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Environmental Challenges, Opportunities, and Policy Implications to Materialize China's Green Belt and Road Initiative

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Abstract: China's Belt and Road Initiative (BRI), announced in 2013, is an unprecedented mega-project that aims to improve connectivity between China and over 70 countries through infrastructure investment and regional cooperation. It has unparalleled potential to bring about positive economic development across vast regions of the world but, at the same time, may inevitably come with considerable environmental challenges. Even so, opportunities exist to prevent or mitigate environmental risks and realize China's promise of a green BRI. China has proposed to construct a green BRI. The existing environmental law framework of host states, green development practices by China and BRI participating countries, and the role of bilateral investment treaties (BITs) as well as multilateral environmental agreements (MEAs) all increase the odds of a green BRI. This article contributes to existing BRI-related literature by examining the environmental challenges and opportunities of the BRI and providing suggestions on building a comprehensive environmental protection mechanism. It is suggested to stringently implement environmental norms and green BRI policies, make greater use of BITs and MEAs, bring together various actors, mobilize all available resources, and establish an efficient environmental dispute settlement and environmental remediation system.

Keywords: belt and road initiative; environmental challenges; environmental opportunities; green belt and road; comprehensive environmental protection mechanism; China

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1. Introduction

The Belt and Road Initiative (BRI), encompassing the Silk Road Economic Belt and 21st Century Maritime Silk Road, is a large-scaled economic and geopolitical strategy launched by China in 2013, aiming to facilitate trade and promote connectivity and cooperation among countries in Eurasia and some African countries. The "Vision and Actions on Jointly Building Belt and Road," released by the Chinese government, has defined five priority areas for cooperation: policy coordination, facilities connectivity, unimpeded trade, financial integration, and people-to-people bond [1]. As of 23 June 2021, China has signed 206 BRI cooperation documents with 140 countries and 32 international organizations [2].

As a global economic cooperation initiative involving more than 70 countries that account for two-thirds of the world's population and one-third of global GDP [3], the BRI could provide unprecedented economic cooperation opportunities and has revealed unparalleled economic potentialities, especially in accelerating economic growth of poverty-stricken areas under the BRI framework. According to the estimation of the World Bank Group (WBG), if completed, BRI transport projects alone could reduce travel times along economic corridors by 12 percent and with the rest of the world by an average of three percent; increase trade between 2.8 percent and 9.7 percent for corridor economies and between 1.7 percent and 6.2 percent for the world; and increase income by up to 3.4 percent, lifting 7.6 million people from extreme poverty and 32 million from moderate poverty [4] (p. XIII). Therefore, the BRI has become a big attraction to countries in such regions as Central Asia [5].

Despite those potential economic benefits, such a large, cross-border project entailing the expansion and upgrading of such colossal infrastructure as roads, railways, airports, ports, power stations, and pipelines, comes with considerable risks. In addition to causing possible economic issues to local communities, such as disproportionally reallocating economic benefits and losses [6], it may pose daunting environmental and climate challenges. China has proposed to construct a green BRI [7], but still, possible environmental repercussions, such as worsening pollution, depleting resources, and sabotaging land, water, and wildlife as well as escalating climate change, have become a cause for deep concern and a target for criticism [8–10]. Many scholars have pointed out the BRI's potential impact on global greenhouse gas emissions in the future [11,12]. It is blamed for hindering the realization of the emissions targets in the Paris Agreement [13–15] and tipping the world into catastrophic climate change [16].

Having said that, those environmental challenges can be turned into opportunities for environmental stewardship and provide China with a chance to promote its view of ecological societies [13,14] if a well-designed, comprehensive environmental protection mechanism is put in place. For such a sustainable scenario, BRI needs to capitalize on and further existing opportunities for green development, including green BRI policies, environmental norms, and green development practices of China and participating countries' BITs as well as international environmental law framework.

This article has strong policy implications for government regulators, policymakers and BRI investors. Contributing to the literature on the BRI, this article aims to examine the environmental challenges and opportunities of the BRI and provide corresponding policy implications on the construction of a comprehensive environmental protection mechanism for the BRI. It provided the following suggestions: (1) stringently implement environmental norms and green BRI policies; (2) make greater use of BITs and MEAs; (3) bring together various actors and mobilize all available resources; and (4) establish an efficient environmental dispute-settlement and environmental remediation system.

