CENTER for LARGE LANDSCAPE CONSERVATION

FOCUS-BRI Country Report

Framing Opportunities for Conservation by Understanding Safeguards in the Belt and Road Initiative

Mongolia

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Acronyms

ADB	Asian Development Bank
BRI	Belt and Road Initiative
CBI	Composite Biodiversity Index
CBD	Convention on Biological Diversity
CBRM	Community Based Rangeland Management
CDB	China Development Bank
CES	Central Energy System
CHEXIM	China Export-Import Bank
CITES	Convention on the International Trade in Endangered Species of Wild Flora and Fauna
CMREC	China-Mongolia-Russia Economic Corridor
CMS	Convention on the Conservation of Migratory Species of Wild Animals
EIA	Environmental Impact Assessment
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GIUM	Global Initiative on Ungulate Migration
GPS	Global Positioning System
IPCC	Intergovernmental Panel on Climate Change
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for the Conservation of Nature
IWRM	Integrated Water Resource Management
KBA	Key Biodiversity Area
LI	Linear Infrastructure
MAP 21	Mongolian Action Program for the 21st Century
MNET	Ministry of Nature, Environment and Tourism
MRTD	Ministry of Roads Transportation and Development
NAPCC	National Action Programme on Climate Change
NGO	Non-governmental Organization
OT-GS	Oyu Tolgoi to Gashuun-Sukhait road
PA	Protected Area
PM	Particulate Matter
TNC	The Nature Conservancy
UNCCD	United Nations Convention to Combat Desertification
WCS	Wildlife Conservation Society
WHC	World Heritage Convention

Mongolia Factsheet

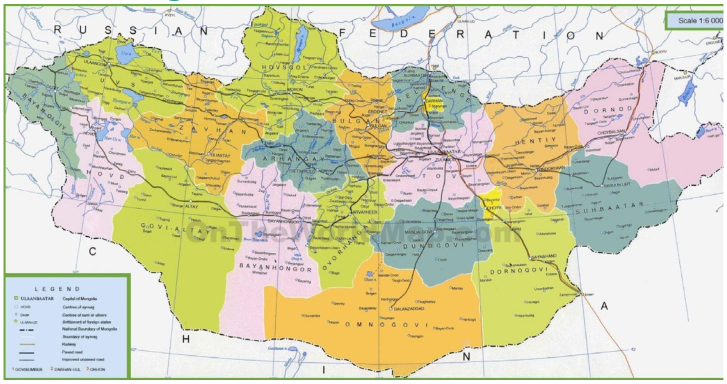


Figure 1. *Political map of Mongolia. Source: Nations Online Project.*

Table 1. *Mongolia country statistics. Information assembled from the Stimson Center, World Bank, and the Convention on Biological Diversity.*

Region	Eastern Asia
Capital	Ulaanbaatar
BRI Corridor	China-Mongolia-Russia
BRI investment ($ in millions)	
Income Status	Lower Middle Income
Population	3,278,000
GDP	$ 14.233 bn
Land Area	1,564,120 km^2
Protected Areas (km^2)	267000
Protected Areas (ranking)	80
Species Richness (ranking)	60
Biodiversity Intactness (ranking)	85
ND-GAIN Country Index; Climate vulnerability (ranking)	72
GDP Growth Rate Projections	-5.6%* (2023 forecast, ADB)
Inequality (Gini Coefficient)	32.7 (2018)
Human Development Index (HDI)	0.737

I. Introduction

Mongolia is an East Asian country with an area of 1,564,116 km^2 and a population of just over 3 million, bordered by Russia to the north and China to the south (Thaller, 2021). Much of Mongolia's area is covered by grassy steppe, with mountains to the north and west and the Gobi Desert to the south. It is one of the world's highest regions, with an average elevation of over 1580 meters above sea level (Encyclopedia Britannica, 2021). Mongolia is also one of the world's most sparsely populated countries. With roughly half of its people living in Ulaanbaatar, the capital and largest city, the sweeping landscapes are largely uninhabited - except for traditional communities of nomadic herders.

Mongolia shed its single-party system in favor of democracy in 1990 (Thaller, 2021) and transitioned to a market economy after its new constitution was laid out in 1992 (FAO, 1998). Since its market was largely dependent on agriculture and livestock, one of the major recent challenges that the country faced after this transition was overgrazing. Mongolia's landscape consists of multidimensional human activities such as pastoralism, mining industries, and urban growth (Barcus, 2018). The last two decades have seen the natural landscapes of Mongolia being sacrificed for rapid development. The problems are manifold, habitat fragmentation due to transportation infrastructure, over-exploitation of water due to mineral and oil processing, soil erosion, and desertification due to decreased vegetation cover. A major challenge is balancing local needs and development goals with environmental sustainability.

The major land cover of Mongolia is grassland and barren land, followed by forest (Fig. 2), and a recent study reveals decadal changes in Mongolia's land cover (Wang et al., 2022). The land-use change from 1990 – 2020 reveals that the forest has experienced a decrease from 1990 to 2010, followed by an increase in the last decade (Fig. 3).

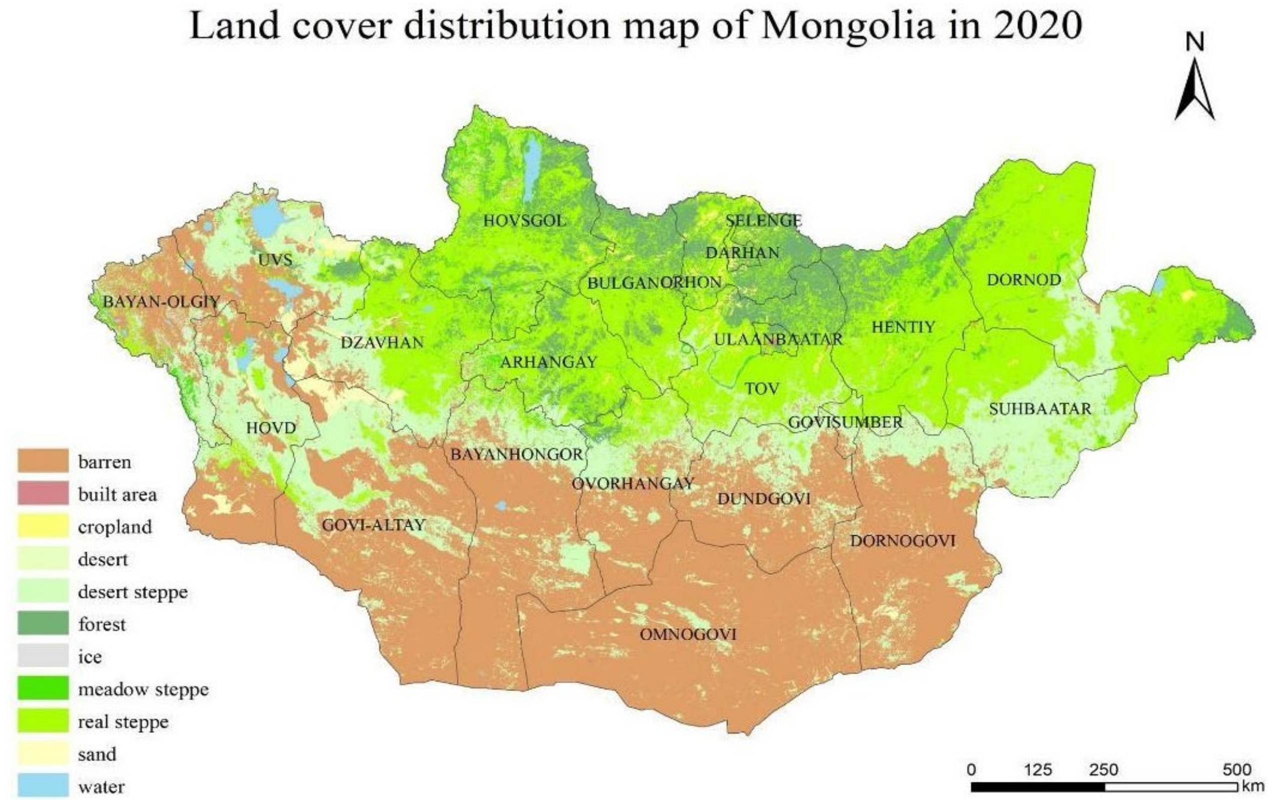


Figure 2. *Land cover types across Mongolia. The southern part of the country is mostly barren land, while the North and the East are composed of grassland, mostly in the form of real steppe and desert steppe. Source: Royal Meteorological Survey.*

