



FOCUS-BRI Country Report

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

Pakistan

Aaditee Kudrimoti, Sam Williams, Amrita Neelakantan, Satvik Parashar, Grace Stonecipher, and Jessica DiCarlo

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Report contributions

Lead country researcher: Aaditee Kudrimoti

Research design: Jessica DiCarlo

Maps and spatial analysis: Satvik Parashar, Grace Stonecipher, Amrita Neelakantan

Overall review: Jessica DiCarlo, Sam Williams, Amrita Neelakantan

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Acronyms

BAP	Biodiversity Action Plan
BRI	Belt and Road Initiative
CBI	Composite Biodiversity Index
CCP	Chinese Communist Party
CDB	China Development Bank
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CPEC	China-Pakistan Economic Corridor
CHEXIM	China Export-Import Bank
EIA	Environmental Impact Assessment
FDI	Foreign Direct Investment
HKH	Hindukush-Karakoram-Himalaya
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature
JCC	Joint Cooperation Committee
KBA	Key Biodiversity Area
LI	Linear Infrastructure
NGO	Non-governmental organization
PA	Protected Area
PEPA	Pakistan Environmental Protection Act
PEPO	Pakistan Environmental Protection Ordinance
NGO	Non-governmental Organization
SEZ	Special Economic Zone
UNCCD	United Nations Convention to Combat Desertification
UNFCC	United Nations Framework Convention on Climate Change
WWF	World Wide Fund for Nature

Pakistan Factsheet



Figure 1. Political map of Pakistan. Source: Nations Online Project.

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

Region	South Asia
Capital	Islamabad
BRI Corridor	China Pakistan Economic Corridor
BRI investment (\$ in millions)	US\$ 8,400 million
Income Status	Lower middle income
Population	220.89 million (2020)
GDP	262.61 billion USD (2020)
Land Area	770, 880 km ²
Protected Areas (km ²)	94,818 km ²
Species Richness (ranking)	57
Biodiversity Intactness (ranking)	41
ND-GAIN Country Index; Climate vulnerability (ranking)	143
GDP Growth Rate Projections	4% for 2022
Inequality (Gini Coefficient)	29.6 in 2018
Human Development Index (HDI)	0.557 in 2019
Key exports	Textiles, cotton, cereals, and copper

I. Introduction

The Belt and Road Initiative (BRI) comprises six economic corridors, one of which is the China-Pakistan Economic Corridor (CPEC). The CPEC, valued at over US\$60 billion, was established in April 2015 by the Chinese and Pakistani states to enhance Pakistan's economic competitiveness and catalyze development while strengthening bilateral ties between the two countries. Pakistan's poor transportation infrastructure has been estimated to cause a near 4-6% loss of the country's annual GDP, and as such became one of the country's top development priorities (Kiani, 2013). The CPEC was designed in part to address this challenge and develop linear infrastructure (LI) to link China to Gwadar Port, which lies on the Arabian Sea in the Balochistan region of Pakistan. Most BRI-affiliated linear infrastructure in Pakistan can be attributed to the development of Gwadar Port, and other key large infrastructure projects: energy megaprojects, mines, and Special Economic Zones (SEZs). The CPEC is, however, extremely politically sensitive and public details about the initiative are limited. Thus, while it may seem mutually beneficial – Pakistan's updates to transport infrastructure and China's aim to build large dams, SEZs, and ports to support China's own geoeconomic goals – Pakistani academics and groups reviewing the impacts of China's BRI are skeptical whether these projects are truly meeting Pakistan's development goals.

The CPEC's promise of economic development and stickiness of the environment versus development debate especially in rural and tribal settings further weakens attempts at ecologically-sound LI planning and construction. Critical to Pakistan's BRI LI development is that the placement of key non-LI infrastructure projects actually determines the development of LI projects, influencing their impacts on biodiversity and the feasibility of alternative roads, railways, and powerlines. The importance and subsequent limited negotiability of non-LI projects to the success of China's BRI goals thus act as a constraint to identifying the least biologically damaging options for related LI. While other countries' governments and environmental NGOs often address environmental challenges by incorporating local and indigenous populations into decision-making processes to ensure the protection of critical landscapes and biodiversity, in Pakistan, challenges are more complex due to the politics of development and underdevelopment, and tribal versus national governance (Interview, 2022). Pakistan as a nation-state remains a weak attempt at unifying a series of heterogeneous princely states and tribes – many of which claim to be economically neglected by Islamabad and subsequently remain underdeveloped (Interview, 2022). Such concerns have led to armed protests and unrest, especially as Pakistan continues to take in Chinese investments in infrastructure (Interview, 2022).

Currently, there are few attempts to integrate biodiversity conservation into CPEC projects – it is, in general, an afterthought in the form of mitigation efforts that attempt to offset habitat loss resulting from large infrastructure projects and weak enforcement of the national Biodiversity Action Plan. For example, under former Prime Minister Imran Khan, afforestation programs became popular, though primarily as a means to tackle climate change. He initiated the "Plant for Pakistan or "10 Billion Tree Tsunami" initiative that aimed to plant 10 billion trees in Pakistan over the course of five years (Gul, 2018). The initiative employed more than 60,000 workers, who set up nurseries, planted trees, and served as forest protection guards (Al Jazeera, 2020). This is, however, a rare example of a recent successful mitigation effort spearheaded by the Pakistani government. Many mitigation programs are still small-scale and are often poorly executed, hardly offsetting the impact of LI. This emphasis on responding to environmental degradation rather than preventing it allows ecologically destructive LI projects to be approved and have a larger environmental footprint than can be undone with mitigation strategies. Thus, Pakistani chapters of international conservation groups like WWF and IUCN are looking to focus their conservation efforts on the planning process surrounding LI and related regulation,

specifically aiming to strengthen the EIA process, advocating for more wildlife preserves, and developing multi-stakeholder forums to inform stakeholders about biodiversity challenges surrounding LI as well as collaborating with them to develop alternatives. Many conservation advocates in Pakistan explain that foreign entities entering the country with conservation interventions are unfamiliar with the complex political economy of CPEC and its related sensitivities. Thus, this report on Pakistan will:

1. Explain the complex political economy of the CPEC and explain related barriers to conservation interventions and relevant stakeholders.
2. Explore how linear infrastructure projects and energy megaprojects, SEZs, and ports are inextricably linked and define subsequent barriers to biodiversity mitigation and planning efforts in Pakistan.
3. Define opportunities to support international conservation efforts in Pakistan, specifically in the LI planning process and strengthening of environmental regulation.

II. Linear Infrastructure Investment Landscape

Investment conditions are favorable for linear infrastructure development in Pakistan, especially LI that falls under the umbrella of the CPEC. Special institutions have been set up by China and Pakistan to accept and direct BRI-related investment in infrastructure more broadly, like the Joint Cooperation Committee (JCC) which was established in 2013. The JCC splits the responsibility of planning and executing CPEC projects with ten Joint Working Groups across topics of energy, transport infrastructure, special economic zones, security, ports, international cooperation and coordination, social and economic development, technology, and agriculture (Zhang, 2021). Despite efforts to institutionalize pathways for CPEC investments and direct them towards projects that satisfy the Pakistani state's development goals, terms of investment are often unfavorable for Pakistan – loans can be predatory, indigenous communities are displaced, and biodiversity degradation is endemic.

