



**DEVELOPMENT
CORRIDORS
PARTNERSHIP**

IMPACT ASSESSMENT FOR CORRIDORS: FROM INFRASTRUCTURE TO DEVELOPMENT CORRIDORS

Edited by:
Jonathan Hobbs and Diego Juffe Bignoli
2022

The Development Corridors Partnership

The Development Corridors Partnership (DCP) is a research and capacity development initiative. It is a collaboration between institutions from China, Kenya, Tanzania and the UK. The main objective is to deliver effective research and capacity-building to help improve corridor planning and management. It aims to ensure that development corridor decision-making is based on sound scientific evidence and effective use of available planning tools and procedures, to ensure that risks are

avoided and opportunities exploited. The DCP comprises partners from the University of York, the University of Cambridge, London School of Economics, Sokoine University of Agriculture, the University of Nairobi, as well as the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), African Conservation Centre, the World Wide Fund for Nature (WWF), the Chinese Academy of Agricultural Sciences and the Chinese Academy of International Trade and Economic Cooperation (CAITEC).

DCP Partners:



For the purposes of this publication, DCP collaboration was extended to experts representing Netherlands Commission for Environmental Assessment, the Centre for Energy, Petroleum and Mineral Law and Policy at the University of Dundee, the University of Queensland, the Columbia Centre on Sustainable Investment, the GOBI

Framework for Sustainable Infrastructure Initiative (comprising the University of Oxford, University of Central Asia and the Independent Research Institute of Mongolia), The Biodiversity Consultancy, the Wildlife Institute of India, the Endangered Wildlife Trust and Ecotecnia Ingenieros Consultores SRL.

Expert Organisations:



This publication was made possible through funding provided by:



Disclaimer

The views expressed in this publication are solely those of the authors and do not express the views of UNEP-WCMC or the Development Corridors Partnership. Any errors are the responsibility of the authors. Copyright of the respective chapters rests with the authors and re-use or reproduction requires the authors' prior permission. This book is based on work conducted by the authors in 2021.

Citation:

This publication should be cited as:

The Development Corridors Partnership (2022). *Impact Assessment for Corridors: From Infrastructure to Development Corridors*. Hobbs, J. and Juffe-Bignoli, D. (eds.). Cambridge: The Development Corridors Partnership.

Example of individual chapter citation:

Gannon, K. (2022) Achieving the Sustainable Development Goals through Integrated approaches to Development Corridor Planning. In: *The Development Corridors Partnership (2022). Impact Assessment for Corridors: From Infrastructure to Development Corridor*. Hobbs, J. and Juffe-Bignoli, D. (eds.). Cambridge: The Development Corridors Partnership.

Acknowledgements

This report would not have been possible without the hard work and invaluable support of the UNEP-WCMC DCP team: Amayaa Wijesinghe (Assistant editor and design coordination), Neil Burgess, Tanya Payne, Camilla Blasi-Foglietti, Cecilia Antonini, Aisha Niazi (editorial support and design), and Chris Hawksworth, Julia Wentworth, and Lisen Runsten (project management).

Image Credits

Many embedded images in this report have been sourced through Shutterstock licensing. Any differing sources are named in the image credits.

Foreword

In the course of a long and varied working life, I have been privileged to work with, or learn from, a stimulating panoply of individuals who are committed to contributing to the economic, social, and environmental development of all aspects of the United Nations Sustainable Development Goals.

Jon Hobbs and Diego Juffe-Bignoli are, thankfully, two of these individuals. I was delighted to learn that they had come together to produce, for the Development Corridors Partnership, a rich and stimulating collection of research reports, case studies and assessments relating to the array of efforts made under the rubric of 'development corridors'. They were determined to express the conviction that decisions made, primarily by governments, regarding the planning and building of Corridors, really must be informed by an evidence-based understanding of the consequences - positive or negative - of these decisions. And they have succeeded. But Jon Hobbs will never read these words. He was hospitalized after the bulk of the work was complete, and, to the deep sadness and regret of all who knew him, he passed away at the end of September, 2021.

Jon and Diego sought out and recruited a daunting array of researchers, scholars and stakeholders to shed light on the processes currently underlying the world of development corridors today. They certainly succeeded.

The work was initiated before the onset of the COVID-19 pandemic, and as governments turn to the formidable challenge of restoring

economic vitality without further damage to the climate, it becomes even more imperative that impact assessment be understood, embraced and improved. Jon and Diego have shown us the way forward for a journey which absolutely must be embarked upon.

They would be first to recognise that the Development Corridors Partnership as a whole must be commended for showing - in many different ways and places - that, not only is the need for impact assessment clear and present, but so are the skills and commitment of researchers, scholars and stakeholders. These are to be found in an impressive coming together of universities, civil society organizations and business groups, and communities.

All are part of an outstanding initiative, funded by the UK Research and Innovation Council, and managed by the UNEP-WCMC. This initiative has been embraced by some of the best minds that have been turned to the task of ensuring that - while we attempt to bring economic and social benefits to people, in line with the United Nations Sustainable Development Goals - we do not risk significant environmental and social costs, and thus actually undermine long-term development successes.

So, I urge you to read this book, and figure out how you might improve your own contribution to the challenges ahead. Jon and Diego have set out a case. It needs to be taken up, not set aside; acted on, not just talked about. It is in your hands.

John Harker

Chair of the Development Corridors Partnership Independent Advisory Board,
Nova Scotia, Canada.

Dedicated to the memory of Jon Hobbs
who was the architect and driving force of this book

Executive Summary

Driven by increasing globalisation, the development aspirations of nations, and the need to access resources, an infrastructure boom is impacting many regions of our planet. New infrastructure projects are traversing diverse landscapes over hundreds of kilometres, often crossing international borders and penetrating into remote areas previously unaffected by industrialisation and urbanisation. These large-scale projects, mostly spanning several regions in a same country, but often linear and transnational in nature, are generically called corridors. Depending on the nature and objectives, they can be transport, infrastructure, growth, resource or economic corridors.

The rapid development of corridors globally presents environmental planning professionals with numerous challenges. **The primary need is to ensure that decisions about these developments are informed by an evidence-based understanding of their consequences - both positive and negative.** This will enable infrastructure development to meet development needs without adversely impacting ecological systems or human welfare. Improving the quality of infrastructure policies, plans, programmes and projects, by ensuring they include the necessary environmental and social scrutiny, is urgently required now - and will be for the foreseeable future. This challenge is the unifying theme of this publication.

Using insights from Africa, Asia and South America, this sourcebook compiles 24 contributed papers written in 2021, covering many facets of the

opportunities and challenges presented by the rapidly growing number of infrastructure and corridor developments around the world. Prevailing planning practices are reviewed through case studies along with the efficacy of some of the available tools to conduct systematic and comprehensive impact assessments. The latter includes Strategic Environmental Impact Assessment (SEA) and Environmental Impact Assessment (EIA).

As the title suggests the underlying thesis of this publication is that, where they are justified, **there are significant benefits in ensuring that corridors that contain single purpose infrastructure developments (utility, infrastructure or transport) progress through a carefully planned sequential process of diversification and expansion to ensure the maximisation of benefits in full-blown 'development corridors'.** In this book, development corridors are therefore aspirational. They comprise areas identified as priorities for investment to catalyse economic growth and development. They should be developed with multiple stakeholders and social, economic and environmental interests and interdependencies in mind. With the integration of sustainability principles and appropriate environmental and social standards, development corridors could become true '(sustainable) development corridors'. They should be planned to maximise positive opportunities and minimise negative risks. Without this, today's short-term successes will become tomorrow's challenges and long-term human welfare and ecosystem integrity will be undermined.

Overview of contents

This book brings together a wide range of perspectives from experts, researchers, and practitioners around the world with the purpose to foster greater collaboration and increase our global understanding of corridors and their benefits and potential negative impacts. 13 of the 24 chapters are written by independent experts and researchers from Australia, Bolivia, Brazil, China, India, Kenya, Mongolia, South Africa, Tanzania, UK, and the USA. The book also includes 11 chapters containing material gathered by the Development Corridors Partnership, a programme of work led by UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and funded by the UK Government via their Global Challenges Research Fund.

The collection of papers in this sourcebook is divided into five sections. First an introductory section where we introduce some key terms and definitions that underpin this work ([Chapter 1](#)). We then explore some key principles and aspirations of corridors such as delivering the Sustainable Development Goals ([Chapter 2](#)), ensuring theory and practice align ([Chapter 3](#)), ensuring financial sustainability ([Chapter 4](#)), properly assessing environmental sensitivity ([Chapter 5](#)) respecting human

rights ([Chapter 6](#)), or maximising, co-benefits ([Chapter 7](#)).

In the next three sections, we present 15 case studies from three continents: Africa, Asia, and Latin America. These case studies explore key challenges and lessons learned from specific planned, ongoing, and already implemented developments. They are presented as individual stories that readers can explore.

The final and fifth section aims to summarise lessons learned from a 4-year research and capacity building programme specifically aiming to understand the key challenges and opportunities around corridors and that has been the major driving force of this work: The Development Corridors Partnership project (DCP). DCP is a collaborative partnership across UK, Kenya, Tanzania and China, funded by the UK Research and Innovation Global Challenges Research Fund (see [Chapter 23](#)).

The book finishes with an overview of the lessons learned from the contributed papers included in this book and develops ten principles for corridor planning and delivering a meaningful and comprehensive impact assessment ([Chapter 24](#)), which we summarise here as ten key messages.

Key messages

1

Corridors must seek to achieve positive sustainability outcomes:

The mindset underwriting environmental planning of most infrastructure developments has been to mitigate negative impacts. The planning of few existing corridors is based on their role in supporting a sustainability vision for a country or region in which they are situated. Corridor developments must therefore be based on sustainability principles and support progress towards national, regional and international sustainable development goals. A true development corridor will seek to do good, as well as to mitigate negative impacts.