The rest of this article is organized as follows: the second section introduces the research methods, the third section discusses the environmental challenges confronted by the BRI, and the fourth section analyses potential environmental opportunities. On this basis, the fifth section puts forward policy implications to build a comprehensive environmental protection mechanism for the BRI. Finally, the sixth section concludes this article.

2. Research Methods

To achieve the research objective, that is, to find out the environmental challenges and opportunities of the BRI and to provide suggestions on addressing such challenges, this research mainly employed qualitative research methods.

The research process was divided into three steps. The first step was to collect data and information. To ensure the authenticity and credibility of those data and information, the researcher carefully selected the source basis. It downloaded policy documents concerning the BRI from the official website of the Chinese government, such as that of the State Council and the Department of Commerce of the People's Republic of China. It investigated BITs between China and BRI-participating countries, existing MEAs that may contribute to the greening of the BRI, and BRI-related cases with the commonly used legal research tool, Thomson Reuters Westlaw. The research referred to pertinent academic research from the trusted citation database Web of Science. It also collected data produced by the World Bank Group, the World Wildlife Foundation, the National Resources Defence Council, and the World Resources Institute, etc., from their official websites, respectively. More importantly, to ensure that relevant data truly represent the case of China and the BRI, the researcher cross-checked data from different sources. For instance, as regards the MEAs China has acceded to, it checked both Westlaw and the University of Oregon International Environmental Agreements (IEA) Database to ensure data consistency. Moreover, to reduce the impact of potential biases, it not only collected news released by the Chinese media,

such as China Daily and Xinhua News, but also examined western media coverage, such as the Guardian.

The second step was to select the fitting data, ideas, and themes and to systematically categorize them into different sections of the research topic so as to make preparations for further analysis. Based on the first two steps, the third step was to explore the research topic in detail and carry out in-depth analysis. During this process, a set of analytic strategies of qualitative research were applied, including document analysis, data analysis, and case studies. Document analysis has evolved into one of the most used qualitative methods in nearly every field. In this research, it mainly refers to the examination, interpretation, and evaluation of governmental policy documents, news, existing academic research, and relevant legal documents, such as BITs and MEAs. Data analysis in this research includes analysis of both qualitative data and quantitative data originally produced by existing research. In addition, this research also cited and analysed a series of BRI environmental cases as empirical evidence. All these analytic strategies were designed to identify potential environmental challenges and opportunities of the BRI and to come up with feasible means of materializing a green BRI, which constitutes the purpose of this research.

3. Environmental Challenges of the BRI

As with other major infrastructure projects, the BRI is inevitably fraught with environmental challenges. Most of BRI participating countries are developing countries featuring varied environment and climates with prominent ecological issues, and some countries prioritizing economic development have not paid adequate attention to environmental protection. The implementation of the BRI may make matters worse. Infrastructure construction and energy exploitation may further increase the discharge of pollutants and consumption of resources, including the extraction and use of raw materials and exploitation of oil and gas reserves that may exceed the rate of renewal. It may also negatively impact biodiversity by chopping up habitats, increasing wildlife mortality, pollution, and spread of invasive species, as manifested by the preliminary spatial analysis of the World Wildlife Fund (WWF) [17].

Besides, many BRI routes run through geodynamically active areas that are vulnerable to flooding, soil erosion, landslides, and sedimentation in rivers. Examples are the Russia–China Amur Bridge transport corridor that dissects two nature reserves with pristine forests [18] and the Karakoram Highway that traverses one of the most geodynamic regions on earth, posing risks to earthquakes, landslides, flooding, etc. [19–21].

Apart from those direct environmental effects of the BRI to different components of the Earth system, including atmosphere, hydrosphere, geosphere, and biosphere [22], landscape connectivity and land-use changes may also lead to indirect effects. For instance, the construction of roads and railways lowers transport costs and thereby shifts markets and human populations, which may lead to illegal poaching, logging, and other economic and environmental effects [4] (p. 112).