The Pakistani LI investment landscape, though usually favorable to foreign investment, is shaped heavily by the current governing party's priorities. During the Nawaz Sharif administration (Pakistan Muslim League, PML-N) which spanned between 2013-18, CPEC investment was mostly focused on the energy sector to address Pakistan's energy shortage (Zhang, 2021). Once Imran Khan's administration (the Pakistan Movement for Justice (PTI)) party rose to power in 2018, it aimed to shift investment priorities toward micro-level socio-economic development rather than top-down infrastructure. Although this government tried to promote industrial corporations by building special economic zones and pushing large-scale agricultural development, growth was significantly slower than the previous period. Chinese officials continue to communicate with important and powerful political entities to maintain their goals across shifts in government. To centralize and expedite decision-making surrounding CPEC projects, Imran Khan's (PTI) government (2018 to April 2022) established a new CPEC Authority that operates mostly independently of other government agencies in the planning and execution of infrastructure projects. A retired lieutenant general was appointed its Chairman, which many claim is an attempt for the military to signal to the populace its unyielding support for China and BRI despite fragmentation in the civilian government (Zhang, 2021). Previously legitimized through an ordinance, the CPEC Authority obtained a permanent legal status through legislation passed by the Pakistani Senate in May 2021. Recently, there have been talks of abolishing the CPEC authority through the CPEC Authority Amendment Bill, 2021 due to its "poor performance" in making SEZs operational, which would then

hand over key decision-making powers on infrastructure planning to the Planning Commission (The Express Tribune, 2022).

While the primary institution directing BRI-driven LI in Pakistan is the CPEC authority, situated within the Ministry of Planning, Development, and Special Initiatives, there are other actors that also influence or try to influence CPEC investments. On the biodiversity conservation front, some of these include the Ministry of Environment, the Ministry of Climate Change's Pakistan Environmental Protection Agency, and international NGOs like IUCN and WWF Pakistan. Non-governmental organizations (NGOs) engage in conservation advocacy work, encouraging the enforcement of existing EIA policy infrastructure and engaging with local populations, many of whom prefer LI development for economic growth and often deprioritize conservation. Many of these local populations are tribal groups, of which some harbor anti-government sentiment, in part due to feeling economically neglected by BRI and CPEC investments. In Part IV, we will further explore how these stakeholders shape LI and biodiversity conservation in Pakistan in the face of CPEC and its related promise of economic development.

III. China in Pakistan: Geopolitics, infrastructure, and biodiversity conservation

Pakistan's relationship with China is shaped heavily by its geopolitical challenges with India, post-partition. Pakistan was the first Islamic country to establish a relationship with China in 1951 and strengthened its relationship in the 1960s after observing the United States and Soviet Union gaining influence in India. At the same time China's relationship with both the Soviet Union and India were deteriorating – China distanced itself from the Soviet Union due to different interpretations of Marxism-Leninism, and warred with India at the Himalayan border in 1962. When Pakistan and India fought again in 1965, China provided Pakistani forces with weapons, and since has become Pakistan's main source of military aid. China has also offered continued political support to Pakistan, especially during domestic turmoil like the 1971 civil war. The political and military relationships between Pakistan and China continued to strengthen throughout the 1970s, and China began expanding its influence in Pakistan by investing in infrastructure like the Karakoram Highway, the Heavy Mechanical Complex, and the Heavy Forge and Foundry in Taxila. Throughout the 1980s and 1990s, the Chinese Communist Party (CCP) maintained a series of party-level contracts with a variety of political parties in Pakistan (Mohammed, 2011). It also attempted to play a moderating role between Pakistan and India's race for nuclear weapon development. In the 2000s, when Pakistan became embroiled in the War on Terror, China showed support for enhanced military cooperation between Pakistan and the United States, which was in part motivated by its goal to tackle terrorist groups in Xinjiang, which borders Pakistan. In 2005, the two countries signed the 'Treaty of Friendship, Cooperation, and Good Neighborly Relations,' which provided the legal basis to formally institutionalize their bilateral relationship.

Despite decades of a strong bilateral relationship, the Chinese state's treatment of Uyghurs in Xinjiang has caused challenges. China believes that some Uyghur militants received training in al-Qaeda camps in Pakistan (The People's Daily, 2003). Likely due to China's heavy investment in infrastructure and development in Pakistan, Pakistani authorities cooperated with China in the crackdown of alleged militants and supposed terrorism, separatism, and religious extremism in Xinjiang. When many nations condemned China for its treatment of Uyghurs and other Muslim minorities in Xinjiang in the 2010s, Pakistan sided with China. In the 2000s, Pakistan and China built the Gwadar Port which later became a

centerpiece of the CPEC. In 2015, they signed the “All Weather Strategic Cooperative Partnership”, a unique design amongst China’s bilateral relationships, as it is tied to CPEC, a special initiative to encourage and ease challenges to Chinese investment in Pakistan (Xinhua, 2022). While governments of both countries have a positive relationship, Pakistani citizens do not necessarily share the same view of China, Chinese laborers, and Chinese businesses that operate in Pakistan. As stated above, many tribal peoples feel that they do not reap the economic benefits, while others feel displaced by the Chinese (Interview, 2022). To address these challenges, heads of state have tried to deepen cultural ties through people-to-people exchanges. For example, they established Five Confucius Institutes and two Confucius Classrooms for the study of Chinese language and culture. The Chinese government also sponsors Pakistani students to study at Chinese universities.

Box 1 - Perspectives: Tribal Politics as a Barrier to Biodiversity Conservation in Balochistan

The following is a collection of ideas paraphrased from an interview with a Kazakh conservation expert

Observation: Pakistan’s political factionalization is in part due to tribal politics and the country’s separation from India during the Partition. Many princely states were forced to become a part of Pakistan, and many provinces were unable to get their fair share of development funding because the government was run predominantly by Punjabis, who primarily invested in their own communities. This resulted in underdevelopment for many parts of Pakistan, specifically Balochistan. The 1970s civil war in Balochistan further pushed the province into poverty. Succession efforts were a constant struggle, and have made Balochistan even more unstable. Balochistan is essentially run by the military and security apparatus called the FC which is responsible for ensuring the security of the region. Existing so-called development projects in Balochistan, like the Reko Diq coal and copper mine or the Saindak copper mine, have been plagued by nepotistic politics, as for example, the chairman of Saindak is the son of an influential family in the Balochistan region. Today, tribes in the region feel only weakly integrated into Pakistan and seek an urgent need to meet their development goals. This thirst for development and frustration with the central government in combination produce a desire for infrastructure development often at the cost of wildlife conservation. In fact, as many of these communities are agrarian herding communities, they often feel that wild animals are a nuisance due to human-wildlife conflict.

According to Khan and Kasi (2015), the tribal chief or “Sardar” in the tribal system plays an important role in the economic, social, and political affairs of his people. Like the modern democratic state, the tribal system of Baloch does not have a parliament but instead a system of Jirga which consists of experienced and notable figures of the tribe. The Sardars settle disputes or issues with the help of the tribal Jirga democratically. The Jirga role is similar to that of parliament in democratic countries. The decision on each issue is taken by majority votes of the members of Jirga (Khan and Kasi, 2015).

Recommendation: In order to promote biodiversity conservation in non-metropolitan or rural areas, local advocacy groups must have a strong understanding of the tribal political structure and motivations to secure investment projects. This understanding will inform more effective interventions at the local level.

Although the CPEC is China and Pakistan’s largest infrastructure collaboration to date, infrastructure investment has played a significant role in their bilateral relationship since approximately the 1970s, with the Karakoram Highway, the Heavy Mechanical Complex, and the Heavy Forge and Foundry. Since, their infrastructural cooperation has only strengthened and the BRI led Pakistan to formally designate a specific pathway for Chinese investments in roads, railways, ports, SEZs, dams, and more through the CPEC. The CPEC is envisioned to stretch from the western Chinese city of Kashgar to Pakistan’s Arabian

Sea port of Gwadar, strategically located near Persian Gulf shipping lanes. Pakistan and China signed an MoU in 2013, before the BRI was announced. Two years later, China's State Council announced the CPEC as one of its six economic corridors, totaling US\$46 billion, and then rising to US\$62 billion, though the amount continues to change as the selection of projects and the costs of these projects change. For detailed data on Chinese loans to Pakistan from 2009-2019 see Table 2.

Table 2. CDB and CHEXIM infrastructure loans to Pakistan 2008-2019. Source: Global Development Policy Center, Boston University.

