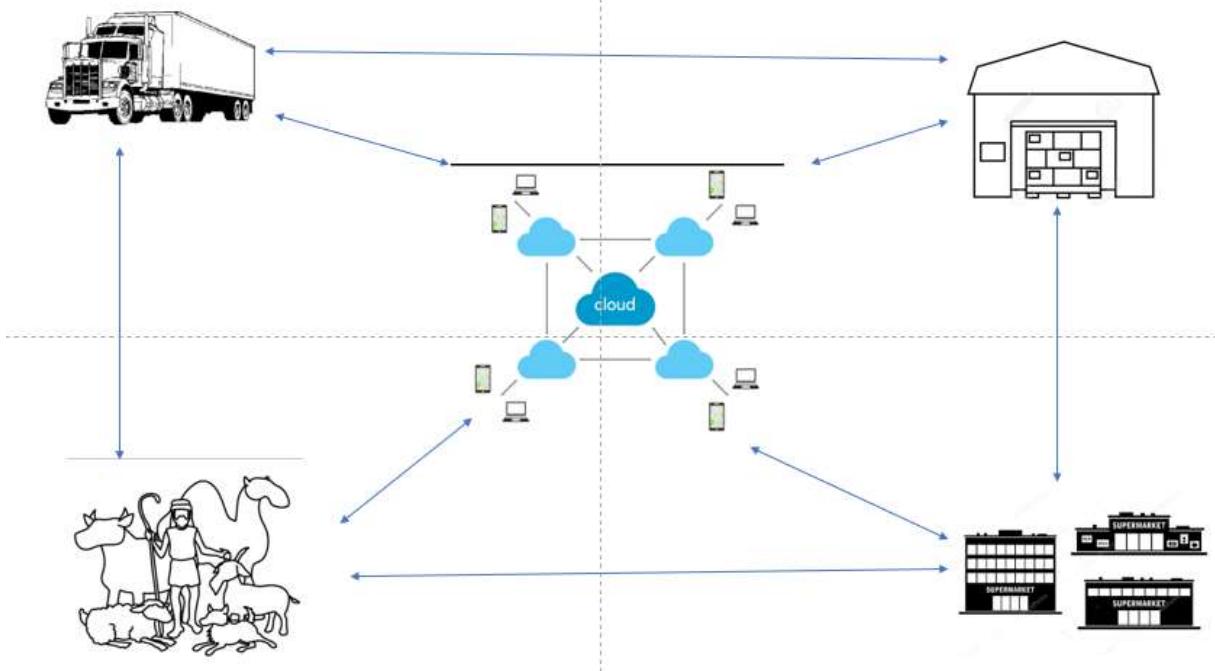
16. It is expected that the “superstructure,” including the facilities for packing, freezing, and warehousing, could be financed by the private investor through a PPP structure (for details on the PPP, see annex 7). However, if such financing is unavailable on the local market, the financing will be done through the Project, and the private partner will enter into a long-term management contract to operate and manage the hub.

17. On a scale of complexity and range of services provided, the regional hub will be less sophisticated than a typical freight village. It will serve mainly as a warehousing and freezing facility and procure, operate, and maintain a modern trucking fleet to transport the frozen goods to markets as demanded throughout the year. The project scope does not include any slaughtering, tanning, skinning or any such activities which are within the realm of agriculture and animal health. The project boundaries are strictly confined to transport connectivity and logistics focusing on the provision of public roads, logistics and transportation services.

Subcomponent 2.2: Logistics and supply chain platform

18. This subcomponent will support the design, procurement, and setting up of a digital supply chain platform to enable a line of sight from the herder all the way through to the domestic or export market. The aim of the platform is to bridge the information gap between various parts of the supply chain, from herder to market, which is critical to logistics efficiency. The platform will encompass functionalities such as the capacity reservation system for mobile abattoirs, feedlot meat processing facilities, cold storage facilities, intermodal transfers, and rail capacity, as well as an information platform for demand, price, market conditions, and logistics for the herders.

19. The flow of information through the supply chain supports the flow of meat from the hoof to the plate and the payments of the final consumer all the way back to the herder. Both information flows are important in the development and stabilization of the value chain and the elimination of loss. Losses are possible of both the physical product (through disease, poor abattoir practices, perishing during transit) and of trade value (through sales in an unregulated market, price dispersion, poor branding). A transparent logistics platform can reduce these losses.

**Figure A2.6 Logistics and Supply Chain Platform**

20. Information flows that support the flow of the physical product could identify and tag the animal within the herder's herd and connect the animal and slaughtered carcass to a specific herder and the original feedlot, abattoir, or mobile abattoir where the animal was slaughtered. This line of sight begins here and should be visible, enabled by the platform, all the way through the value chain. The next step would be the physical flow facilities (such as the cold storage warehouses at the regional hub and market or central storage facilities) and the transport component (developed roads and railways for export). This connectedness enables the booking system to anticipate requirements in advance and reserve capacity as required. The system will therefore enable:

- Visibility of the animal, carcass, and packaged meat at any given time (enabling and facilitating animal health and certification schemes).
- Forecasts of product availability and consumption of physical facilities (enabling transport and logistics management).
- Just-in-time reservation of capacity for movement (enabling mitigation against perishing, cost-effective transport, and lowest inventory holding cost).

21. The physical requirements of such a system, apart from a suitable data warehouse and operational system, would be a radio frequency identification (RFID) information tagging system, temperature control sensors, and links to enterprise management systems of various players in the value chain such as logistics service providers, abattoirs, traders, and agents. Further linkages to apps used by herders and buyers, as well as to the animal health and veterinary services system, are also necessary.

22. The information flow that supports the market and trade value of the value chain enables transactions against a branded and visible product, keeps records of all transactions and payments ensuring a stable end value pricing mechanism, and ensures fair distribution back through the value chain all the way to the herder, who can now get a fair value for the animals and carcasses.



23. It is envisaged that the digital infrastructure of the platform will be enabled by blockchain technology and performs according to the latest standards of IoT (Internet of things) systems. The platform will also connect to global systems such as LOGINK³⁴, ISO, and Navis.

24. The logistics and supply chain platform will include targeted features designed for herdswomen as well as women transport and logistics service providers to exchange information and arrange and reserve sales and transportation of meat/livestock. One of the platform's features will identify women-led households and women-owned businesses to facilitate women-women business exchanges.

Subcomponent 2.3: Demonstration projects for innovations in the supply chain

25. Based on productive partnerships between the public and private sector, the aim of this subcomponent is to introduce innovations that have direct applicability in Mongolia and harness the potential of new technology to address some of the inefficiencies. The following activities are envisaged:

- **Real-time monitoring of deliveries, including radio-frequency identification (RFID) tags, quick-response codes, and track-and-trace blockchain.** The RFID tags use electromagnetic fields to automatically identify, and track tags attached to objects. Combining RFID technologies with quick-response codes and blockchains will improve the visibility and traceability of products (origin and authenticity). Private partners will be asked to design solutions for specific routes before scaling up.
- **Warehousing and smart trucks/containers.** Using simple technologies for machine learning, artificial intelligence, and robotics, solutions have been designed to reduce incidents of contamination, which are prevalent in Mongolia's meat logistics services.
- **Integrating IoT sensors for environmental and animal monitoring.** Herders' inability to monitor their animals continuously can be addressed by installing and integrating IoT sensors.

Subcomponent 2.4: Regulations and standards for contract logistics services and providers and other players in the value chain

26. This subcomponent includes a review and updating of regulations to support development of the contract logistics sector. Compliance standards and regulations are critical for viability and successful monetization of the contract logistics services in the value chain. The MRTD has the mandate to regulate and promote good practice across Mongolia. As logistics becomes an increasingly important ingredient in achieving national economic and social goals, the manner in which the industry is organized and ways to promote efficiencies will become increasingly important. This component will support preparation of the groundwork needed to achieve these aspirations.

³⁴ The World Bank has supported to develop GOLINK in China. LOGINK's goal is to promote logistics information flow between parties in various supply chains. As a data-sharing software, LOGINK has attracted hundreds of thousands of users, facilitating millions of information exchanges daily. LOGINK software enables multiple organizations within and outside the logistics community to communicate and interact under one platform, to include retailers, carriers, banks, and even enterprise resource planning systems. LOGINK's system also bridges the divide between government and private logistics systems, as it enables the dual use of both technologies under its umbrella. For Mongolia, a simple and extendable version could be developed with publicly available data to support the supply chain.

**Component 3: Technical assistance and capacity building (estimated total cost: US\$2 million; IBRD loan: US\$2 million)**

27. The activities under this component involve necessary preparatory works including market assessment of and consultations with the private sector for future development of logistics hubs as well as strategic studies for export logistics. The component will also support the capacity development of the MRTD in implementing the project activities. The component includes the following subcomponents:

Subcomponent 3.1. Preparatory work for logistics hubs

28. The model hub is expected to form part of a future network of integrated regional hubs and, eventually, a central hub large and efficient enough to ensure meat supply along an unbroken chain for both the domestic and export markets. Market soundings and prefeasibility studies have revealed the private sector's concerns about the design and master plan for the hubs to ensure that they are "right sized"—not too big and not too small. This will depend on several factors such as volumes, activities in the hubs, existing production, and key actors for each aimag, and market demand. To ensure that the network of hubs is built to a suitable scale and market, and that the hubs are well integrated, the project will support preparatory works for the remaining hubs. The activities will include master plans, technical designs, assessment of appropriate governance, financing and PPP options, feasibility studies, and bidding documents.

Subcomponent 3.2. Strategic studies for handling meat destined for export

29. When the potential for meat exports picks up in Mongolia, specific studies for rail and air freight logistics will have to be designed. These strategic studies will lay the groundwork for export logistics and will include technical designs for terminal handling, intermodal operations, and business development for export logistics.