Furthermore, those types of environmental repercussions may also threaten the livelihood of people who rely heavily on local environmental resources, with a negative spillover into fisheries, farming, and agriculture [23]. For example, the Sambor hydroelectric dam backed by China Southern Power Grid Company was reported to have blocked fish migration, devastated fisheries of downstream countries, and prevented riverbed sediment that fertilizes the Mekong Delta rice bowl. Dams already built in China's section of the Mekong river were also blamed for exacerbating a Southeast Asian drought [24]. Ultimately, such environmental threats posed by BRI projects may draw fierce local condemnation and protests, especially from activists and environmentalists, which would, in return, stigmatize the BRI and block its progress. For instance, the construction of a hydroelectric dam on the island of Sumatra, Indonesia, in 2018 encountered intense opposition for fragmenting habitats, threatening local livelihoods and causing risks of earthquakes [25].

Another impact of the BRI engendering more concern is that it may increase greenhouse gas emissions and constitute a challenge to achieving the objectives of the Paris

Agreement. China has great potential for and has largely increased BRI investments in renewable energy with the latest technology [26], but a larger share of BRI projects are oil, gas, and coal focused. According to a report by the World Resources Institute and Boston University's Global Development Policy Centre, out of China state policy banks' loans in the energy sector for the BRI from 2014 to 2017, coal power, nuclear power, and hydropower loans combined are almost seven times more than loans to solar and wind [27]. The World Bank Study concludes that BRI transport infrastructure is estimated to increase carbon dioxide emissions by 0.3 percent worldwide—but by seven percent or more in countries like Cambodia, Kyrgyz Republic, and Lao PDR as production expands in sectors with higher emissions [4] (p. 7).

4. Opportunities for Environmental Protection under the BRI

While the BRI, as a mega-infrastructure initiative, might pose new and grave environmental threats to the economic corridors and beyond, opportunities abound of managing the BRI properly and responsibly, rendering it possible to keep environmental risks under control without sacrificing the massive economic growth potential of the BRI.

4.1. Baseline Protection by the Environmental Laws and Regulations of Host States

To start with, host governments' policies regulate the execution of the green BRI scheme, and host states' laws and regulations may provide at least minimum protection against environmental risks posed by BRI projects.

On 29 January 2019, the Ministry of Commerce of China (MCC) officially published the Guidelines for Country-by-Country (Region-by-Region) Foreign Investment and Cooperation [28]. In addition to introducing the political, economic, cultural, and geographical conditions of 172 countries (all BRI-participating countries included) and prioritizing the development of a green BRI, the Guidelines also include environmental laws and regulations of BRI host states.

China has promised to comply with the laws and regulations of host states for all BRI projects, so theoretically, these norms can serve as the first line of defence against environmental repercussions caused by the BRI if they are enforced with deliberations on site selection, consultation, social impact, displacement, and long-term impacts, etc.

4.2. China's Green BRI Policies in Line with the UN 2030 Sustainable Development Goals (SDGs)

Compliance with host states' environmental laws and regulations ensures that BRI projects meet local environmental requirements, while China's green BRI policies that are linked to the UN 2030 SDGs [29,30] make it possible to adhere to the highest international environmental standards. China asserted that the BRI would be green, and it has proposed broad policies to support this pledge.

As early as 2015, China has brought up a domestic "Ecological Civilization" reform plan [31] backed by a series of new environmental policies, including a strengthened Environmental Protection Law [32], to resolve its environmental crisis. After the Paris Agreement, China made a shift in its energy policy, with increasing emphasis on green development promoting technological innovation and renewables [33]. In October 2017, during the 19th CPC National People's Congress, President Xi Jinping further emphasized "speeding up reform of the ecological civilization system and building a beautiful China" [34]. To link those ecological civilization principles to the BRI, China has envisaged the idea of a "green BRI" and tried to make it materialize.

In addition to existing Guidelines emphasizing Chinese enterprises' responsibility of environmental protection in foreign investment and cooperation [35,36], the 2015 "Vision and Actions on Jointly Building Belt and Road" particularly highlighted ecological civilization during BRI investment and trade and increased cooperation in environmental conservation, biodiversity protection, and climate-change actions [1]. The 2017 "Guidance to Promote Green Belt and Road" is regarded as another encouraging step in boosting a green BRI. It dictates that the BRI should "follow the principle of being resource efficient

and environment friendly; embed the green concept into the efforts in policy coordination; facility connectivity, unimpeded trade, financial integration, and people-to-people bonds; and incorporate environmental protection into all aspects and the whole process of the Belt and Road building" [37].