2

Integrated and inter-disciplinary approaches are needed:

Corridor developments are extensive, complex, multifaceted features traversing many landscapes. They can bring about significant transformational change to physical, economic, social, and cultural systems, and serve as interconnecting features. Yet engagement in corridor planning is often constrained by limited disciplinary and institutional involvement, with projects often superimposed upon communities. Corridor developments need diverse expertise and experience in their planning and management, including local stakeholder knowledge, avoiding disciplinary, institutional, or sectoral silos, that can result in policy conflicts, contradictions, and inconsistencies.

3

Corridor proponents should clearly demonstrate consideration of alternatives:

Corridor options should not be limited to a preferred proposal favoured by an elite. Corridor developments must consider all feasible alternatives (including maintenance of the status quo and no corridor development) and make the risks and opportunities of each option explicit and transparent through meaningful consultation. An important requirement in all corridor planning is to justify the need for a wide choice of options and an explanation of the potential benefits it will bring and to whom, in comparison with the alternatives. Any necessary trade-offs and how any significant potential negative impacts will be effectively managed, and opportunities created must be explained.

4

Public participation and stakeholder engagement should be at the core of corridor planning:

Corridor planning frequently fails to include meaningful participation of all stakeholders. Corridors can profoundly affect the lives and rights of indigenous peoples and local communities, potentially for generations. A common failing is that the first opportunity for local stakeholders to engage arises only after all strategic decisions have already been made and the only option remaining is for them to react negatively to a fait accompli. The meaningful engagement of all stakeholders is necessary to ensure their role is more than reactive. The way corridors are viewed by different stakeholders must be identified, understood, and addressed. Corridor developments must ensure that all interested and affected people are provided with adequate information about a proposal and have meaningful ways to engage in decision-making processes from the outset of strategic planning.

5

Mainstreaming and tiering are fundamental for corridor success:

Corridor planning requires a tiered assessment process, ensuring that environmental and social issues are considered alongside financial and technical considerations from the start of strategic planning or programme development, right through to project specifics. Conceptual corridor planning is frequently dominated by technical and financial suitability criteria with environmental, social, cultural, and human rights sensitivity issues being considered, at best, as externalities, retrospectively, once issues and problems arise. Strategic planning is important because it is when the full range of options is still open for discussion. It also establishes the parameters that will frame and implement a corridor plan or programme. Environmental and social considerations (and the interactions between them) should be considered early in strategic decision-making alongside (and to inform) technical, financial, and economic considerations.

6

An iterative process is needed:

Corridors exist in dynamic environments and need to be responsive to changing circumstances and priorities. Planning must adjust as circumstances and available information changes. The process should identify, map, and engage all interested and affected stakeholders from the earliest stage of corridor planning and throughout the planning and management of the corridor. New concerns and evidence will likely emerge as a corridor development progresses. Corridor planning frequently places undue emphasis on the production of a report (Environmental Impact Report) and its influence on the decision to proceed. The process may not be so linear in nature. It may involve many adjustments and decisions as new evidence emerges and predictions improve. A good-quality report and recommendations is necessary, but they are dependent upon a comprehensive process of ongoing dialogue and engagement with all stakeholders.

7

Corridors must ensure effective use of available tools:

Many corridor environmental impact assessments fail to meet required international standards. Corridor planning and management should make systematic and adequate use of available impact assessment procedures, methods, techniques, and tools to ensure good-quality decisions. The available procedures discussed in this publication (notably Strategic Environmental Assessment and Environmental Impact Assessment) and their associated methods, tools and techniques should be used when appropriate to help ensure that a systematic process identifies all significant potential benefits and development outcomes, and that they outweigh the costs and risks to affected people and their livelihoods and environments. The objectivity and quality of corridor decisions are dependent upon the effective use of the available tools.

8

Plan corridors with resilience and adaptability in mind:

Prevention will always be better than cure in addressing the negative impacts of corridors, and this should be the priority. However, some circumstances dictate an inevitability of negative impacts. Corridors, therefore, need to be designed to be made resilient to anticipated changes and adaptation measures may be necessary as 'coping' mechanisms or to offset unavoidable impacts, such as the impacts caused by climate change. The suitability of measures will require ongoing monitoring and adaptation as needs arise.

9

Seek impact, influence, and implementation capacity:

The decision to proceed with a corridor is ultimately the responsibility of decision makers. They are usually the representatives of all stakeholders' interests and custodians of their natural resources. Any impact assessment report must provide adequate information to ensure sufficiently good-quality decisions. If they are to be effectively implement the recommendations provided. Attempts to improve the performance of planning and associated assessment processes of corridors must tackle the ways in which outcomes are shaped by political contexts and institutional capacities. Approaches to working on assessment processes should integrate political economy analyses and institutional capacity assessment from the outset and on an ongoing basis. Resulting insights should inform the design and implementation of interventions intended to improve planning practice.

10

Evolve from Infrastructure to Development Corridors:

The prospects for linear infrastructure projects to evolve into comprehensive development corridors are often left to chance and spontaneity. Infrastructure projects are often developed in isolation and in an incremental way. For infrastructure projects to progress and become true development corridors, the transition must be systematically sequenced into planning from the start. Assessments must include consideration of potential induced, secondary, synergistic, transboundary, and cumulative impacts likely to result from the corridor development. The progression from infrastructure to development corridors must be based on a systematic, comprehensive, and integrated assessment of the potential positive environmental, social and economic opportunities and the rigorous avoidance or management of negative impacts.

CONTENTS

FOREWORD.....	5
----------------------	----------

EXECUTIVE SUMMARY.....	7
-------------------------------	----------

INTRODUCTION	19
---------------------------	-----------

1. Context and Definitions.....20

1.1 Why this publication?	20
1.2 Drivers of infrastructure growth	21
1.3 Defining infrastructure.....	22
1.4 Defining corridors.....	23
1.5 Conclusion	38
Acknowledgements	39
References.....	39

2. Achieving the Sustainable Development Goals through Integrated Approaches to Development Corridor Planning40

2.1 Introduction	40
2.2 Domesticating the SDGs in Kenya and Tanzania	42
2.3 Delivering the SDGs in Development Corridors	43
2.4 Development synergies and trade-offs in development corridors	44
2.5 Delivering the SDGs through corridors: An integrated governance challenge.....	47
2.6 A way forward through Strategic Environmental Assessment?	50
Acknowledgements	51
References.....	51

3. Tackling the EIA Impact Gap: Addressing Political Economy Realities to Bring Actual Practice Closer to Best Practice.....53

3.1 Introduction	53
3.2 EIA processes - best practice versus actual practice.....	54
3.3 Political realities and EIA performance.....	60
3.4 Towards more impactful EIA processes: dealing with political context head-on	64
3.5 Conclusion	68
Acknowledgements.....	70
References.....	70

4.	The Role of Lender Safeguards in Addressing Biodiversity Risks Associated with Large-scale Infrastructure Projects.....	74
	4.1 Lender safeguards for biodiversity	75
	4.2 Challenges in applying lender safeguards.....	78
	4.3 Conclusions	83
	References.....	83
5.	Environmental Sensitivity Mapping for Corridor Planning	85
	5.1 Introduction	86
	5.2 Defining and differentiating sensitivity.....	88
	5.3 Moving beyond a binary vision of sensitivity.....	90
	5.4 Strengthening impact assessments.....	91
	5.5 Connecting impact assessments with other policies at the landscape level	92
	5.6 Conclusion	94
	Acknowledgements.....	94
	References.....	95
6.	Putting Social Issues on the Infrastructure Agenda: Getting to a Rights-based Approach to Corridor Development.....	97
	6.1 Introduction	98
	6.2 Key challenges in putting social issues on the infrastructure corridor agenda	99
	6.3 What is different about a corridor?.....	105
	6.4 Conclusion	107
	6.5 Recommendations	109
	Acknowledgements.....	110
	References.....	110
7.	Accounting for Sustainable Development Co-benefits: Insights from Local Experiences with Climate Resilience Interventions	113
	7.1 The concept of co-benefits	115
	7.2 Insights from climate resilience: integrating co-benefit appraisal into planning and decision-making processes	116
	7.3 Examples of co-benefit appraisals in projects relevant for the development corridor context.....	119
	7.4 Conclusions	124
	Acknowledgements	126
	References	127

AFRICAN CASE STUDIES 129

8. The Mtwara Development Corridor in Tanzania: Strategic Environmental Assessment of a Planned Corridor..... 130

8.1	Introduction	131
8.2	The Mtwara development corridor in Tanzania	132
8.3	Biodiversity and ecosystem services within the Mtwara corridor	135
8.4	Review of existing impact assessments	136
8.5	National sectoral SEA for the Transport and Trade Systems Development Plan of Tanzania (2013)	137
8.6	Regional SEA for the Mtwara and Ruvuma development plans	141
8.7	Conclusions	144
	Acknowledgements	146
	References	147

9. Managing the Environmental and Social Impacts of Agricultural Transformation: Southern Agricultural Growth Corridor of Tanzania..... 153

9.1	Introduction	154
9.2	Key players and stakeholders	155
9.3	Impact assessment in Tanzania	156
9.4	Environmental impact assessment	157
9.5	Strategic environmental assessment	159
9.6	Inclusive Green Growth Tool	161
9.7	Discussion and recommendations	162
	References	164

10. The Importance of Building Climate Resilience into Environmental Assessment Processes: The Case for the Southern Agricultural Growth Corridor of Tanzania..... 166

10.1	Introduction	167
10.2	Current climate change adaptation measures in SAGCOT	168
10.3	Proposed methodology for a strategic climate change adaptation plan for SAGCOT.....	169
10.4	Conclusions	174
	Acknowledgements	175
	References	175