Subcomponent 3.3. Capacity building and training

30. The public sector in Mongolia is still in the early stages of building its capacity to support logistics and preserve existing physical assets. This subcomponent will support project management and implementation, including a project management office, technical designs, environmental and social (E&S) studies, public consultation and engagement, and monitoring and evaluation (M&E) for activities under the other components, while also developing the capacity to manage road assets, regulate contracted logistics services, and oversee PPPs. Capacity-building activities include workshops, trainings, conferences, and study tours for government departments and technical staff.

Component 4: Contingent Emergency Response Component (CERC) (total cost: US\$0)

31. This component establishes a zero-budget emergency response contingency fund that could be triggered in the event of a natural disaster through formal declaration of a national or regional state of emergency, or upon a formal request from the government in the wake of a disaster. Upon triggering, reallocation of project funds from other project components could be undertaken to facilitate rapid financing of a positive list of goods and services in the transport and agricultural/meat sectors.³⁵ Eligible activities would include clearing and rehabilitation of road infrastructure, infrastructure at any logistics hub identified or supported by the project, and purchase of eligible materials. A CERC annex will be included in the Project Operations Manual, specifying the implementation arrangements for the component, including its activation process, the roles and responsibilities of implementation agencies, a list of activities that may be

³⁵If required, additional financing could be sought to restore funding to components from which funds have been transferred.



financed, E&S aspects, and fiduciary arrangements. When the government has determined that an eligible crisis or emergency has occurred, it can request and seek the agreement of the World Bank to include relevant activities under the project. In such situations, all E&S instruments required for the added activities need to be prepared, disclosed, and approved by the World Bank.

32. **Project cost and financing.** The total cost of the proposed project, including financing costs, is US\$132 million, of which the IBRD loan will finance US\$100 million, and IDA will finance US\$10 million. The Government of Mongolia and the MRTD will provide counterpart funding of US\$2 million (Table A2.2). The project expects to mobilize US\$20 million unguaranteed commercial financing.

Table A2.2 Financing Sources of Four Project Components

Project Component	Total Cost (US\$, million)	Financing Plan				
		IBRD (US\$, million)	IDA (US\$, million)	Private financing (US\$, million)	Counterpart (US\$, million)	% IBRD/IDA Financing
Component 1. Infrastructure investments	80.00	70.00	10.00	0	0	100
Component 2. Transport and logistics services	50.00	28.00	0	20.00	2.00	56
Component 3. Technical assistance and capacity building	2.00	2.00	0	0	0.00	100
Component 4. Contingent Emergency Response Component (CERC)	0	0	0	0	0	0
Total Project Costs	132.00	100.00	10.00	20.00	2	83%

Note: IBRD = International Bank for Reconstruction and Development; IDA = International Development Association



ANNEX 3: Economic Analysis

Introduction

1. This annex presents an economic analysis of the project, covering the infrastructure investments along project corridors over a period of 20 years. It then outlines the basic characteristics of the roads to be addressed under the infrastructure investment component. After summarizing the methodology and assumptions used in both the economic and detailed analyses, it estimates the project's economic rate of return.

Scope of Economic Analysis

2. The scope of the economic analysis conducted at the appraisal stage mainly focuses on physical improvements to project corridors, which represent a large portion of total project investments (estimated at around US\$80 million). There will be totally 11 road improvement activities, totaling 362 km. Of these, 311 km are to be repaired and rehabilitated along key sections of the strategic network under Component 1.1, and 51 km are local roads to be upgraded for last-mile connectivity under Component 1.2 (see table A3.1).

3. The evaluation covers all 362 km of project roads, including those to be repaired and rehabilitated under Component 1.1 and two local roads, out of four selected last-mile roads in Component 1.2. The project roads are either paved or unpaved, in poor or very poor condition, and will be rehabilitated or paved under the project. Table A3.1 presents basic road characteristics.

Table A3.1. Basic Road Characteristics

No.	Road description	Lane Number	Length (km)	Surface Type	Road Roughness (IRI m/km)	Condition	AADT (2020)	Intervention Type ^a
1	A0301 UB-Arvaikeer	2	72	Paved	6.8	Poor	4,836	Periodic repair
2	A0301 UB-Arvaikeer	2	33	Paved	9.9	Very poor	4,836	Capital repair
3	A0501 UB-Undurkhaan	2	68	Paved	9.1	Very poor	2,288	Capital repair
4	A0602 Kharkhorin-Tsetserleg	2	13	Paved	6.9	Poor	970	Periodic repair
5	A0602 Kharkhorin-Tsetserleg	2	27	Paved	9.6	Very poor	970	Capital repair
6	A0902 Bulgan-Murun	2	13	Paved	10.1	Very poor	408	Capital repair
7	A0603 Tsetserleg-Tosontsengel (Arkhangai)	2	40	Paved	6.9	Poor	954	Periodic repair
8	A0603 Tsetserleg-Tosontsengel (Arkhangai)	2	10	Paved	11.2	Very poor	954	Capital repair
9	A0302 Arvaikeer – Bayankhongor (Uvurkhangai)	2	35	Paved	9.0	Very poor	766	Capital repair
10	Bulgan Soum, Arkhangai Aimag	2	35	Unpaved	11.2	Very poor	355	Last-mile connectivity
11	Yosonzuil Soum, Uvurkhangai Aimag	2	16	Unpaved	11.2	Very poor	294	Last-mile connectivity
Total length of road interventions					362			



Source: MRTD.

Note: AADT = annual average daily traffic; IRI = International Roughness Index.

a. According to the relevant national norms and guidelines on road construction and maintenance, there are five types of road repair and rehabilitation interventions: (i) *Maintenance* refers to daily maintenance works such as sweeping of road surface, maintaining ditches, cleaning street furniture as well as winter maintenance works such as removing snow and sprinkling salts and sand, etc.; (ii) *Routine repair* refers to recurrent maintenance works such as patching potholes, replacing barriers, repainting markings, and repairing drainages, etc.; (iii) *Periodic repair* refers to maintenance of a large extent conducted at the interval of several years and includes partial resurfacing, replacement of road signs and markings, and strengthening embankment and shoulders, etc.; (iv) *Capital repair* refers to rehabilitation and upgrade of embankment, roadway, pavement, bridges, drainages as well as street furniture and may include installation of shoulders and parking lots and replacement of pavement bases and drainages; and (v) *Emergency maintenance* refers to road works to rehabilitate road pavement and embankment when a disruption to embankment occurs in an event of flooding or natural disaster.

Methodology and Assumptions of Economic Analysis

1. A cost-benefit analysis (CBA) was carried out in three steps. First, considering the characteristics of the project roads presented under table A3.1, a CBA was conducted for a total of 311 km of road corridors to be repaired and rehabilitated. Second, a separate analysis was conducted for a total of 51 km of local roads based on the assumptions for estimated AADT and condition. Finally, both analyses were consolidated to obtain the overall results of the project. Once the detailed designs for the local roads are completed at a later stage, economic analysis of those activities will be updated as well. It is presumed that they will have similar profiles in terms of economic growth and traffic growth rates.

Traffic Analysis and Forecast

2. **Population and economic growth.** In 2020, Mongolia's population reached about 3.36 million, and about 647,000 vehicles passed technical inspections (National Statistics Office 2021), with vehicle ownership expected to continue growing. While the country's population is expected to grow at a lower rate, approximately 1.6 percent per year, the country's gross domestic product (GDP) is expected to grow by approximately 5.5 percent per year, and inflation by about 6 percent per year until 2026 (IMF April 2021).

3. **Traffic volume (annual average daily traffic, AADT).** This analysis uses the AADT of the national routes to be addressed under Component 1.1.³⁶ For the local roads to be built under Component 1.2, an assumption is made based on the estimated AADT of two local roads.³⁷ It is presumed that traffic will grow approximately 3.5 percent every year until 2040, based on forecasted income and population growth rates. The baseline and project scenarios are assumed to have the same traffic volume, without considering the generated traffic.

Economic Costs

4. The total investment cost for the infrastructure investment is estimated at US\$80 million, of which road repair and rehabilitation works are estimated at US\$59.1 million and the remaining US\$16.9 million is for last-mile connectivity. Since the economic cost does not include taxes, the financial costs have been converted to economic costs by using a factor of 0.94. No other financial costs and benefits have been adjusted. The roadwork will raise the condition of project roads to good, with a paved standard. The average unit costs of the roadwork are estimated at US\$133,375.45 and

³⁶ RMCs operating under the Road and Transport Development Center collect the traffic counts quarterly by vehicle type on their respective national routes, and AADTs of the roads to be rehabilitated under the Component 1.1 are drawn from their AADT records for the respective national routes that cover the selected roads.

³⁷ Mongolian Statistical Information Service 2021: <https://www.1212.mn>.



US\$228,142.22 per km for periodic and capital repairs, and US\$331,163.6 for last-mile connectivity. The annual average maintenance cost is estimated at US\$3,228.1 per km. Major maintenance will be carried out every 10 years and is estimated to cost about 6 percent of the initial investment cost per kilometer of road. Value of time is calculated as a function of the expected growth of the economy.

5. Table A3.2 summarizes the key assumptions made and estimates done in the CBA analysis of the road interventions under Component 1.1 and Component 1.2.