During the first BRI forum in May 2017, the Chinese government declared the BRI would promote the Paris Agreement and UN SDGs and asserted the BRI as a "vision of green development and a way of life and work that is green, low-carbon, circular, and sustainable" [7]. As an official document released from the first forum, "The Belt and Road Ecological and Environmental Cooperation Plan" (Environmental Cooperation Plan) accentuated the significance of environmental cooperation in building a green BRI, facilitating the green transformation of corridor economies and implementing the UN 2030 SDGs. It pointed out the overarching requirements of BRI environmental cooperation and elaborated specific schemes in policy coordination, green infrastructure, green trade, green finance, people-to-people bonds, and capacity building [38]. In the same year, the "Vision for Maritime Cooperation under the Belt and Road Initiative" was also released, which particularly emphasized strengthening BRI maritime cooperation to protect and sustainably utilize marine resources and enhance marine welfare [39]. During the second BRI forum in April 2019, 27 financial institutions around the world, including all major Chinese banks involved in the BRI, signed the "Green Investment Principles" [40], with the expectation of more signatories in the future. The Green Investment Principles include embedding sustainability into corporate governance, understanding environmental, social and governance risks, disclosing environmental information, enhancing communication with stakeholders, utilizing green financial instruments, adopting green supply chain management, and building capacity through collective action. They aim to ensure that "environmental friendliness, climate resilience, and social inclusiveness are built into new investment projects in the Belt and Road" [40].

4.3. Green Development Practices by China and BRI Participating Countries

Apart from broad green BRI policies, China has been translating those sustainable objectives into concrete actions, such as increasing green energy investment, advancing cooperation, and exchanging reference experience with BRI-participating countries on environmental protection. Those green development practices exhibit another promising dimension for a green BRI.

As a world leader in renewable energy [33], China has a window of opportunity to scale up renewable energy investments through the BRI. As pointed out in a recent report by Natural Resources Defence Council (NRDC), from 2008 to 2017, the global average annual growth rate of wind- and solar-power installed capacity was 19 percent and 46 percent, respectively. China's average annual growth rate of wind- and solar-power installed capacity reached 44 percent and 191 percent, respectively, laying a solid foundation for China's renewable energy cooperation with BRI countries [26]. It is estimated that the total installed capacity of renewable energy in 38 countries along the BRI route could reach 644.334 GW from 2020 to 2030, and total investment in wind and solar power could reach $644.334 billion. China has formed an international development cooperation model for renewable energy, which focused on six BRI economic corridors and China–Africa cooperation. Typical examples include the Sweihan Photovoltaic Project jointly developed by China's JinkoSolar and Japan's Marubeni in Abu Dhabi, UAE and Sinomatch and General Electric's cooperation on a 102 MW wind power demonstration project in Kapedo, Kenya, etc. [26]. Therefore, China's massive potential in renewable energy investment can not only go a long way in helping BRI countries meet their domestic clean energy targets under the Paris Agreement, but it can also greatly contribute to the reduction of global carbon emissions [41].

Moreover, in order to enhance international cooperation and share international experience, China launched, in partnership with the United Nations Environment Program, the BRI International Green Development Coalition (BRIGC) in April 2019 [42]. It develops

ten thematic partnerships and has over 130 partners by May 2019, including national environmental authorities, international organizations, research institutions, and businesses [43]. The BRIGC showcases advanced work and provides insights in pollution treatment, the management and conservation of ecosystem, green energy, green production, green lifestyles, green finance, etc. [44], for example, the treatment of sewage in Israel, the restoration of coast in Indonesia, the Karot Hydropower project in Pakistan, the Esquel Plant in Vietnam Industrial Park, the Eco-label of the Republic of Korea, and the solar-powered mill program in Zambia. Most of the cases were from cooperative projects as well as practices by BRI-participating countries. They demonstrate the cooperative efforts within and between BRI-participating countries as well as among stakeholders and may further enhance green consensus, boost confidence in green BRI, and spawn more down-to-earth practices for green development [44].