11.	Public Participation in the Environmental Impact Assessment Process for Development Corridors in Kenya.....	176
11.1	Introduction	177
11.2	The SGR and LAPSSET corridors.....	178
11.3	The environmental and social contexts	178
11.4	The Environmental Impact Assessment framework.....	180
11.5	The EIA process.....	180
11.6	EIA and development projects.....	182
11.7	The study.....	183
11.8	Issues identified	184
11.9	Comparative EIA public participation process analysis	185
11.10	Stakeholder participation in the EIA for the corridor projects	188
11.11	Determinants of stakeholder participation in EIA.....	189
11.12	Stakeholder attitudes towards the EIA for the corridors	190
11.13	Conclusion and recommendations	191
	Acknowledgements	193
	References	193
12.	Exploring the Potential of Scenario Planning for More Effective Environmental Assessments: Standard Gauge Railway Development Corridor, Kenya	200
12.1	Introduction	201
12.2	Brief history of a flagship infrastructure project shrouded in controversy	202
12.3	Method.....	204
12.4	Results and discussion	208
12.5	Environmental impacts.....	211
12.6	Economic impacts.....	214
12.7	Social impacts.....	215
12.8	Conclusions: scenarios as tool for strategy development in EIAs and SEAs.....	219
	References	220
13.	Community Engagement in Corridor Planning and Implementation in Kenya	229
13.1	Introduction	229
13.2	National regulations on community engagement in Kenya	231
13.3	Case study: LAPSSET	233
13.4	Case study: SGR	235

13.5	Conclusions	237
	Acknowledgements	238
	References.....	239

14. Guidelines on Mitigating the Negative Impacts on Biodiversity of Road, Rail and Power Corridors: South African Experiences.....240

14.1	Infrastructure development in South Africa.....	241
14.2	Legal framework for addressing the environmental and social impacts caused by development corridors.....	242
14.3	Implementing and enforcing the mitigation hierarchy	245
14.4	Tools and solutions to assess and manage environmental impacts.....	246
14.5	Conclusions	248
	Acknowledgements.....	249
	References.....	249

15. Lessons Learned from the Maputo Development Corridor: An Environmental and Social Perspective255

15.1	Introduction	255
15.2	Problem statement.....	259
15.3	Linkages with environmental and social environmental assessment in planning and management of corridors	260
15.4	Conclusion	264
	Acknowledgements.....	265
	References.....	265

ASIAN CASE STUDIES.....267

16. Environmental Safeguards for the Belt and Road Initiative: Current Status and Future Prospects.....268

16.1	Belt and Road Initiative: scale and scope	268
16.2	Environmental impact of infrastructure development	270
16.3	Environmental impact of BRI	271
16.4	Environmental impact-related risks of BRI projects	273
16.5	Environmental safeguards for BRI.....	274
16.6	MDB safeguards as a benchmark	275
16.7	Assessing BRI safeguards	276
16.8	The way forward.....	278
	Acknowledgements	282
	References.....	282

17. Sensitive Planning and Design of Transportation Corridors: Vital Elements for Protecting India's Wildlife286

17.1 Introduction 286

17.2 Conservation challenges associated with transportation corridors traversing natural landscapes 287

17.3 Environmental legislation for regulating transportation projects in India 288

17.4 Structural mitigation measures for connecting fragmented habitats: prospects and challenges 289

17.5 Structural mitigation measures applied to transportation projects in India 289

17.6 Relevance of SEA in the planning of multiple linear corridors to 295

17.7 Recommendations 296

Acknowledgements 297

References..... 298

18. The Mekong River Corridor: A Critical Test for EIA/SEA Effectiveness300

18.1 Introduction 301

18.2 The Mekong river 302

18.3 Development pressures 303

18.4 Governance 305

18.5 The Greater Mekong Sub Region (GMS) 306

18.6 The Mekong River Commission (MRC)..... 306

18.7 The Lower Mekong Initiative 310

18.8 The Lancang-Mekong Cooperation 311

18.9 Review of hydropower developments 311

18.10 Environmental planning and management..... 312

18.11 Conclusion 315

18.12 Upper Mekong 317

18.13 Lower Mekong 320

18.14 The Mekong Delta 327

Acknowledgements 328

References..... 328

19. The Belt and Road Initiative in Mongolia: Infrastructure Development and Impact Assessment331

19.1 Introduction: the China-Mongolia-Russia corridor overview..... 332

19.2 The China-Mongolia-Russia corridor 334

19.3 The Mongolian Steppe Road Programme..... 335

19.4 Mongolia and the Belt and Road Programme 336

19.5 Impact assessment in Mongolia: the legal context..... 337

19.6 Effectiveness of impact assessment policies and procedures 341

19.7 Impact assessment in planning and management of corridors..... 343

19.8 Key recommendations for Central Asia 343

Acknowledgements..... 344

References 344

LATIN AMERICAN CASE STUDIES.....347

20. Carajás Corridor in Brazil: Could a SEA have Reconciled Shared-use Infrastructure & Environmental Protection?348

20.1 Historical background and current status of shared use of the Carajás corridor..... 349

20.2 Long-term social and environmental implications of a pro-economic development agenda..... 351

20.3 Could a SEA have reconciled shared-use and environmental protection in Carajás?..... 353

20.4 Conclusions 358

Acknowledgements..... 359

References..... 359

21. Lessons Learned from SEAs of Road Infrastructure Developments in Bolivia: Santa Cruz-Puerto Suarez Corridor361

21.1 Background and context..... 361

21.2 Characterization of the corridor development area..... 362

21.3 From EIA to SEA 364

21.4 The SEA process..... 365

21.5 Results of the implementation of the SEA 367

21.6 Lessons learned..... 367

Acknowledgements..... 368

References..... 368

22. Strategic Environmental Assessment for a Sustainable Mining Corridor: Addressing the Social and Environmental Risks of Tailings Dam Disasters after Mariana and Brumadinho369

22.1	Introduction	370
22.2	Background	371
22.3	The Mariana and Brumadinho TD disasters: losses and reactions	372
22.4	The EIA in Mariana and Brumadinho: failures in the social and environmental protection and evolving laws	376
22.5	Approaches of the SEA for iron ore in Minas Gerais	379
22.6	Conclusion and policy implications.....	381
	References.....	382

LESSONS LEARNED 385

23. Lessons learned from a corridor focused research and capacity-building programme386

23.1	Introduction	386
23.2	Lessons learned.....	387
23.3	Conclusion	400
	Acknowledgements.....	401
	References.....	401

24. Principles for development corridor planning402

Authors Profiles.....407

Asian Case Studies



Environmental Safeguards for the Belt and Road Initiative: Current Status and Future Prospects

Divya Narain and Martine Maron

Centre for Biodiversity and Conservation Science, School of Earth and Environmental Sciences, University of Queensland, St Lucia, Australia

ABSTRACT

Encompassing eight transcontinental corridors that span 71 countries, China's Belt and Road Initiative (BRI) has been dubbed the largest infrastructure development programme in history. While China's five cooperation priorities for the initiative, namely, "policy coordination, facilities connectivity, unimpeded trade, financial integration and people-to-people bonds" go well beyond mere infrastructure building, whether BRI's corridors will emerge as true development corridors will depend on the quality of environmental and social safeguards in place. This chapter makes an inquiry into the potential environmental impacts of BRI projects and the safeguards used to manage those impacts. The environmental impacts typical of infrastructure development are likely to be more pronounced in the case of BRI, given its scale and proximity to ecologically-sensitive areas. Environmental safeguards with requirements for impact assessment and mitigation for BRI can be brought to the table by various actors including Chinese regulators, host country governments, international bodies, projects developers and financiers. Content analysis reveals that, while the policies issued by regulators, industry associations and international multi-stakeholder bodies include broad plans on environmental protection and some even project-level guidelines, none offer binding operational requirements, something that can go a long way in making project outcomes sustainable. Fine-tuned through decades of international application and regular stakeholder consultations, the safeguard standards of multilateral development banks (MDBs) can act as useful templates for improving environmental standards for the BRI.

16.1 Belt and Road Initiative: scale and scope

China's BRI envisages eight economic corridors connecting population centres across 71 countries (referred to as corridor countries) in Asia, Europe and Africa (Kenderdine 2017; National Development and Reform Commission 2015). Among the corridors

are six overland ones, that connect China to Central Asia, Southeast Asia and Europe (together called the Silk Road Economic Belt), and one maritime corridor that connects China to Africa via the South China Sea and the Indian Ocean (referred to as the 21st-century

maritime silk road) (Fig. 16.1). Another recent addition is the 'polar silk road', which would involve developing new shipping lanes along the Northern sea route (connecting China to Northern Europe) that is likely to open up with the rapidly melting Arctic. More than 12,000km of roads and 31,000km of railways (both new and upgrades) along the overland

corridors (Losos *et al.* 2019) and 70 ports along the maritime corridor (Turschwell *et al.* 2020) are already underway. These transport infrastructure projects being built along BRI's corridors are acting as axes of future economic growth, catalyzing hundreds of energy, industrial and resource extraction projects around them (Teo *et al.* 2019).

Figure 16.1 Corridor countries along six overland, and one maritime corridor

The overland corridors include the Bangladesh-China-India-Myanmar economic corridor (BCIM), the China-Central Asia-West Asia economic corridor (CCWAEC), the China-Indochina Peninsula Economic Corridor (CICPEC), the China-Mongolia-Russia Economic Corridor (CMREC), the China-Pakistan Economic Corridor (CPEC) and the New Eurasian Land Bridge (NLB).



Source: Wikimedia Commons.

Since BRI was announced in 2013, China has signed Memorandums of Understanding (MoUs) with 144 countries (including most of the 71 corridor countries) and 30 international organizations to participate in the initiative (Belt and Road Portal 2020; Coenen *et al.* 2020). According to the World Bank, BRI investment is already worth US\$ 575 billion, with 75 per cent of it having gone into the high-environmental-footprint sectors of energy and electric power (46 per cent), transportation and shipping (25 per cent), and mining

infrastructure (4 per cent) (Ruta *et al.* 2019).