Project	Type	Borrower	Lender	Signed	Total (USD millions)
Chashma Power Station Unit 3 and 4	Nuclear Electric Power Generation	Government	CHEXIM	2011	157.00
Hubco Coal Power Plant	Fossil Fuel Electric Power Generation	Government	Bank of Communications, CCB, CDB, CHEXIM, ICBC	2017	1500.00
Rahim Yar Khan Coal Fired Plant	Fossil Fuel Electric Power	Nishat Energy Limited	CHEXIM	2016	956.00
Taunsa hydro electric project	Hydroelectric Power	Government of Punjab	CHEXIM	2011	377.00
Balloki Combined Cycle Power Plant	Fossil Fuel Electric Power	NPPMCL	CHEXIM	2015	785.40
Orange Line Metro Train Project	Transportation	Government	CHEXIM, ICBC	2014	1626.00
Karachi Nuclear Power Complex (K-2/K-3)	Nuclear Electric Power	Government	CHEXIM	2014	6500.00
Bunji Hydropower Project (Bunji Dam)	Hydroelectric Power	Government	CHEXIM	2009	6868.00
Thar Block II Power Plant (Thar Engro)	Fossil Fuel Electric Power Generation	Sindh Engro Coal Mining Company	Bank Alfalah, CDB, Construction Bank of China, Faysal Bank, ICBC, Habib Bank, National Bank Pakistan United Bank.	2015	995.40
Pakistan-China Cross-border Fiber Optic Cable	Telecommunications	Government	CHEXIM	2013	44.00
Karachi-Lahore highway	Transportation	Pakistan National Highway Authority	CHEXIM	2014	1905.60
Karachi-Lahore Motorway	Transportation	Government	CDB,CHEXIM	2015	2980.00
Havelian-Thakot Karakoram Highway Phase II (Construction)	Transportation	Government	CDB,CHEXIM	2013	1300.00
Karakoram Highway	Transportation	Government	CHEXIM	2008	327.00

Neelum-Jhelum Hydro Station	Hydroelectric Power	Government	CHEXIM	2015	576.00
Neelum-Jhelum Hydro Station	Hydroelectric Power Generation	Government	CHEXIM	2012	448.00
Peshawar-Karachi Motorway (PKM) Project	Highway, Street, and Bridge Construction	Government	CHEXIM	2016	2900.00
Gwadar-Nawabshah LNG terminal and pipeline project	Pipeline Transportation of Natural Gas	Government	CHEXIM	2015	2706.00
Expansion And Reconstruction Of Existing Line ML-1	Rail Transportation	Ministry of Railways	CHEXIM	2017	7200.00
Thakot–Raikot Karakoram Highway (Upgrade)	Highway, Street, and Bridge Construction	Government	CHEXIM	2017	76.00
Paksat-1R Satellite	Satellite Communications	Government	CHEXIM	2008	200.35
Emergency Loan-Foreign Exchange	Monetary Authorities-Central Bank	Government	CDB, ICBC	2017	1200.00
Banking sector finance	Monetary Authorities-Central Bank	Government	CDB	2016	500.00
					Total: US\$ 42,127.75 million

Although growth of CPEC projects has slowed in recent years, the CPEC has been deemed a “gamechanger” for Pakistan’s economy, as China became one of the only countries heavily investing in Pakistan because it often lives in the shadow of political controversy (Notezai, 2021). Generally, the development of Chinese-funded LI in Pakistan differs from its other LI investments across the BRI due to Pakistan’s location connecting land and sea. As the CPEC connects Kashgar of Xinjiang to Gwadar of Pakistan, and crosses Pakistan from north to south, it connects the Economic Belt of the BRI with the Maritime Silk Road (Box 2). Pakistan thus plays a critical role in optimizing the BRI’s efficiency. Pakistan’s critical role of connecting the “Belt to the Road” makes ecologically sensitive infrastructure difficult to propose and implement given the deprioritization of conservation and the spatial planning and construction already underway.

IV. Pakistan’s biodiversity landscape and protected regions

Pakistan is rich in biodiversity in its arid and semi-arid regions which cover approximately 80% of its landscape. The country extends some 1,700 km north from the Arabian Sea coast and the mouth of the Indus River to its headwaters in the Hindu Kush and Karakoram ranges of the Himalayan mountains. Its coastline extends 1,046 km with 22,820 km² of territorial waters and an Exclusive Economic Zone of about 196,600 km². Pakistan also contains three of the world’s eight biogeographic realms, which

contributes to its vast biodiversity, including Indo-Malayan, Palearctic, and Afro-Tropical realms each with their distinct biota, and also contains four of Earth's ten biomes, including desert, temperate grassland, tropical forest, and mountain. Rapid population growth, increased deforestation, overgrazing, soil erosion, and infrastructure development pose risks to the country's biodiversity. Conservation was first addressed by the National Conservation Strategy, which was approved in 1992. The Strategy was implemented by province, and each province tried to address conservation concerns that specifically affected their region. However, this was insufficient to address the aforementioned challenges. The Government of Pakistan has recognized the importance of these challenges by ratifying the Convention on Biological Diversity (CBD) in 1994. Pakistan's Biodiversity Action Plan (BAP) was designed to meet the requirements of the Convention. Preparation of the BAP has been carried out under an agreement between the Government of Pakistan and the World Bank under the Global Environment Facility. The World Conservation Union's (IUCN) Pakistan office was selected as the lead agency in collaboration with the World Wide Fund for Nature (WWF) Pakistan (Biodiversity Action Plan for Pakistan, 2000).

Though a large number of actions recommended by the Biodiversity Action Plan have been implemented, there has been limited progress in reaching desired outcomes. The measures laid out in the plan were not implemented until 2006, when a Biodiversity Secretariat was established within the Ministry of Environment. It played an important role in influencing policy and financial decisions on conservation, including advocating for the incorporation of the conservation agenda into Vision 2030 and Strategy for Forest Biodiversity, and allocating funds for conservation in Pakistan's five-year plans. Though institutionalized, the Secretariat lacked capacity and resources and failed to develop an effective coordination mechanism for BAP implementation at the national and provincial levels. A Biodiversity Working Group was established, but only held a few meetings due to capacity issues and financial constraints. While biodiversity committees were established in all provinces, most remain dormant (CBD, 2022). Though such institutions have often failed to develop new projects for BAP implementation, there has been reasonable progress made towards the achievement of the 2020 Aichi Biodiversity Targets. Pakistan has established protected areas spanning major habitats and ecosystems covering more than 10% of the country's area (Fig. 2a). It has designated 23 national parks, 97 game sanctuaries, and 104 game reserves. Though these have been formally established, a protected areas system review was done in the year 2000 which found that many of these so-called protected areas did not meet the international criteria for protected areas – only 58 of 169 PAs were considered to be in accordance with IUCN criteria (CBD, 2022). Figure 2b below illustrates the array of protected areas according to their IUCN classification and the existing dense LI network in Pakistan.