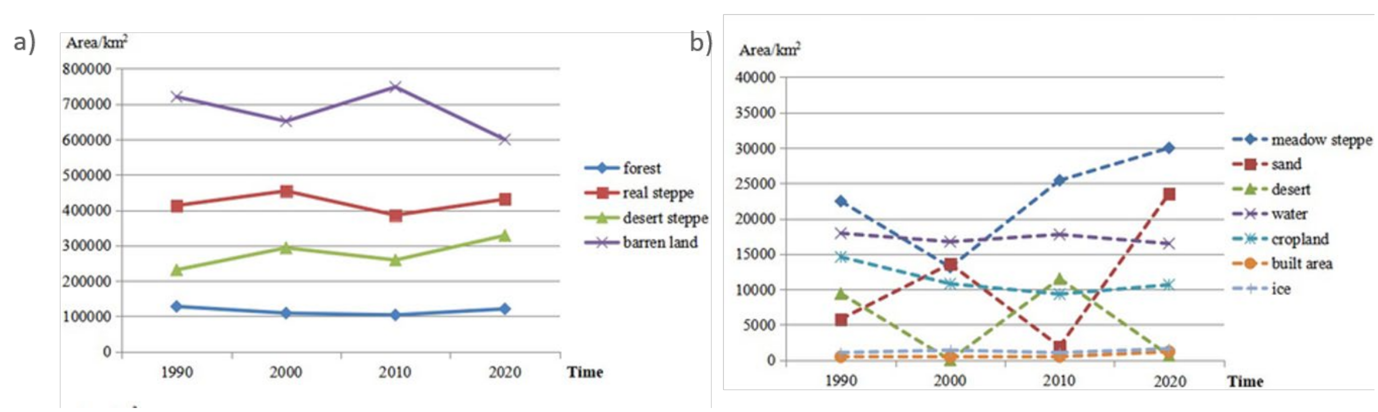


Figure 3. *Change in areas of different Land cover types in Mongolia from 1990 – 2010. a) Changes in areas of forest, real steppe, desert steppe, and barren land. b) Changes in areas of meadow steppe, sand, desert, water, cropland, built area, and ice. Source: Wang, 2022.*

Overall, the forest has decreased due to human logging for the timber industry (Wang et al., 2022). Real steppe and desert steppe have increased in the last 30 years. This could be the result of climate change, as melting snows create abundant water - the areas at lower elevations would then see rapid vegetation growth, most of it in the form of grasslands (Wang et al., 2022). Just like cropland, there has been an overall reduction of the barren land. This can be attributed to rapid urbanization between 1990 and 2019, which has increased the urban population by one million (National Statistics Office of Mongolia, 2020). The changes in land use are also connected with the extension of linear infrastructure (LI) networks across the country.

Climate change in Mongolia

With a 2.1°C rise in its average temperature in the last 60 years, Mongolia has seen one of the greatest temperature increases on Earth (Dagvadorj et al., 2014). Mongolia's population, especially the migratory population whose herds are now highly vulnerable to winter disasters, is feeling firsthand the effects of this warming. Dry summers followed by cold winters create a form of natural hazard locally termed dzud (ADB, 2017) - where grazing populations face huge die-offs due to starvation. Mongolia is also vulnerable to both droughts and floods. Droughts can be attributed to precipitation deficit (meteorological) and surface water flow (hydrological) (ADB, 2017). With the level of temperature rise observed in Mongolia, the frequency of droughts will increase more than twofold (ADB, 2017). Climate change will also result in extreme river flow events that will cause more severe floods.

II. Linear Infrastructure Investment Landscape

Mongolia seeks infrastructure to connect underdeveloped sectors of its economy to urban centers in the region. This includes a significant push to increase linear infrastructure supporting extractive industries like mining and logistical connectivity for meat products. Rich in mineral resources and surrounded by Russia and China, mining exports account for 80% of total exports and about a quarter of Mongolia's GDP (World Bank, 2021a). The pressure to develop LI in conjunction with tourism opportunities is intense as a tourist destination.

Road

Mongolia has a road network of 48,538 km. Most of these are local roads (35,828 km), while the remaining are state and international roads (12,710 km) (ADB, 2017). Only 13% of the roads are paved (ADB, 2017).

Rail

The Mongolian rail network comprises 1,815 km of rail track, of which 1,110 km are on the main line linking Russia to China, 238 km are on a separate network in Eastern Mongolia that has its link to the Russian railway, and the remaining 477 km are branches from the main line (World Food Program, 2011). The Trans-Mongolian Railway is a single track linking the capital of Mongolia, Ulaanbaatar, with Ulan-Ude in the republic of Buryatia in Russia and Erenhot, northwest of Peking in China (Encyclopedia Britannica, 2022). Expansion of the railroad is underway to connect the mineral-rich southern desert region to the Trans-Siberian railroad network.

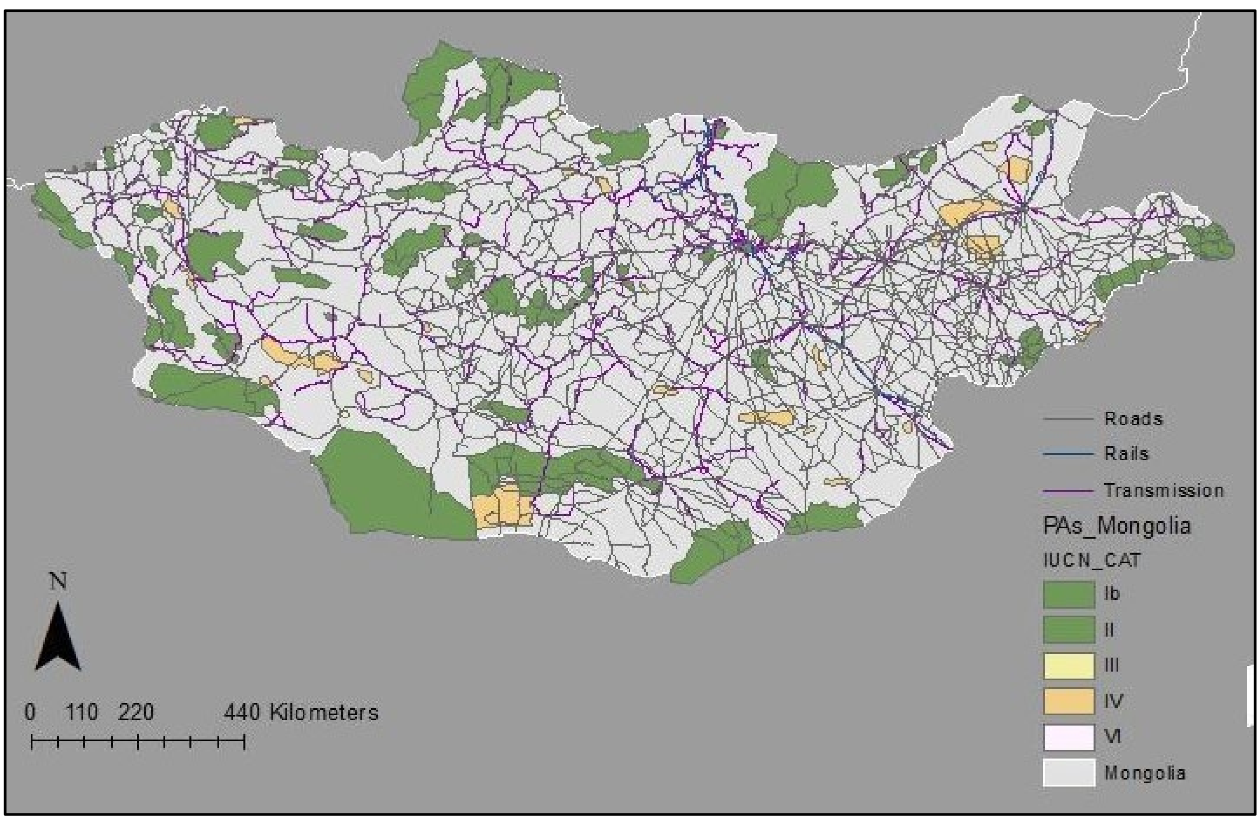
Power Lines

The Mongolian power system consists of five interconnected but mostly separate grid networks, with the Central Energy System (CES) being the largest and most complex among them. The CES has 220 kV of main power lines that span 1412 km between the Russian border and Mongolian substations, while the low voltage 110 kV power lines have a 3379 km network across the country (Purevjav, 2020).