Table A3.2 Key Assumptions and Estimates for Project Roads

Item	A0301 Ulaanbaatar -Arvaikheer	A0301 Ulaanbaatar -Arvaikheer	A0501 Ulaanbaatar- Undurkhaan	A0602 Kharkhorin -Tsetserleg	A0602 Kharkhorin -Tsetserleg	A0902 Bulgan- Murun	A0603 Tsetserleg- Tosontsengel	A0603 Tsetserleg- Tosontsengel	A0302 Arvaikheer- Bayankhongor	Bulgan, Arkhangai	Yosonzuil, Uvurkhangai
Vehicle composition: ^a											
Cars (%)	73.39	73.39	71.93	75.44	75.44	85.86	75.08	75.08	76.98	51.83	48.29
Trucks (%)	20.03	20.03	20.58	19.54	19.54	8.17	19.54	19.54	17.67	47.32	50.0
Buses (%)	6.58	6.58	7.48	5.02	5.02	5.97	5.44	5.44	5.35	0.85	1.71
Vehicle fleet mean speed (km/h) without project	59.64	60	60	59.64	60	60	59.64	60	60	30	30
Vehicle fleet mean speed (km/h) with project ^b	77	77	77	77	77	77	77	77	77	60	60
Annual traffic growth rate (%)	3.5 (2024–40)	3.5 (2025–41)	3.5 (2025–41)	3.5 (2024–40)	3.5 (2025–41)	3.5 (2025–41)	3.5 (2024–40)	3.5 (2025–41)	3.5 (2025–41)	3.5 (2025–41)	3.5 (2025–41)
Unit cost for roadwork (US\$ million/km)	0.13	0.23	0.23	0.13	0.23	0.23	0.13	0.23	0.23	0.33	0.33
Total cost of roadwork (US\$ million) ^c	6.13	8.44	6.16	1.73	4.33	5.7	5.3	2.28	7.98	11.59	5.29
Average VOC without project (US\$/100 VKT)	18.5	20.6	21.1	17.7	19.4	17.1	17.3	20.1	20.1	34.2	35.2
Average VOC (US\$/100 VKT)	15.9	15.9	16.6	15.2	15.2	13.5	14.8	14.8	16	22.2	22.8

Source: World Bank estimates.

Note: km/h = kilometers per hour; VKT = vehicle kilometers travelled; VOC = vehicle operating cost.

a. In the absence of vehicle composition data for the selected last-mile roads during project preparation, the number of registered vehicles in the relevant soums is used.

b. The assumption is based on an ex post economic evaluation of similar road projects implemented by the Millennium Challenge Corporation in Mongolia (details at: <https://data.mcc.gov/evaluations/index.php/catalog/229>).

c. The total cost per road is in financial terms.



Economic Benefits

6. The project will generate direct and indirect benefits because of a reduction in vehicle operating costs (VOCs) and reductions in travel time due to improved road conditions. Taking a conservative approach, the project will assume the following quantifiable economic benefits: (i) reduction in VOCs, (ii) vehicle travel time savings, and (iii) reduction of the frequency and severity of road crashes.

7. The methodology for quantifying these economic benefits is as follows:

- **Benefits of lower VOC in project roads due to improved road conditions.** Taking a conservative assumption, VOC savings are calculated based on the increased speed of travel for major vehicles.
- **Benefits of travel time savings due to improved road conditions.** The travel time of private cars, trucks, and buses will decrease resulting in travel time savings for all passengers on project roads. Travel time cost savings are calculated by multiplying time savings by a gradually increasing forecasted value of time.
- **Benefits of reduced road fatalities.** The World Bank's Road Safety Screening and Appraisal Tool (RSSAT) was used to assess the baseline and project scenarios, to estimate the change in road crashes (expressed in the Project Safety Impact), and finally to estimate the safety benefits and costs of the project for 17 years of operation.

8. The road rehabilitation works involving periodic and capital repairs will be completed in 2024 and 2025, while the interventions for last-mile connectivity will be completed tentatively in 2025, and the project roads will start generating benefits. Table A3.3 presents the estimated benefits.

Table A3.3 Economic Benefits of Project Roads after Intervention

Item	2041 (with project)
VOC savings (US\$ million/year)	13.4
Travel time cost savings (US\$ million/year)	5.2
Vehicle speed (km/h) for road repairs and rehabilitations	77
Vehicle speed (km/h) for local roads	60
Safety savings (US\$ million/year)	1.67

Source: World Bank estimates and calculation.

Note: km/h = kilometers per hour; VOC = vehicle operating cost.

Greenhouse Gas (GHG) Accounting

9. This is measured by the lower carbon dioxide (CO₂) emission costs. The economic costs and benefits of GHG accounting is calculated in accordance with the World Bank's 2017 guidance note on the shadow price of carbon in economic analysis. The total GHG emission increases stem from increased speed due to the improved conditions of the road repair and rehabilitations on the A0301 Ulaanbaatar-Arvaiheer, A0501 Ulaanbaatar-Undurkhaan, A0602 Kharkhorin-Tsetserleg, A0603 Tsetserleg-Tosontsengel (Arkhangai), and A0302 Arvaikheer-Bayankhongor (Uvurkhangai) routes.

10. Applying the shadow price of carbon, the total gross CO₂ emissions over the 20-year evaluation period under the baseline and project scenarios are estimated, resulting in a net increase of CO₂ emissions of about 60,753 tons, or 3037.6



tons per year.

Results of Economic Evaluation and Sensitivity Analysis

11. The overall economic internal rate of return (EIRR) and net present value (NPV) of the project are estimated to be 20.8 percent and US\$124.9 million, respectively, at a 6 percent discount rate. Table A3.4 presents the breakdown of the EIRR and NPV by road intervention.

Table A3.4 Results of Economic Analysis

No.	Road Intervention	EIRR (%)	NPV at 6% discount rate (US\$ million)
1	A0301 Ulaanbaatar-Arvaikeer	42.7	90.19
2	A0501 Ulaanbaatar-Undurkhaan	21.6	28.72
3	A0602 Kharkhorin-Tsetserleg	11.5	4.16
4	A0902 Bulgan-Murun	7.7	0.47
5	A0603 Tsetserleg-Tosontsengel (Arkhangai)	12.3	4.48
6	A0302 Arvaikeer-Bayankhongor (Uvurkhangai)	5.6	0.29
7	Bulgan soum, Arkhangai	4	-1.52
8	Yosonzuil soum, Uvurkhangai	3	-1.26
Total		20.8	124.9

Source: World Bank estimates and calculation.

Note: EIRR = economic internal rate of return; NPV = net present value.

12. Sensitivity tests have also been undertaken to assess the robustness of the estimated EIRR and NPV to different key variations; the results are summarized in table A3.5.

Table 3.5. Results of Sensitivity Analysis

Parameter	EIRR (%)	NPV at 6% (US\$ million)
Base scenario	20.8	124.9
Benefits reduce by 20%	16.68	83.2
Project cost increases by 20%	17.71	112.2
Benefits decreases and cost increases by 20%	14	70.4

Note: EIRR = economic internal rate of return; NPV = net present value.

**ANNEX 4: Adjustments to the Country Program in Response to COVID-19**

1. **Mongolia took proactive measures against the COVID-19 outbreak from the beginning.** From February 2020, Mongolia took early actions including border closure with its two neighbors, complete stop of international commercial air travel, and quarantine measures for passengers arriving through chartered flights. Preventive and containment measures, including strict lockdown across the country especially in urban centers, active contact tracing and testing, and isolation of suspected cases were carried out. As a result, Mongolia had no reported cases from local transmission until November 2020.

2. **Despite the early successes, local transmission started in November 2020, and since then, has not been fully brought under control.** As of September 16, 2021, over 288,000 local cases have been reported, of which more than half are in Ulaanbaatar city. Mongolia has had over 1,000 COVID-related deaths. After peaking in June, the case numbers were on a downward trend during the summer, only to start increasing again in September with the spread of the Delta variant. Considering Mongolia's small population of 3.3 million, the infection rate is relatively high.

3. **Mongolia's national vaccination program started in February 2021 and has achieved a high vaccination rate.** It had planned to vaccinate at least 60 percent of its 3.3 million people, or its entire adult population, in 2021. As of September 16, first dose coverage among the target population was 95.4 percent, and second dose coverage was 89.9 percent. Nonetheless, with lockdown measures easing, the high vaccination rate has not stopped local transmission, although it has helped in easing the symptoms and reducing the risk of serious complications. Mongolia has started administering booster shots to adults on a voluntary basis starting in early September 2021.

Impact of COVID-19

4. **While the public health impact of COVID-19 has been relatively limited in Mongolia, the impact on the economy has been significant—in 2020, Mongolia's economy contracted by over 5 percent, the country's first sizable recession in over a decade.** The COVID-19 pandemic adversely affected exports, foreign direct investment (FDI), private investment, and domestic activities. The mining sector was hit amid the collapse in external demand and domestic lockdown measures. Non-mining sector output also contracted, largely driven by slowdowns in the manufacturing, trade, and transportation sectors, as well as tourism. Meanwhile, private investment plummeted amid lower FDI inflows and the negative growth of private sector credit. As a result, about 45 percent of firms have permanently exited the market since the beginning of the pandemic.

5. **The economic and social impact is threatening the gains in poverty reduction Mongolia achieved over the past years.** COVID-19 has led to broad reductions in household income. A recent household phone survey conducted by the National Statistics Office of Mongolia and the World Bank indicates that the pandemic had caused significant disruptions in employment and broad reductions in labor income. With the rise in COVID-19 cases in November 2020 and stricter containment measures, about 85 percent of households engaged in nonfarm businesses were not able to operate fully in December 2020 and nearly 90 percent experienced income losses compared to the same period last year. Herders have been able to work during the pandemic, but their livestock income has declined due to harsh weather conditions.

6. **In response to the crisis, the government has announced three phases of stimulus measures amounting to US\$2.5 billion, or about 18 percent of GDP, for the period between April 2020 and December 2021.** The size of fiscal relief is among the highest in the East Asia and Pacific region. The measures are a mix of forgone revenue and spending on relief, primarily focused on supporting households and firms (particularly small and medium enterprises [SMEs]) to



cushion losses of income and avoid mass unemployment and bankruptcies. This includes about 11.8 percent of GDP in support measures to households and 6.1 percent of GDP in support measures to firms. Key spending measures included an expanded Child Money Program (CMP) and higher health spending. The above-mentioned phone survey results indicate that 81 percent of CMP-recipient households reported that the program partially mitigated the negative impacts of the pandemic and another 9 percent reported it completely offset impacts. In early 2021, authorities announced a new stimulus program of about US\$3.5 billion (over 20 percent of GDP) to be implemented over three years. The program largely targets the banking sector and offers a combination of refinancing from the central bank, interest subsidies from the budget, and an expansion of the state guarantee fund to encourage banks to resume lending to the private sector. The program's direct fiscal impact is relatively limited although contingent liabilities will need to be carefully assessed; its economic impact will depend on the take-up by the banking sector.

