Horizon Scan of the Belt and Road Initiative (BRI)

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Abstract

The Belt and Road Initiative (BRI) represents the largest infrastructure and development project in human history, and presents risks and opportunities for ecosystems, economies, and communities. Some risks, (habitat fragmentation, roadkill), are obvious, however many of the BRI's largest challenges for development and conservation are not obvious and require extensive consideration to identify. In this first BRI Horizon Scan, we identify eleven frontier issues that may have large environmental and social impacts but are not yet recognised. More generally, the BRI will increase China's participation in international environmental governance. Thus, new cooperative modes of governance are needed to balance geopolitical, societal, and environmental interests. Upgrading and standardising global environmental standards is essential to safeguard ecological systems and human societies.

Challenges of the Belt & Road initiative

The Belt and Road Initiative (BRI) is the largest and most ambitious global infrastructure initiative ever planned. Spanning 65 countries in its initial phase (with global expansion progressing) and with five components (policy coordination, transport connectivity, trade facilitation, currency convertibility, and people-to-people exchanges; **Box 1**), the BRI presents a suite of both well-known and novel challenges and opportunities to natural and social systems. To date, most research has focused on the potential impacts of the transport-connectivity component, which involves the building of roads, railways, and pipelines (the 'Belt'), seaports along maritime-shipping routes (the 'Road'), and special economic zones along these new transport links, and which can be subdivided into *direct* impacts (in the vicinity of construction, i.e. habitat loss and fragmentation, roadkill, and disruption of migratory routes [1]; [2]), *indirect*

67 impacts (e.g. supportive infrastructure, pollution), and *displaced* impacts (e.g. raw material
68 extraction, climate change). However, a more holistic approach is needed to identify less obvious
69 but potentially equally important impacts of a project of this scale and complexity; and few prior
70 studies have included the interdisciplinary teams needed to assay the consequences of the
71 intersection of social, economic, and environmental issues, and how associated risk may be
72 appropriately managed (see Outstanding questions).
73 Some media reports have taken alarmist perspectives on the potential risks posed by the BRI
74 ([3,4]), while other sources highlight its potential to act as a catalyst for green infrastructure
75 development while enhancing human welfare and environmental health. Either way, careful and
76 well-reasoned analysis and debate are needed to generate solutions to potential problems, to
77 avoid or mitigate negative impacts, and to maximise emerging opportunities. Here, we look to
78 the future to identify "frontier horizon issues" that may have large impacts within a few years but
79 are not yet generally known to policymakers or academics, and provide suggestions of solutions
80 and approaches to mitigate them.
81
82 **Frontier Issues Identification**
83 An interdisciplinary group of researchers was assembled to identify 'frontier horizon'
84 environmental and social issues for the BRI using a modified Delphi method (Supplemental
85 Methods). One hundred issues were initially submitted, then revised to 63 issues for voting.
86 After voting, 33 issues (19 environmental and 14 social) were retained for in-depth discussion
87 and on-site voting (Supplement 2). Of these, eleven issues were retained, being considered likely
88 to have major impacts within the next few years but not yet well-known to policymakers or
89 academics. These final-list issues are approximately half social and half environmental, though

most have implications for both. The top eleven issues were scored similarly by (self-identified) natural and social scientists, whereas lower ranked issues were more variable. Seven other issues were deemed high impact but insufficiently novel, with the natural scientists generally giving these six lower scores (Supplements 1). Two examples are (1) the prospect of 'Cryptic PADDD' (Protected-Area Downgrading, Downsizing, and Degazettement) driven by BRI routes fracturing existing reserves or displacing people into protected areas and (2) the loss of distinct native crop and livestock breeds/varieties, due to market pressures under globalising systems that homogenise food systems. The eleven final-list issues are presented below in descending order of their combined scores.