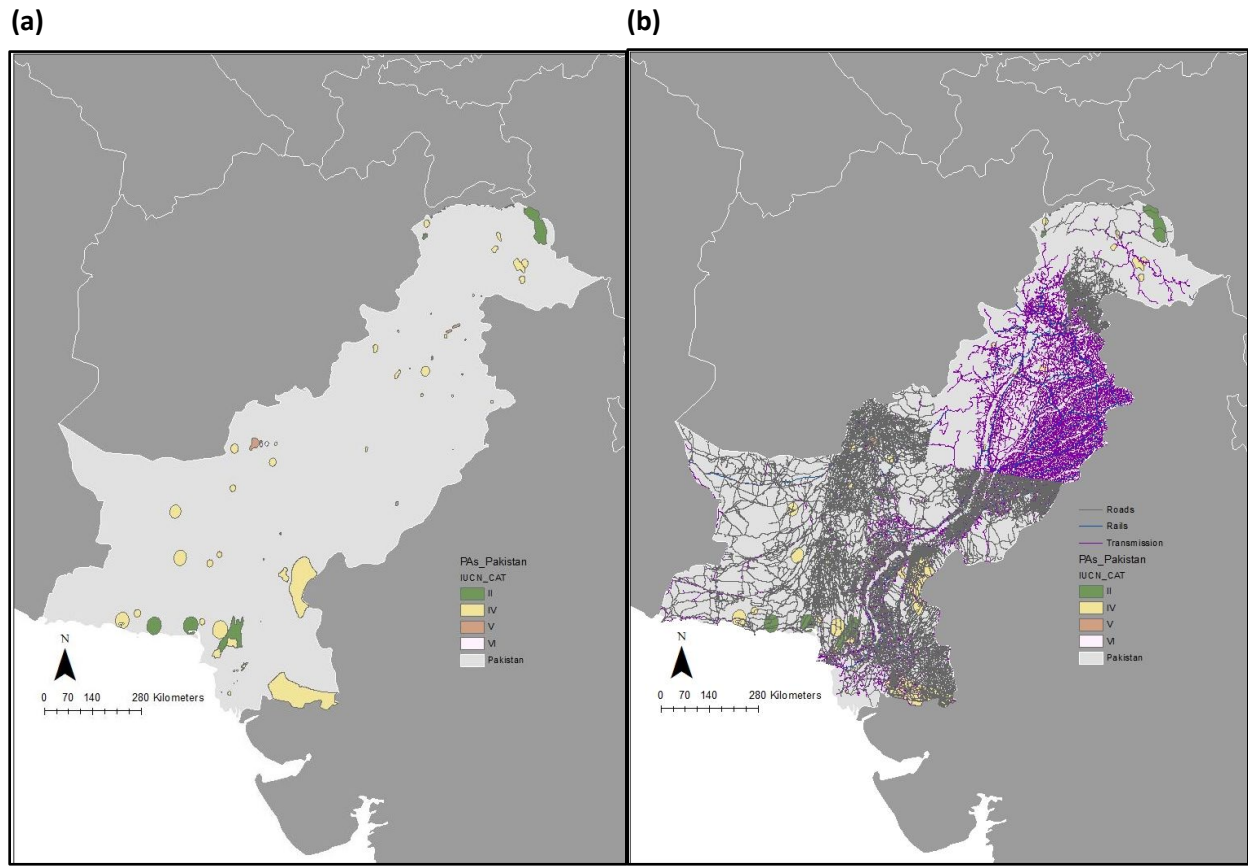


Figure 2. (a) There are multiple types of Protected Areas in Pakistan affording varying degrees of protection to multi-use landscapes. The highest protection is afforded to IUCN categories I and II. **(b)** Existing infrastructure already compromises multiple protected areas. We consider only road, rails, and transmission lines as linear infrastructure for this study.

In 2018, only 12% of Pakistan was classified as “environmentally protected,” despite being one of the six countries in the world most at risk from climate change due to low forest cover in the region (Baig & Al-Subaiee, 2011). In response to this challenge, the government of Pakistan created the Protected Areas Initiative, which aims to increase protected areas such as national parks, wetlands, and wildlife reserves to 15% of the country’s total area by 2023 (Baig & Al-Subaiee, 2011). Since 2020, protected area coverage has increased by almost 14% (UNEP, 2021). Pakistan has also established botanical gardens and herbaria in a variety of universities and government departments, like the Pakistan Forest Institute and the Karakorum Agriculture Institute for the Gilgit-Baltistan Area. Recently, there have been attempts to integrate local communities into the planning and management of national parks (Interview, 2022). There have been no rigorous assessments of protected areas to determine biodiversity status and management effectiveness. However, populations of endangered species have reportedly increased due to the efforts of local communities and conservation NGOs, though not necessarily due to formal institutions (Interview, 2022). These populations of ungulates, endemic reptiles, brown bear, and black bear purportedly improved due to limitations on hunting, not through efforts to limit or provide alternatives to infrastructure development – a challenge that is more important to consider for the future stability of biodiversity in Pakistan after banning the direct harvest of wild species.

Natural resources outside formally protected or community-based conservation areas are rapidly deteriorating and threaten ecosystems as well as people whose livelihoods depend on them. Beyond this, institutions to enforce biodiversity conservation efforts remain weak. For example, the Biodiversity Secretariat, which is central to BAP implementation, failed to guide implementing agencies in planning and executing specific projects. Despite biodiversity conservation often lacking institutional capacity, it appears that planners and policy-makers are trying to address the Convention on Biological Diversity through sectoral planning efforts and policies. One such example is the Ministry of Education incorporating biodiversity concepts in the curricula of all high school grades. In addition, drafts for agriculture and livestock policies include biodiversity concerns and fisheries policy encourages sustainable harvest and rehabilitation of marine environments affected by pollution, and the forestry sector launched afforestation projects (CBD, 2022). However, it is unclear whether or not the CPEC Authority has implemented BAP.

Despite the strong efforts to implement BAP, there are growing concerns regarding the enforcement of biodiversity and conservation policy in both planned and implemented CPEC projects. Conservation organizations like WWF-Pakistan are encouraging government planners, investors, and public sector stakeholders to evaluate the negative environmental impacts of the CPEC prior to accepting and building projects in addition to the current strategy, which is mostly retrospective mitigation. WWF reports that the Hindukush-Karakoram-Himalaya mountains and the Malan-Gwadar Coastal and Marine Complex require the most attention to minimize the negative ecological effects of the CPEC. Experts say that Gwadar port in Balochistan needs biodiversity safeguards. China and Pakistan are both open to biodiversity protections for their marine environments, though they have taken very few measures to actually do so thus far (Interview, 2022). Gilgit Baltistan in Northern Pakistan has a fragile ecosystem, and more funding is needed to strengthen existing biodiversity reserves and create new ones. BRI projects along the Indus River (both dams and transmission lines) are critical, and so is the restoration and preservation of the Indus River Basin, upon which many peoples and animals depend. Government organizations like the Ministry of Climate Change's Steering Committee for the 'Silk Route Ecologically Responsible Tourism and Preservation of Natural Resources Programme' and UNDP are currently working with organizations such as WWF to preserve biodiversity in regions undergoing CPEC-related development, though more funding and manpower is needed in the aforementioned regions.

Box 2 - Perspectives: Conservation Interventions Need to Take Rapidly Changing Public Opinion on CPEC Investments Into Account

The following is a collection of ideas paraphrased from an interview with a Pakistani conservation expert

Observation: The BRI is host to significant controversy surrounding projects in Pakistan because individuals do not approve of the high levels of borrowing involved. In general and initially, Pakistanis were very open to and excited about the BRI. However, as the economic situation became more challenging, popular support for BRI projects decreased. As the loans came due, debt servicing became difficult. For this reason, it is not as broadly appealing as it used to be. There is a need to assess current public perception of the BRI. Political, economic, and geopolitical differences since the Covid-19 pandemic began have produced further changes in public perception of BRI. In Pakistan, there is also a perception that China's outward attitude has changed as well – the “Bamboo Curtain” has strengthened and hostility towards the West under both Trump and Biden has increased.

