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Environmental risks, challenges and opportunities along the African Belt and Road Initiative

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Abstract

China's Belt and Road Initiative (BRI) is playing a central role in the infrastructure development of Africa, with investments centered in the transportation and energy sectors, aiming to promote the long-desired growth of trade routes between and within African regions and the world. The expansion of transportation infrastructures, seaports and airports, as well of power-lines and other linear infrastructures, is expected to foster the development of industries and economy, by improving the connectivity between human settlements and main trade hubs. However, despite the expected benefits for human well-being, the feedback of development boosted by the BRI may come with a high toll for the environment in Africa. I briefly discuss how this major development driver may threaten Africa's unique biodiversity. Also, I highlight some unpredicted costs of infrastructures that may jeopardize the economic growth and prosperity and identify big challenges for the pacific implementation of the BRI, namely the lack of environmental commitment by Chinese companies abroad, and the poor governance in African countries. I also identify great opportunities to be pursued for sustainable coexistence between development and conservation, including broadening education to more populations, and increasing food production.

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1. African Belt and Road Initiative

Africa is home to wild animal species, some of them iconic megafauna, and extraordinary landscapes with little human occupation; is a dream vacation destination and scenery of amazing wildlife documentaries. However, Africa is more than picturesque, it is also a continent where human development indices remain at a low level. For example, African countries occupy 41 of the 50 countries with lowest Human Development Index, and none is present in the top 50 (United Nations Development Programme 2018).

One of the major problems plaguing Africa's development is the lack of connectivity between cities, between rural and urban areas, and between people and opportunities (World Bank 2014). Africa's road network is still far short of estimated needs, characterized by a lack of regional links, and those that exist are mostly unpaved and in poor condition due to lack of maintenance (African Development Bank 2011). Moreover, railway transport system, which is essential for both freight and passenger transport, is even more poorly interconnected than the roads, since different rail gauges do not allow cross-border network connectivity and usage of the same rolling stock between neighboring countries. However, it is believed that constructing, rehabilitating, and maintaining reliable and efficient regional infrastructures act as a catalyst for development, by bringing down the time and thereby the costs of cross-border trade and transport, which in turn foster the creation of new jobs and opportunities, and are therefore essential to human wellbeing, as underlined by the United Nations' Sustainable Development Goals. The biggest gains accrue to the most isolated and resource-deprived regions.

In this regard, China is playing a central role in the development of Africa, being one of the largest trading partners with African countries, particularly within the China's Belt and

Road Initiative. Most of the Chinese investments are centered in the transportation and energy sectors, aiming to promote the desired massive development of trade routes between and within African regions and the world. The paradigmatic example of the envisioned new economic corridors is the *Lamu Port–South Sudan–Ethiopia Transport corridor* (LAPSSET), a multibillion-dollar flagship project under the Kenya Vision 2030 National Development Policy plan. Its core infrastructures include a new deep seaport in Lamu, new highways, railways and pipelines connecting Kenya, South Sudan, and Ethiopia, oil refineries, a 1000MW coal plant also in Lamu, three resort cities, three airports and the most powerful hydroelectric power station, along the river Tana. Altogether, and only considering the straight-line distances between localities, the LAPSSET will add over 2,250 km of highways, 2,360 km of railways and 2,160 km of pipelines, together with multiple service roads and the necessary power-line grid to distribute the energy along the LAPSSET corridor (www.lapsset.go.ke). It is estimated that such huge development will cost US$ 25 billion, in great extent financed by the Chinese EximBank (Breuer 2018; Farooq et al. 2018).

Other examples of African BRI include the 1,315 km Kano-Lagos railway line in Nigeria, over 4,000 km railways in Angola, 560 km Belinga-Santa Clara railway in Gabon, 172 km railway in Libya and 430 km rail in Mauritania, among others (Breuer 2018; Farooq et al. 2018). More generally, China and African Union signed a memorandum of understanding during the last Forum on China-Africa Cooperation (FOCAC) on cross-continental infrastructure development, which will certainly foster the building of new highways, railway and high-speed train networks, seaports and airports, to accomplish the long-wished goal of connecting all African capitals (Fig. 1). Envisaged more than 40 years ago by the United Nations Economic Commission for Africa (UNECA), the Trans-African Highway system is part of the Programme for Infrastructure Development in Africa (PIDA), a network of highways intended to connect all corners of Africa from north to south, east and

west. The ambitious plan, first proposed in 1971, is aimed at boosting internal trade on the continent by building transportation infrastructures across Africa, that would collectively measure nearly 60,000 km of roads and railways.

The expansion of transportation infrastructures, seaports and airports, as well of power-lines and other linear infrastructures, will foster the increasing development and industries, improving the connectivity between human settlements and main trade hubs. Concurrently, there will be an increasing demand of energy to supply to new industries and homes, alongside with the conversion of vast areas for agriculture to feed a growing population, the intensification of extraction of natural resources, both as part of new industries and of classic activities as mining. In turn, increasing development will certainly contribute to the growth of urban areas, which will again demand more energy and need more infrastructures.