The road and rail network in Mongolia is rapidly increasing. Mongolia has plans to construct more than 6000 km of paved roads by 2030 and add 5684 km of railway in three phases - mostly tied to the development of mining projects (Huijser et al., 2013). Mining companies have a significant interest in developing linear infrastructure, often not aligned with regional development goals. These LI developments will create a barrier effect, which is predicted to have a long-term effect on the rates of survival of some highly migratory species.

Road upgrades can induce major threats to wildlife (Fig. 4). One such example is the 107 km stretch of road from the Oyu Tolgoi mining site to the Gashuun-Sukhait (OT-GS road), which is being revamped for copper concentrate export (Huijser et al., 2013). It is expected to seriously impact Mongolian wildlife species such as khulan, Mongolian gazelle, and black-tailed gazelle directly through habitat loss and indirectly due to increased accessibility to poachers (Huijser et al., 2013). Existing infrastructure projects should be modified in such a way as to make them more permeable for wildlife movement. Fencing along the LI routes (esp. railways) is a major problem in Mongolia that creates barriers to species movement, resulting in a loss of natural resources. It is possible to take down the railway fencing according to provisions of the Convention on Migratory Species, the Constitution of Mongolia, the Environmental Protection Law, and the Law on Fauna (Bolorchuluun, 2017).

Figure 4. *There are multiple types of Protected Areas in Mongolia affording varying degrees of protection to multi-use landscapes; the greatest protection is afforded to IUCN categories I and II. (b) Existing infrastructure intrudes into protected areas across the country. We consider only roads, rails, and transmission lines as linear infrastructure for this study (see Appendix A for methodology).*



BRI and Chinese activities in Mongolia

Chinese investment in Mongolian LI projects are active and spread across multiple international efforts. Mongolia, China, and Russia signed a Memorandum of Understanding (MoU) in 2015 to build an economic corridor that would facilitate the interests of all three nations. It is a vital area for cooperation between them, as Mongolia separates the connective infrastructure of its two powerful neighbors. Formalized in the BRI as the China Mongolia-Russia economic corridor (CMREC), this corridor would extend Mongolia's Prairie Road program and Russia's transcontinental rail plan by connecting them to China's Silk Road Economic Belt (RT, 2015). Most projects within CMREC are related to transportation infrastructure and railway projects to support the mining sector (Ulagpan, 2021). The "Steppe Road" program was also introduced in Mongolia's interest to export its products to a third market and create a favorable political and economic environment with its two neighbors (Ulagpan, 2021). This project similarly involves developing linear infrastructure (roads, rails, gas pipelines, and transmission lines) to facilitate trade between Russia and China using Mongolia as a bridge (Ulagpan, 2021). Below we detail data on Chinese loans to Mongolia from 2009-2019 (Table 2).

Table 2. *CDB and CHEXIM loans to Mongolia between 2009-2019. Source: GDPC, Boston University.*

Project	*Type*	*Borrower*	*Lender*	*Signed*	*Total (USD millions)*
Airport Road	Transport	Public	CHEXIM	2016	140.00
Tavan Tolgoi Coal Railway	Transport	Public	CHEXIM	2016	1,300.00

The projects related to the BRI cooperatives come with significant environmental concerns: air and water pollution, habitat fragmentation, and soil erosion are some of the direct impacts of LI construction in this region (World Bank, 2021b). The overlap of Chinese LI projects might be underrepresented in our data (Fig. 5). Still, a study by the World Wide Fund for Nature in 2017 states that there is a significant overlap between the BRI corridors and some of the most ecologically fragile places on earth (WWF, 2017). Among indirect impacts are the trafficking of wildlife and timber, deforestation, and long-term habitat loss for numerous species in this ecologically vital region (World Bank, 2021b). The proposed gas and oil pipelines traversing through Mongolia could threaten local communities' livelihoods: Mongolia would bear most of the risk for a project that primarily benefits its neighbors (Ulagpan, 2021). The pipeline would significantly disrupt herders' activities unless there is effective community involvement during the early planning stages. There would also be a long-term risk of spillage around the pipeline (Ulagpan, 2021), affecting habitat and water sources for people and animals alike.

The development strategies of the OT-GS road project could act as a model for upcoming BRI development. The project report by Huijser et al. (2013) suggests that to facilitate LI development without creating an insurmountable barrier to wildlife, the construction should be split into phases - instead of building the entire road length at once. This would likely facilitate learning and therefore effective adaptation in the subsequent phases. Assessment measures include developing efficient monitoring and record-keeping systems for wildlife deaths, speed monitoring, and fauna surveys (Huijser et al., 2013). New projects should avoid fragmentation and use GPS tracking of animals to identify preferred animal movements and plan the infrastructure projects accordingly (Olson & van der Ree, 2015). Developing anti-poaching programs, capacity building, and educating the public, are also key components of robust project safeguards. The lessons learned from the OT-GS road construction project can undoubtedly be applied to other Chinese LI projects to promote more sustainable social and environmental outcomes.

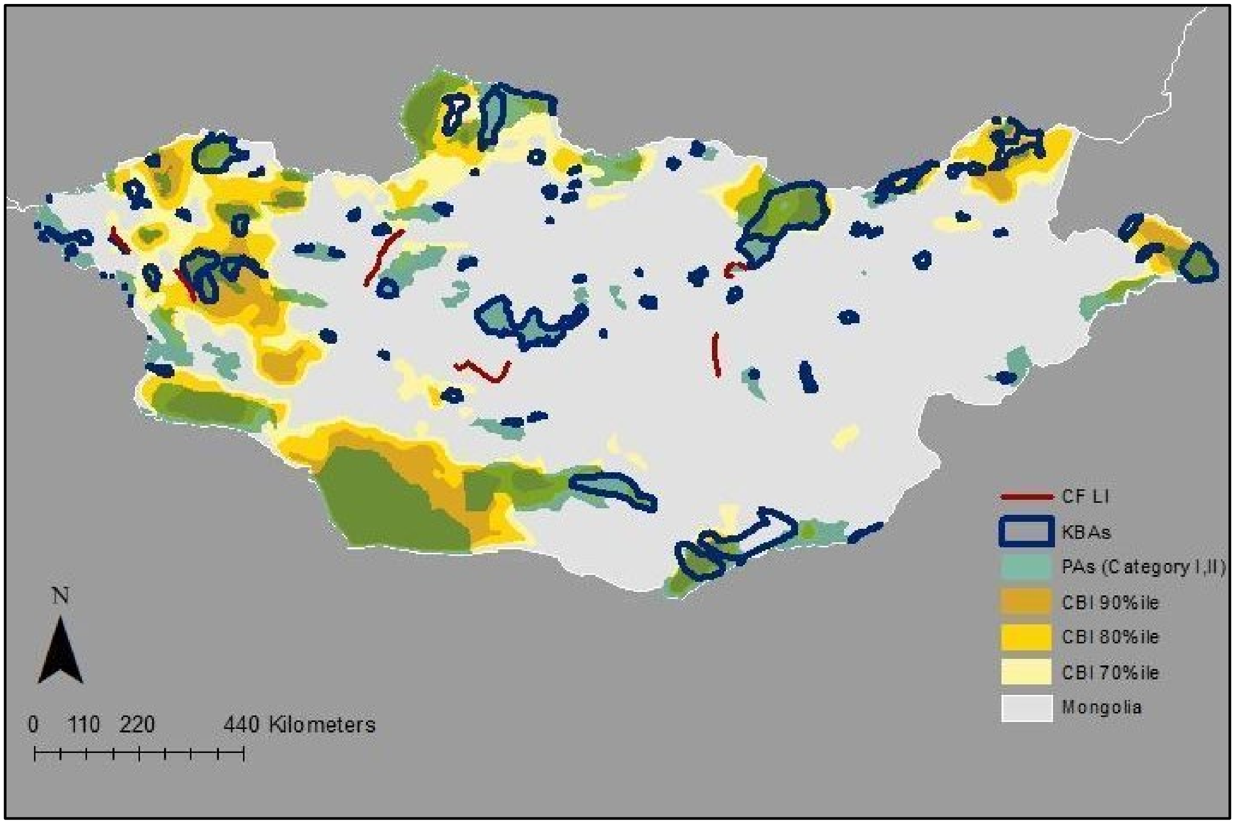


Figure 5. *Chinese-funded linear infrastructure (CF LI) - as captured by Custer et al. (2021) - overlaid over Composite Biodiversity Index (CBI) cores with PAs and KBAs. The CF LI in the figure underestimates the actual CF LI extent, due to the lack of data available about these projects, even in the most comprehensive single source available (i.e., Custer et al., 2021). Methodology and further analysis in Appendices A and B.*