Frontier issues

1. Groundwater pumping threatening the viability of freshwater ecosystems

Rapid decline of natural river ecosystems was recognised as one of the most acute problems related to the BRI, as changing power and irrigation demands means damming of free-flowing rivers across many BRI regions. Yet surface-freshwater ecosystems (lakes, wetlands, rivers, and streams) are vulnerable not only to direct damming, but also to loss of 'baseflow supply' from groundwater reservoirs. Baseflow supply is essential to maintain continuity of water flow through dry periods and to supply the cool, clean, oxygenated water that is required for the survival of aquatic food webs during warm summer months [5]. Long before groundwater storage levels have been substantially depleted, pumping can reduce groundwater baseflows into surface waters by enough to threaten the viability of aquatic ecosystems [6]. High-resolution modelling now suggests that by 2050, under a business-as-usual groundwater-pumping scenario,

aquatic ecosystem viability will have been or will begin to be threatened in 42-79% of watersheds around the world [6]. Because many of these threatened aquatic ecosystems are in regions traversed by the BRI, such as Central Asia (Figure 1a), groundwater pumping rates will likely rise due to demand for infrastructure (e.g. concrete), mining, and agriculture. Severe groundwater depletion can also cause water flows to reverse from surface to underground, resulting in contamination by metals, nutrients, and pesticides into groundwater reserves, potentially restricting future groundwater use and harming little-known subterranean biodiversity [7]. Identifying areas most at risk (i.e. see Fig 1) and avoiding development already at risk of groundwater depletion is a simple step to minimise the probability groundwater depletion, whilst more holistic assessments of alternative sources of power provision may provide less environmentally harmful outcomes for ecosystems and societies along the route.

2. Invisible invasives: incidental spread of fungi, bacteria, and viruses

Though the risk of invasive plant and animal species along new transport routes is well-acknowledged, the risk posed by smaller invaders is frequently overlooked [8]. Microorganisms are omnipresent and important for ecosystem services such as decomposition, and the vast majority are unknown, with <1% of expected species described for bacteria and fungi [9]. For example, a study in Thailand found that 96% of inventoried fungi were undescribed, with their invasive potentials unknown along the core BRI route [10]. Although few microbial species are directly pathogenic on humans, they are important [11], and plant-pathogenic microbes may endanger food security across highly-populated developing countries across the BRI [9]. Increased traffic of people and livestock along BRI routes also provide a risk of spread of diseases. Epidemics in amphibians [12], bats [13], and Saiga antelope [14] originated in Eurasia

and demonstrate the potential impact of disease on species and populations. Local microbial communities might also be exposed to competitive displacement, with unknown effects on soil functioning and the possibility of increased pathogenicity, since greater prevalence raises the probability of resistance development [15]. With enhanced connectivity among regions facilitated by BRI, biosecurity screenings and more stringent waste-disposal standards will become progressively more vital to prevent the potential of the spread of disease to naïve populations.

3. Cementing extinction

Sand-mining is a known biodiversity threat [16], but the impact cement production on limestone ecosystems is often overlooked. About 20% of terrestrial ecosystems are limestone-based karsts [17]; in Southeast Asia, this equates to ~800,000km^2. A single karst formation can host over twelve known site-endemic species, and it is estimated that 90% of karst-cave invertebrate species are still undescribed [18]. In Southeast Asia, these ecosystems lose about 6% of their area annually, largely for cement extraction. As a reference measure of cement demand, China itself accounts for around 63% of annual global cement consumption, at an equivalent of around 1.7 tonnes for each of its 1.34 billion people [19]. Many regions across the BRI preferentially use cement in road construction, given lower costs and higher durability, which will likely cause a significant increase in the mining of karsts for limestone [1]. Consequently, these irreplaceable karst ecosystems may be some of the most threatened by BRI, despite many being distant from BRI routes, and careful sourcing policies (or the use of alternatives to traditional cement such as polymers) will be needed to minimise the impacts of increased cement demand.

4. Polar/Arctic Silk Road

The thawing Arctic icecap is enabling marine traffic and increasing extraction pressures for natural gas, oil, fish, and minerals, creating the so-called 'Polar/Arctic Silk Road'. In 2017, liquefied natural gas (LNG) icebreaking tankers with cargo capacities of 172,600 m^3 started operation [20], and over 20 million tons of LNG have already been shipped from Russia's Yamal LNG plant. The infrastructure for LNG plants has disrupted ecosystems [21] and impacted indigenous communities [22]. Increasing traffic in new shipping lanes risks marine-mammal collisions and the pollution of their habitats [23], and the reduction of Arctic sea-ice is already implicated in the transfer of phocine distemper virus from Atlantic to Pacific marine mammals [24]. Melting ice and permafrost also release diseases frozen for thousands of years, and measures need to be taken to ensure the preservation of new long frozen specimens, their screening for potential infections, and to monitor the release of mercury [25]. The precautionary approach has been widely endorsed [26] but cannot survive this acceleration into 'new passageways and new trade opportunities' [27]. Hence there is a need for an overarching legal treaty to provide environmental governance in the Arctic, both to maintain terrestrial and aquatic habitats and to provide adequate biosecurity measures.