Some commentators have interpreted BRI as China's attempt to boost regional connectivity, promote energy security and stimulate local industrialization, with a view to lifting host country populations out of poverty and isolation (Chan 2018; Zhao *et al.* 2019). Others have dubbed it China's attempt to cement its regional influence in Central and Southeast Asia, invest its surplus capital, internationalize its currency (the renminbi), deploy its excess

manufacturing capacity, find business for its state-owned enterprises (SOEs), access new reserves of energy and natural resources, and even to relocate its polluting industries to pollution havens (Bradshaw *et al.* 2009; Tracy *et al.* 2017; Cai 2018; Coenen *et al.* 2020; Liang 2020; Tracy *et al.* 2017). While the geopolitical and geoeconomic drivers of BRI remain open to interpretation, what is incontrovertible is its sheer scale and potential for social and ecological transformation. In its vision statement for the BRI, China outlines five cooperation priorities for the initiative: promotion

of “policy coordination, facilities connectivity, unimpeded trade, financial integration and people to people bonds” (National Development and Reform Commission 2015). While these priorities go well beyond infrastructure building, whether BRI’s corridors will emerge as true development corridors will depend on the extent to which environmental and social considerations are taken on board. This chapter makes an inquiry into the potential environmental impacts of BRI and the safeguards in place to manage them.

16.2 Environmental impact of infrastructure development

Construction of infrastructure can have a range of environmental externalities, including air and water pollution, hydrological and topographical damage, soil contamination and erosion, and destruction of wildlife and its habitat (Coffin 2007; Silde, Stokes and Ghesthem 2014; Laurance *et al.* 2015). Infrastructure categories – nodal versus linear, roads versus rail, new versus upgrades – vary in terms of the extent, intensity and type of impact they cause (Losos *et al.* 2019).

Nodal infrastructure, such as dams, mines and oil rigs, have ecosystem impacts resulting from pressures such as deforestation and submergence (Butt *et al.* 2013; Lees *et al.* 2016). However, potentially more deleterious are linear infrastructure such as roads, railway lines and transmission lines, as they can lead to cascading landscape-scale impacts of fragmentation and edge effects, isolating species populations and exposing forest edges to the risk of droughts and fires (Coffin 2007; Bruschi *et al.* 2015; Alamgir *et al.* 2019). Shipping routes can be equally damaging. As marine roads, concentrating the movement of vessels between multiple locations, new shipping routes increase the risk of vessel collisions with marine animals, the impact of low-frequency underwater shipping noise (causing

behavioural modifications in animals), chemical pollution from emissions/discharges, and spread of invasive species through ballast water (Pirodda *et al.* 2018).

The impact of new infrastructure is considered to be higher than that of upgrade/expansion of existing infrastructure, as the former may make the first cut into intact landscapes, exposing them to a slew of secondary pressures such as poaching, illegal logging, wildlife trafficking, encroachment and land speculation (Laurance *et al.* 2014). Impact also varies with the type of infrastructure. For instance, with their narrower, straighter paths, rail lines tend to have a lower environmental footprint than roads (Losos *et al.* 2019), although this also means that there are fewer options for alternative routing around sensitive areas.

While the construction-induced impacts of infrastructure can in themselves be very substantial, often more profound are the growth-induced impacts resulting from the increased industrialization, agricultural expansion, urbanization, trade and better access to markets that are triggered after the infrastructure becomes operational. These impacts manifest in the form of increased consumption, emissions and waste generation (Losos *et al.* 2019; Johnson *et al.* 2020).

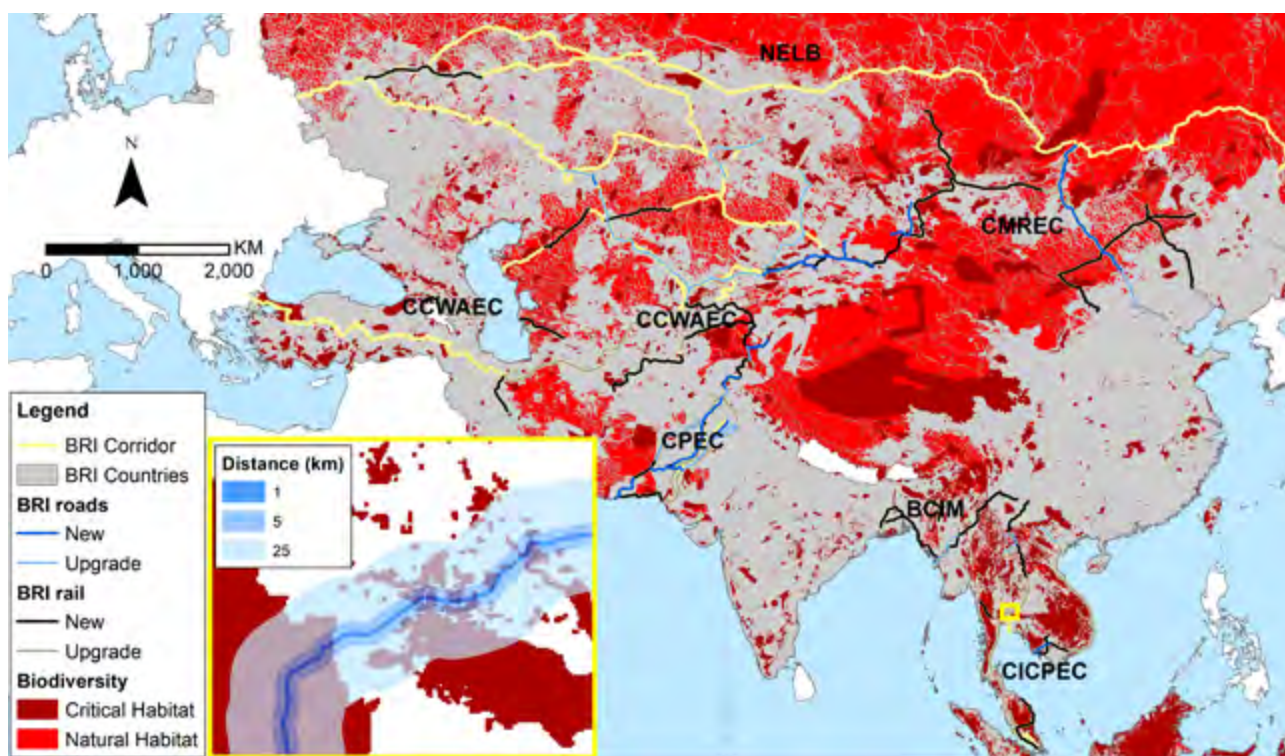


16.3 Environmental impact of BRI

The environmental impacts typical of infrastructure development are likely to be more pronounced in the case of BRI, given its extensive geographical scale and the proximity of its corridors to some of the world's most ecologically-sensitive areas (World Wide Fund for Nature 2017). An analysis by Hughes (2019) found that several areas of conservation priority, such as key biodiversity areas and protected areas, as well as hotspots of particularly threatened taxa, existed in close proximity with the proposed rail and road routes. Another recent study by Narain *et al.*

(2020) found that more than 6,000km² of critical habitat (as defined by the International Finance Corporation) occurred within 1km of BRI's road and rail infrastructure (Fig. 16.2). Turschwell *et al.* (2020) assessed the intersection of marine species ranges with ports being built along the 21st-century maritime silk road (using different buffer distances for different types of impacts), and found that over 400 threatened species are imperilled by the impacts of construction and dredging, while over 200 are affected by an increase in shipping traffic and noise pollution.

Figure 16.2 Spatial overlap of BRI's road and rail routes (within three buffer zones of 1km, 5km and 25km, respectively) with critical and natural habitats at the global scale



Source: Narain *et al.* (2020).

In addition to the typical construction-induced impacts on species and their habitats, a number of secondary pressures are expected to be created by BRI's projects. The new trade and transport routes are likely to intensify the risk of biological invasion. Several such invasion hotspots have been identified along the overland corridors by Liu *et al.* (2019). Likewise, BRI is also expected to exacerbate illegal wildlife trade by opening up new supply routes in West and Central Asia through the China-Pakistan economic corridor (CPEC) corridor (Farhadinia *et al.* 2019) and by increasing the demand for wildlife-based ingredients of traditional Chinese medicine, promoting which is an objective of the initiative (Hinsley *et al.* 2019).

BRI's growth-induced impacts triggered by the increase in trade, transport, manufacturing and higher disposable income are likely to be more enduring and significant than the immediate impacts of infrastructure building. According to the World Bank, the transport infrastructure being built under the BRI is likely to increase

the trade flows among BRI countries (including China) by 4.1 per cent (Baniya, Rocha and Ruta 2019). The infrastructure-induced economic growth in host countries could drive up greenhouse gas (GHG) emissions, jeopardizing their Paris Agreement targets (Zhou *et al.* 2018). According to a 2019 Tsinghua University study (Ma and Zadek 2019), commensurate with the growth in their gross domestic products (GDPs) (attributable in part to BRI investments), host countries could account for 66 per cent of global GHG emissions by 2050, which alone could catapult the world on a 2.7-degree rise pathway (Ma and Zadek 2019). On the other hand, future -appropriate energy investments in these countries could present an opportunity to set them on a low-carbon course.

Conversely, there are certain factors that may contribute to reduction of these potential negative impacts. For example, fewer road projects (by length) are being built than rail projects, and there is a significant proportion of upgrades among the projects rather than new roads. Therefore, the amount of habitat

that is impacted likely to be smaller (Losos *et al.* 2019, Narain *et al.* 2020). Another factor for a potentially diminished impact is that BRI road and rail routes (except for a few projects in China-Mongolia-Russia economic corridor [CMREC], the China-Indochina Peninsula economic Corridor (CICPEC) and the polar silk

road corridors) are not located in the proximity of intact forest landscapes (seamless stretches of natural areas [$>500\text{km}^2$] devoid of any human disturbance [Potapov *et al.* 2017]) as they are designed to connect population centres (Losos *et al.* 2019).