III. Mongolia's Biodiversity landscape

Summary of biodiversity and conservation efforts

Mongolia has a varied biodiversity landscape where the Siberian taiga forest, Central Asian steppe, Altai Mountains and Gobi Desert meet. There are over 5,682 plant species recorded in Mongolia, including 2,950 vascular plant species, 445 moss species, 999 lichen species, and 1,288 algae species (CBD, 2020). Mongolia also hosts 138 species of mammals, six species of amphibians and 21 species of reptiles, and 76 fish species (CBD, 2020). The nation's rich grasslands are home to a variety of species, such as Mongolian gazelle, saiga antelope, black-tailed gazelle, and Asiatic wild ass (Olson and van der Ree, 2015). The Mongolian Steppe is one the last refuges for migratory species specific to temperate grasslands worldwide. There are four major global migratory routes in Mongolia (the East Asia-Australasia flyway, Central Asia flyway, West Pacific flyway, and the Africa-Eurasia flyway), meaning 391 of Mongolia's 472 bird species are migratory (CBD, 2020).

Mongolia is a landscape that hosts many species of ungulates that migrate to follow the grass stores upon which they depend. Wildlife native to the Mongolian Steppe includes gray wolf, red fox, Corsac fox, Pallas cat, great bustard, Saker falcon, lesser kestrel, Siberian marmot, and over one million Mongolian gazelle (Olson, 2008). Several globally-endangered water birds, such as swan goose, relict gull, and species of cranes, rely on Mongolia's water bodies and wetlands (Nyambayar & Tsveenmyadag, 2009). A shared repository of migration data and expert knowledge helps enable multi-disciplinary teams to collaborate and produce actionable science. The Global Initiative on Ungulate Migration (GIUM) is one such data portal hosting research and connecting stakeholders to data and each other. The Wildlife Conservation Society (WCS) also aggregates documented knowledge of Mongolia's wildlife and landscape, especially the Eastern steppe and the Gobi desert.

Challenges regarding on-the-ground implementation of Mongolia's environmental safeguards have been attributed to a lack of data and accurate maps (Surenkhorloo et al., 2021), so shared data platforms such as GIUM and WCS help overcome these challenges. Other major challenges to wildlife include ecological fragmentation and degradation, the desiccation of water sources, and desertification. As tackling these issues requires significant capital investments, Mongolia is also taking steps to revamp its internal financial system. By 2030, the country aims to increase the share of its green loans by 10% in the banking sector and 5% in the non-banking sector (National Sustainable Finance Roadmap, 2020).

Protected Areas

A total of 17.4 % of Mongolia's territory is protected by the state (CBD, 2020). Key Biodiversity Areas of Mongolia enjoy a fair inclusion under the PAs with the greatest protection (Fig. 6). For the conservation of its biodiversity, the Mongolian government has developed a unique system of designating regional protected areas (PAs) (Fig. 7). Local levels of government collaborate with local people to identify areas of high biodiversity importance, demarcate their bounds, and then designate them as protected areas. The local-level governments in Mongolia have designated 1,220 regional protected areas covering 66.4 million acres—17% of the country's landmass, which is far more numerous and widespread than those PAs identified by the IUCN as national protected areas assessment. The long-term plan is to recognize these locally-designated protected areas nationally. The program is headed by The Nature Conservancy, which works with Mongolia's government on the ground (Jenkins, 2019). Targeted interventions incorporating local perspectives go a long way toward helping Mongolia achieve its target to protect at least 30% of its land by 2030.

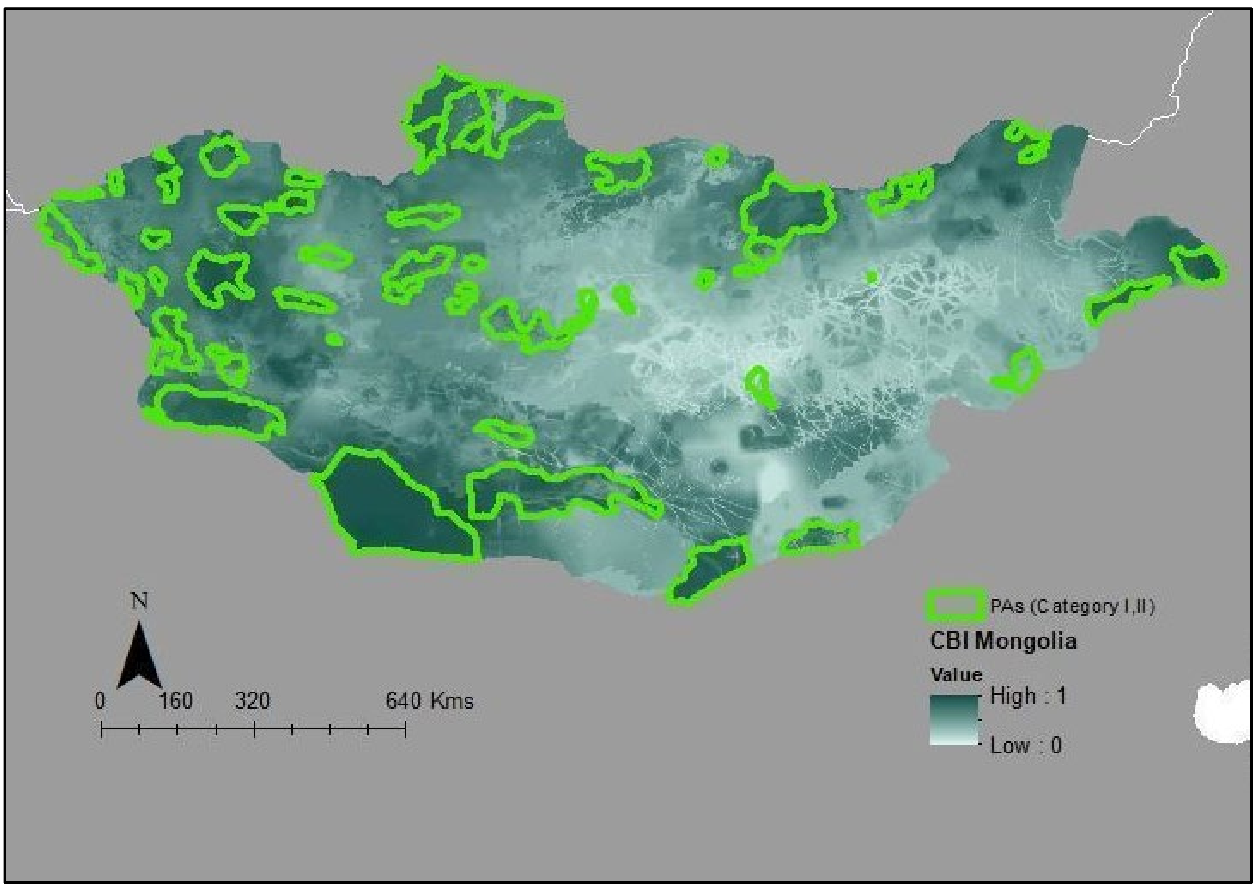


Figure 6. *In Mongolia, Protected Areas (PAs) with the highest protection (at IUCN Category II) cover some important biodiversity areas (high CBI values). See Appendix A for methodology.*