7. Recovery from the pandemic is likely to be slow and hesitant. Mongolia's economic growth rebounded in the first half of 2021 to 6.1 percent (year on year) on the back of robust exports and a surge in private investment, mainly in the mining sector. The government's relief and stimulus measures during the pandemic further supported domestic demand as it stimulated domestic investment by fueling credit growth. However, the strong economic recovery lost steam in Q2 following a month-long quarantine in May and disruption in external trade due to heightened measures amid the pandemic. The logistical issues at the border amid the heightened risk of contagion disrupted not only exports of key commodities, but the supply chain of imported inputs for domestic production. Mainly due to the prolonged trade disruption since late May, Mongolia's economic recovery is likely to be weaker at 4.5 percent in 2021. Some rebound in exports, strong recovery in private sector investments on the back of FDI flows and subsidized loans, and the government's decision to extend income support until end-2021 would support domestic demand in 2021. Growth could accelerate in 2022–23, driven by non-mining industries and service sectors, supported by the rapid implementation of the stimulus program, improved trade facilitation, and digitalization.

The Bank's COVID-19 Response Support

8. The Bank has mobilized quickly to support the public health response as well as economic and social assistance targeting the poor and vulnerable. As of September 2021, the Bank has committed US\$116.15 million for the COVID-19 response, including US\$80.8 million in public health responses. These funds come from a mix of new financing and reallocations from existing portfolios.

- In the health sector, an emergency financing project (US\$26.9 million) was rapidly mobilized as part of the first batch of the Global COVID-19 Multiphase Programmatic Approach (MPA) in FY20. It was followed by one of the earliest MPA additional financings (US\$50.7 million) approved in FY21 to support purchase and distribution of COVID-19 vaccines. Both operations used exceptional IDA19 allocations to Mongolia. They were complemented by a US\$1 million grant from the Pandemic Emergency Financing Facility, and US\$2.2 million reallocated from the existing E-health project. The Bank's emergency support has supported purchase of essential medical equipment and personal protective equipment for hospitals in 21 provinces and 9 districts, and mobile x-ray and ultrasound machines for designated COVID-19 hospitals and health facilities and has most recently financed the construction of the national vaccine cold storage facility. It is also supporting risk communication and training for health workers. The Bank team is in discussion with the authorities to finance US\$15.6 million worth of Sinopharm vaccines.
- In economic and social response, the Bank supported social insurance contribution exemptions and microloans for workers, through restructuring an ongoing project as well as a new project



with a total funding of US\$27.5 million. The ongoing education project provided US\$5 million for cash transfers under the CMP. The ongoing governance projects and SME-support projects also reallocated funds to support the government's COVID-19 response and SMEs, respectively.

9. As the economy moves from COVID-19 containment to recovery, the authorities are targeting an investment-led recovery, including through the latest stimulus package. Guided by the new World Bank Group Country Partnership Framework for Mongolia (FY21–25), the Bank's support will also shift toward supporting critical infrastructure, while using the opportunity to move to a more sustainable development path. Following the Ulaanbaatar urban transport project in FY21, the Mongolia Transport Connectivity and Logistics Improvement Project continues to reflect this shift.



ANNEX 5: Road Safety Appraisal Tool Results

1. Repair of A0301 Ulaanbaatar-Arvaiheer: The selected sections (72 km) of the Ulaanbaatar-Arvaiheer corridor to be repaired under the project currently have an annual fatality rate of about 0.23 deaths per km, which is categorized as *High* based on international standards. The analysis from the Road Safety Screening and Appraisal Tool (RSSAT) indicates pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 27.5 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 7.6 percent; and bicyclist fatalities, which account for 0.31 percent, will see an increase of about 31.5 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 kilometers per hour (km/h) to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, the installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian crossings, and road signs and markings have contributed positively to increasing safety. Overall, for all road users, the sections analyzed are expected to have about 1.5 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2024.

Table A5.1 Risks on Repaired Roads (A0301) Compared between Baseline and Project Scenarios

Country: Mongolia																																																								
Road Segment Name: A0301 UB-Arvaiheer																																																								
Summary Results for Year of Beginning Operation(2024)																																																								
Results																																																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Fatality Percentage Change</td><td style="text-align: right;">-1.5%</td></tr> <tr> <td>Project Safety Impact (PSI)</td><td style="text-align: right;">0.99</td></tr> <tr> <td>Fatalities without project (Selected Year)</td><td style="text-align: right;">17.1</td></tr> <tr> <td>Fatalities with project (Selected Year)</td><td style="text-align: right;">16.8</td></tr> </table>				Fatality Percentage Change	-1.5%	Project Safety Impact (PSI)	0.99	Fatalities without project (Selected Year)	17.1	Fatalities with project (Selected Year)	16.8																																													
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th><th>Fatalities Without Project (Selected Year)</th><th>Fatalities With Project (Selected Year)</th><th>PSI</th><th>Fatality % Change</th></tr> </thead> <tbody> <tr> <td>Vehicle Occupants</td><td style="text-align: right;">13</td><td style="text-align: right;">14</td><td style="text-align: right;">1.076</td><td style="text-align: right;">7.6%</td></tr> <tr> <td>Motorcyclists</td><td style="text-align: right;">0</td><td style="text-align: right;">0</td><td style="text-align: right;">1.004</td><td style="text-align: right;">0.0%</td></tr> <tr> <td>Pedestrians</td><td style="text-align: right;">4</td><td style="text-align: right;">3</td><td style="text-align: right;">0.725</td><td style="text-align: right;">-27.5%</td></tr> <tr> <td>Bicyclist</td><td style="text-align: right;">0</td><td style="text-align: right;">0</td><td style="text-align: right;">1.315</td><td style="text-align: right;">31.5%</td></tr> <tr> <td>Total Fatalities</td><td style="text-align: right;">17</td><td style="text-align: right;">17</td><td style="text-align: right;">0.985</td><td style="text-align: right;">-1.5%</td></tr> </tbody> </table>						Fatalities Without Project (Selected Year)	Fatalities With Project (Selected Year)	PSI	Fatality % Change	Vehicle Occupants	13	14	1.076	7.6%	Motorcyclists	0	0	1.004	0.0%	Pedestrians	4	3	0.725	-27.5%	Bicyclist	0	0	1.315	31.5%	Total Fatalities	17	17	0.985	-1.5%																						
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Vehicle Occupants	13	14	1.076	7.6%																																																				
Motorcyclists	0	0	1.004	0.0%																																																				
Pedestrians	4	3	0.725	-27.5%																																																				
Bicyclist	0	0	1.315	31.5%																																																				
Total Fatalities	17	17	0.985	-1.5%																																																				
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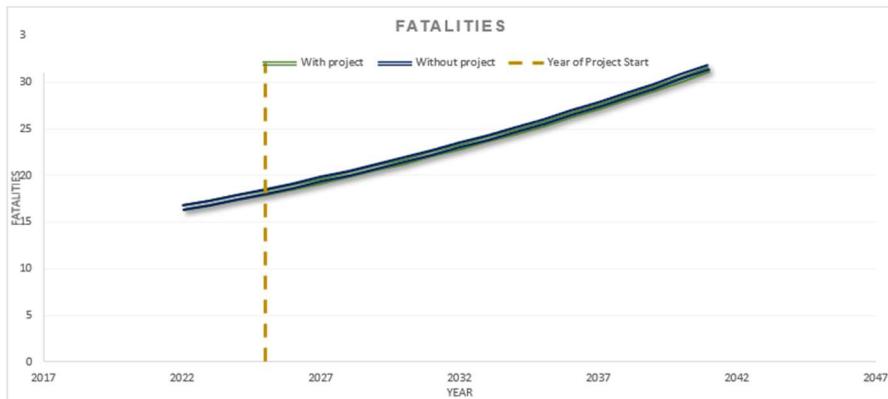
**Figure A5.1 Fatality Projections for Repaired Roads (A0301) Compared between Baseline and Project Scenarios**

Source: World Bank team.

2. **Rehabilitation of A0301 Ulaanbaatar-Arvaiheer:** The selected sections (33 km) of the Ulaanbaatar-Arvaiheer corridor to be rehabilitated under the project currently have an annual fatality rate of about 0.55 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 14.6 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 3.8 percent; and bicyclist fatalities, which now account for 0.31 percent, will see an increase of about 30.2 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, the installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing the safety. Overall, for all road users, the sections analyzed are expected to have about 0.9 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2025.

**Table A5.2 Risks on Rehabilitated Roads (A0301) Compared between Baseline and Project Scenarios**

Country: Mongolia				
Road Segment Name: A0301 UB-Avaikeer				
Summary Results for Year of Beginning Operation(2025)				
Results				
Fatality Percentage Change	-0.9%			
Project Safety Impact (PSI)	0.99			
Fatalities without project (Selected Year)	18.3			
Fatalities with project (Selected Year)	18.1			
	Fatalities Without Project (Selected Year)	Fatalities With Project (Selected Year)	PSI	Fatality % Change
Vehicle Occupants	13	14	1.038	3.8%
Motorcyclists	0	0	0.969	0.0%
Pedestrians	5	4	0.854	-14.6%
Bicyclist	0	0	1.302	30.2%
Total Fatalities	18	18	0.991	-0.9%
Rate Change (Selected Year)		Without Project		With Project
Road Casualties				
	Value	Risk Rating	Value	Risk Rating
Annual Fatalities per km	0.5537	High	0.5486	High
Fatalities per billion veh-km	282.92	High	280.3	High
Annual Serious Injuries per km	1.1	--	1.1	--
Serious Injuries per billion veh-km	566	--	561	--
Cost Benefit Analysis				
Road Safety Cost without project	\$9,694,468			
Road Safety Cost with project	\$9,605,420			
Benefit (Selected Year)	\$89,048			

Figure A5.2 Fatality Projections for Rehabilitated Roads (A0301) Compared between Baseline and Project Scenarios

Source: World Bank team.