16.4 Environmental impact-related risks of BRI projects

Failure to pre-empt and address environmental impacts of projects can result in a range of physical, regulatory, financial and reputational risks for project developers that often spill over to project financiers (Bauer and Hann 2010). These risks usually begin with pushback from environmental groups or local communities, often translating into litigation or regulatory action that leads to project delays, cost-overruns, asset devaluation and even project closure. Consequently, developers are confronted with reduced stock value and credit ratings and financiers with loan defaults (World Resources Institute 2013; World Economic Forum 2019). In case of overseas investments, such risks can arise both in the host (investee) and the home (investor) countries (Table 16.1). Some of these eventualities are already playing out in the case of BRI. According to a 2018 study, 14 per cent of BRI projects in 66 countries have faced some kind of local opposition (RWR Advisory 2018).

Myanmar's Myitsone hydropower project is a prominent case, wherein a BRI project was suspended mid-construction due to its potential environmental impact, locking-in investor funds indefinitely. The project is slated to be the largest in the region and the 15th largest in the world (Hadfield 2014). The dam was feared to have inhibited upstream migration of fish to spawning areas and enrichment of downstream agricultural deltas, thus threatening the livelihoods of vulnerable fishing and agricultural communities in the Burmese state of Kachin (International Rivers 2011). With construction starting in 2009, several villages were

already displaced before the dam was suspended by the government, following sustained opposition from local Kachin leaders, as well as Burmese and international NGOs. The project developers were the China Power Investment Corporation (CPI) (a major Chinese state-owned hydropower developer) and the investor China EXIM bank (one of the two Chinese state-owned policy banks). While CPI's Environmental Impact Assessment (EIA) report was found by independent experts to have underestimated the damage (International Rivers and), the real clincher is believed to have been the government-commissioned Strategic Environmental Assessment (SEA) of the overarching impact of hydropower projects on Myanmar's major rivers, which warned against the Myitsone dam: "if constructed, Myitsone dam would break river connectivity, trap sediment, and alter the river flow on a wide scale" (Fawthrop 2019). Myitsone dam is not the only BRI project to have faced environmental impact-related risks. Kenya's Lamu coalmine and port project, proposed on an ecologically-fragile island, was halted by a court ruling amid protests from land defenders (Ullman 2019). Another example is that of a hydroelectric dam in the Batang Toru ecosystem of the Indonesian island of Sumatra, funded by the Bank of China. The dam threatens the only habitat of the rare and critically endangered Tapanuli orangutan (one among eight extant species of great apes) and has faced protests and litigation (Leahy 2019). These examples point to a need for robust risk management frameworks incorporating environmental safeguards to be put in place for BRI projects.

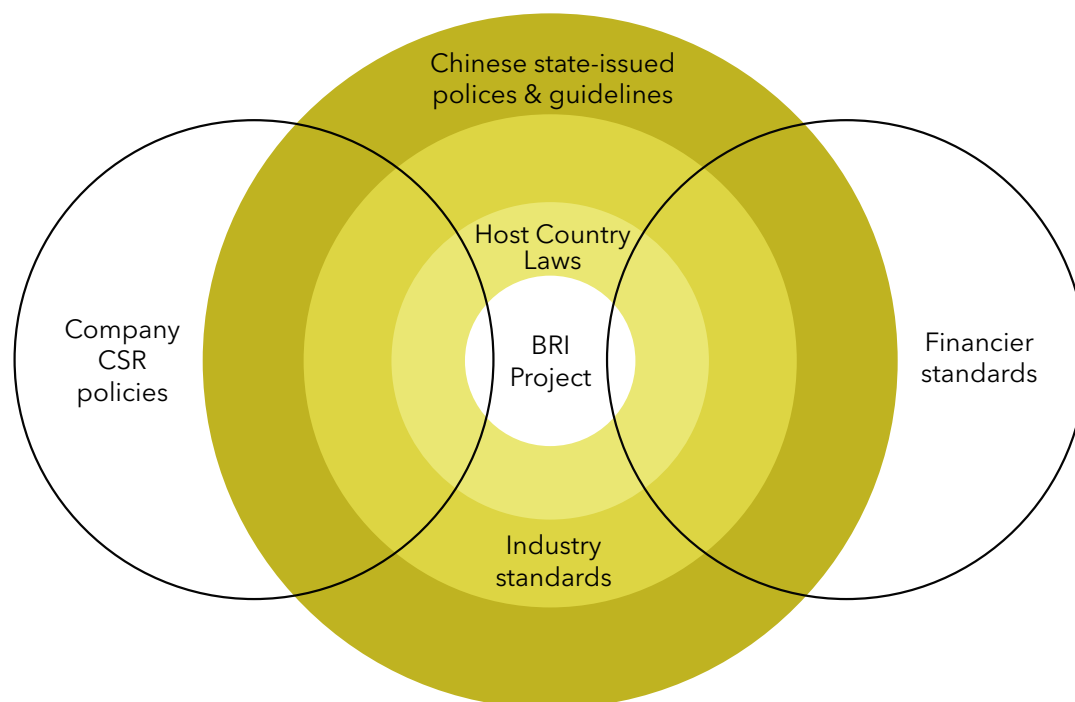
16.5 Environmental safeguards for BRI

While the environmental impacts of BRI can be considerable, their early assessment and effective mitigation can limit both their probability of occurrence and their magnitude (Sánchez and Gallardo 2005), resulting in sustainable outcomes for BRI projects. President Xi Jinping emphasized this in his address during the April 2019 Belt and Road Forum, when he called for “building high-quality, sustainable, risk-resistant, reasonably priced, and inclusive infrastructure” (Goh and Cadell 2019). The Mitigation Hierarchy (MH) offers a best-practice approach for managing environmental impacts. Application of the MH involves sequentially avoiding, minimizing and offsetting of environmental impacts (see [Chapter 4](#) and [Chapter 8](#) for more details). Integral to and intertwined with the application of the MH is EIA, a tool that allows for incorporating environmental considerations into project decision-making and entails identification of direct, indirect and cumulative impacts of the proposed project (and its alternatives) on the environment (Ekstrom, Bennun and Mitchell 2015). Due to

the multi-jurisdictional nature of BRI projects, transboundary EIAs become relevant, requiring putting in place bilateral/multilateral reciprocal legal frameworks for transboundary information exchange and consultation (Schrage and Bonvoisin 2008). Another approach relevant to a multi-project programme like BRI is SEA, which involves impact assessment at the broader scales of plans, programmes and policies (Fischer 2003).

Environmental safeguards encompassing requirements on EIA and impacting mitigation in the context of the BRI can be brought to the table by: (1) Chinese regulators through state-issued policies and guidelines for BRI projects; (2) host country governments through national EIA regulations; (3) financiers through their investment requirements; (4) project developers (primarily SOEs) through their environmental policies; and/or (5) industry associations through their industry-specific guidelines (Fig. 16.3) (World Resources Institute 2013; Skinner and Haas 2014).

Figure 16.3 Regulatory landscape governing BRI projects



China's overseas investments take three forms: (1) projects funded by governmental agencies using fiscal revenue and routed through foreign aid programmes (grants, zero-interest loans or concessional loans); (2) projects funded through trade finance loans (non-concessional loans, commercial loans and export credits) provided by Chinese banks, primarily its two policy banks, China Development Bank (CDB) and China Exim (CHEXIM); and (3) projects sponsored by China's SOEs (Hale *et al.* 2020). The type of project determines the involvement of each actor and, by extension, the influence they can exert on

project environmental performance (Hale *et al.* 2020). For example, safeguards brought to the table by Chinese policy banks and SOEs are likely to be more relevant for trade finance loan-funded projects, which constitute the bulk of Chinese overseas development projects, while Chinese state-issued guidelines would be more relevant for foreign aid-funded projects. Similarly, when an SOE is involved as a project sponsor (Joy-Perez and Scissors 2018), it is likely to have a greater control over what EIA and mitigation measures are applied to the project than when it is involved as a contractor (International Rivers 2012).

16.6 MDB safeguards as a benchmark

Environmental safeguards of MDBs provide a useful benchmark for assessing the safeguards in place for BRI projects, as they have been fine-tuned through decades of international application and regular updating, often after extensive stakeholder consultations. Safeguards of MDBs such as the World Bank Group specify operational requirements on conducting EIA and application of the MH. A key example is the International Finance Corporation (IFC)'s Performance Standards, which are regarded as international best practice. Several other financial institutions (e.g. European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, US Exim, Caribbean Development Bank, Kreditanstalt Für Wiederaufbau, Agence Française De Development) have aligned their safeguards to IFC's Performance Standards, with only subtle adjustments (Gallagher and Yuan 2017).

Applicable to all projects financed by IFC, Performance Standard 1 (PS1) requires clients (as a pre-condition to investment) to carry out

an EIA and apply the MH. Other Performance Standards are triggered based on the impacts identified. IFC's Performance Standard 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources, for example, has to be applied if the proposed project potentially impacts certain elements of biodiversity such as critical habitat or natural habitat (see [Chapter 4](#) for more details on IFC Performance Standard 6). Accordingly, IFC PS6 has specified biodiversity impact mitigation requirements. For example, it requires clients to achieve a net gain of biodiversity in impacted critical habitat (International Finance Corporation 2012b). To demonstrate how they will mitigate (i.e. avoid, minimize, restore and offset) the identified impacts, clients are required to prepare environmental management plans and to implement them through the establishment of environmental and social management systems and put in place procedures for its monitoring and review (International Finance Corporation 2012a).



Image credits: Rob Marchant

16.7 Assessing BRI safeguards

Here, we examine whether the various regulatory frameworks applicable to BRI offer operational environmental safeguards with project-level requirements in line with MDB safeguards.