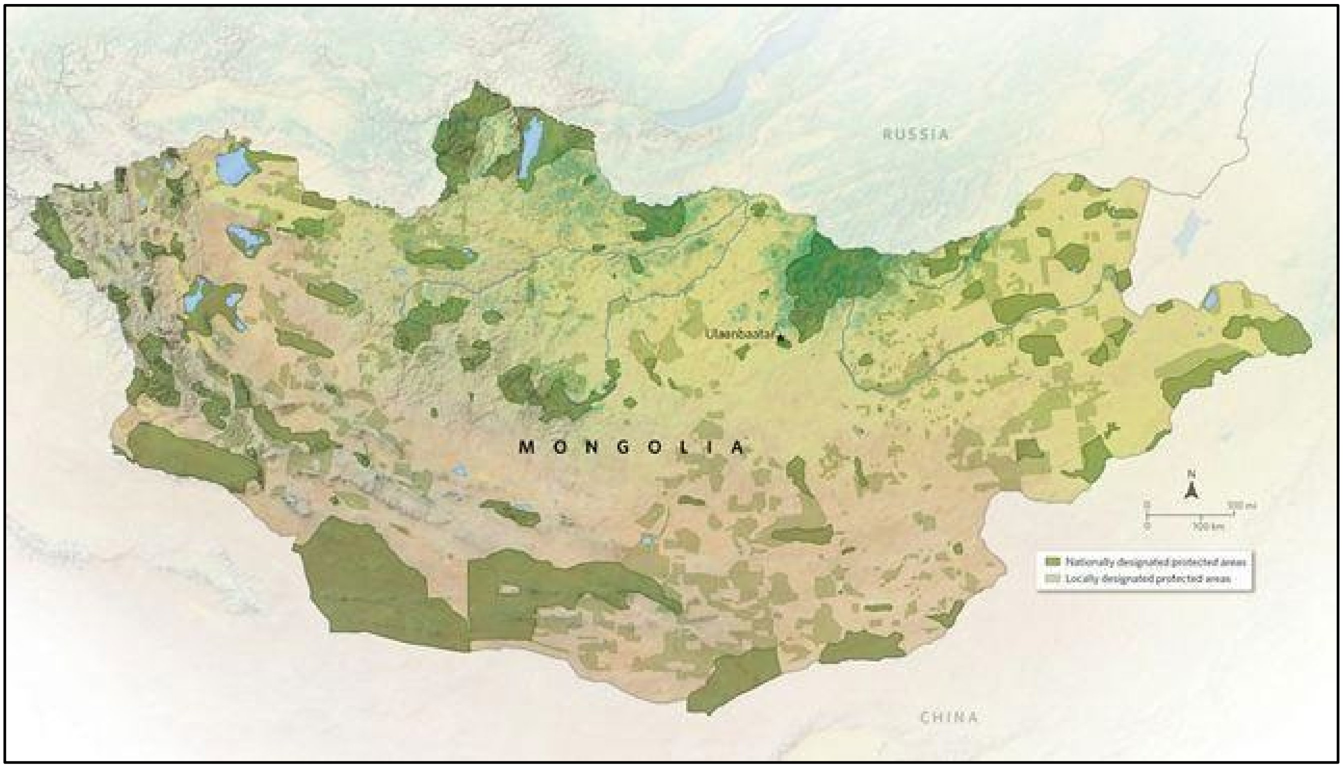


Figure 7. *Mongolia's protected areas are nationally and locally designated. Locally designated protected areas (light green) are temporary but prevent infrastructure development while they are valid. Source: Mapping Specialists, Ltd.*

People, livelihoods, and agrobiodiversity

Centering Traditional Knowledge: Community Based Rangeland Management (CBRM)

The people of Mongolia's dependence on livestock grazing necessitates that sustainability concerns are incorporated into the planning and management of its grasslands. To address these concerns, Tunga Ulambayar, country director for the Zoological Society of London's Mongolia office, has worked to combine science and the traditional knowledge of the Mongolian people. Local knowledge can provide substantial background and insight into climate and vegetation trends - aiding in early warning and a proactive approach to rangeland management (Fernández-Gimenez et al., 2015). A unique grassroots approach called community-based rangeland management (CBRM) engages local herder communities in the process of designing better policies and practices (Fig. 8). "Over 2000 formally organized herder groups have been formed since 1999 to help empower and educate herders to manage their lands and herds sustainably (Mau & Chantsalkham, 2006)."

When involved in conservation efforts, herders and nomads find ways to protect their territories better, as many are aware of the fragilities of the ecosystem (Pasotti, 2021). Ulambayar and

Fernández-Giménez's (2019) study compares social and ecological outcomes across over 70 traditional "neighborhoods" with and without CBRM. They observed that there were greater social outcomes for herders in the CBRM neighborhoods, including access to knowledge and information sources, better herd management practices, efficient use of traditional knowledge, good social networking, and more. This was because CBRM neighborhoods had more opportunities for knowledge exchange, more decisive leadership, and fair rules for resource use (Ulambayar and Fernández-Giménez, 2019).

Figure 8: *Some of the herders with whom Ulambayar works. Source: Jacopo Pasotti for Mongabay.*

There have been many recommendations to improve the existing CBRM systems. One such intervention is to ensure the efficient management of human resources and pursue more intermediate assessments. Strengthening CBRM capacity, in the form of training and knowledge transfer to the herders, is key to finding a sustainable balance between pastures, livestock, and people (Ulambayar and Fernández-Giménez, 2019). Additionally, it is not always possible to foresee the ultimate outcomes of interventions in complex systems, so incorporating the timely evaluation of intermediary results would improve adaptability and effectiveness.

Human activities and policymaking influence the landscape of a place in the longer term (Dong, 2021). The Mongolian CBRM system is one of its kind and can lay the foundation for synergy between policymaking and traditional ecological knowledge.

IV. Country policy and planning landscape for biodiversity & infrastructure

National and international commitments to conserve biodiversity

Environmental regulation in Mongolia is hierarchical, with priority given to the constitution, followed by international treaties and specific environmental laws (ADB, 2017). Mongolia has developed an extensive legal framework for environmental protection over the last three decades. Environmental legislation aimed at safeguarding the natural environment and biodiversity of the country has been observed to be largely consistent and coherent. Important laws in Mongolia include the Law on Environmental Protection (1995, amended in 2007), the Water Law (2004), the Forest Law (2012, amended in 2013), the Law on Air (1995, amended in 2012), the Energy Law (2001) and the Disaster Prevention Law (2003). In addition to adopting these laws, the government has also developed detailed action plans and inter-ministerial working groups to ensure the effective protection and preservation of the country's natural heritage. Some of the most important (and internationally recognized) action plans include the National Biodiversity Action Plan, National Action Plan to Combat Desertification, National Action Programme to Protect the Ozone Layer (Nachmany et al., 2015), and Action Programme to Protect Air Quality. The plans specific to Mongolia are The Mongolian Action Programme for the 21st Century (MAP 21) and the Mongolian Environmental Action Plan.

Laws such as the 1994 Law on Special Protected Areas exist exclusive to mining and tourism. It prohibits mining within the state-protected areas and marks special zones for tourism activities (Nyambayar & Tsveenmyadag, 2009). The Mineral Law prohibits mining in important biodiversity areas, but public consultation is lacking when laying out the procedures, which impacts the implementation of the safeguards. A major concern for Mongolia is the on-the-ground implementation of mining safeguards. Strengthening monitoring and assessment of existing legal mechanisms would help in this regard. Mongolia has also passed several laws to protect its water bodies from infrastructure projects, especially those related to resource extraction, including Integrated Water Resource Management (IWRM), river basin governance organizations, and laws protecting riparian zones (Surenkhorloo et al., 2021).