4.4. BITs and MEAs

BITs, by setting down stable and predictable legal framework, have become one of the most widely used types of international agreements for protecting and influencing foreign investments [45]. They may also promote environmental protection in host states by provisions on or references to sustainable development in general, or more specifically, to the protection of the environment [46]. BITs may also play a significant role in greening BRI investments by clarifying environmental standards; specifying environmental rights, obligations, and accountability of the contracting parties; incorporating cooperation on green technologies; as well as establishing an efficient environmental dispute-settlement or environmental restoration mechanism. By December 2016, China had signed BITs with 104 countries [47], providing another channel for BRI host states to promote economic development without compromising on environmental protection.

MEAs, as an effective form of international environmental governance, play a key role in addressing regional and global environmental issues and are another important choice to combat BRI environmental risks, especially under the circumstances where China has not signed any BIT with some countries along the Belt and Road. The good news is that in recent years, China has assumed an increasingly elevated role in global environmental protection by signing and ratifying a series of MEAs [48]. China also emphasizes cooperation for compliance with environmental agreements in the "Environmental Cooperation Plan" of BRI, determined to "help relevant countries along the Belt and Road to fulfil commitments under MEAs, such as Convention on Biological Diversity and Stockholm Convention on Persistent Organic Pollutants, by building up cooperation mechanisms for MEAs implementation and enabling technological exchange and South-South cooperation" [38]. Adherence to those MEAs by China and BRI participating countries may largely contribute to the management of BRI environmental risks and the greening of the projects that are developing or will be developed along the BRI corridors.

5. Policy Suggestions for Materializing a Green BRI

Current environmentally sound institutional arrangement and practical endeavours increase the odds that BRI projects are green-development oriented. However, addressing environmental issues associated with the BRI is tremendously complex and, accordingly, entails a more comprehensive environmental-protection mechanism. Such a mechanism necessitates both institutional design in broad strokes and effective implementation in a piecemeal fashion. It combines exertions at both domestic and international levels, maximizes the role of all possible participants, and facilitates the settlement of environmental disputes as well as the restoration of degraded ecosystems. To that end, this research puts forward some suggestions as follows.

5.1. Stringently Implementing Environmental Norms and Green BRI Policies

Existing environmental laws and regulations of participating countries may provide baseline environmental protection in the BRI domain, and China's vigorous policy support

presents another promising prospect for a green BRI. Yet for all this, good environmental performance all comes down to stringent implementation, which depends critically on the synergy between concrete environmental standards and local government's willingness and capacity to follow through.

First of all, China should translate its grand and aspirational green BRI statements into concrete principles and standards. The robust green BRI policies pledged by China represent its commitment to fight against environmental risks and an ambitious vision for a green BRI. However, the overarching requirements under BRI's underlying sustainability framework, by their very essence, are generic domestic policies, lacking detailed and binding mechanisms for implementation, monitoring, and enforcement. Unless made mandatory overseas, chances are high that those eco-friendly guidelines will eventually fall through the cracks. Therefore, China is not only required to come up with a green, low-emissions, and sustainable BRI framework in the areas of policies, infrastructure, trade, finance, culture, etc., but what is more important is to translate it into concrete green investment standards.

For instance, emphasis on enterprises' environmental responsibility should not be confined to voluntary guidelines that encourage investors to comply with local environmental norms, strengthen environmental management, or disclose more environmental information [38]. Rather, it should refine standards to intensify the monitoring and enforcement of the Chinese foreign investment laws regarding environmental protection and hold Chinese banks and companies liable for disregarding environmental standards overseas. Only by doing so can it ensure that all BRI participants and stakeholders, particularly Chinese investors, rigorously and concisely adhere to those environmental norms in every BRI project.

The establishment of concrete standards may necessitate the co-efforts of multiple regulatory authorities, such as the Ministry of Commerce (MCC), the National Development and Reform Commission (NRDC), the Ministry of Ecology and Environment (MEEC), the Ministry of Finance, and the China Banking and Insurance Regulatory Commission. One suggestion is that all BRI-related projects implemented outside China adhere to the environmental standards China applies at home [14], while another possible way is to follow the high standards applied by such international financial institutions as the World Bank [49].