Policies and guidelines that set the overall vision and principles for environmental protection under the BRI are available. Table 16.2 lists these various applicable policies and guidelines in three ways: (1) BRI-specific policies and guidelines; (2) policies on overseas investment focused on environmental protection and (3) green credit guidelines as well as policies on overseas investment focused on environmental protection; and industry-specific guidelines issued by industry associations. The content analysis of these policies and guidelines shows that, while most of them include broad vision/plans for environmental protection and even project-level guidelines, none offer binding requirements. The various guidelines for overseas investments and green credit policies make the case for green lending and encourage environmental risk management,

but they do not make specific project-level provisions (Table 16. 2). A study by Gallagher and Qi (2018) of China's policies encouraging responsible overseas investment concludes that all such guidelines are voluntary, with little explicit accountability and no penalties for non-compliance.

Ultimately, BRI policies defer to host countries on the issue of environmental safeguards (Coenen *et al.* 2020). For example, the Guidance on Promoting Green Belt and Road urges "businesses to observe international regulations on economy and trade and the laws, regulations, policies and standards of the host countries on eco-environment protection" (Belt and Road Portal 2017). However, scholars point to the weak institutional capacities and poor regulatory climate in many BRI host countries, arguing that they are often ill-equipped to offer adequate safeguards (Tracy *et al.* 2017; Masood 2019; Coenen *et al.* 2020). A similar pilot attempt by the World Bank, dubbed the 'country systems' approach, which involved using a country's own environmental

and social safeguard systems, where they were assessed as being equivalent to the Bank's systems, received limited acceptance (Larsen and Ballesteros 2013). Recent assessments of the EIAs of 65 BRI countries (including China) show that, while all countries have legal frameworks for EIA in place, they are at various stages of evolution. Only four countries, namely, Lithuania, Moldova, Hungary and Latvia, rank better than China on a composite indicator of EIA legislation, administration, procedure, decision-making and support. SEA has been institutionalized in several of the BRI countries (e.g. in several European BRI partners through the EU SEA directive and in the Middle Eastern partners through the Mediterranean Environmental Technical Assistance Program), while it is driven by donor requirements in many others (e.g. several SEAs have been supported by the World Bank in Southeast Asia). However, only a few European BRI partners have signed up to the United Nations' Espoo Convention and have put in place legislation requiring transboundary EIAs (Aung and Fischer 2020).

Principles and guidelines for greening the BRI have also been developed jointly by international stakeholders (Table 16.3). Even though they have been widely accepted, these policies and guidelines remain non-specific, conveying a broader vision on environmental protection. Another set of actors that can offer safeguards for BRI projects are companies that implement the projects. China's overseas investment space is dominated by centrally-owned SOEs that act not only as project developers or construction contractors, but also as project sponsors (non-financial sources of FDI⁸⁴) (International Rivers 2012). Many Chinese SOEs are involved in project design (when engaged as Engineering Procurement Construction/Built Operate Transfer contractors, rather than only as construction contractors) and can potentially influence project environmental performance by requiring Environmental Impact Assessment and mitigation as a part of their Corporate Social Responsibility

policies (International Rivers 2012). However, reviews of such policies of Chinese SOEs investing abroad have found them (especially those focused on environmental protection) to be not at par with global standards, with their implementation marked by *ad-hocism* and inconsistencies (Tan-Mullins and Mohan 2013).

In the absence of operational project-level safeguards from Chinese regulators and SOEs, project financiers can mandate Environmental Impact Assessment and mitigation. The Asian Infrastructure Investment Bank (AIIB), a MDB that was initially conceived to fund the BRI (NDRC 2015) has an environmental and social framework that shares many features with that of the World Bank (Gransow and Price 2019). Although AIIB has specific requirements on EIA and mitigation, it has been a marginal investor until now, having invested only about US\$ 1 billion in BRI-related projects (Hameiri and Jones 2018). China's two policy banks CDB and CHEXIM, the key financiers of BRI projects do require *ex ante* and *ex post* EIAs (Hale *et al.* 2020). However, a recent examination of biodiversity-specific safeguards of 65 key financiers of BRI (35 led by China and 30 international) found that 26 had published environmental policies and, of those, 17 had project-level requirements for biodiversity impact mitigation. While 16 of the 30 international financiers had biodiversity impact mitigation requirements, only one (China-ASEAN Investment Cooperation Fund) of the 35 Chinese/China-led financiers had such requirements (Narain *et al.* 2020). It can be argued that it is not common for national development banks of donor countries to have MDB-like evolved safeguards. However, CDB and CHEXIM, unlike other national development banks, are increasingly internationalized; overseas investments by these banks are now on a par with that of the World Bank (Gallagher and Ray 2020). An internationalization of investment to such a degree calls for a commensurate internationalization of environmental standards.

84 Foreign Direct Investment or FDI involves direct investment by a foreign company in projects implemented in a host country. This is distinct from official development financing (ODF) which involves official lending by financial institutions of a foreign company (e.g., by China's twin policy banks CDB and CHEXIM) to governments or projects in the host country.

16.8 The way forward

The BRI is likely to result in significant economic benefits for host countries. It is expected to boost the GDP of host countries by 3.4 per cent (De Soyres *et al.* 2020), lifting 7.6 million people from extreme poverty and 32 million from moderate poverty (Maliszewska and Van Der Mensbrugge 2019). However, whether it will lead to equitable and sustainable development pathways for host countries will be determined by how its impacts on the environment and society are assessed and managed (Ascensão *et al.* 2018). Environmental safeguards are seen as an important tool for reconciling the conflict between economic development and environmental protection (Gallagher and Yuan 2017; Morgado and Taşkın 2019). Based on the evidence provided in this study, it seems the current regulatory framework for BRI seems to fall short in terms of project-level operational safeguards.

There is a need for various actors namely, Chinese state agencies, regulators, industry associations, SOEs and financial institutions to evolve their own safeguards so that they can provide multiple lines of defence against environmental impacts and risks. International safeguards systems such as those of the World Bank Group can provide a useful template for developing such safeguards for use by Chinese entities. At the same time, it is important for China to build institutional capacities and transfer good practice within host countries where possible, so that country systems can eventually be brought on a par with international standards. It is only when they are planned, implemented and managed according to the principles of sustainability that BRI's infrastructure corridors can become development corridors.

Table 16.1 Environmental impact-related risks faced by project developers

Type of risk	In host country	In home country
Regulatory approval - failure or delay of approvals	✓	✓
Regulatory/legal action - permit withdrawal, penalties, compensation liabilities, litigation tightening of requirements	✓	
Political - opposition to development projects or sectors	✓	
Financing - withdrawal or delay of financing, tightening of requirements		✓
Project construction - delays, cost overruns due to regulatory/legal action	✓	
Project operation - disruption due to regulatory/legal action	✓	
Reputational risk - impact on brand image	✓	

Table 16.2 Chinese policies and guidelines on BRI: examining the presence of operational safeguards

	Title	Year	Issuing authority	Vision/plan of environmental protection	Project-level EIA and mitigation guidelines	Project-level biodiversity impact assessment and mitigation requirements (binding)
BRI Specific						
1	Vision and Actions on Jointly Building Silk Road Economic Belt and 21 st Century maritime Silk Road ⁸⁵	2015	National Development and Reform Commission (NDRC), Ministry of Foreign Affairs, and Ministry of Commerce (MOFCOM)	Yes	No	No
2	Vision for Maritime Cooperation under the Belt and Road Initiative ⁸⁶	2017	NDRC and State Oceanic Administration	Yes	No	No
3	Guidance on promoting a green Belt and Road ⁸⁷	2017	Ministry of Ecology and Environment (MEE)	Yes	No	No
4	The Belt and Road Ecological and Environmental Cooperation Plan ⁸⁸	2017	Ministry of Environmental Protection (MEP) (now MEE)	Yes	No	No
5	Building the Belt and Road: Concepts, Practices and China's Contributions ⁸⁹	2017	Office of the Leading Group for the BRI	Yes	No	No

85 http://en.ndrc.gov.cn/newsrelease/201503/t20150330_669367.html

86 http://www.china.org.cn/world/2017-06/20/content_41063286.htm

87 http://english.mee.gov.cn/Resources/Policies/policies/Frameworkp1/201706/t20170628_416864.shtml

88 <https://eng.yidaiyilu.gov.cn/zchj/qwfb/13392.htm>

89 <https://eng.yidaiyilu.gov.cn/wcm.files/upload/CMSydylyw/201705/201705110537027.pdf>

6	The Guidance for the Central Enterprises to Disclose Their Social Responsibility ⁹⁰	2017	The State-owned Assets Supervision and Administration Commission of the State Council (SASAC)	No	No	No
Guidelines on overseas investment focused on environmental protection and guidelines on green credit applicable to overseas investments						
1	Green Credit Guidelines (and related KPIs) ⁹¹	2012	China Banking Regulatory Commission (CBRC)	Yes	No	No
2	Guidelines on Environmental Protection for Overseas Investment and Cooperation ⁹²	2013	MOFCOM and MEP	Yes	Yes	No
3	Guidelines for Establishing the Green Financial System ⁹³	2016	People's Bank of China (PBOC) with NDRC, CBRC, MEE, the Ministry of Finance (MOF), China Securities Regulatory Commission, and China Insurance Regulatory Commission	Yes	No	No
4	Measures for the Administration of Overseas Investment of Enterprises ⁹⁴	2017	NDRC	No	No	No
5	Guidelines to Chinese state-owned enterprises on fulfilling corporate social responsibilities ⁹⁵	2008	State-Owned Assets Supervision and Administration Commission of the State Council	No	No	No

90 ["http://www.gov.cn/zwqk/2008-01/04/content_850589.htm"](http://www.gov.cn/zwqk/2008-01/04/content_850589.htm)

91 <http://www.cbrc.gov.cn/EngdocView.do?docID=3CE646AB629B46B9B533B1D8D9FF8C4A>

92 <http://english.mofcom.gov.cn/article/policyrelease/bbb/201303/20130300043226.shtml>