5. Coastal ecosystems under threat

Coastal ecosystems tend to fall through the gap when considering terrestrial or marine systems, yet they are under huge threat as the interface between the maritime and terrestrial components, subject to increased shipping, new port development, and reclamation as well as pollution. The EAAF (East Asian–Australasian Flyway, a bird migratory route) spans much of East and Southeast Asia's coastlines, but coastal reclamation and pollution, especially key breeding

grounds around the Yellow Sea, have already driven the loss of over 70% of some species populations for the estimated 50 million migratory birds that annually use this route [28]. The development of ports and reclamation of further coastlines for the maritime component of the BRI could prove disastrous for these species [29], especially given that around the Yellow Sea, 61% of priority bird sites are unprotected and tidal flats have decreased in area by 65% since the 1950s. Protected-area shrinkage has also been highest in coastal systems at 55% loss, relative to 3% average for China [30], reflecting the rapid loss and under-protection of coastal systems. Construction of industrial, agricultural, and aquaculture parks as well as new ports is impacting the coastline via sedimentation, destruction of biota, and pollution [31]. New guidelines for the sustainable management of these systems, and the identification and preservation of key sites are urgently needed to provide adequate protection for coast-dependent species.

6. BRI and Traditional Chinese Medicine supporting and stimulating a market in wildlife trade

Promotion of Traditional Chinese Medicine (TCM) is a central component of BRI "people-to-people exchange" goals. Formal agreements have been signed between China and BRI countries on cooperation related to traditional medicine [32], and TCM training centres are being established along BRI routes [33]. Active TCM promotion, coupled with its inclusion in the World Health Organization's 2019 International Classification of Disease [34], will likely increase demand, use, and access to TCM products globally. Chinese overseas workers on BRI infrastructure projects might increase demand for threatened wildlife locally, and/or export wildlife products back to China. In addition, the BRI's increased connectivity and access to previously unreachable wild places that could facilitate the sourcing from new areas of wildlife-

205 based TCM ingredients, along with species for pets, ornamentation, and food [35], all of which
206 increase the risk of new arising zoonotic diseases and/or the transmission of those diseases along
207 the BRI. Existing international and national legal mechanisms are insufficient to prevent illegal
208 trade in endangered species between China and the countries involved in the BRI [36]. However,
209 if measures are put in place to develop sustainable supply chains, new markets for some TCM
210 products could also support sustainable development and rural livelihoods [37], potentially
211 supported by China's newly announced supply-chain tracking system to ensure ingredient
212 quality and safety (http://www.china.org.cn/china/2019-11/21/content_75431126.htm).
213
214 **7. Harmonizing international and national environmental standards in BRI foreign**
215 **investment projects**
216 Mismatches frequently exist between international and domestic legal, environmental, and social
217 standards (i.e. requirements of environmental or social impact assessments, and monitoring as
218 conditions of financing). This creates challenges in the setting of locally appropriate standards
219 and in the forms of investment that should be funded by BRI, even before considering
220 enforcement. The lowering of trade barriers could mean that jurisdictions with laxer
221 environmental regulations become attractive to polluting industries [38], or that competition for
222 reducing costs forces down international standards. High-level policy on BRI (i.e. Greening the
223 BRI [39]) as well as policies and regulations within China (i.e. 'Ecological Civilization')
224 advocate for environmental and social protection, and green development. However, how these
225 policies translate on the ground remains unclear, particularly beyond China's borders. Little
226 alignment in standards and safeguards from the International Finance Corporations, development
227 banks and Equator Principles institutions with Chinese financial institutions has occurred to date.
228 However, China's multilateral investment bank, the Asian Infrastructure Investment Bank [40],

has adopted environmental and social safeguards resembling those of other development banks and committed to review them every three years [41]. There is also the argument that engaging with multiple stakeholders can help 'scrutinise contracts, flag bad deals, and empower countries to push for better terms,' as shown in the case of Myanmar, where a US task force facilitated renegotiation of the Kyaukphyu special economic zone development to protect human rights of people in the region (https://ejatlas.org/conflict/kyaukpyu-special-economic-zone). International actors are also pushing for the development of a project bank to improve screening and transparency mechanisms for investment projects [42], suggesting that with the right impetus, the BRI could propel a global rise in environmental and social standards.