3. Rehabilitation of A0501 Ulaanbaatar-Undurkhaan: The selected sections (68 km) of the Ulaanbaatar-Undurkhaan corridor to be rehabilitated under the project currently have an annual fatality rate of about 0.22 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 14.9 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 2.4 percent; and bicyclist fatalities, which now account for 0.31 percent, will see an increase of about 29.8 percent of relative risk when project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists, while installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing their safety. Overall, for all road users, the sections analyzed are expected to have about 2.0 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2025.

Table A5.3 Risks on Rehabilitated Roads (A0501) Compared between Baseline and Project Scenarios

Country: Mongolia																																		
Road_Segment Name: A0501_UB-Undurkhaan																																		
Summary Results for Year of Beginning Operation(2025)																																		
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Figure A5.3 Fatality Projections for Rehabilitated Roads (A0501) Compared between Baseline and Project Scenarios



Source: World Bank team.

4. **Repair of A0602 Kharkhorin-Tsetserleg:** The selected sections (13 km) of the Kharkhorin-Tsetserleg corridor to be repaired under the project currently have an annual fatality rate of about 0.78 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 15.1 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 1.3 percent; and bicyclist fatalities, which now account for 0.31 percent, will see an increase of about 29.4 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, the installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing the safety. Overall, for all road users, the sections analyzed are expected to have about 2.9 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2024.

**Table A5.4 Risks on Repaired Roads (A0602) Compared between Baseline and Project Scenarios**

Results				
Fatality Percentage Change				-2.9%
Project Safety Impact (PSI)				0.97
Fatalities without project (Selected Year)				10.2
Fatalities with project (Selected Year)				9.9
	Fatalities Without Project (Selected Year)	Fatalities With Project (Selected Year)	PSI	Fatality % Change
Vehicle Occupants	7	8	1.013	1.3%
Motorcyclists	0	0	0.946	0.0%
Pedestrians	3	2	0.849	-15.1%
Bicyclist	0	0	1.294	29.4%
Total Fatalities	10	10	0.971	-2.9%
Rate Change (Selected Year)		Without Project		With Project
Road Casualties				
	Value	Risk Rating	Value	Risk Rating
Annual Fatalities per km	0.7812	High	0.7588	High
Fatalities per billion veh-km	2059.68	High	2000.6	High
Annual Serious Injuries per km	1.6	--	1.5	--
Serious Injuries per billion veh-km	4119	--	4001	--
Cost Benefit Analysis				
Road Safety Cost without project	\$5,121,528			
Road Safety Cost with project	\$4,974,655			
Benefit (Selected Year)	\$146,873			

Figure A5.4 Fatality Projections for Repaired Roads (A0602) Compared between Baseline and Project Scenarios

Source: World Bank team.

5. **Rehabilitation of A0602 Kharkhorin-Tsetserleg:** The selected sections (27 km) of the Kharkhorin-Tsetserleg corridor to be rehabilitated under the project currently have an annual fatality rate of about 0.38 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 14.6 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 3.8 percent; and bicyclist fatalities, which now account for 0.31 percent, will see an increase of about 30.2 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, the installation and

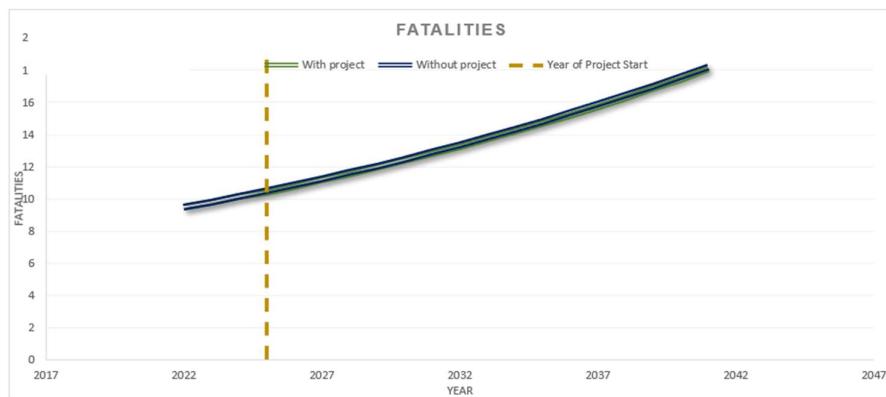


improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing their safety. Overall, for all road users, the sections analyzed are expected to have about 0.9 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2025.

Table A5.5 Risks on Rehabilitated Roads (A0602) Compared between Baseline and Project Scenarios

Results				
Fatality Percentage Change		-0.9%		
Project Safety Impact (PSI)		0.99		
Fatalities without project (Selected Year)		10.5		
Fatalities with project (Selected Year)		10.4		
	Fatalities Without Project (Selected Year)	Fatalities With Project (Selected Year)	PSI	Fatality % Change
Vehicle Occupants	8	8	1.038	3.8%
Motorcyclists	0	0	0.969	0.0%
Pedestrians	3	2	0.854	-14.6%
Bicyclist	0	0	1.302	30.2%
Total Fatalities	11	10	0.991	-0.9%
Rate Change (Selected Year)		Without Project		With Project
Road Casualties				
	Value	Risk Rating	Value	Risk Rating
Annual Fatalities per km	0.3893	High	0.3857	High
Fatalities per billion veh-km	991.70	High	982.6	High
Annual Serious Injuries per km	0.8	--	0.8	--
Serious Injuries per billion veh-km	1983	--	1965	--
Cost Benefit Analysis				
Road Safety Cost without project	\$5,576,422			
Road Safety Cost with project	\$5,525,478			
Benefit (Selected Year)	\$50,944			

Figure A5.5 Fatality Projections for Rehabilitated Roads (A0602) Compared between Baseline and Project Scenarios



Source: World Bank team.

6. Rehabilitation of A0902 Bulgan-Murun: The selected sections (13 km) of the A0902 Bulgan-Murun corridor to be rehabilitated under the project currently have an annual fatality rate of about 0.65 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 20.6 percent; vehicle occupants, which now



account for 73.67 percent of fatalities, will see an increase of about 3.5 percent; bicyclist fatalities, which now account for 0.31 percent of fatalities, will see an increase of about 30.1 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing their safety. Overall, for all road users, the sections analyzed are expected to have about 2.7 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2025.

Table A5.6 Risks on Rehabilitated Roads (A0902) Compared between Baseline and Project Scenarios

Country: Mongolia																																						
Road_Segment Name: A0902_Bulgan-Murun																																						
Summary Results for Year of Beginning Operation(2025)																																						
Results																																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Fatality Percentage Change</td><td style="text-align: right;">-2.7%</td></tr> <tr> <td>Project Safety Impact (PSI)</td><td style="text-align: right;">0.97</td></tr> <tr> <td>Fatalities without project (Selected Year)</td><td style="text-align: right;">8.5</td></tr> <tr> <td>Fatalities with project (Selected Year)</td><td style="text-align: right;">8.3</td></tr> </table>				Fatality Percentage Change	-2.7%	Project Safety Impact (PSI)	0.97	Fatalities without project (Selected Year)	8.5	Fatalities with project (Selected Year)	8.3																											
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Figure A5.6 Fatality Projections for Rehabilitated Roads (A0902) Compared between Baseline and Project Scenarios



Source: World Bank team.



7. **Repair of A0603 Tsetserleg-Tosontsengel:** The selected sections (40 km) of the Tsetserleg-Tosontsengel corridor to be repaired under the project currently have an annual fatality rate of about 0.32 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 31.0 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 3.4 percent; and bicyclist fatalities, which now account for 0.31 percent, will see an increase of about 30.1 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, the installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing their safety. Overall, for all road users, the sections analyzed are expected to have about 5.5 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2024.

Table A5.7 Risks on Repaired Roads (A0603) Compared between Baseline and Project Scenarios

Results				
Fatality Percentage Change		-5.5%		
Project Safety Impact (PSI)		0.95		
Fatalities without project (Selected Year)		12.9		
Fatalities with project (Selected Year)		12.1		
	Fatalities Without Project (Selected Year)	Fatalities With Project (Selected Year)	PSI	Fatality % Change
Vehicle Occupants	9	10	1.034	3.4%
Motorcyclists	0	0	0.965	0.0%
Pedestrians	3	2	0.690	-31.0%
Bicyclist	0	0	1.301	30.1%
Total Fatalities	13	12	0.945	-5.5%
Rate Change (Selected Year)		Without Project		With Project
		Road Casualties		
		Value	Risk Rating	Value
Annual Fatalities per km		0.3214	High	0.3037
Fatalities per billion veh-km		861.55	High	814.2
Annual Serious Injuries per km		0.6	--	0.6
Serious Injuries per billion veh-km		1723	--	1628
Cost Benefit Analysis				
Road Safety Cost without project		\$6,482,947		
Road Safety Cost with project		\$6,127,013		
Benefit (Selected Year)		\$355,934		



Figure A5.7 Fatality Projections for Repaired Roads (A0603) Compared between Baseline and Project Scenarios



Source: World Bank team.