93 http://www.chinadaily.com.cn/business/2016hangzhoug/2016-09/04/content_26692931.htm

94 http://www.gov.cn/gongbao/content/2018/content_5280579.htm

95 <http://www.sasac.gov.cn/n2588030/n2588939/c4297449/content.html>

6	Regulations on Outbound Investment and Business Activities of Private Enterprises ⁹⁶	2017	NDRC and MOFCOM	No	No	No
7	Guide to Strengthen Risk Prevention and Control ⁹⁷	2017	CBRC	No	No	No
Guidelines issued by industry associations						
1	Environmental Risk Management for China's Overseas Investment guidelines ⁹⁸	2017	Green Finance Committee (GFC) of China Society for Finance and Banking, Investment Association of China, China Banking Association	Yes	No	No
2	Guidelines of Sustainable Infrastructure for Chinese International Contractors ⁹⁹	2017	China International Contractors Association	Yes	Yes	No
3	Guidelines on the Corporate Social Responsibility of Banking Institutions of China ¹⁰⁰	2009	China Banking Association	Yes	No	No

Source: List of policies compiled using Coenen et al., (2020) and Gallagher and Qi (2018); Sector-specific guidelines not included

96 <https://www.ndrc.gov.cn/fggz/lywzjw/zcfg/201404/W020190909440616023780.pdf>

97 https://www.mee.gov.cn/gkml/zj/wj/200910/t20091022_172469.htm

98 <https://www.ghub.org/en/environmental-risk-management-manual-for-china-overseas-investment/>

99 <http://images.mofcom.gov.cn/csr2/201707/20170713103213247.pdf>

100 <http://www.lawinfochina.com/display.aspx?lib=law&id=7296&CGid=>

Table 16.3 International multistakeholder guidelines on BRI

	Title	Year	Developed by	Vision/plan of environmental protection	Project-level EIA and mitigation guidelines	Project-level biodiversity impact assessment and mitigation requirements (binding)
1	Guiding Principles on Financing the Belt and Road ¹⁰¹	2019	Chinese Ministry of Finance and its counterparts in 27 countries	Yes	No	No
2	Green Investment Principles ¹⁰²	2017	Developed by Green Finance Committee of China Society for Finance and Banking and the City of London Corporation's Green Finance Initiative; the World Economic Forum, UNPRI, Belt & Road Bankers Roundtable, the Green Belt and Road Investor Alliance and the Paulson Institute; Signed by all major Chinese banks and financial institutions	Yes	No	No

Source: [List of policies compiled using] Gallagher and Qi (2018); Coenen et al. (2020). Sector-specific guidelines not included.

Acknowledgements

We would like to thank Hoong Chen Teo, PhD Candidate at NUS, Singapore for the content analysis of five policy documents for which English translations were not available.

References

- Alamgir, M., Campbell, M.J., Sloan, S., Suhardiman, A., Suprianta, J. and Laurance, W.F. (2019). High-risk infrastructure projects pose imminent threats to forests in Indonesian Borneo. *Scientific reports* 9, 140.
- Ascensao, F., Fahrig, L., Clevenger, A.P., Corlett, R.T., Jaegar, J.A.G., Laurance, W.F. and Pereira, H.M. (2018). Environ-

101 <https://en.imsilkroad.com/p/314204.html>

102 <https://green-bri.org/green-investment-principle-gip-belt-and-road-initiative/>

- mental challenges for the Belt and Road Initiative. *Nature Sustainability* 1, 206-209.
- Aung, T.S. and Fischer, T.B. (2020). Quality of environmental impact assessment systems and economic growth in countries participating in the belt and road initiatives. *Impact Assessment and Project Appraisal*, 1-19.
- Aung, T.S., Fischer, T.B. and Shengji, L. (2020). Evaluating environmental impact assessment (EIA) in the countries along the belt and road initiatives: System effectiveness and the compatibility with the Chinese EIA. *Environmental Impact Assessment Review* 81, 106361.
- Baniya, S., Rocha, N. and Ruta, M. (2019). Trade Effects of the New Silk Road: A Gravity Analysis. <http://documents.worldbank.org/curated/en/623141547127268639/Trade-Effects-of-the-New-Silk-Road-A-Gravity-Analysis>. Accessed 2 July 2021.
- Bauer, R. and Hann, D. (2010). Corporate environmental management and credit risk. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1660470. Accessed 21 July 2021.
- Belt and Road Portal (2017). *Guidance on Promoting Green Belt and Road*. <https://eng.yidaiyilu.gov.cn/zchj/qwfb/12479.htm>. Accessed 2 July 2021.
- Belt and Road Portal (2020). *International Cooperation*. https://eng.yidaiyilu.gov.cn/info/iList.jsp?cat_id=10076. Accessed 15 June 2020.
- Bradshaw, C.J., Warkentin, I.G., Sodhi, N.S.J.T.I.E. and Evolution (2009). Urgent preservation of boreal carbon stocks and biodiversity. *Trends in Ecology & Evolution* 24(10), 541-548.
- Bruschi, D., Garcia, D.A., Gugliermetti, F. and Cumo, F. (2015). Characterizing the fragmentation level of Italian's National Parks due to transportation infrastructures. *Transportation Research Part D: Transport and Environment* 36, 18-28.
- Butt, N., Beyer, H., Bennett, J., Biggs, D., Maggini, R., Mills, M. et al. (2013). Biodiversity risks from fossil fuel extraction. *Science* 342(6157), 425-426.
- Cai, K.G. (2018). The one belt one road and the Asian infrastructure investment bank: Beijing's new strategy of geoeconomics and geopolitics. *Journal of Contemporary China* 27, 831-847.
- Chan, M.H.T. (2018). The belt and road initiative-the new silk road: a research agenda. *Journal of Contemporary East Asia Studies* 7, 104-123.
- Chen, Q., Zhang, Y. and Ekroos, A. (2007). Comparison of China's environmental impact assessment (EIA) law with the European Union (EU) EIA Directive. *Environmental monitoring and assessment* 132, 53-65.
- Coenen, J., Bager, S., Meyfroidt, P., Newig, J. and Challies, E. (2020). Environmental Governance of China's Belt and Road Initiative. *Environmental Policy and Governance* 31(1), 3-17.
- Coffin, A.W. (2007). From roadkill to road ecology: a review of the ecological effects of roads. *Journal of transport Geography* 15, 396-406.
- DE SOYRES, F., MULABDIC, A. & RUTA, M. 2020. Common transport infrastructure: A quantitative model and estimates from the Belt and Road Initiative. *Journal of Development Economics*, 143, 102415.
- Ekstrom, J., Bennun, L. and Mitchell, R. (2015). A cross-sector guide for implementing the Mitigation Hierarchy. <https://www.icmm.com/en-gb/publications/biodiversity/a-cross-sector-guide-for-implementing-the-mitigation-hierarchy>. Accessed 2 July 2021.
- Farhadina, M.S., Maheshwari, A., Nawaz, M.A., Ambarli, H., Gritsina, M. A., Koshkin, M.A. et al. (2019). Belt and Road Initiative may create new supplies for illegal wildlife trade in large carnivores. *Nature Ecology & Evolution* 3, 1267-1268.
- Fawthrop, T. (2019). Myanmar's Myitsone Dam Dilemma. <https://thediplomat.com/2019/03/myanmars-myitsone-dam-dilemma/>. Accessed 2 July 2021.
- Fischer, T.B. (2003). Strategic environmental assessment in post-modern times. *Environmental impact assessment review* 23, 155-170.
- Gallagher, K.P. and Ray, R. (2020). Scope and Findings: China's Overseas Development Finance Database. <https://www.bu.edu/gdp/2020/12/13/scope-and-findings-chinas-overseas-development-finance-database/>. Accessed 2 July 2021.
- Gallagher, K.P. and Yuan, F. (2017). Standardizing sustainable development: A comparison of development banks in the Americas. *The Journal of Environment Development* 26, 243-271.
- Gallagher, K.S. and Qi, Q. (2018). Policies governing China's overseas development finance implications for climate change. *Center for International Environment and Resource Policy*, The Fletcher School, Tufts University, March.
- Goh, B. and Cadell, C. (2019). China's Xi says Belt and Road must be green, sustainable. Reuters. <https://www.reuters.com/article/us-china-silkroad-idUSKCN1S104I>. Accessed 21 July 2021.
- Gransow, B. and Price, S. (2019). Social risk management at AIB-Chinese or international characteristics? *Journal of Chinese Political Science* 24, 289-311.
- Hadfield, P. (2014). Burmese villagers exiled from ancestral home as fate of dam remains unclear. <https://www.the->

[guardian.com/environment/2014/mar/04/burma-village-myitsone-dam-project-china](https://www.theguardian.com/environment/2014/mar/04/burma-village-myitsone-dam-project-china). Accessed 2 July 2021.

Hale, T., Liu, C. and Urpelainen, J. (2020). Belt and Road Decision-Making in China and Recipient Countries: How and To What Extent Does Sustainability Matter? Initiative for Sustainable Energy Policy (ISEP) and Blavatnik School of Government. <https://www.geg.ox.ac.uk/publication/belt-and-road-decision-making-china-and-recipient-countries-how-and-what-extent-does>. Accessed 21 July 2021.

Hameiri, S. and Jones, L. (2018). The misunderstood AIIB. *The Interpreter*. <https://www.lowyinstitute.org/the-interpret-er/misunderstood-aiib>. Accessed 04 Aug 2021.

Hinsley, A., Milner-Gulland, E., Cooney, R., Timoshynya, A., Ruan, X. and Lee, T.M. (2019). Building sustainability into the Belt and Road Initiative's Traditional Chinese Medicine trade. *Nature Sustainability* 3, 96-100.

Hughes, A.C. (2019). Understanding and minimizing environmental impacts of the Belt and Road Initiative. *Conservation Biology* 33, 883-894.