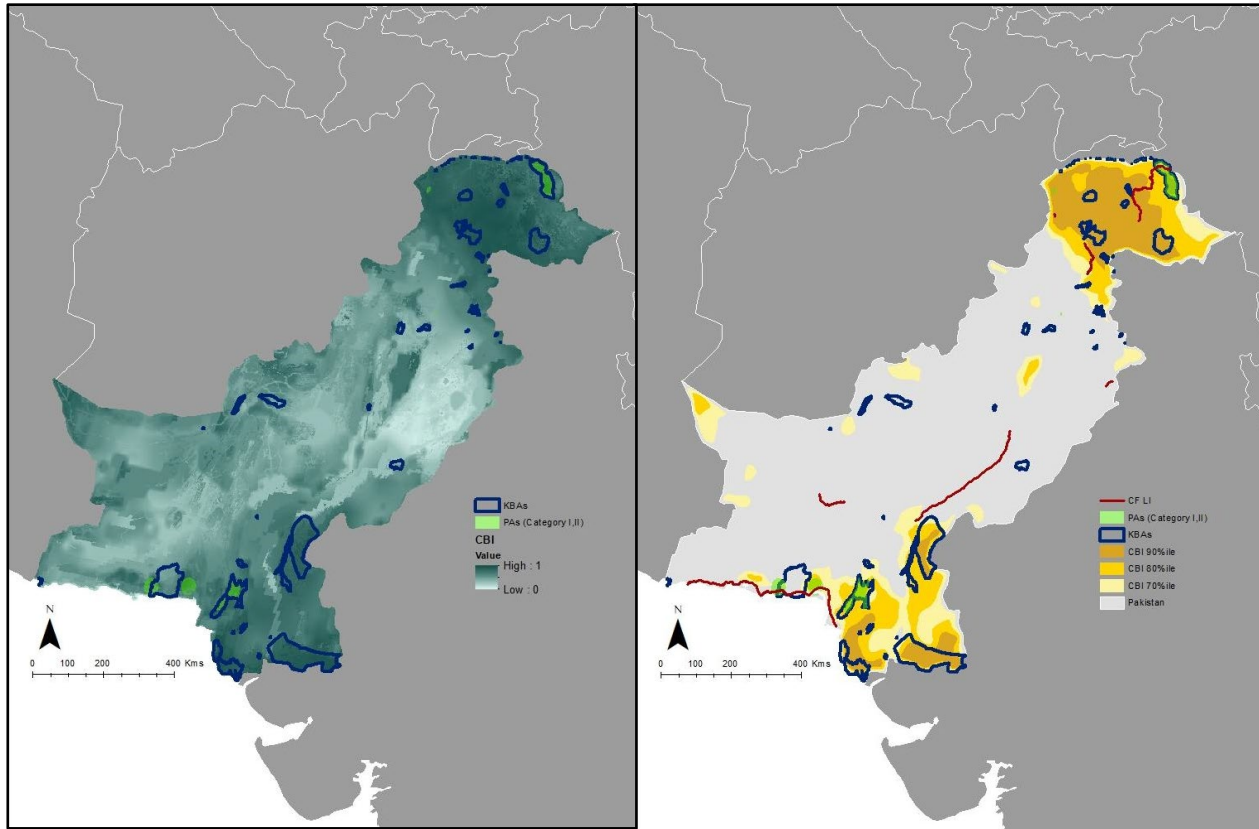
Additionally, there has been recent political fallout – Chinese civilians were killed in Pakistan in provinces where some people feel that they have not benefited from the BRI. However, after the Sharifs were reinstated as the heads of government, the CPEC appears to have more favorable public perception than it had during the Khan administration. The perceptions and conversations on the BRI and CPEC are thus dynamic, even though interventions on biodiversity and other socio-environmental problems surrounding Chinese infrastructure investments often treat the BRI and CPEC’s political context and public perception as static. If conservation organizations are to advocate for more ecologically sound alternatives to Chinese investment, they must contextualize interventions in the complex and rapidly changing politics of BRI, local politics, and public perceptions.

Recommendations: The Gwadar Port Marine Environment requires biodiversity safeguards, to which both the Chinese and Pakistani governments are very open. The Northern region of Pakistan is ecologically fragile (i.e. Gilgit Baltistan) and projects along the Indus river require more biodiversity safeguarding – national parks exist, but more funding is needed to turn them into more effective biodiversity reserves. Funding conservation must go through large, well-established organizations, whether that be certain government ministries or international organizations with local chapters like IUCN, WWF, Water-FAO, or even domestic advocacy groups like the Hisaar Foundation. However, these organizations should engage with local partners, and avoid imposing western-centric views of conservation. Surveys and studies to understand public and civil society sentiment surrounding CPEC projects are critical prior to designing biodiversity conservation interventions.

Linear infrastructure and biodiversity in Pakistan

Because the CPEC is uniquely positioned and designed to link the BRI’s maritime road and land-based belt, the composition of BRI projects in Pakistan is a combination of roads, rail, powerlines, ports, dams, and SEZs. Linear infrastructure (LI) in Pakistan is inextricably linked to non-LI infrastructure projects, like ports and dams. The linkage between LI and non-LI projects can restrict pathways for more ecologically sustainable alternatives because non-LI projects are often strategically placed to produce goods that require LI to be efficiently transported. This relationship between LI and non-LI projects requires further research. Recently, 11 CPEC projects were recognized in the Gilgit-Baltistan, Azad Jammu and Kashmir, Khyber Pakhtunkhwa, Balochistan, and Sindh regions that will impact the ecological balance of the regions including the Karakoram Highway, amongst others. In the North, the construction of rail lines and tunnels will intensify glacial melting and endanger any existing transport infrastructure in the region (Key Informant Interview). The deglaciation rate is already high in the western Himalayas due to the presence of black carbon from increased human activity, including heavy military movement. Black carbon is the second leading contributor to climate change in the region (Gilgit-Baltistan: Environmental Consequences of China’s Incursion, 2011). Elsewhere, projects also lead to deforestation, loss of biodiversity, generation of more solid waste, and water, air, and noise pollution, damage to important cultural heritage sites. Figure 3b represents Chinese funded linear infrastructure in Pakistan.

Figure 3. (a) In Pakistan, KBAs cover more areas of conservation importance (as demarcated by high Composite



Biodiversity Index [CBI] values) than PAs with the greatest protection in IUCN categories I and II. **(b)** Chinese-funded Linear Infrastructure (CF LI) refers to road, rail, and transmission (or power line) projects from AidData’s Chinese development projects database (Custer et al., 2021). Upcoming CF LI is cutting into and across CBI cores - mostly in areas with low protection but high biodiversity importance. See Appendix A for Methodology.

BRI-driven LI in Pakistan, like other infrastructure, is decided and governed by the CPEC Authority. The CPEC Authority is notoriously opaque and identifying decision-makers and exact governance structures is a challenge. There is also limited information that identifies how the BAP is integrated into decision-making surrounding LI, and it is unclear whether planners and policymakers in the Biodiversity Secretariat, Ministry of Climate Change, or any other related governmental group successfully engage with and influence the CPEC Authority. Advocacy groups like WWF, SHEHRI-Citizens for a Better Environment, Indus Earth Trust’s Strengthening Participatory Organization, and other IUCN member organizations encourage conservation at the grassroots level. WWF-Pakistan is especially active in researching and advocating for LI sustainability and biodiversity safeguards. It recently published a report entitled “Greening Infrastructure in the Hindukush-Karakoram-Himalaya (HKH) Landscape,” which highlights engagement with local stakeholders over the preservation of the Snow Leopard’s habitat and provides recommendations for making HKH infrastructure more sustainable. The study is a model of the type of work that is of growing importance with regard to biodiversity conservation and LI (see Box 3). More recently, WWF-Pakistan has been working on producing a report on biodiversity safeguards for LI in Pakistan. They also focus on strengthening existing policy, specifically making EIAs more “robust, inclusive, and transparent.” WWF’s work is representative of a larger push to introduce biodiversity safeguards in infrastructure policy.

Box 3 - Model Intervention: WWF-Pakistan & The Snow Leopard Habitat Conservation, Greening Infrastructure in the HKH

Adapted from “WWF-Pakistan’s Sustainable Infrastructure Initiative” presentation

Observation: The Hindukush-Karakoram-Himalaya (HKH) landscape is a mountain region that lies in the northern part of Pakistan and spans seven other countries including Afghanistan, Bangladesh, Bhutan, China, India, Nepal, and Myanmar. Planned and proposed CPEC infrastructure which ranges from transmission lines and pipelines, energy megaprojects, rail, and motorway transportation infrastructure, and more is predicted to result in irreversible destruction of the HKH landscape. To address this, WWF-Pakistan plans to “embed an understanding of the value of nature in development planning and infrastructure” (WWF, 2021). WWF also aims to advocate for “the vision of greening infrastructure development in the HKH landscape can be integrated into Local and district level development plans so that industries, financial institutions, public and private entities, and other relevant stakeholders adopt sustainable infrastructure practices” (WWF, 2021). WWF Pakistan’s Sustainable Infrastructure Programme was formally launched in 2020, to address the need for research and advocacy for greening BRI infrastructure.