8. Securing the inclusive governance and management of 'Territories of Life' and recognising the role of 'culture' in conservation of biodiversity by indigenous and local communities

Over a quarter of the world's land across 87 countries falls under local collective governance, overlapping 40% of terrestrial protected areas and numerous key biodiversity areas (KBAs) [43] (Figure 1b). It is unlikely that any of the global goals of increasing protected area coverage and management effectiveness can be achieved without including these "Territories of Life" (territories/areas conserved by indigenous peoples and local communities) and their custodians [44]. BRI projects transect numerous such territories, but the potential social and environmental impacts are unquantified, and laws often provide insufficient protection (Figure 1b). Custodian communities should be included throughout all stages of planning and implementation to ensure cultural continuity and sharing of benefits, to enable wellbeing [45] and sustainable livelihoods, particularly in pastoral communities [46]. Multifaceted values of territories and biodiversity

require careful consideration, and the roles of culture and inclusive conservation within sustainable development need recognition and inclusion [47]. BRI projects need action plans that protect the rights of indigenous and local communities and ensure their full participation in environmental management and other development dialogues relevant to those projects. Common values regarding all socio-ecological systems affected by BRI need identification and inclusion [48] to enable more pluralistic societies to develop and prosper together.

9. The environmental consequences of geopolitical rivalry over infrastructure financing

In response to the BRI, other G20 countries have proposed global and regional development initiatives, such as the EU Strategy on Connecting Europe and Asia [49], the U.S. International Development Finance Corporation, and the Australian Infrastructure Financing Facility for the Pacific [50], which could accelerate investment in large physical infrastructure, potentially entailing less-thorough analysis of alternative, sustainable development options. Such geopolitical rivalry at the international level, combined with commercial competition for specific projects, could in turn decrease the appetite of sponsors and financiers for confronting corruption, scrutinising governance weaknesses, and addressing environmental and social risks in host countries [51]. Competition with BRI projects might exacerbate debt-fed, large-scale, top-down megaproject developments and perpetuate low-quality strategic development planning. For example, in 2019, the US, Australia, New Zealand, and Japan announced a commitment to connect 70% of Papua New Guinea's population to a nationwide electrical grid, which was reported as an explicit counterbalance to China-financed infrastructure projects in PNG [52]. Such competition could have consequences for the environment, as standards may be

compromised to compete, especially in time-limited projects. This project has been criticised for its failure to take advantage of greener and cheaper local-power-generation options. Another example of such rivalry is the funding of river damming projects by the World-Bank, which stopped in 1997 following the World-Commission on Dams report on the impact of large dam projects. But this decision was reversed twenty years later due to funding by China and Brazil, despite their well-recognised ecological consequences [53].

Alternatively, 'counter-BRI' initiatives could raise standards for more inclusive, environmentally sustainable, and locally-driven development (i.e. the World Bank's Environmental and Social Framework, Japan and the ADB's Partnership for Quality Infrastructure) [54], given that some of these new initiatives emphasise sustainability and high quality.

10. Regreening the never green: "Anti-desertification" and "restoration" in natural ecosystems

Across Central-Asia along the route of the BRI, there are efforts to counter desertification through large-scale planting of drought-resistant and deep-rooted species. However, some of these efforts aim to convert native deserts and savannas into more economically productive systems. For example the conversion of a third of the Kubuqi desert (Inner Mongolia) to productive landscapes, with plans for expansion across Central Asia. The Chinese company ELION claims that biodiversity has increased in their projects (http://www.elion.com.cn/en/), but third-party supporting evidence or standardised inventory data do not seem to exist, which raises potential risks of reduced ecosystem functioning and invasion by alien animal and plant species. For instance, tree-planting campaigns have been used to combat erosion and climate change in other native ecosystems (e.g. savannas [55]), but when composed of non-native species, they

298 have reduced native biodiversity [56] and lowered the water-table [57] and actively damaged
299 native biodiversity. Yet, these schemes are still championed to "combat climate change" despite
300 often being less effective than native functional ecosystems and at huge potential cost to
301 biodiversity, as has been demonstrated with the AFR100 scheme, which aims to afforest native
302 grassy-biomes across Africa ([58]). These "regreening initiatives" are being actively explored by
303 arid countries along the route of the BRI (Kubuqi Forum 2019: http://en.kubuqiforum.org/). A
304 BRI-facilitated drive for afforestation as climate-change mitigation and anti-desertification
305 measure based on monocultures and/or on non-native and water-thirsty species could reduce
306 native biodiversity, by changing the dynamics of natural systems, especially if conducted with no
307 inventory of native diversity. To minimise ecological risk better methods for inventorying native
308 diversity are needed, in addition to policies that target systems which requiring restoration or
309 rewilding, rather than modifying viable native ecosystems for commercial gain.
310