As for the international commitments to biodiversity conservation, Mongolia is a signatory to many multi-national conventions and environmental agreements, including:

1. Convention on Biological Diversity (CBD)
2. World Heritage Convention (WHC)
3. Convention on the Conservation of Migratory Species of Wild Animals (CMS)
4. Intergovernmental Panel on Climate Change (IPCC)
5. International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)
6. Convention on Wetlands of International Importance (RAMSAR)
7. CITES (1994)
8. United Nations Convention to Combat Desertification (UNCCD)

Relevant Mongolian laws and guidelines surrounding biodiversity and infrastructure safeguards

One key to balancing developmental and environmental goals is identifying landscape functions critical for biodiversity's long-term health. To complement this, it is also important to identify the level of development that, when crossed, would cause irreversible damage to the biodiversity (Kiesecker et al., 2017) (Table 3). To conserve critical areas, the Mongolian government has also integrated sector-specific environmental requirements into the legal and policy framework for infrastructure development. Some such safeguards for LI include the joint Ministerial Working Group between the Ministry of Nature, Environment and Tourism (MNET) and the Ministry of Roads Transportation and Development (MRTD), established in November 2016. The main goal of this coordination unit is to ensure the cooperation of businesses and efforts to promote sustainable development by understanding the ecosystem capacity, maintaining the environmental balance, and rehabilitating natural resources (Ministry of Environment and Tourism, 2020). Another example is the 2018 Steppe Road and Railway Standard, which laid out guidelines for animal crossings in linear infrastructure development.

***Table 3**: List of environmental laws and guidelines directly or indirectly related to infrastructure development.*

Legal instrument	Year	Summary
The Forest Law	2012, revised 2013	Regulates relations for protection, possession, sustainable use & reproduction of the forest in Mongolia. Defines prohibited activities in protected forest zones and the regimes and conditions under which they may be completed.
Law on Soil Protection and Prevention of Desertification	2012	The law includes measures to prevent desertification due to human activities such as mining, road construction, intensive agriculture, urbanization, and climate change.
National Action Programme on Climate Change (NAPCC)		The NAPCC aims to create a sustainable environment by promoting capacities and measures on adaptation to climate change, halting imbalances in the country's ecosystems, and protecting them.
Law on Environmental Impact Assessment	1998, revised 2012	Regulates "relations concerning the protection of the environment, prevention of ecological imbalance, the use of natural resources, assessment of the environmental impact, and decision-making at the start of a project". It sets out the general requirements and procedures for project screening, environmental impact assessment, and review.
Law on fauna	2012	Regulates matters related to protecting animals, their growth, development, breeding, and the rational use of resources.
Law on Buffer Zones	1997	Mandates and regulates special protected area buffer zones and the activities within. Article 9 requires the conduct of detailed environmental assessments for the establishment of water reservoirs or the construction of floodwalls or dams in buffer zones.
Law on Environmental Protection	1995, revised 2012	Regulates "relations between the state, citizens, economic entities and organizations to guarantee the human right to live in a healthy and safe environment, have ecologically balanced social and economic

		development, and for the protection of the environment for present and future generations, the proper use of natural resources and the restoration of available resources." Article 7 requires the conduct of natural resource assessment and environmental impact assessment to preserve the natural state of the environment, and Article 10, requires the conduct of environmental monitoring of the state and environmental changes.
Law on Special Protected Areas	1994, revised 2004	Regulates relations concerning the use & development of areas under special protection (natural conservation parks, natural complex areas, natural reserves & national monument areas).
Railway Transport Law	2007	Assesses railway fares and facilities for lower income groups. Finding ways in which public transport can help enable social development. As emission and exhaust fumes from transport are one of the main contributors to air pollution in Mongolian cities, assessments regarding particulate matter (PM) and the respiratory health of people have been regularly conducted thanks to this law.

The State Administrative Central Organization is generally responsible for overseeing any infrastructure project and assessing its implications for the environment. Usually, an expert is appointed to carry out a project's Environmental Impact Assessment (EIA). Even with a strong EIA setup for projects with potential impacts on natural resources, EIA procedures are considered more administrative hurdles than opportunities to improve project sustainability. The major problem is the implementation in areas such as oversight and quality of assessment (UNECE, 2018). This can be attributed to the lack of involvement of NGOs or communities working at the grassroots level in the professional EIA council. This has resulted in the development of infrastructure, processes, and legal frameworks that may not be effective.

Another challenge is that the EIA process typically works reactively. The expected environmental footprints are assessed after a project has been proposed. A collaborative planning process with the project proponents and EIA stakeholders would enable planning based on environmental and social values (Heiner et al.2019a and 2019b). Minimizing impacts on irreplaceable natural assets should be a continuous process taught in a state's education, values, and traditions. It is vital to share and implement the knowledge of the best international standards to ensure that development induces minimal impacts on biodiversity. Ideally, these impacts can eventually be restored on-site, and best practices will help ensure that prior strategies to offset residual impacts are a key feature of development (Heiner et al., 2011), strengthening the EIA process in the long run.

V. Project Profile: Tianjin-Ulaanbaatar-Ulan Ude Central Route

International Politics of a Landlocked Nation: Tianjin-Ulaanbaatar-Ulan Ude Central Route (Adapted from Kumar, 2022).

Context

The assessment by Kumar (2022) on the Tianjin-Ulaanbaatar-Ulan-Ude Central Route highlights a landlocked country's international politics and dealings with its powerful neighbors. The central route is a railway freight corridor and international highway that connects Russia and China via Mongolia - connecting the capital of Ulaanbaatar to cities in Russia and China (Fig. 9). The improvement of the international road was carried out by China in 2018 as part of its Belt and Road Initiative (BRI). China proposed its standard narrower (1435mm) railway line, which would facilitate only Chinese trade. This doesn't suit the existing Mongolian and Russian rail system (1520 mm track width), which led to Mongolia and Russia joining hands in opposition to the project. After a consensus of the three nations, it was decided to complete the construction of the railway track in line with the existing Russian-Mongolian rail system.

Figure 9: *BRI Projects under Tianjin-Ulaanbaatar-Ulan-Ude Central Route Source: https://beltandroad.ventures/beltandroadblog/china-mongolia-russia-economic-corridor.*

Anticipated socio-environmental impact
A major challenge for Mongolia is to find coherence in its environmental targets with the international development goals that its powerful neighbors often drive. In the China-Mongolia-Russia Economic Corridor, socio-economic factors have prevailed over environmental and cultural factors where decisions regarding infrastructure projects are concerned (Dong, 2021). The macro-scale of large projects such as the Tianjin-Ulaanbaatar-Ulan-Ude Central Route often overlook the protection of local practices, such as pastoral nomadism. An example of this can also be seen in the Oyu Tolgoi Resettlement Action Plan Document, which ignores important indigenous characteristics and needs, such as local herder mobility patterns and campsites, and centers on the needs of international beneficiaries. This induces not only conflicts but also negative impacts on the regional population. This case highlights the shortcomings in implementing Mongolia's legal framework for environmental protection.

Outcomes
China brings investment opportunities to Mongolia, mostly through its development projects. This sustained flow creates a hospitable environment in Mongolia for Chinese investment. However, incompatibility between China's and Mongolia's transport standards is a major challenge. Russian policies, however, include social measures such as free visas, debt cancellation, and more, and have influenced Mongolians in their favor. This creates a divide within Mongolia, with a split between those favoring the economic development that China promises and those favoring Russian social schemes. Being landlocked, Mongolia relies on cooperation with its two powerful neighbors for its economic and social development. Therefore, how Mongolia handles its international politics also influences its environmental goals and progress towards those goals.

VI. Understanding stakeholders and power dynamics: Who can influence the development of infrastructure projects and how?

The main actors involved in road construction and maintenance processes include the Ministry of Road, Transportation, Construction, and Urban Development of Mongolia.Through the tender process, the private licensed companies maintain and build the roads. Road development projects are funded through loans, technical assistance, grants, and other aid from international funding institutions such as the World Bank, Asian Development Bank, and the European Union (WFP, 2011). The Japanese government and Kuwait fund for Arab Development are also noted funders.

Due to its geographical location as a landlocked country, Mongolia is heavily dependent on its neighbors for trade and economic benefits. Data from Trading Economics (2015) states that 89% of Mongolia's exports and 26% of its imports are from China (Han, 2015). While Mongolia has independent policies and governance systems to protect its autonomy and culture, Russia and China have a high degree of influence, especially in decisions and strategies regarding transnational infrastructure development. Mongolia falls within the economic route of Russia and China, makes it a critical hotspot for BRI projects. Despite the pressures from its neighbors, Mongolia can influence the implementation of foreign infrastructure projects so that they are aligned with Mongolia's development goals. For instance, the state influenced the decision to maintain the railway tracks along the Tianjin-UlaaTheto Mongolia's standards, as opposed to previously propos through the tender processed Chinese standards.