For this study, WWF-Pakistan first focused on a single species to explore how to “green” infrastructure in the HKH region: the Snow leopard (*Panthera uncia*). The snow leopard home spans about 1,776,000 square kilometers, of which about 4.5% is in Pakistan, specifically in the Karakoram mountains, spread across Khyber Pakhtunkhwa (KPK), Gilgit-Baltistan, and Azad Jammu and Kashmir (AJK). There are only about 250-400 snow leopards remaining in Pakistan – LI poses a serious threat to this already small population. To preserve this population amongst the rise of ecologically destructive infrastructure in the region, WWF-Pakistan’s Sustainable Infrastructure team “focused on mapping and identifying the impacts of proposed and planned BRI-related large-scale infrastructure projects on the environment, biodiversity, and local communities, and developed high-level recommendations on how to mitigate the identified impacts. To build upon this research and understand the status of snow leopard habitat research in the Gilgit Baltistan region, the team held a two-day *Consultative Workshop on Infrastructure Development in Snow Leopard Home Ranges in Pakistan* event on June 16-17, 2021 in Gilgit. More than 30 representatives from the Government of Pakistan, species experts from the WWF Network, policymakers, academics, researchers, and local community members attended. The workshop specifically allowed panelists to engage with each other and participants. The first technical session identified the present status of academic research and allowed researchers and academics to share research initiatives and ideas on Snow leopard conservation in Pakistan. The second session highlighted the experience of local community members to share their experiences and insights regarding snow leopard activity and conservation in Pakistan. The other technical sessions invited attendees to break out into groups and review current conservation strategies in light of infrastructure development and propose alternatives for snow leopard habitat protection.

From these sessions, it became clear that the main challenges are coordination, resources, and data. More specifically, there is a need to create a platform or body that encourages coordination in conservation efforts among and within provinces and the federal government. Government bodies need more resources for capacity building for environmental planning during infrastructure development and there need to be more conservation funds. Integrated databases to collate research and studies on the ecological impacts of infrastructure development are also a necessity. These findings apply to biodiversity conservation efforts for LI in Pakistan more broadly.

While there is growing recognition of the importance of biodiversity safeguards for LI amongst advocacy groups, this is not the case for government officials (specifically in the CPEC Authority) or rural and tribal populations. These key stakeholder groups appear to fall prey to an antiquated industrial-era development narrative that posits economic development comes at the expense of environmental conservation and sustainability, and that people must exploit their natural resources for development. Pakistan's history of factionalization – fighting among the provinces, tribal politics, and deep-rooted conflict that led to a nuclear stand-off with India – prevented Pakistan from gaining real political and economic stability in the last 50 years. The country oscillates between military rule and democratically elected government, and “between secular policies and financial backing as a ‘frontline’ state during the Cold War and the war against terrorism” (Jalal, n.d.). Pakistani government officials, like many across the world, appear to invite foreign investment (much of which is in LI through the BRI) as means to secure political and economic stability. One of the greatest challenges to encouraging biodiversity safeguarding for LI in Pakistan is thus reframing the commonly accepted narrative of investment versus environment.

Box 4 - Perspectives: Focusing Conservation Interventions in the CPEC LI Planning Process - Gilgit Baltistan

The following is a collection of ideas paraphrased from a key informant interview with a Pakistani conservation expert

Observation: Many people that are affected by CPEC-related LI are excluded from decision-making. Local communities and regional political representatives do not have formal spaces for input within CPEC project consideration and evaluation because projects are discussed and approved at only the National level (between the Pakistani and China states). The bureaucrats responsible for implementing projects don't necessarily know the details discussed within the CPEC, as they are kept within the CPEC Authority. What information is available can be found on the Pakistani government's website. There have been demands made by the public in different regions, specifically regarding the unequal distribution of projects. People are encouraged to believe that CPEC is an issue of national interest (encouraged for economic development), and are thus dissuaded from challenging it. Voices of dissent advocate for greater shares of CPEC benefits but those voices are not given a national platform, and often do not have the technical know-how to provide alternatives to meet state goals. Civil society is encouraging biodiversity review, but the Chinese are not very engaged in EIAs.

EIAs must be submitted to provincial governments' environmental agencies, though the intricacies of how EIAs are submitted and evaluated vary province by province. This information should be centralized to avoid confusion surrounding the EIA process in Pakistan. In Gilgit Baltistan, China has been constructing tunnels that are predicted to have negative environmental impacts, though this has not been formally stated. Gilgit Baltistan is getting a share of less than 1% of Chinese investment and wants more. Currently, there is only one SEZ in the area (which is still in the planning stage). There are specific plans for a railway network from Kashgar to Islamabad, with many mountainous areas and cities along the proposed route. There has been rapid and unplanned urbanization not because of CPEC projects but because of speculation that these places (in Gilgit Baltistan) will become transport hubs. Very few people in the region are talking about biodiversity conservation. In underdeveloped areas receiving projects, people are not aware of the benefits or conversations around biodiversity and development issues and don't have the tools or the vocabulary to advocate for themselves.

Recommendation: Propose interventions in the planning stages of LI, before further development of Gilgit Baltistan. Support advocacy/research groups to provide platforms for local people to engage in the decision-making process. Advocacy/research groups can help formalize their insights into formal recommendations in consultation processes. Advocate for EIAs to play a larger role in project determination in the LI planning process.

V. Policy infrastructure and notable stakeholders in environmental protection and conservation

Overall, biodiversity conservation is not a priority of the Pakistani state, which is reflected in the deficit of effective conservation policy. While Pakistan has already generated biodiversity-specific policy documents like the National Conservation Strategy and BAP, the implementation of these plans has met with little success. In addition, there are weak linkages between the implementation of the CBD, UN Convention to Combat Desertification (UNCCD), UN Framework Convention on Climate Change (UNFCCC), and other relevant conventions such as the Convention on Migratory Species (CMS), the Convention on Wetlands (RAMSAR) and the Convention on International Trade in Endangered Species (CITES). Anwar et al. (2005) recommend that the national goals for these conventions need to be coordinated and implemented as uniform national standards for biodiversity conservation.

To date, EIAs remain the most widely implemented biodiversity conservation policy tool, though the use of EIAs is still patchy and inconsistent. EIAs received legal status in Pakistan when the Environmental Protection Ordinance (PEPO) was drafted in 1983 and was later converted into the Pakistan Environmental Protection Act (PEPA) in 1997 (Ehtasham et al., 2021). Today, EIAs are conducted for development projects across infrastructure and industry. Environmental protection acts containing sections related to EIA and Initial Environmental Examinations (IEE; a preliminary study for an EIA project) have been established by all Pakistani provinces, which facilitate EIAs on the ground. Public involvement in the EIA process is supposed to play a central role in determining whether or not projects are accepted or rejected, though in the case of CPEC, this is rarely the case – many EIAs are even conducted after projects begin construction (Interview, 2022; Saeed et al., 2012). Even then, EIAs very rarely integrate public opinion, thus often failing to minimize the impact on local communities. Still, the number of EIAs being conducted in Pakistan has grown over the last two decades: the number of EIAs submitted in 2000 was only six, but in 2008 there were 109 submitted, and even more since then have been submitted. However, the number of large infrastructure investment projects has grown significantly since 2000 as well. The largest number of EIA reports were submitted in Punjab and the smallest have historically been submitted in Balochistan.