Second, to yield the best environmental outcomes, strategic environmental standards must converge with robust local enforcement. On the one hand, China is required to create more incentives for local governments' active enforcement and to discourage environmental "race to the bottom". This may include providing compensatory payments to local governments in return for reducing pollution and maintaining ecosystems. Green financing and insurance is another incentive tactic that prioritizes renewable energy projects, utilizes advanced and efficient technology for energy transmission infrastructure, supports the development of public transit systems, and holds project developers to high environmental governance standards. On the other hand, China needs to help improve local governments' environmental governance capacity by such means as enhancing cooperation on environmental technologies and sharing cutting-edge environmental assessment tools, deepening collaboration on pollution control and ecological conservation, and providing support in environmental policy and legislation, personnel exchanges, and green projects demonstrations, etc.

Furthermore, the efficacy of environmental norms and green BRI policies is subject to the involvement of credible Strategic Environmental Assessments (SEAs) and environmental impact assessments (EIAs). Well-established SEAs systematically evaluate the environmental consequences of BRI policies, planning, and programs, while EIAs help to avoid detrimental environmental impacts of every BRI project. Both of them should be incorporated into the earliest possible stages of decision making so that environmental impacts could be addressed on a timely and appropriate basis. A negative example is that

Chinese-owned Amazar Forest Complex in the Zabaikalsky Province of Russia is stalled for lack of comprehensive SEA/EIA at the outset [50].

Besides, transparency is another principle that must be upheld to reduce enforcement deficits. More public information should be provided during the planning, financing, and procurement processes of BRI projects so that legal practitioners, media, activists, and the public could freely question the government and enterprises in case of possible environmental impacts, thereby encouraging community involvement, bolstering public trust in investment decisions, and helping build positive local perceptions of China and the BRI [5] (p. 127).

5.2. Making Greater Use of BITs and MEAs

Although China has signed a vast array of BITs, including those signed with many BRI participating countries, there are few containing BRI-specific environmental protection provisions. Therefore, in view of BRI environmental risks, China needs to re-examine those BITs and revise them if necessary, especially those signed with countries with the most Chinese investment. It is required to incorporate more detailed environment protection provisions according to local environmental protection requirements. Such provisions should contain specific environmental standards and transparent decision-making procedures for each BRI project. During this process, the environmental standards and practices recognized by the international community through various MEAs represent a good reference value [51]. It is also necessary to emphasize the environmental governance of host states, elucidate enforceable environmental obligations of investors, and establish relevant dispute-settlement mechanisms. What is particularly important, inter alia, is to clearly stipulate investors' environmental obligations in BITs. Those obligations may serve as the legal basis for host-state environmental counterclaims that are regarded as a chance for host states to "put environmental considerations on equal footing with trade and investment concerns" [52] and a reminder for investors to sharpen environmental risk perception during BRI investments.

MEAs, referred to by scholars and practitioners as "soft laws", form the overarching legal basis for global environmental governance. By complementing national legislation and bilateral or regional agreements, their role in achieving sustainable development has long been recognized [53]. Currently, the number of MEAs has reached over 1300 [48], and a substantial number of them, such as the Paris Agreement on tackling climate change, are important international legal instruments that should also steer the design and implementation of the BRI.

To make greater use of MEAs in greening the BRI, China should make further efforts in the following two aspects. First, China needs to effectively implement the already signed MEAs by translating them into BRI-related policies, strategies, actions, and enforcement tools, such as legislation, bilateral or regional agreements, and technical and financial measures [54]. Second, China should pay attention to other MEAs highly relevant to the BRI and consider ratifying them when the timing is right [50]. Examples of those MEAs include the UNECE Water Convention (ratified by 41 BRI countries) [55], the UNECE Espoo EIA Convention and its SEA Protocol (ratified by 44 and 31 BRI countries, respectively) [56,57], the UNECE Aarhus Convention (ratified by 46 BRI countries) [58], and the Bonn Convention on the Conservation of Migratory Species of Wild Animals (the CMS Convention, ratified by 65 BRI countries) [59].