The downside, however, is that despite the expected benefits for human well-being and economic development, the feedback development boosted by the BRI may come with a high toll for the environment in Africa. In the following sections, I briefly discuss how these major development drivers may become threats to Africa's unique biodiversity and identify some challenges and opportunities toward the sustainable coexistence between development and conservation.

2. Linear infrastructures as drivers of biodiversity changes

Linear infrastructures, including roads, railways, power-lines, pipelines and fences are responsible for a number of direct and indirect impacts on biodiversity, where the negative effects often outweigh any positive outcomes (Forman and Alexander 1998; Forman et al. 2003; Van der Ree et al. 2015; Borda-de-Água et al. 2017).

2.1. Direct impacts

The most visible and perhaps the most pernicious direct impact is the mortality due to animal-vehicle collisions. Throughout the world several studies have reported striking mortality rates for numerous species. For example, over two million mammals are estimated to be road-killed every year solely in Brazil (González-Suárez et al. 2018), and the annual bird mortality in the United States is estimated to range from 12 to 64 million on power lines (Loss et al. 2013). However, such studies are uncommon in Africa and given the exceptional biodiversity of this continent, particularly the megafauna of central Africa and their vast migrations (Wilkie et al. 2000), there is still scarce information on how wildlife population will respond to the new linear infrastructures and increasing traffic volumes.

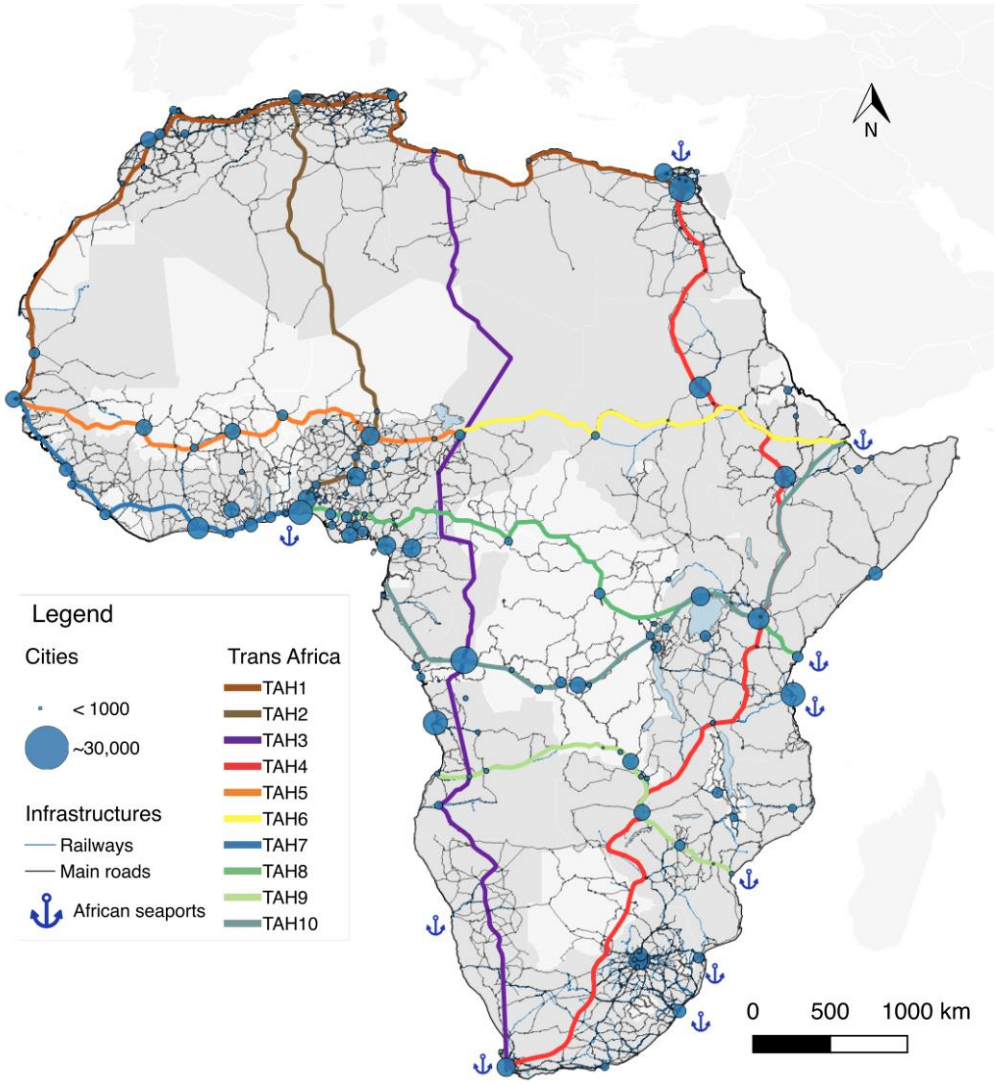

Figure 1 – Location of the Trans-Africa Highways (TAH) across the continent, linking major cities (blue circles, size proportional to the number of inhabitants) in different countries. In its majority, this network is not built yet, excepting the TAH5, between Dakar in Senegal and N'Djamena in Chad. Existing main roads and railways are also presented, together with main seaports.