8. **Rehabilitation of A0603 Tsetserleg-Tosontsengel:** The selected sections (10 km) of the Tsetserleg-Tosontsengel corridor to be rehabilitated under the project currently have an annual fatality rate of about 1.33 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 5.2 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 5.1 percent; and bicyclist fatalities, which now account for 0.31 percent, will see an increase of about 30.6 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, the installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing their safety. Overall, for all road users, the sections analyzed are expected to have about 2.5 percent increase of deaths compared to existing conditions, when the road is opened to traffic in 2025.

Table A5.8 Risks on Rehabilitated Roads (A0603) Compared between Baseline and Project Scenarios

Country: Mongolia												
Road_Segment Name: A0603_Tsetserleg-Tosontsengel (Solongoitiin davaa)												
Summary Results for Year of Beginning Operation(2025)												
Results												
<table border="1"><thead><tr><th>Fatality Percentage Change</th><th>2.5%</th></tr></thead><tbody><tr><td>Project Safety Impact (PSI)</td><td>1.02</td></tr><tr><td>Fatalities without project (Selected Year)</td><td>13.3</td></tr><tr><td>Fatalities with project (Selected Year)</td><td>13.6</td></tr></tbody></table>					Fatality Percentage Change	2.5%	Project Safety Impact (PSI)	1.02	Fatalities without project (Selected Year)	13.3	Fatalities with project (Selected Year)	13.6
Fatality Percentage Change	2.5%											
Project Safety Impact (PSI)	1.02											
Fatalities without project (Selected Year)	13.3											
Fatalities with project (Selected Year)	13.6											
	Fatalities Without Project (Selected Year)	Fatalities With Project (Selected Year)	PSI	Fatality % Change								
Vehicle Occupants	10	10	1.051	5.1%								
Motorcyclists	0	0	0.981	0.0%								
Pedestrians	3	3	0.948	-5.2%								
Bicyclist	0	0	1.306	30.6%								
Total Fatalities	13	14	1.025	2.5%								
Rate Change (Selected Year)		Without Project		With Project								
Road Casualties												
	Value	Risk Rating	Value	Risk Rating								
Annual Fatalities per km	1.3305	High	1.3636	High								
Fatalities per billion veh-km	3446.20	High	3532.1	High								
Annual Serious Injuries per km	2.7	--	2.7	--								
Serious Injuries per billion veh-km	6892	--	7064	--								
Cost Benefit Analysis												
Road Safety Cost without project	\$7,058,762											
Road Safety Cost with project	\$7,234,791											
Benefit (Selected Year)	-\$176,029											



Figure A5.8 Fatality Projections for Rehabilitated Roads (A0603) Compared between Baseline and Project Scenarios

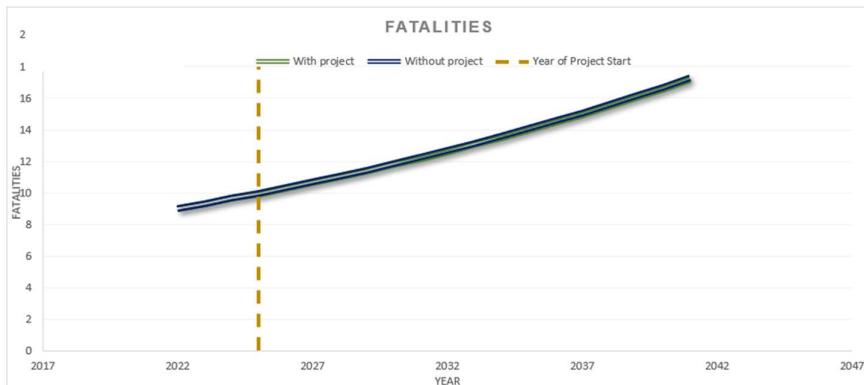


Source: World Bank team.

9. **Rehabilitation of A0302 Arvaikheer-Bayankhongor:** The selected sections (10 km) of the Arvaikheer-Bayankhongor corridor to be rehabilitated under the project currently have an annual fatality rate of about 0.28 deaths per km, which is categorized as *High* based on international standards. The RSSAT analysis shows that pedestrian fatalities, which now account for about 26.02 percent of fatalities, will see a drop of about 20.2 percent; vehicle occupants, which now account for 73.67 percent of fatalities, will see an increase of about 6.0 percent; and bicyclist fatalities, which now account for 0.31 percent, will see an increase of about 30.9 percent of relative risk when the project design is compared to existing conditions. The lack of a segregated cycle path and the increase in operating speed from 60 km/h to 77 km/h are primarily responsible for the increased safety risk, primarily for bicyclists. Meanwhile, the installation and improvement of traffic-calming measures along the corridor as well as improvements in roadside barriers, paved shoulders, pedestrian-crossing facilities, and road signs and markings have contributed positively to increasing their safety. Overall, for all road users, the sections analyzed are expected to have about 0.7 percent fewer deaths compared to existing conditions, when the road is opened to traffic in 2025.

**Table A5.9 Risks on Rehabilitated Roads (A0302) Compared between Baseline and Project Scenarios**

Results				
Fatality Percentage Change				-0.7%
Project Safety Impact (PSI)				0.99
Fatalities without project (Selected Year)				10.0
Fatalities with project (Selected Year)				9.9
	Fatalities Without Project (Selected Year)	Fatalities With Project (Selected Year)	PSI	Fatality % Change
Vehicle Occupants	7	8	1.060	6.0%
Motorcyclists	0	0	0.989	0.0%
Pedestrians	3	2	0.798	-20.2%
Bicyclist	0	0	1.309	30.9%
Total Fatalities	10	10	0.993	-0.7%
Rate Change (Selected Year)		Without Project		With Project
Road Casualties		Value	Risk Rating	Value
Annual Fatalities per km		0.2851	High	0.2830
Fatalities per billion veh-km		919.71	High	912.9
Annual Serious Injuries per km		0.6	--	0.6
Serious Injuries per billion veh-km		1839	--	1826
Cost Benefit Analysis				
Road Safety Cost without project		\$5,294,072		
Road Safety Cost with project		\$5,254,935		
Benefit (Selected Year)		\$39,136		

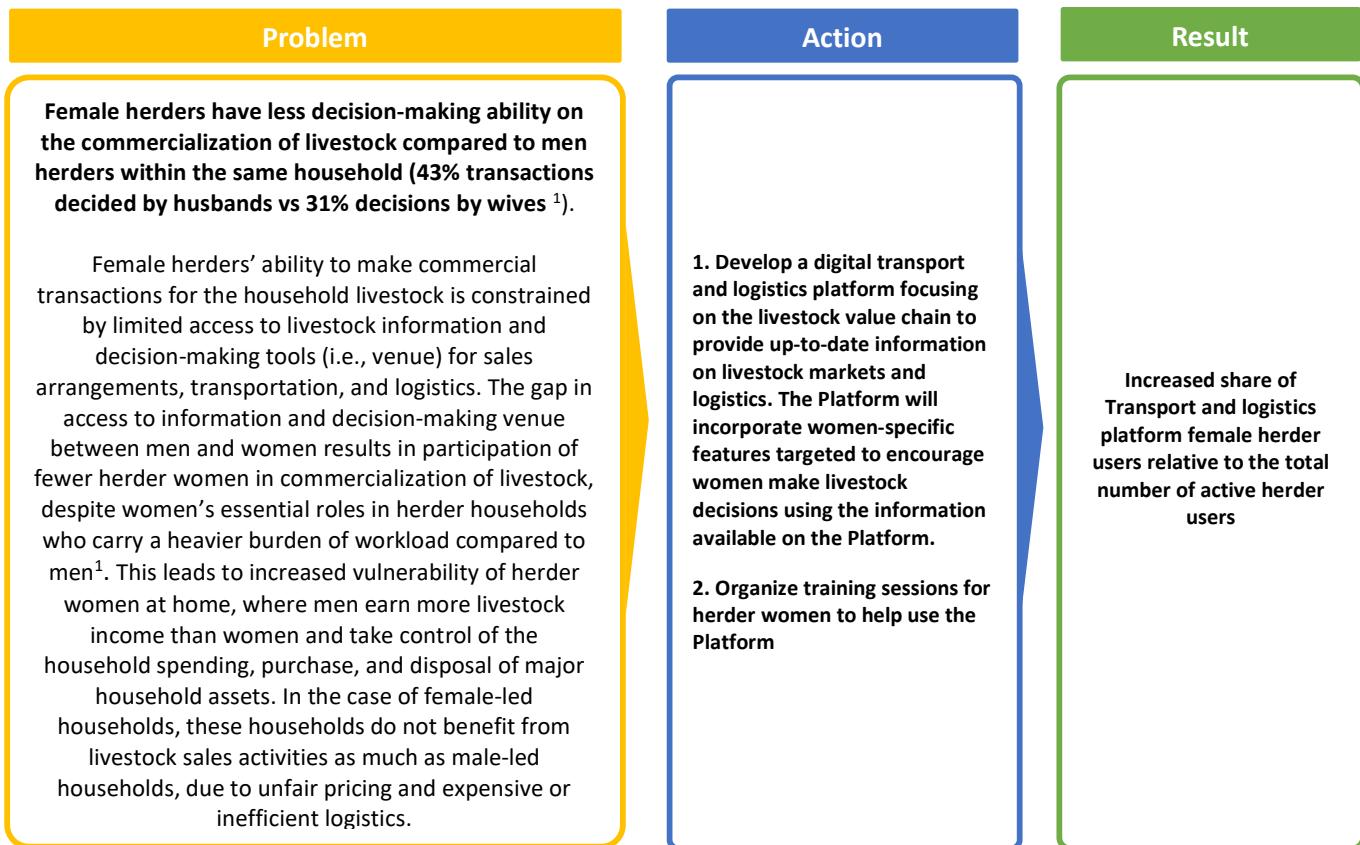
Figure A5.9 Fatality Projections for Rehabilitated Roads (A0302) Compared between Baseline and Project Scenarios

Source: World Bank team.