For instance, as stated earlier, environmental assessment tools, such as EIAs and SEAs, are vital to preventing possible negative environmental impacts of BRI projects. The construction of infrastructure facilities and the harmonization of spatial-planning schemes along the economic corridors are virtually impossible without the use of those techniques. Although both are mandatory in China domestically, China has not signed the UNECE Espoo EIA Convention and its SEA Protocol as a binding international legal instrument for its overseas projects. Additionally, WWF BRI Spatial Analysis of IUCN Red List data shows that BRI corridors overlap with the range of 265 threatened species,

including 39 critically endangered species and 81 endangered species [17], yet China has not signed the CMS Convention, which is the only global Convention specializing in the conservation of migratory species, their habitats, and migration routes. Therefore, if China could ratify those Conventions in the future and apply them to the implementation of the BRI, it would largely elevate the sustainability of BRI projects.

5.3. Bringing Together Various Actors and Mobilizing All Available Resources

The achievement of a green BRI requires not only the efforts of China and the governments of participating countries but also the collective wisdom and strength as well as continuous endeavours from all parties, including the UN system and other international organizations, NGOs, think tanks, private actors, and civil society, etc. Those various actors may facilitate the building of a green BRI in three ways.

First, enhancing multilateral cooperation and popularizing green development practices. A typical example is the establishment of the BRIGC that provides a communication platform for all BRI stakeholders, showcases advanced work and insights on green development, and increases green consensus. Besides, the Green Silk Road Initiative Declaration put forward by a group of 20 NGOs from 11 countries in 2016 further demonstrates their role in unifying civil society and pushing for BRI's adherence to the concept of ecological civilization, employment of environmentally sound development strategies, and adoption of green economy and green finance mechanisms [60].

Second, providing environmental governance standards and policy recommendations for BRI projects. For example, the governance norms and environmental standards established by international banks, such as the World Bank's Environmental and Social Framework [49], if adopted, could stimulate BRI project developers to comply with the highest international social and environmental standards and to better manage environmental and social risks. Besides, the BRI recommendations and spatial analysis by the WWF, with its expertise and credibility in several subjects critical to the BRI, is also instrumental in mitigating potential negative environmental impacts of BRI projects [17].

Third, promoting green technology and sharing environmental information. The role of such think tanks as environmental and scientific research institutions in developing cutting-edge green technology and environmental assessment tools for the BRI cannot be overstated. For instance, the big Earth data project launched by the Chinese Academy of Sciences in 2018 could serve as a BRI environmental information sharing platform that provides comprehensive information support for eco-friendly Belt and Road and enhances advisory services for environmental risk assessment and prevention [61].

Therefore, if the BRI could give full play to the role of all possible participants and mobilize all available resources during its implementation, it would move a further step towards the achievement of its green objectives.

5.4. Establishing an Efficient Environmental Dispute-Settlement and Environmental Remediation System

Generally speaking, an investor and its host state may submit unsolved environmental disputes to a local court or to a third-party arbitral tribunal to adjudicate on the violation of environmental obligations under the investment treaty and the specific liability of the violator. Compared with litigation, international arbitration has unparalleled advantages in impartiality, confidentiality, efficiency, and enforceability.

First, with neutrality, independence, and impartiality as the central themes in the arbitral process, arbitration offers a neutral forum, with neither party having the advantage of their local court, thus allowing the parties to experience a fair process and attain a just outcome [62]. Second, in contrast to publicity in litigation, most arbitral rules do not allow for public attendance or public access to the parties' filings in the case. Accordingly, arbitration offers a key advantage over litigation by ensuring a greater level of confidentiality that is particularly important to many investment and business transactions. Third, unlike trials, which must be worked into overcrowded court calendars, arbitration is more flexible in time, and as opposed to the convoluted rules of evidence and procedure required in

litigation, arbitration proceedings are often simplified and more easily adapted to the needs of those involved, rendering arbitration a more efficient way to resolve disputes. Last but not least, due to the landmark treaty, Convention on the Recognition and Enforcement of Foreign Arbitral Awards (the New York Convention) [63], an international arbitral award is enforceable virtually worldwide, while a judgment from a national court is often only enforceable in the nation that issued it. A good example is that Chinese courts recognized and enforced 86.4 percent of international arbitral awards presented to them from 2011 to 2015 [64].