International Finance Corporation (2012a). Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts. https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps1. Accessed 23 July 2021.

International Finance Corporation (2012b). Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. https://www.ifc.org/wps/wcm/connect/bff0a28049a790d6b835faa8c6a8312a/PS6_English_2012.pdf?MOD=AJPERES. Accessed 2 July 2021.

International Rivers (2011). Irrawaddy Myitsone Dam. <https://archive.internationalrivers.org/resources/the-myitsone-dam-on-the-irrawaddy-river-a-briefing-3931>. Accessed 21 July 2021.

International Rivers (2012). The new great walls: A guide to China's overseas dam industry. International Rivers.

International Rivers. nd. Independent Expert Review of the Myitsone Dam EIA. https://www.internationalrivers.org/sites/default/files/attached-files/independent_expert_review_of_the_myitsone_dam_eia_0.pdf. Accessed 2 July 2021.

Johnson, C.J., Venter, O., Ray, J.C. and Watson, J.E. (2020). Growth-inducing infrastructure represents transformative yet ignored keystone environmental decisions. *Conservation Letters* 13, e12696.

Joy-Perez, C. and Scissors, D. (2018). The Chinese State Funds Belt and Road but Does Not Have Millions to Spare. American Enterprise Institute. <https://www.aei.org/research-products/report/the-chinese-state-funds-belt-and-road-but-does-not-have-trillions-to-spare/>. Accessed 21 July 2021.

Kenderdine, T. (2017). Arctic link reveals the full scope of China's belt and road ambitions. *South China Morning Post*. <https://www.scmp.com/comment/insight-opinion/article/2116273/arctic-link-reveals-full-scope-chinas-belt-and-road>. Accessed 2 July 2021.

Kynge, J. (2018). China's Belt and Road difficulties are proliferating across the world. *Financial Times*. <https://www.ft.com/content/fa3ca8ce-835c-11e8-a29d-73e3d454535d>. Accessed 04 Aug 2021.

Larsen, G. and Ballesteros, A. (2013). Striking the Balance: Ownership and Accountability in Social and Environmental Safeguards. https://pdf.wri.org/striking_the_balance_ownership_and_accountability_in_social_and_environmental_safeguards.pdf. Accessed 21 July 2021.

Laurance, W.F., Clements, G.R., Sloan, S., O'Connell, C.S., Mueller, N.D., Goosem, M., et al. (2014). A global strategy for road building. *Nature* 514(7521):262-262.

Laurance, W.F., Peletier-Jellema, A., Geenen, B., Koster, H., Verweij, P., Van Dijk, P., et al. (2015). Reducing the global environmental impacts of rapid infrastructure expansion. *Current Biology* 25, R259-R262.

Leahy, S. (2019). Hydroelectric dam threatens to wipe out world's rarest ape. *National Geographic*. <https://www.nationalgeographic.com/animals/article/tapanuli-orangutan-rarest-ape-threatened-dam-news>. Accessed 21 July 2021.

Lees, A.C., Peres, C.A., Fearnside, P.M., Schneider, M., Zuanon, J.A.S. (2016). Hydropower and the future of Amazonian biodiversity. *Biodivers Conserv* 25, 451-466.

Liang, Y. (2020). RMB Internationalization and Financing Belt-Road Initiative: An MMT Perspective. *The Chinese Economy* 53, 317-328.

Liu, X., Blackburn, T.M., Song, T., Li, X., Huang, C. and Li, Y. (2019). Risks of biological invasion on the belt and road. *Current Biology* 29, 499-505. e4.

Losos, E.C., Pfaff, A., Olander, L.P., Mason, S. and Morgan, S. (2019). Reducing Environmental Risks from Belt and Road Initiative Investments in Transportation Infrastructure. <http://documents.worldbank.org/curated/en/700631548446492003/Reducing-Environmental-Risks-from-Belt-and-Road-Initiative-Investments-in-Transportation-Infrastructure>. Accessed 2 July 2021.

Ma, J. and Zadek, S. (2019). Decarbonizing the Belt and Road: A Green Finance Roadmap. Tsinghua University, Vivid Economics and Climateworks Foundation. https://www.climateworks.org/wp-content/uploads/2019/09/Decarbonizing-the-Belt-and-Road_report_final_lo-res.pdf. Accessed 21 July 2021.

Maliszewska, M. and Van Der Mensbrugge, D. (2019). *The Belt and Road Initiative: Economic, poverty and environmental impacts*. The World Bank. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/126471554923176405/the-belt-and-road-initiative-economic-poverty-and-environmental-impacts>. Accessed 21

July 2021.

Masoon, E. (2019). How China is redrawing the map of world science. *Nature* 569, 20-24.

Morgado, N.C. and Taskin, Ö. (2019). Managing environmental risks in development banks and development finance institutions-what role for donor shareholders? *ECD Development Co-operation Working Papers*, No. 55, OECD Publishing, Paris, <https://doi.org/10.1787/ca0f0d4f-en>. Accessed 21 July 2021.

Narain, D., Maron, M., Teo, H.C., Hussey, K. and Lechner, A.M. (2020). Best-practice biodiversity safeguards for Belt and Road Initiative's financiers. *Nature Sustainability* 3(8), 650-657.

NDRC, MOFA and Ministry of Commerce of the People's Republic of China (2015). *Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road*. <http://www.chinese-embassy.org.uk/eng/zywl/t1251719.htm>. Accessed 21 July 2021.

Pirotta, V., Grech, A., Jonsen, I.D., Laurance, W.F., Harcourt, R.G. (2018). Consequences of global shipping traffic for marine giants. *Frontiers in Ecology and the Environment* 17(1), 39-47.

Potapov, P., Hansen, M.C., Laestadius, L., Turbanova, S., Yaroshenko, A., Thies, C. et al. (2017). The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013. *Science Advances* 3(1), e1600821.

Ruta, M., Dappe, M.H., Zhang, C., Churchill, E., Constantinescu, C., Lebrand, M. and Mulabdic, A. (2019). Belt and Road Economics: Opportunities and Risks of Transport Corridors. <https://www.worldbank.org/en/topic/regional-integration/publication/belt-and-road-economics-opportunities-and-risks-of-transport-corridors>. Accessed 2 July 2021.

Sánchez, L.E. and Gallardo, A.L.C.F. (2005). On the successful implementation of mitigation measures. *Impact Assessment and Project Appraisal* 23(3), 182-190.

Schrage, W. and Bonvoisin, N. (2008). Transboundary impact assessment: frameworks, experiences and challenges. *Impact Assessment and Project Appraisal* 26(4), 234-238.

Silde, R., Stokes, A. and Ghesthem, M. (2014). Epic landslide erosion from mountain roads in Yunnan, China-challenges for sustainable development. *Natural Hazards and Earth System Sciences* 14(11), 3093-3104.

Skinner, J. and Haas, L.J. (2014). Watered down. *A Review of Social and Environmental Safeguards for Large Dam Projects Natural Resource Issues*. <https://pubs.iied.org/17517iied>. Accessed 21 July 2021.

Tan-Mullins, M. and Mohan, G. (2013). The potential of corporate environmental responsibility of Chinese state-owned enterprises in Africa. *Environment, Development and Sustainability* 15(2), 265-284.

Teo, H.C., Lechner, A.M., Walton, G.W., Chan, F.K.S., Cheshmehzangi, A., Tan-Mullins, M. et al. (2019). Environmental Impacts of Infrastructure Development under the Belt and Road Initiative. *Environments* 6(6), 72.

Tracy, E.F., Shvarts, E., Simonov, E., Babenko, M.J. (2017). China's new Eurasian ambitions: the environmental risks of the Silk Road Economic Belt. *Eurasian Geography and Economics* 58(1), 56-88.

Turschwell, M.P., Brown, C.J., Pearson, R.M. and Connolly, R.M. (2020). China's Belt and Road Initiative: Conservation opportunities for threatened marine species and habitats. *Marine Policy* 112, 103791.

Ullman, D. (2019). When Coal Comes to Paradise. *Foreign Policy*. <https://foreignpolicy.com/2019/06/09/when-coal-came-to-paradise-china-coal-kenya-lamu-pollution-africa-chinese-industry-bri/>. Accessed 21 July 2021.

World Economic Forum (2019). Biodiversity and business risk. <https://www.pwc.co.uk/assets/pdf/wef-biodiversity-and-business-risk.pdf>. Accessed 04 Aug 2021

World Resources Institute (2013). Environmental and Social Policies in Overseas Investments: Progress and Challenges for China. *Issue Brief*. <https://www.wri.org/research/environmental-and-social-policies-overseas-investments>. Accessed 21 July 2021.

World Wide Fund for Nature (2017). The Belt And Road Initiative: WWF Recommendations and Spatial Analysis. http://awsassets.panda.org/downloads/the_belt_and_road_initiative_wwf_recommendations_and_spatial_analysis_may_2017.pdf. Accessed 2 July 2021.

Yost, N.C. and Zhang, X. (2017). Environmental Impact Assessment in China and the United States: A Comparison. *Envtl. L. Rep. News & Analysis* 47, 10067. <https://www.jtnfa.com/en/booksdetail.aspx?type=06001&keyid=00000000000000002777&PageUrl=majorbook&Lan=EN>. Accessed 21 July 2021.

Zhao, Y., Liu, X., Wang, S. and Ge, Y. (2019). Energy relations between China and the countries along the Belt and Road: An analysis of the distribution of energy resources and interdependence relationships. *Renewable and Sustainable Energy Reviews* 107, 133-144.

Zhou, L., Gilbert, S., Wang, Y., Cabré, M.M. and Gallagher, K.P. (2018). Moving the green belt and road initiative: from words to actions. *World Resources Institute and Global Development Policy Center*. <https://www.wri.org/research/moving-green-belt-and-road-initiative-words-actions>. Accessed 21 July 2021.