The country's legal framework also provides local people with the platform and opportunities to have a say in policy decision-making processes that would indirectly affect their livelihoods. The CBRM approach in Mongolia's governance engages the local herder communities in designing better policies and practices, which influence development within the state. Mongolian identity remains tied to its rangelands and nomadic traditions, allowing for bottom-up progress in more generally acknowledging the importance of safeguards for wildlife and the environment.

NGOs in Mongolia are engaging more and more with the safeguarding of wildlife via funder-driven requirements for wildlife data and 'development by design.' The Nature Conservancy's assistance in identifying the regional level PAs and their suggestion to adopt a holistic development by design approach to new projects puts light on the missing link between on-the-ground challenges, local concerns, and national-level planning. NGOs also acknowledge that coalitions and collaborations will be required for trust building within the NGO community and for coordination among various stakeholders. Moreover, NGOs in Mongolia are keen to solicit support to create neutral-ground platforms where industry, local peoples, and wildlife professionals may work together to utilize opportunities to mainstream biodiversity in LI construction, mitigation for mining, and other development projects.

VII. Recommendations

- Support of ongoing projects in Mongolia and providing a common platform for the same to be unified is key.
    - WCS Mongolia remains an authority on wildlife, information; The Nature Conservancy (TNC) in Mongolia serves the role of direct advising to the government for natural resource management, for instance, with "Development by Design" and river management.
- Strengthening capacity by supporting, for instance, training and knowledge transfer to local communities and participation in collaborative initiatives such as community-based rangeland management (CBRM).
- Enabling and supporting the involvement of NGOs and communities working on the ground in the official EIA council.

- Propose, develop, and support an inclusive platform or network to define environmental and community standards in LI build-out that incorporates local context and needs.
- Continue work to strengthen local protected areas and engage with local communities to meet environmental goals that are shared between their livelihoods and conservation.
- Data platforms such as The Global Initiative on Ungulate Migration (GIUM) could be required for use in EIAs in Mongolia. This would feed well into other collaborative efforts.
- Continued support of research to inform decision-making. Developing efficient monitoring and record-keeping systems regarding wildlife deaths, vehicular speed, fauna surveys, etc., would provide important baseline information.
- Other opportunities include supporting anti-poaching programs and capacity-building programs to help educate the public and raise awareness.

Key Considerations

- Mongolia is a state where cultural and national identity drives the environmental ethic. A truly bottom-up approach to mainstreaming environmental concerns exists in certain contexts here (such as CBRM) and can be leveraged more broadly.
- Key informants suggest that no individual organization can hope to work towards sufficient implementation of safeguards for wildlife - making an inclusive, collaborative platform or network a potentially effective approach.
- Mongolia has the unique conditions of large remaining, relatively “natural” landscapes, thanks to the nomadic traditions of people who still depend on them. The lack of human-dominated spaces, the prevalence of traditional herding communities, and the centering of multiple-use planning by the government create a unique opportunity for conservation. The ground-up implementation of such planning in this context could help protect ecologically important landscapes and the people who live on them: dovetailing well with the “Mongolian identity”.

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Appendix A: Methodology

The complexity of LI project development and safeguarding means that understanding local and regional cultural, political, historical, and environmental conditions is essential. The FOCUS BRI research process was developed to ensure consultation with the experts in their fields and locations, who also either constitute or represent overlooked or marginalized perspectives. To this end, the project relied on key informant interviews, focus groups, and the field expertise of its team members. Below, we detail our methodology across two key contributions of FOCUS BRI:

1. Country Case Studies

A. Country Selection

Country selection played an important role in defining project bounds and ensuring that goals may be effectively and efficiently met. Countries without involvement with the BRI (as evidenced by an MoU) were removed from our list, leaving 140 countries (as of September 2021). Next, we decided to focus our efforts in Africa and Asia, which represent the majority of BRI investment. Additionally, CLLCmaintains a widespread professional network, decades of combined experience, and ongoing programmatic work in these regions. To further narrow the list, a dataset of indicators was built around the key selection criteria, including:

1. Level of Chinese investment
2. Biodiversity
3. Existing network and stakeholder connections
4. Climate vulnerability

With different metrics populated for each category and remaining country, we developed a function to combine and rank countries, which resulted in a prioritized list. We then selected twelve countries from the top 30, with an eye toward a diverse and representative suite of country case studies.

B. Case Study Development

The twelve country cases were developed through two main methods: a desk-based research process and key informant interviews. We opted to conduct in-depth reviews of relevant secondary data prior to carrying out interviews. In this way, researchers became familiar with the country context, the relevant bodies of work, and potential interviewees who are actively involved in work related to either environmental or biodiversity conservation or infrastructure development. This process consisted of a secondary literature review guided by a research template, to ensure consistency and efficiency across the country cases. The literature review captured relevant academic work and gray literature pertaining to biodiversity issues, Chinese infrastructure development and relations, and national policy and implementation landscapes for biodiversity protection and LI project development. The following briefly summarizes the report sections:

1. **Introduction** - including country context, relations with China, and broader transboundary issues.
2. **Linear infrastructure investment landscape** - including statistics, projects, type of projects, and agencies involved.
3. **Biodiversity landscape** - describing the biodiversity characteristics and hotspots, national conservation spaces and policy frameworks, and the key work focused on conserving biodiversity. Agrobiodiversity considerations were also noted where relevant.

4. **Country policy and planning landscape for biodiversity and infrastructure** - the national environmental and biodiversity laws and regulations, ESIA processes, actors in charge and their role, and especially the way these pieces play out in the context of large LI projects.
5. **Exemplary projects** - describing illustrative projects, whether successes or failures, to add texture to the above information.
6. **Understanding stakeholders and power dynamics** - highlighting the network of stakeholders and the degree and ways in which these stakeholders can influence processes.
7. **Recommendations** - gathered from research and interviews; what interventions and investments can best improve LI development outcomes for biodiversity, local communities, and climate, and how might they proceed.

Following the secondary literature review, interviews were organized and conducted by the country research lead. To connect with interviewees, leads contacted existing CLLC connections in the country, relied on personal networks, and reached out to voices identified as especially relevant in these fields in-country. Interviewees thus consisted of actors from the academy, non-governmental organizations, government, the private sector, or communities. We aimed to gather 3-5 key informant interviews to ground the research, add texture to the information, fill gaps and connect to resources, and share their expert opinions on barriers, opportunities, and more.

Interviews followed a semi-structured template, tailored to the informational needs of the specific report and interviewee. The main sections of the interviews were:

1. Introduction to the FOCUS project, interview, and purpose.
2. The current country "landscape" of implementation processes, actors, and resources.
3. Understanding the formal and informal spaces for coordination and inclusion of diverse stakeholders and interests into these processes.
4. The barriers to safeguard implementation and how to overcome them.
5. Any additional/more specific questions
6. Concluding remarks

Interviews were recorded for ease of transcription and information gathered during interviews was then integrated into reports. Upon the completion of individual country case studies, a process of synthesis was initiated to uncover the trends and common threads found across these twelve countries and within each region (Africa, Central Asia, Southeast Asia). These findings were then incorporated into the summary report.