Conservation advocates argue that solidifying and standardizing the use of EIAs will ensure that every CPEC-related project is executed with biodiversity conservation in mind. Chinese companies conduct EIAs and local entities oversee their implementation (i.e. Hagler Bailly Pakistan, EMC, DefCon), while NGOs and research groups are in the position of providing more ecologically sustainable alternatives in the case that EIAs illustrate severe ecological impact for projects. The main challenge now, however, is advocating for the standardization of EIAs to the federal government, specifically within the CPEC Authority – the arm of government that accepts bids for Chinese infrastructure projects – so that it becomes a priority to be enforced at the provincial level.

VI. Understanding Stakeholders, Institutions, and Power Dynamics

Below we describe graphically all the various stakeholders and interacting organizations as application to linear infrastructure and biodiversity interacting in Pakistan (Fig. 4).

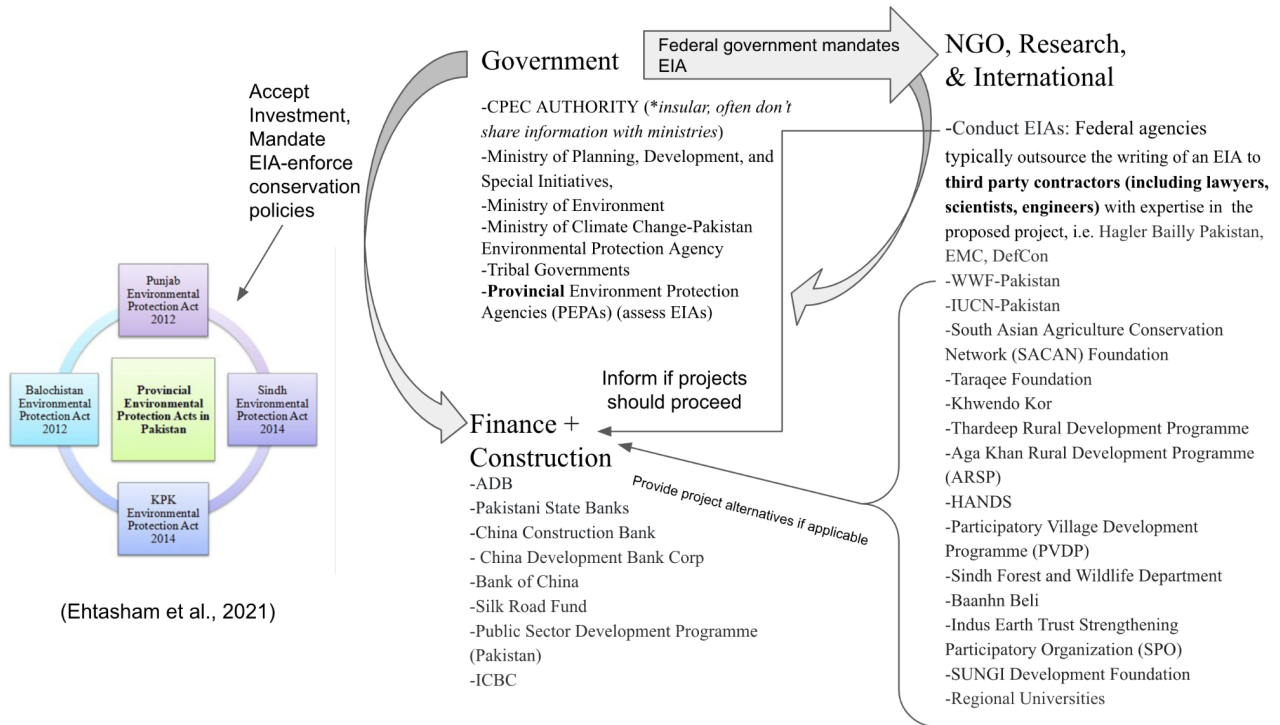


Figure 4. Stakeholders and power dynamics

VII. Recommendations

Despite the prevalence of government institutions dedicated to environmental sustainability, biodiversity conservation still remains a weak priority in Pakistan, especially as it relates to LI and economic development. Conservation organizations mostly agree that the best opportunity to influence decision-making on conservation and LI is by working within the current policy infrastructure by advocating for more robust EIAs that meet their intended goal of identifying ecologically destructive projects and finding more sustainable alternatives. Civil society representatives state that weak biodiversity monitoring and equally weak EIA assessment frameworks allow destructive projects to slip through the cracks. Currently, experts state that most conservation efforts are tailored towards mitigation strategies and technologies that will solve biodiversity challenges that result from LI. Many EIAs that are conducted for infrastructure either identify serious problems but fail to stop construction in the name of “development” or are poorly conducted or completely fabricated. For example, one anonymous representative from a local chapter of a biodiversity monitoring organization stated that in

an EIA for an infrastructure project in cold and wooded Gilgit-Baltistan, the EIA on record stated that they'd have to "cut down banana trees" – a species which does not grow in the region. It was later uncovered that the EIA for the Gilgit-Baltistan project was copied verbatim from an EIA for Sindh, where banana trees are prevalent. Beyond this, organizations also hope to encourage more local, culturally sensitive advocacy that understands and addresses the dynamics that cause tribal populations and civil society groups (many of them led by women and indigenous peoples) sometimes support, and sometimes protest against Chinese investment and decipher how their support affects biodiversity outcomes in the area. The highest priority action item is thus assisting local conservation organizations in two tasks: 1) strengthening the EIA framework and implementation and 2) facilitating platforms for affected communities, government agencies, and researchers to meet and discuss projects.

Priority Recommendations

There are a series of challenges that funders can directly invest in mitigating in order to strengthen biodiversity conservation efforts surrounding linear infrastructure development in Pakistan:

- a. Long-term recommendation: Focus on biodiversity conservation at the planning stages. To do so, recommend that funders utilize and strengthen policy infrastructure, specifically EIAs.
 - i. Short-term starting point for long-term goal: Ensuring EIAs are conducted accurately and thoroughly for each project. The most pressing challenge is the lack of a well-trained workforce that operates within high standards to conduct environmental impact assessments of linear infrastructure projects. It is important to define specific, achievable, and efficient standards for EIAs that are enforced by national and provincial governments--advocating this to Provincial Environment Protection Agencies is especially critical because they assess EIAs, and may have enough bargaining power to propose changes to the EIA process to the national government. Developing and training teams within organizations that conduct EIAs. Can partner with advocacy groups like WWF to encourage stronger enforcement of EIAs (pre-project construction) at the national and provincial levels – especially through the CPEC Authority. An evaluation and enforcement tool, like federally designated criteria for robust EIAs, could be effective to develop in a multi-stakeholder format, alongside NGOs, EIA-conducting organizations, government agencies, and civil society. Gilgit-Baltistan has many LI projects that are still in the planning stages – conservation efforts may be best placed there.
- b. Long-term recommendation: Supporting efforts to build multi-stakeholder platforms to facilitate discussions on biodiversity conservation and BRI projects.
 - i. Short-term starting point for long-term goal: Collaborate with WWF, which has already designed a methodology for developing multi-stakeholder platforms to engage individuals from local and indigenous groups, civil society, government, industry, and others to discuss regional biodiversity conservation. They require funding to initiate these platforms and produce research outputs based on their discussions with stakeholders on effective strategies to integrate biodiversity conservation into the planning of LI projects and infrastructure projects more generally.
- c. Long-term recommendation: Collecting and centralizing data on the effect of Chinese-funded linear infrastructure projects on biodiversity.

- i. Short-term starting point for long-term goal: Funding academic research groups in Pakistan, WWF, IUCN, and their partners who are already attempting to do this work but don't have enough capacity or resources to work on it. Using funding to hire Chinese infrastructure specialists will be effective.
- d. Long-term recommendation: Strengthening the governance of ecological reserves in Pakistan
 - i. Short-term starting point for long-term goal: Develop uniform criteria and regulations for existing nature preserves and encourage their enforcement at the provincial level. Provincial Environment Protection Agencies and biodiversity advocacy groups will be appropriate local partners.
- e. Long-term recommendation: Building up a team of engineers, data scientists, and conservation biologists to provide alternative options to detrimental linear infrastructure projects.
 - i. Short-term starting point for long-term goal: Build up teams at research-oriented advocacy organizations that have the internal technical capacity to conduct studies on alternatives after EIAs are conducted. These organizations should have a close working relationship with those working on the EIAs, or at least those enforcing them. Future roads and railways must avoid further fragmentation, existing roads and railways should be modified to restore wildlife movements, and fences should be modified or removed to allow wildlife migration. Pakistan's position connecting BRI's land and sea routes may affect the flexibility of LI development plans, and alternatives may be especially challenging to design.