ANNEX 6: World Bank Corporate Commitment: Gender and Climate Co-Benefits

Figure 6.1 Gender Result Chain



The gender indicator is Share of transport and logistics platform women herder users relative to the total number of active herder users. The increased share of women herder users measures the relative increase of participation of women herders in livestock trading independently as a result of enhanced information and market access through the Livestock Transport and Logistics Platform. Relevant data will be aggregated from platform statistics and surveys.

Table 6.1 Climate Co-Benefits

Components	Climate Measures	Types
Component 1: Infrastructure investments (IBRD loan US\$70 million, IDA credit US\$10 million)		
Subcomponent 1.1: Results-based maintenance of key sections of the strategic network.	Adaptation: Both subcomponents will allow the use of both preventative (such as prevention of water ingress, improvement of drainages, and preservation of crash barriers) and curative (maintenance, repair of potholes, patching, etc.) road treatment through the consideration of climate-resilient norms during the project design, implementation, and operations.	Adaptation and mitigation



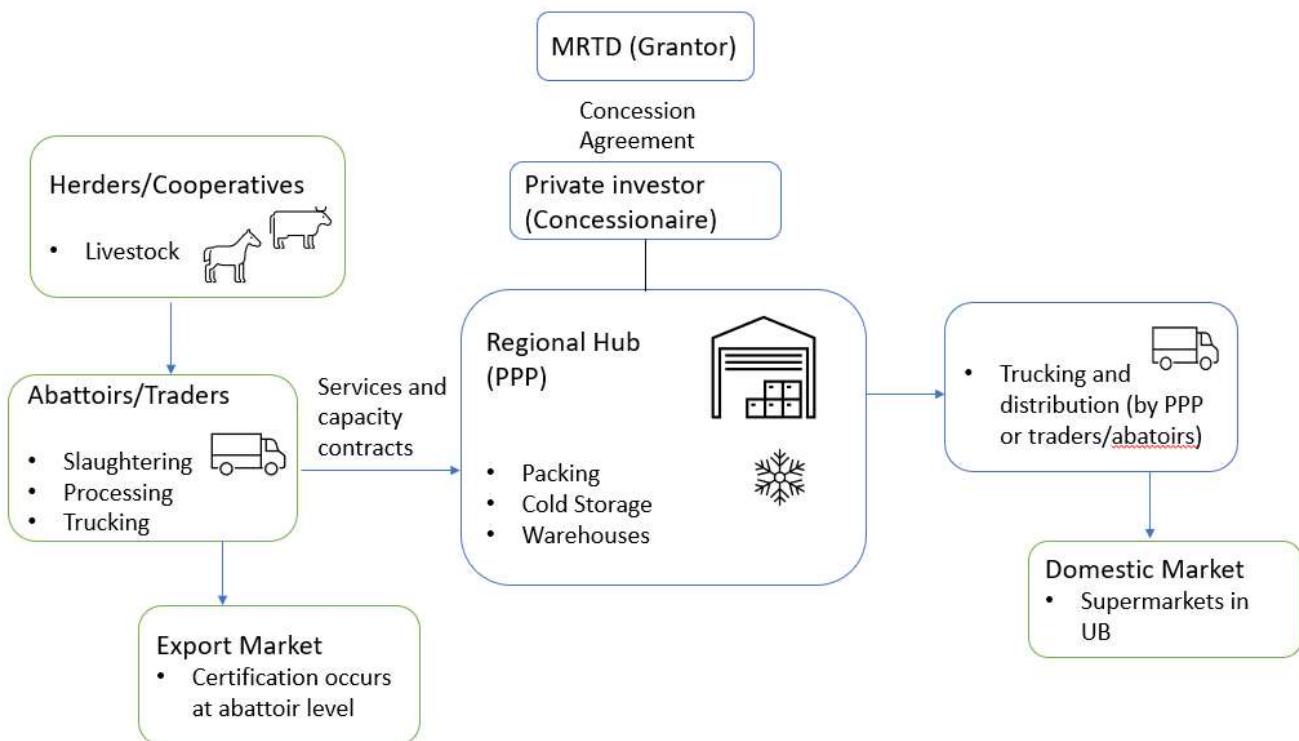
Components	Climate Measures	Types
Subcomponent 1.2: Last-mile connectivity for local herders.	<p>This will help herders together with other road users to reach critical services (meat and other markets, hospitals, schools, etc.) in case of climate-induced disasters.</p> <p>More specifically, to increase the overall climate resilience of the project roads, the following interventions are considered:</p> <ul style="list-style-type: none">- <i>Winter and severe weather maintenance</i>—gritting for extreme cold; activities to combat high winds, mudslides, and flooding.- <i>Reactive and emergency response</i>—repair of potholes, patching, clearing incidents, and traffic management.- <i>Routine maintenance</i>—cyclic maintenance including inspections for minor repairs, clearing drains, inventory management, fixing road signs, and marking.- <i>Planned renewals</i>—interventions to prevent water ingress, drainage improvement, resealing, and preservation of crash barriers. <p>Mitigation: With the scheduled works (improvement of roads in poor and very poor condition, to achieve year-round connectivity and completion of the missing links in the meat value chain), the project will contribute to reducing fuel consumption and fuel-generated greenhouse gas (GHG) emissions from vehicles through reduced travel distance and travel time.</p>	
Subcomponent 1.3: Road asset management.	With the development of the national road asset management framework, the system will help in rationalizing decision-making on road works planning to prioritize rehabilitation and maintenance interventions based on the climate vulnerability and socio-criticality level of road sections. The subsequent improvement of the network availability, safety, and preservation of the national road assets would contribute to improving the climate resilience of road network, transport efficiency, travel time and distance, and fuel consumption.	Adaptation/ mitigation
Component 2: Transport and logistics services (IBRD loan: US\$28 million)		
Subcomponent 2.1: Model regional logistics hub.	<p>Subcomponent 2.1. would offer similar consideration of climate-resilient norms during the project design, implementation, and operations, and would yield the same benefits as for subcomponents 1.1 and 1.2.</p> <p>The same approach will be utilized for the roads, parking spaces, offices, and ancillary services to be constructed, to improve their resilience to climate hazards, through more resilient up-front design and construction.</p>	Adaptation



Components	Climate Measures	Types
Subcomponent 2.1: Model regional logistics hub. Subcomponent 2.2: Logistics and supply chain platform. Subcomponent 2.3: Pilot projects for innovations in the supply chain. Subcomponent 2.4: Regulations and standards for contract logistics services.	<p>The entire Component 2 will reduce GHG emissions due to decreased back-and-forth travel between locations, by consolidating the necessary interventions related to the logistics process in one location (the regional hub). The consolidated logistics network and operations will lead to reduced trips and travel distances, thereby reducing vehicle movements and relevant GHG emissions.</p> <p>Subcomponent 2.1 will physically consolidate various interventions in one location and facilitate the domestic and export markets; Subcomponent 2.2 will facilitate operations through a shared logistics information platform.</p> <p>The soft subcomponents under Subcomponent 2.3 (to harness the potential of new technology through real-time monitoring of deliveries and warehousing and smart trucks/containers) and Subcomponent 2.4 (to update and develop standards to improve contract logistics) will contribute to an increased rationalization of the truck fleet management and logistics standards that would ultimately consolidate climate mitigation co-benefits.</p> <p>All these interventions under Component 2 would specifically reduce the need for small, partially loaded trucks without temperature control mechanisms toward more modern and larger trucks.</p>	Mitigation
Component 3: Technical assistance and capacity building (IBRD loan: US\$2 million)		
Subcomponent 3.1: Preparatory works for logistics hubs.	<p>These preparatory works will use the same approach as the preparatory works for Subcomponent 2.1, with the same consideration of climate-resilient norms at the design stage, to allow for the same climate resilience implementation and operations once the relevant investment funds are available.</p> <p>This subcomponent would therefore yield the same adaptation and mitigation benefits.</p>	Adaptation and mitigation
Subcomponent 3.2: Strategic studies for meat export transport and logistics.	With expected specific studies in rail logistics to lay the groundwork for export logistics, this component would increase the impact of mitigation measures with the potential use of a less polluting transport mode—that is, railways—instead of trucks.	Adaptation and mitigation
Subcomponent 3.3: Capacity building and training.	The inclusion of this subcomponent will help build the capacity of the Ministry of Road and Transport Development to manage road assets, prepare climate-resilient engineering designs (including feasibility studies) and master plans, monitor climate change indicators as presented in the monitoring and evaluation framework, as well as enhance the income-earning potential of herders.	Adaptation

**ANNEX 7: World Bank Corporate Commitment: Private Capital Mobilization**

1. An initial prefeasibility study and market-sounding exercise on the demand analysis and the potential scope of a public-private-partnership (PPP) for the regional and central hubs show a business case for private investment on a PPP basis in the regional hubs to supply to the domestic meat market in Ulaanbaatar in the near term. This could also potentially positively affect the export market in the future, as the regional hub project is expected to resolve some market failures starting from the herders, which overlap with market failures in the export value chains. This will complement an existing private market in trucking services, abattoirs, and herding (see figure A7.1).

Figure A7.1 Regional Hub PPP Scheme

Note: MRTD = Ministry of Road and Transport Development; PPP = public-private partnership; UB = Ulaanbaatar.

2. The prefeasibility study suggested that the target volume of the regional hub would be approximately 6,350 tons of processed meat per year, which is about 5 percent of final annual demand in Ulaanbaatar. The proposed regional hub facility would operate in all seasons. The business case is based on a demand analysis that sees the potential for meat supply to Ulaanbaatar throughout the year if appropriate cold storage were available to smooth out seasonal discrepancies in meat supply and improve the quality of the meat through modernized packaging, freezing, and warehousing capabilities. Any exported meat must come from a zone that is free of animal disease—largely in the western regions of Mongolia. The location of the pilot hub takes this into account.