2. Spatial Context and Mapping

A. Context maps

We used ARCmap 10.8 and R Studio 2021.09.1+372 to develop all maps for this project. The aim of the first set of maps was to provide contextual detail by capturing the intersections between protected areas (PAs) and existing infrastructure in a given country. To visualize the diversity of PA uses within a country, we classified them according to the IUCN categories (Ia, Ib, II, III, IV, V, and VI). These categories are internationally recognized standards that classify PAs according to their management objectives. All PA polygons were acquired from the World Protected Areas layer found on the Protected Planet clipped to country boundaries

(Table A). To add existing linear infrastructure (LI) line shapefiles for each LI type (roads, rails, and transmission lines) were clipped to the countries' borders. These layers were overlaid with the PAs to highlight the intersection of LI and PAs. The Global Roads Open Access Data Set (gROADS) (CIESIN - Columbia University, and ITOS - University of Georgia, 2013), a global road layer for 1980-2010, was used to represent the road network. The railway layer was acquired from the World Food Program's global railway dataset, which was last updated in 2017. For the transmission lines, we used Aderne et al's (2019) dataset, which was last updated in 2019 (Table A). A more updated road layer (up to 2018), the Global Roads Inventory Project (GRIP) roads dataset was clipped to the country boundary and is represented in a separate map. The higher density of roads in the GRIP dataset often overshadows railways and transmission lines if visualized on the same map with PAs. We include the more recent dataset to highlight that spatial data needs regular updating to reflect continued LI construction and that our maps offer problem setting context but underrepresent the extent of LI interacting with wildlife habitat.

B. Composite Biodiversity Index and cores

We created a Composite Biodiversity Index (CBI) to identify regions of high biodiversity. To develop a CBI layer for each country, we applied a method created by Dr. Tyler Creech for the Center for Large Landscape Conservation. Dr. Creech created the CBI based on nine existing biodiversity indices related to species richness, endemism, abundance, intactness, ecological condition, rarity, and complementarity. The value of CBI ranges from 0 (lowest biodiversity value) to 1 (highest biodiversity value). We selected three percentile cut-offs from the CBI layer, representing biodiversity richness areas by the 70th, 80th, and 90th percentile, which we refer to as biodiversity cores. For more details of the CBI methodology, see the LISA project spatial annex[1]. The amount of overlap between PAs and CBI is of importance to spatial planning for LI as not all CBI areas have formal protection but provide for connected wild populations. To demonstrate this point, we overlay PAs from IUCN Categories Ia, Ib, and II, (i.e., areas with higher protection regulations and supported by country environmental and biodiversity laws), Key Biodiversity Areas (KBAs) - which enjoy wide acknowledgment as important for long-term conservation of wildlife though are not always formally protected, - and CBI. We acquired KBAs from Birdlife International (updated 2021) and clipped them to the respective country's boundaries. We then overlaid the resulting PAs and KBAs over the CBI layer to highlight protection provided to important biodiversity areas.

Finally, to identify where Chinese-funded projects intersect with PAs and top percentile CBI cores, we looked to Chinese-funded LI in the AidData dataset within each country. AidData captures projects with development, commercial, or representational intent that are supported by official financial and in-kind commitments (or pledges) from China between 2000 and 2017, with implementation details covering a 22-year period (2000-2021) (Table A). Given the inconsistent sharing of data, dearth of publicly available geospatial information for LI projects, and many disparate institutions involved, AidData's list is one of the most comprehensive and publicly available to date. We filtered results to include only roads, rails, and transmission

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[1] USAID ((U.S. Agency for International Development). 2021. Annex 1: Spatial analyses of linear infrastructure threats to biodiversity in Asia. *In:* Building a foundation for linear infrastructure safeguards in Asia. Authors: Creech T, Stonecipher G, Bell M, Clevenger AP, Ament R. Prepared by Perez, APC for Contract no. AID-OAA-I-15-00051/AIDOAA-TO-16-00028, ESS WA#13. U.S. Agency for International Development, Washington, DC. 98 pp.

projects. The layer for Chinese-backed LI was overlaid with PAs, KBAs, and the three percentile cores, summarizing the impact of such LI on biodiversity-rich regions and the incidences of Chinese LI impinging on PAs.

C. Summary statistics from our analyses (Appendix B)

We converted CBI cores for each percentile (70th, 80th, and 90th) to polygons, then calculated the area of each polygon using the 'Calculate Geometry' tool in Arcmap. Each of the cores was clipped to the category I and II PA boundaries, resulting in layers representing the overlap of each core with PAs. The area of the overlap layers was similarly calculated using the 'Calculate Geometry' tool. We then determined the percentage of the PA overlap area with the total core area. We then clipped AidData's LI layer to each country boundary. The length of each of the line attributes within the clipped layer was calculated using the 'Calculate Geometry' tool. The linear length of each LI type (roads, rails, and transmission lines) was calculated using the 'summary statistics' function. We repeated this process for each of the percentile cores by clipping the LI to each core boundary in the first step. Finally, the Chinese LI layer was also clipped using the PA (Category I and II) polygons. The length of each of the line attributes within the clipped layer was calculated using the 'Calculate Geometry' tool. The length of road for each of the LI type (roads, rails, and transmission lines) was calculated using the 'summary statistics' function.

Table A. *Datasets used to visualize protected areas and linear infrastructure in each of the 12 countries chosen for FOCUS-BRI*

Dataset	Year Last Updated	Geographic Scale	Dataset Format	Source	Data Download link
World Protected Areas (WDPA)	2021	Global (separated by continents)	Vector polygon shapefile	UNEP-WCMC and IUCN (2021)	Explore the World's Protected Areas (protectedplanet.net)
gROADS	2010 (1980-2010)	Global	Vector lines shapefile	CIESIN - Columbia University, and ITOS - University of Georgia(2013)	https://www.globio.info/download-grip-dataset
GRIP Road Data	2018	Global	Vector lines shapefile	Meijer et al. (2018)	https://sedac.ciesin.columbia.edu/data/set/groads-global-roads-open-access-v1

Global Transmission Lines	2019	Global	Vector lines shapefile	Arderne, Christopher, NIcolas, Claire, Zorn, Conrad, & Koks, Elco E. (2019). Data from: Predictive mapping of the global power system using open data [Data set]. In Nature Scientific Data (1.1.0, Vol. 7, Number Article 19). Zenodo. https://doi.org/10.5281/zenodo.3538890	Data from: Predictive mapping of the global power system using open data | Zenodo
Global Railway	2017	Global	Vector lines shapefile	World Food Program/ Humdata	https://data.humdata.org/dataset/global-railways
Key biodiversity areas - KBA	2021	Global	Vector polygon shapefile	BirdLife International (2021)	Key Biodiversity Areas GIS Data Request
Chinese development projects	2021	Global	Vector polygon shapefiles	Custer et al., 2021 - AidData	https://github.com/aiddata/china-osm-geodata

Limitations

This project was exploratory and survey-oriented in nature. It is intended to be a first step that sketches the biodiversity, infrastructural, and local policy landscapes in each country. As such, it was also intended to raise important and possibly overlooked questions and issues for funders to direct their money. Given the scale and scope of this project, there were several limitations. First, it would be practically impossible to detail the complete policy landscape of each country, as they are both vast and constantly evolving over time. Second, we used spatial data to set the context for this project. Due to data limitations, our maps are likely very conservative. They do not include spatial data for planned LI, nor the expansion of existing LI. Instead, we highlighted only existing LI to showcase how biodiversity is currently impacted. Finally, due to the exploratory nature of this project, we gathered information to address particular foci in our reports and, thus, our methods did not lead to a comprehensive review.

Appendix B: Spatial Data Tables

The following tables provide summary information from the spatial analyses.

PAs (IUCN categories I and II) and CBI cores overlap

Mongolia	70th Percentile Core	80th Percentile Core	90th Percentile Core
CBI Core Area (km^2)	467657	311680	155204
Overlap with Protected Areas (km^2)	179131	148083	97142.9
Percentage of CBI Core within PAs (%)	38.3039	47.5112	62.5905

Chinese-funded LI across Mongolia

The Chinese-funded LI dataset was clipped by Mongolia's boundaries and line length of each LI Mode was calculated.

LI Mode	Length
Road (km)	509.895902
Rail (km)	0
Transmission (km)	87.637497

Length of Chinese-funded LI within PAs (IUCN categories I and II) in Mongolia

The Chinese-funded LI dataset was clipped within the PA boundaries.

LI Mode	Length
Road (km)	6.28
Rail (km)	0
Transmission (km)	0

Length of Chinese-funded LI within CBI Cores in Mongolia

The Chinese-funded LI dataset was clipped by boundaries of every percentile core and line length of each LI Mode within each core was calculated.

LI Mode	70th Percentile Core	80th Percentile Core	90th Percentile Core
Road (km)	146.137204	67.097801	28.129801
Rail (km)	0	0	0
Transmission (km)	0	0	0