Due to the above advantages, international arbitration has enjoyed increasing popularity as an alternative to litigation in court and has become the mainstream in resolving foreign investment disputes [65]. Therefore, it is highly recommended to choose arbitration as the best means to resolve investment disputes including environmental disputes arising under the BRI. To yield a predictable and more enforceable outcome, the contracting parties may agree beforehand on the choice of arbitral institutions, the applicable law, and matters relating to the enforcement of arbitral awards. Depending on the location of the parties and the characteristics of potential disputes, there are many arbitral institutions that can be considered, such as International Chamber of Commerce (ICC), International Centre for Settlement of Investment Disputes (ICSID), Arbitration Institute of the Stockholm Chamber of Commerce (SCC), Swiss Chambers Arbitration Institution, London Court of International Arbitration (LCIA), China International Economic and Trade Arbitration Commission (CIETAC), etc. On the part of the arbitral tribunal, it shall conform to the principle of sustainability while settling BRI environmental disputes, striking a balance between investor protection and the environmental interest of the host state and of the globe at large, thereby contributing to global environmental governance.

Apart from an efficient dispute resolution mechanism, it is also of great necessity to establish an effective environmental remediation system which, compared with ex ante environmental risk-control measures, ensures the restoration or compensation of the damaged environment and ecosystem in a timely and efficacious manner. In general, such a mechanism is composed of three levels of remediation. First, primary remediation aims to return the damaged environment and/or impaired services to baseline condition by taking such remedial actions as stabilizing damaged slopes and replanting vegetation. Second, complementary remediation, such as off-site remediation, occurs when primary remediation does not result in full in-situ restoration. Third, compensatory remediation compensates for interim losses of natural resources and/or services that occur during restoration [65]. The specific environmental remediation mechanism under the BRI may be set up through intergovernmental cooperation agreements or the BIT between the BRI investor and the host state by reference to relevant domestic legislation [66–69] or international environmental conventions [70,71].

6. Conclusions

The BRI is an unprecedentedly ambitious development plan that promises prosperity to participating countries and contributes to the global economy as well. As BRI projects move steadily from a blueprint to realization, it remains to be seen whether China will be able to realize its promise of a green BRI. Regardless, it is clear that, as such a wide-ranging and all-encompassing program, the BRI is destined to shape the environmental future of many nations and of our planet for decades to come.

Despite its possible negative environmental impacts, the BRI should be put into perspective. Overall, the economic gains of the BRI and its possible contributions to the world may largely outweigh its negative impacts, and those possible environmental repercussions can be significantly prevented or mitigated if the green BRI scheme is well enforced, and proper measures are effectively taken. To date, by virtue of the existing legal framework, a host of green development policies and practices as well as the signing of a variety of BITs and MEAs, China has cultivated promising opportunities to responsibly and

properly manage the environmental impacts of the BRI and to produce positive spill-over effects on future global infrastructure development programs.

However, to reap the full benefits of the BRI and translate green BRI objectives to real progress, current efforts are not enough. Generally, the achievement of a green BRI calls for a more comprehensive environmental protection mechanism. To be specific, the implementation of BRI projects should stringently comply with existing environmental norms and green BRI policies of China and participating countries. For that purpose, China needs to put its high-flown green BRI pledges into mandatory and detailed environmental standards, to stimulate robust local enforcement, and enhance local environmental governance capacity by all means. It is also vital to take full advantage of BITs and MEAs as effective legal instruments to mandate environmental protection by incorporating BRI-specific environmental provisions into BITs, effectively implementing the already signed MEAs, and, if feasible, ratifying more BRI-related MEAs in the future. In addition to actions on the governmental level, the role of various actors, such as organizations, private actors, thinks tanks, and civil society, should not be underestimated. Finally, it is imperative that an efficient environmental dispute resolution and environmental remediation system be put in place so as to ensure the accountability of environmental saboteurs and the effective restoration of the degraded ecosystem. To that end, international arbitration has become a preferable alternative to litigation, and specific environmental remediation mechanism can be elaborately designed by reference to a pertinent domestic or international legal framework.

Admittedly, responding to the environmental challenges of the BRI is a complex project with variance and uncertainties in politics, law, economy, history, geography, etc. While this article just sketches out possible policy recommendations, especially from the legal perspective, it provides a good starting point for discussion, and future studies could take a deeper dive into this issue through other different lenses.

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