3. A PPP—rather than a purely commercial investment—likely the most suitable way to finance and deliver the regional hub. This is because the private sector can better manage risks in design, construction, and operation and maintenance (O&M), and would be incentivized to do so through a performance-based contract. Operating under a cost-for-service model, the PPP concessionaire would provide packaging, wholesale distribution, and storage services of already processed meat owned by abattoirs or traders. Investment could come in the form of up-front financing for the construction of the packaging and storage facilities, as well as in the form of working capital facilities to operate the hub. (to be determined by a feasibility study, including amounts of viability gap funding or public support as necessary). The hub would be an open-access midmarket service in which competing abattoirs, auctioneers, and traders rent capacity and storage space. This would encourage competitive markets and avoid a monopoly situation that would occur if the PPP investor was more vertically integrated along the value chain. The design of the hub envisages a phased approach: an initial capacity will be built, and as the hub secures more long-term supply and capacity contracts that current capacity cannot fulfil, the investor will be required to invest in additional capacity under the concession agreement.

4. The government is expected to be responsible for: preparing the commercial transaction, including market sounding and identifying the PPP counterparty, preparing bidding documents and PPP contracts, conducting a competitive tender, securing land and rights of way, funding and constructing roads, ensuring access to information and communication technology, and premarketing and securing expressions of interest from abattoirs. The government will also have the responsibility of monitoring the private party's O&M performance to ensure attainment of key performance indicators. A summary of the division of risks and responsibilities can be found in table A7.1.

Table A7.1 Division of Risks and Responsibilities in PPPs

	Public	Private
Project preparation	1. Preparing the commercial transactions, including market sounding and identifying the PPP counterparty 2. Premarketing and securing expressions of interest from abattoirs 3. Preparing bid documents and the PPP contract 4. Conducting a competitive tender	
Land	Securing land and rights of way	
Access roads	Funding and constructing access roads	
Utilities	Funding and constructing information and communication technology, electricity, and wastewater facilities	
Meat processing and warehousing facilities		Designing, financing, and constructing meat-warehousing facilities
Operation and maintenance (O&M)	Monitoring O&M performance to ensure attainment of key performance	Conducting O&M of the hub, including managing supply and capacity



	indicators	contracts from abattoirs and traders and working capital needs
--	------------	--

Note: PPP = public-private partnership.

5. The initial estimate of costs is approximately US\$12 million for the hub, with an estimate of US\$4.5 million of public funding for the costs on the government side (mostly land and public utilities and roads) and private financing for the costs on the private sector side (mostly superstructure and facilities—assuming no VGF). Cost recovery (using annualized total capital expenditure and O&M costs) is around MNT 560 per kilo of meat processed and stored. The recovery cost is roughly 5-6 percent of the final retail prices of meat, using mutton and beef prices for illustration. Considering that storage is a major segment of the domestic value chain, the indicative proportion of the regional hub costs to the final retail prices of meat indicates that the project could be financially viable without raising the cost of meat. Spending around 5-6 percent of the final retail price on key components of the value chain would likely leave other stages in the value chain (such as herding, processing, transporting, and retailing) with room to recover their own investment and earn a margin.

Table A7.2 Cost-Recovery Analysis

Annualized Cost of the Regional Hub (in MNT/yr)	Target Meat Volume (in Kilos) (5% of UB consumption)	Per Kilo Cost to Recover Life-cycle Costs of the Regional Hub	Cost of Meat per Kilo in 2020
3,564,395,694.57	6,352,687.67	MNT 561.08	Mutton: Tog 9,450/kg Beef: MNT 11,533/kg

Note: UB = Ulaanbaatar.

11. The project, alongside other World Bank complementary projects, will support the Government of Mongolia's responsibilities under the PPP (as listed above). This will include studies verifying the estimates in the prefeasibility study and assessing whether further fiscal support such as viability gap funding will be needed.

**ANNEX 8: Logistics and Logistics Hubs****What Is Logistics?**

1. Because commodities and products are usually not at the time and place where they are needed, logistics is required. This problem is made worse by specialization. In situations such as subsistence farming, very little logistics is required. People, such as herders, will consume their own produce right where they are. Some produce, such as staple foods (and also dried or frozen meat), will have to be stored to solve the time problem, but logistics requirements are usually low. With specialization, however, the time and place problem get worse. Excess produce needs to be traded, creating a larger time and place problem. The place where the produce, such as meat, is required is now even further away, and the time between production and consumption also becomes longer. Logistics therefore provides a utility to solve this problem, usually called a time and place utility.

2. Various activities are required to solve the time and place problem and provide the utility:

- Transportation
- Warehousing
- Management and administration (M+A)
- Opportunity cost of holding inventory

3. Transportation is the movement from one place to the other, warehousing is the storage of the product until needed, M+A are the administrative tasks required to organize it all, and the opportunity cost of holding inventory is the financial cost of not realizing the commodity value until needed, such as the interest on loans for the commodity's purchase or the interest that could have been earned once the commodity was delivered and sold.

4. Logistics is a combination of these four items, but it is not merely a list. It is an integrated set of activities that work together to deliver the task in the most efficient manner. Each activity affects the others. To get cheaper transportation, for instance, one would wait until larger loads are available, therefore keeping the commodity in storage long before it is shipped. This will lower the transportation rate but increase the storage cost. It will also increase the opportunity cost of holding inventory, but in many cases makes administration easier, because of the bigger shipments. The job of logistics is to calculate the costs of these items, the influence they have on one another, and then go for the lowest-cost option. The second job is to influence this process with clever solutions that introduce new options, which might make certain items more expensive and some cheaper but lower the total cost. Keeping meat in an unbroken cold chain and waiting for larger shipments will increase storage costs but reduce transport costs and decrease storage losses.

5. To provide the best interventions, various cost items are considered. For transport, it is the transportation rate (including drivers' salaries and fuel, maintenance, and capital costs). For warehousing, it is the cost of putting it in storage and taking it out, the time cost while it is there, and the losses while in storage. M+A usually consists of salaries and systems such as trading and logistics platforms, and the opportunity cost of holding inventory is usually the interest rate applied to the value of the inventory.

6. With Mongolian meat, for instance, transport costs would be from hoof to market, warehousing costs would be the storage cost of the meat until required as well as losses that are incurred. With a system such as the proposed one, the costs would be transport from herd to hub, and from the hub to a central facility or market; warehousing would be the cost of cold storage at the hub and losses; administration would be employees and a trading and logistics platform; and the time elapsed from hoof to plate would be the opportunity cost of holding inventory. It is expected that better



roads will improve the transport rate (lower cost of maintenance, larger loads possible, which will reduce costs of fuel and the unit costs of capital and improve vehicle turnaround time). This will improve the storage cost as an unbroken cold chain lowers the cost of losses; other agricultural services such as animal health will also improve losses.

Logistics Hubs

7. An integrated set of activities interacts to provide the lowest overall cost (which is often called the lowest cost of ownership). Each sometimes work separately, such as meat on a road or meat in a refrigerated storage, but they always meet in time and space. This convergence is important, because it is not only the loose standing cost items that affect one another, but also how they converge. The most common and simple example would be where an item is removed from storage and placed on a transportation device, that is, loaded. This could be a transshipment point on a shipper or freight owner's premises, or a place used by many shippers, in which case it is called a terminal. If many different commodities, for instance, meat, milk, leather, and other produce, are transshipped it is called a multipurpose terminal. If other services are provided, such as large storage facilities, loading equipment, administration services such as shipping and forwarding and agency services, truck repair services, and information technology (IT) infrastructure, it will be called a logistics hub. If some light manufacturing is added, it becomes a freight village.

8. Putting many of these activities together in one place makes the interaction between these items even cheaper. It reduces the distance between points in the supply chain (for instance, the movement between abattoir and final processing); creates larger loads, which is cheaper; reduces storage cost due to economies of scale; reduces losses, because attention to produce is more focused; and so on. Too many such hubs would be expensive though, so a network must be designed that indicates the optimal size of each and the links between these and a central market. The cost of the intervention would be the cost of developing the hubs, building the roads, and acquiring new equipment (fixed and vehicles) and IT systems. The return will be a lower cost of many of these items, a lower cost of interaction, and, therefore, a much lower cost of ownership.

From Logistics Hubs to Freight Villages

9. Due to the low density of Mongolia's economy in terms of geography and the shortage of concentration points that will facilitate economies of scale, the logistics hubs will most definitely act as freight villages of various sizes and scales. Normally freight villages can be classified as either a simple warehousing and distribution cluster with the most focus on the arrival and dispatch of trucks to facilitate cargo consolidation and light beneficiation (Level 1); an intermodal facility that includes all of these activities but also focusses on transshipment between various modes (Level 2); or, on the third level, a logistics hub that includes all of the activities mentioned before, but also functions as an international gateway (Level 3). On all levels, light beneficiation is included to facilitate economies of scale and the reduction of distance between the various phases in the value chain. It is envisioned that the regional logistics hubs will operate as a Level 1 freight village (but with the added focus of veterinary services), and the central hub as a Level 2 freight village, but with the option of developing into a Level 3 facility.

10. This means that in all cases it would include:

- Co-located and focused transport facilities;
- A terminal located close to container or reefer storage and handling facilities;
- Warehouses that are linked to these facilities;
- Shared facilities, equipment, and services (truck maintenance, licensing, offices, and training); and



- Centralized management and ownership structure for planning and leasing and other governance issues.

11. The overarching benefits will be economies of scale, synergies, reduction in movement waste, knowledge and development focus, and an attractive proposition to tenants in all positions along the value chain. In order to be successful, long-term land use planning would be required that not only fulfills current requirements but anticipates future needs. This requires proactive policy making to promote manufacturing and logistics zones closer to where freight is generated. To do this, robust freight flow analysis and forecasting would be required to focus evidenced-based future planning.