311 **11. Willingness to build infrastructure in existing conflict zones**

312 At the international level, policy frameworks and codes of conduct for undertaking large-scale
313 infrastructure projects in conflict zones do not exist, and the standard response to conflict has
314 been to restrict investment. Such 'frozen conflicts' can break connectivity and drive up
315 inefficiencies, cause large diversion routes to bypass conflict zones, as exemplified by the
316 closure of borders to Armenia by Azerbaijan and Turkey, which in turn has resulted in billions of
317 dollars of compensatory road building to facilitate trade between Azerbaijan and Europe [59]. In
318 the West, infrastructure building in conflict zones has been thought only to provide a barometer
319 of the likelihood of transition out of conflict [60]. In contrast, since the conflict in Darfur, Sudan
320 in 2007, China has advocated economic development as a driver of peace and a primary means

of post-conflict reconstruction [61]. However, on the China-Pakistan Economic Corridor (including Pakistan-occupied Kashmir), the construction of roads and rails to link Xinjiang in China with the Indian Ocean has required a large security force to ensure the safety of BRI projects [62]. The Kyaukpyu-Kunming railway and three new Special Economic Zones in Myanmar intersect with conflict zones that are currently occupied by independent army groups (Figure 1c). The diversion of resources for security reduces the scope for carrying out environmental and social impact assessments and addressing other critical issues such as water conservation, wildlife trafficking, and the modification of infrastructure to avoid environmentally and socially sensitive areas. Infrastructure projects in such regions could also exacerbate existing social tensions and environmental challenges. Navigating such challenges is difficult, and may require the development of additional funding programs in areas where the cost of security reduce the budget available for carrying out standardised environmental assessment.

Discussion

Many of the 100 issues in our initial list were considered high impact but not novel and thus were not included in the final list of 11 frontier issues (Supplements 2). However, to our knowledge, no holistic interdisciplinary evaluation of even the non-novel impacts exists for any given geographic region. Though ecological analyses have been conducted [1,51] analysing environmental impacts is challenging due to the lack of biodiversity data for many BRI regions, and have largely ignored more complex topics or the interactions between environmental and social issues.

The role of China in shaping global environmental governance.

China's BRI presents both risks and opportunities for economies, ecosystems, and human societies. In the current geopolitical climate, we are witnessing a build-up of competition that threatens to undermine international cooperation. As the centre of global power shifts, conflicting strategic and economic concerns between China and other parts of the world will only become more pronounced. New modalities of global governance thus must seek to reconcile diverging national interests while mitigating friction between different groups of stakeholders, in the pursuit of improved environmental and social standards. Above all, to ensure long-term sustainability, social and environmental impact assessments need to be fully integrated into BRI-mandated projects. In many of these issues, there is a clear trade-off between development and sustainability, and though some issues may be effectively managed through financial policies, which require EIA with oversight, and may only require bilateral or even just donor based policy consideration, others such as provisions to protect against fallout from geopolitical rivalry, may require more global agreements, such as international conventions. Issues such as access to water are likely to become more pronounced; thus equitable modes of Governance need to be developed to ensure with water access is not impacted by demand from other countries.

In addition some issues highlight the importance of the inclusion of diverse voices, and the development of processes that ensure their role from planning to development. There is also the need to develop safeguards to protect cultural diversity and local varieties in formerly isolated areas.

Looking to the future

Many of the issues that we identified in our Horizon Scan, especially issues 6 (TCM supply-chain tracking), 7 (harmonization of environmental standards), 9 (geopolitical rivalry) and 11 (building in conflict zones) suggest that China will need to increase its participation in the

structures of global environmental governance. Domestically, China has recently instituted a high-level policy of achieving an 'Ecological Civilization', which includes as one of its measures the definition and protection of 'ecological redlines,' which are the minimal areas needed to guarantee ecological functioning and biological diversity [63]. This is arguably the largest ecosystem-service-protection policy in the world, and its implementation, assessment, and enforcement are posing large challenges to China's scientists and policymakers [64]. Important questions to ask are whether China will apply the ecological redline concept to the BRI, and if so, how the governance of such an approach can be instituted in a more complex international environment (see Outstanding Questions).