Important Considerations

- Understanding the local political economy of development and public sentiment surrounding BRI projects is critical to the success of any biodiversity conservation initiative. Each intervention must be developed within the context of domestic politics, and potentially amended to reflect the rapidly changing public opinion surrounding BRI projects.
- Much of the country, like many developing nations, still operates within an environment vs. development dichotomy. This may be a challenge when trying to strengthen the EIA framework, as there may be pushback because stronger EIAs also may mean that more projects are rejected on the basis of ecological damage. This is why providing efficient alternatives in a timely manner is especially important.
- The CPEC Authority is notoriously opaque. Gaining information on the status of projects may be difficult, as even many bureaucrats do not have access to project information. It is especially important to have a positive relationship with government officials in order to access this information – WWF-Pakistan has effective strategies to do so.
- Best starting point partners in Gilgit Baltistan (recommended regional starting point by key informants due to many projects still in the planning stage to date): Gilgit Baltistan Provincial Environment Protection Agency, WWF-Pakistan, Karakoram International University-for Gilgit-Baltistan.

References

- Al Jazeera. 2020. "Pakistan's virus-idled workers hired to plant trees". Available from: <https://www.aljazeera.com/news/2020/4/29/pakistans-virus-idled-workers-hired-to-plant-trees>
- Anwar, M., A.W. Jasra and M.I. Sultani. 2005. "Conservation and Sustainable Use of Biodiversity in Pakistan—A Review." Available from: <https://www.tandfonline.com//doi/abs/10.1080/14888386.2009.9712858>
- Baig, Mirza B, and Faisal Sultan Al-Subaiee. 2011. "Biodiversity in Pakistan: Key Issues" Available from: <https://www.tandfonline.com/doi/abs/10.1080/14888386.2009.9712858>.
- CBD (Convention on Biological Diversity). 2022. *Pakistan Country Profile*. Available from: <https://www.cbd.int/countries/profile/?country=pk>.
- Custer, S., Dreher, A., Elston, T. B., Fuchs, A. Ghose, S., Lin, J., Malik, A., Parks, B. C., Russell, B., Solomon, K., Strange, A., Tierney, M. J., Walsh, K., Zaleski, L., and Zhang, S. 2021. Tracking Chinese Development Finance: An Application of AidData's TUFF 2.0 Methodology. Williamsburg VA: AidData at William & Mary. From Dreher, A., Fuchs, A., Parks, B. C., Strange, A., and Tierney, M. J. (Forthcoming) *Banking on Beijing: The Aims and Impacts of China's Overseas Development Program*. Cambridge, UK: Cambridge University Press.
- Ehtasham, Laraib, Sadia H. Sherani, Kiran Younas, Umana Izbel, Amna H. Khan, Anila Bahadur and Ali Akbar. 2021. "A Review of the Status of Environmental Impact Assessment In Pakistan. Integrated Environmental Assessment and Management" Available from: <https://setac.onlinelibrary.wiley.com/doi/abs/10.1002/ieam.4499>.
- Gul, Ayaz. 2018. "Pakistan's Incoming Government to Plant '10 Billion Trees'". VOA. Available from: <https://www.voanews.com/a/pakistan-incoming-government-to-plant-10-billion-trees-/4516212.html>
- Jalal, Ayesha. n.d. "Pakistan: A Political History." The Asia Society. Available from: <https://asiasociety.org/education/pakistan-political-history>.
- Khan, Abdul Qadir, and Adil Zaman Kasi. 2015. "The Tribal System in Balochistan: Its Administrative Organization and Modern Democracy." Balochistan Study Center. Available from: <http://web.uob.edu.pk/uob/Journals/Balochistan-Review/br.php>.
- Khan, Neshmiya A. 2021. "WWF-Pakistan's Sustainable Infrastructure Initiative". Conservation Corridor. Available from: WWF-Pakistan's Sustainable Infrastructure Initiative (conservationcorridor.org)
- Khan, Riz Mohammed. 2011. "Pakistan-China Relations: An Overview ." Pakistan Horizon, Pakistan Institute of International Affairs. Available from: <https://www.jstor.org/stable/24711187>.
- Kiani, Khaleeq. 2013. "Poor infrastructure a major hurdle to growth". Dawn News. Available from: <https://www.dawn.com/news/1044734>
- Kuo, Lily and Niko Kommenda. 2018. "What is China's Belt and Road Initiative?". The Guardian. Available from: [What is China's Belt and Road Initiative? | Cities | The Guardian](https://www.theguardian.com/cities/2018/sep/12/what-is-chinas-belt-and-road-initiative)
- Notezai, Muhammad Akbar. 2021. "What Happened to the China-Pakistan Economic Corridor?" The Diplomat. Available from: <https://thediplomat.com/2021/02/what-happened-to-the-china-pakistan-economic-corridor/>.
- UNEP. 2021. "Pakistan Ramps up Protected Areas." Available from: <https://www.unep.org/news-and-stories/story/pakistan-ramps-protected-areas#:~:text=In%202020%2C%20Pakistan%27s%20government%20launched,country%27s%20total%20area%20by%202020>.
- UNPO. 2011. "Gilgit Baltistan: Environmental Consequences of China's Incursion." Available from: <https://unpo.org/article/12286>.

People's Daily Online. 2003. "China, Pakistan Highlight Cooperation in Beijing." Available from:
http://en.people.cn/200311/04/eng20031104_127511.shtml.

Saeed, Rashid, Ayesha Sattar, Zafar Iqbal, Muhammad Imran, and Raziya Nadeem. 2012. "Environmental impact assessment (EIA): an overlooked instrument for sustainable development in Pakistan".

The Express Tribune. 2022. "Government Likely to disband CPEC Authority". Available from:
<https://tribune.com.pk/story/2356563/govt-likely-to-disband-cpec-authority>

World Wildlife Fund (WWF). 2017. "The Belt and Road Initiative: WWF Recommendations and Spatial Analysis".

World Wide Fund for Nature, and Pakistan and International Union for Conservation of Nature and Natural Resources, Pakistan. 2000. "Biodiversity Action Plan for Pakistan". Available from:
Government of Pakistan,, 2000, <https://portals.iucn.org/library/efiles/documents/2000-081.pdf>.

Xinhua. 2022. "GLOBALINK: CPEC Is a Unique Form of Cooperation Based on Friendship and Economic Prosperity: Pakistani President." Available from:
<https://english.news.cn/20220118/1c53861cc2fb442485ac3faf36e59490/c.html>.

Zhang, Hong. 2021. "Pakistan." The People's Map of Global China. Available from:
<https://thepeoplesmap.net/country/pakistan/>.

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, CLLC maintains 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 annex¹. 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 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

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.

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 analysis:

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

Pakistan	70th Percentile Core	80th Percentile Core	90th Percentile Core
CBI Core Area (km ²)	261843	175181	87155
Overlap with Protected Areas (km ²)	8337.4	6916.05	1390.08
Percentage of CBI Core within PAs (%)	3.18412	3.94795	1.59495

Chinese-funded LI across Pakistan

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

LI Mode	Length
Road (km)	1580.707477
Rail (km)	25.1677
Transmission (km)	0

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

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

LI Mode	Length
Road (km)	139.514297
Rail (km)	0
Transmission (km)	0

Length of Chinese-funded LI within CBI Cores in Pakistan

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)	633.175482	448.081067	175.589573
Rail (km)	0	0	0
Transmission (km)	0	0	0