Alternatively, the build-up of economic competition within the international system may fuel a race to the bottom. Thus, new cooperative modes of governance are needed to balance a wide range of geopolitical, societal, and environmental interests. Upgrading global environmental standards is a prerequisite for ensuring a more sustainable and equitable BRI that can play a role in safeguarding the future of ecological systems and human societies.

Box 1. What is the Belt and Road Initiative?

The Belt and Road Initiative (BRI; One Belt One Road (一带一路), Silk Road Economic Belt and the 21st-Century Maritime Silk Road) was officially launched in 2013 by China's President Xi Jinping as the modern version of the historical Silk Road, which had for centuries facilitated trade and cultural exchange across Eurasia. The BRI is primarily intended to increase trade and connectivity amongst China, Central and South Asia, the Middle East, Europe, and Africa [65], though global expansion is underway. This will be achieved by advancing BRI's five main

components: policy coordination, transport connectivity, trade facilitation (i.e. more efficient border crossings), currency convertibility, and people-to-people exchanges.

The BRI's initial geographic coverage encompassed 65 countries (including China) across mainland Eurasia, Africa, and the Middle East, although the BRI 'brand' has since been applied to many other China-financed projects globally. Consequently, it is difficult to delimit the amount of China-sourced finance that will be spent on the BRI, but one estimate is >US$100 billion/yr 2017-2027 [66]. To put this in perspective, the European Bank for Reconstruction and Development estimates the 2018-2022 infrastructure spending needs of the 36 countries in its remit (largely overlapping with the BRI) as >US$320 billion/yr, with two-thirds needed for transport connectivity [59]. While there is talk of integration between the BRI and other regional infrastructural plans, concrete actions are incipient (ASEAN-China Joint Statement on Synergising the Master Plan on ASEAN Connectivity (MPAC) 2025).

To fulfil the strategic visions of the BRI, numerous projects aim to generate new high-resolution data and improve the capacity to plan and understand the impacts of the route. For example, the "Digital Silk Road" (DBAR) has been developed with an initial budget equivalent to US$32 million [67]. DBAR aims to provide high-quality remotely sensed data to overcome present data deficits (the "digital divide") to apply remotely sensed data as a tool for global targets and challenges such as the SDGs and to better inform sustainable development across BRI partner countries [68]. DBAR also aims enable scientific cooperation across BRI regions, thus an Alliance of International Science Organisations of the BRI region has been established, including over 120 nations, in addition to regional alliances [69].

411 The cultural component of BRI should not be overlooked and has already included over 10,000
412 scholarships, >240% increase in tourist visits, and 374 training facilities for cultural activities
413 (such as TCM) in BRI countries
414 (https://news.cgtn.com/news/3d3d674d7841544d34457a6333566d54/index.html).

415 Understanding the BRI and associated impacts and opportunities requires consideration of all
416 components of the BRI vision, including not only hard infrastructure, but also social,
417 environmental, economic, and technological change. Most studies have focused on the impact of
418 hard-infrastructure to the ecosystems traversed by the BRI [1], which though significant are only
419 a part of the environmental and ecological implications of the initiative. As highlighted above
420 BRI has the scope to have global impacts that are less obvious but simultaneously provide
421 opportunities for new forms of governance.

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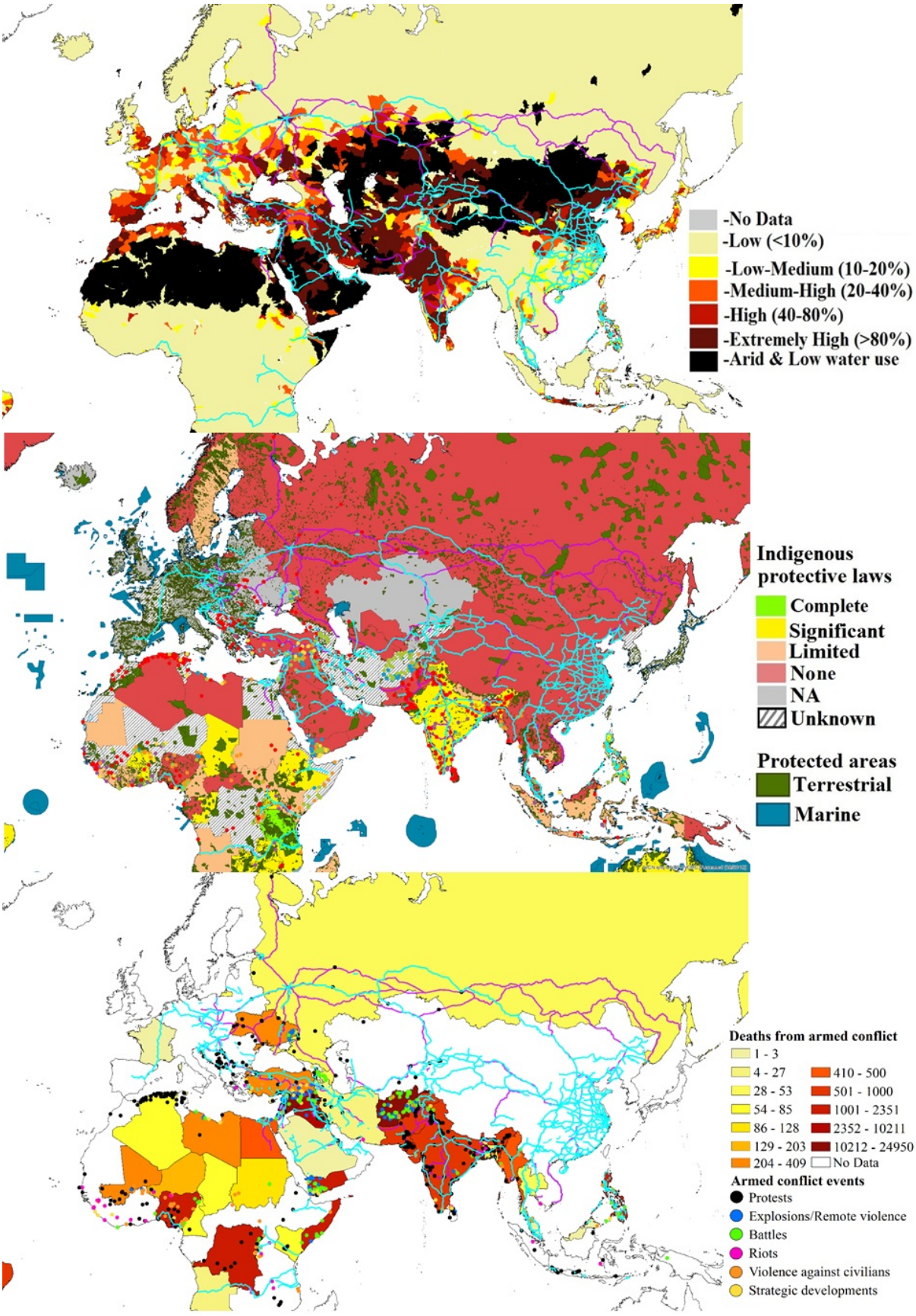
Figures 1a-c. Spatial overlaps between BRI-associated roads (light purple) and railways (light blue) in Eurasia and Africa with **(a)** groundwater supply projection for 2020 based on the RCP of 2.5, SSP2 at the CMIP5 phase (as projections were most complete for 2020), **(b)** indigenous territories (scale is progress towards providing legal security for indigenous groups) and state-protected areas, and **(c)** conflict areas and level of conflict. Some of these routes already exist but may be rebuilt, upgraded, resurfaced, enlarged or have new routes built to replace them. Routes continuous to those built as part of the BRI are expected to receive additional traffic from BRI-facilitated trade (e.g. some of those in China, India, and the EU). Sources of data and figure construction are detailed in supplemental methods.


-No Data
-Low (<10%)
-Low-Medium (10-20%)
-Medium-High (20-40%)
-High (40-80%)
-Extremely High (>80%)
-Arid & Low water use
Indigenous protective laws
Complete
Significant
Limited
None
NA
Unknown
Protected areas
Terrestrial
Marine
Deaths from armed conflict
1 - 3
4 - 27
28 - 53
54 - 85
86 - 128
129 - 203
204 - 409
410 - 500
501 - 1000
1001 - 2351
2352 - 10211
10212 - 24950
No Data
Armed conflict events
Protests
Explosions/Remote violence
Battles
Riots
Violence against civilians
Strategic developments

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