One thing is certain, a high number of animal collisions involving numerous species, from invertebrates to mega-mammals, is to be expected. This has been demonstrated by research carried out around the world and also in Africa (Drews 1995; Hayward et al. 2010; Bullock et al. 2011; Collinson et al. 2015, 2019; Nyirenda et al. 2017). However, given the huge body mass of numerous mammal species inhabiting different African regions, many collisions may unfortunately result in human injuries. Such dramatic events will come along with a high cost for the economy, for example with the expected delays on train schedules as

well vehicle repair and insurances (Huijser et al. 2009). Likewise, despite the lack of studies in Africa, it is also expected that the power-lines will represent a serious mortality source for flying animals, some of which will cause blackouts with the inevitable costs for the people and companies (Maricato et al. 2016; D'Amico et al. 2019).

On the other hand, studies on the responses of different animal species to roads, including African elephants and other large mammals, have reported disparate patterns of responses across species and regions, ranging from intentional use of roads for displacements, thus being subject to higher roadkill risk, to roads functioning as important barriers or filters for animal movement, with animals avoiding its proximity or suffering from significant physiological stress (Blake et al. 2008; Vanthomme et al. 2013; Lunde et al. 2016; Mulero-Pázmány et al. 2016; Hägerling and Ebersole 2017). For example, in Congo Basin, roads outside protected areas (which are not protected from hunting) are a formidable barrier to movement for the African elephant, while roads inside protected areas are not (Blake et al. 2008). Other direct impacts resulting from linear infrastructure development include habitat loss, edge effects, pollution (emissions, noise, lights), physical disturbance (e.g. on soils and hydrology), and the spread of non-native species (Forman and Alexander 1998; Van der Ree et al. 2015; Borda-de-Água et al. 2017).

Fences may also represent significant barriers for the daily and seasonal animal movement, with severe implications for the persistence of populations, especially for migratory species. From the human perspective, fencing may provide social, economic and even conservation benefits, including optimizing grazing by controlling the timing and duration of landscape use by large herbivores, reduce human-wildlife conflicts, and control for disease spreading (Boone and Hobbs 2004). However, fencing transportation infrastructures to avoid animal-vehicle collisions will also have tremendous negative implications for wildlife and human wellbeing in the African context. East Africa is home of

the last massive migration by large mammals, involving millions of wildebeest, zebras and Thomson's gazelle, among others (Fig 2). Increasing fencing on African landscapes will further truncate the migratory routes, entangle or electrocute animals, and excise important resources needed by these large mammals, with consequent impacts for their predators and all trophic chain. In fact, in areas where fences have hampered large-mammal migrations, notably Etosha National Park in Namibia and Kgalagadi Transfrontier Park in Botswana, the ecosystem has collapsed to a less diverse and productive state (Spinage 1992; Boone and Hobbs 2004).

Figure 2 – Large herbivores join in large groups involving thousands of animals, moving in mobs in search of new pastures. The number and size of these migrations make coexistence with traffic (cars and trains) a major challenge, and the elevation of transport routes is probably the most feasible solution © David Wong, Vancouver

One well-known example is the Serengeti Highway, aimed to cross the northern region of the Serengeti protected area, breaking the link between the wet-season grazing area of the Serengeti Plains to the dry-season feeding grounds in the Maasai Mara Nature Reserve,

Kenya (Caro et al. 2014). An intense debate is ongoing regarding the social, economic and environmental costs and benefits of this road to the region (Dobson et al. 2010; Homewood et al. 2010; Holdo et al. 2011; Fyumagwa et al. 2013; Hopcraft et al. 2015). Worryingly, simulations suggest that a barrier to migration as the Serengeti Highway (even more if fenced) could cause the wildebeest population to decline by about one-third due to lack of access to foraging areas (Holdo et al. 2011). Unsurprisingly, a Chinese company won the contract for the construction of this road, connecting Arusha to Musoma. And yet, this is just one of many highways bisecting the migration routes of the megafauna across African landscapes, many of which (co)financed or being built by Chinese banks and companies.

2.2. Indirect impacts

Linear infrastructures and particularly roads may also promote a panoply of indirect negative impacts on biodiversity, namely illegal logging, poaching, mining, or urban encroachment (Wilkie et al. 2000; Laurance et al. 2008, 2009; Ali et al. 2015; Bebbington et al. 2018). These indirect impacts may inflict even higher impacts on biodiversity than direct ones. There is surmount evidence that roads cutting intact forest areas lead to illegal logging and deforestation (Laurance et al. 2009). For example, ca. 5% of deforestation in Amazon occurs within five kilometer of a road or one kilometer of a navigable river (Barber et al. 2014). Likewise, new and improved roads are likely to increasing poaching and illegal trade (Laurance et al. 2006), a major conservation problem throughout Africa (Wasser et al. 2015; Wilkie et al. 2016; Cerling et al. 2016; van Velden et al. 2018), as well to boost the urban growth (Vermeiren et al. 2012).

Example pangolin - https://onlinelibrary.wiley.com/doi/10.1111/csp2.82 [see pics in ACLIE presentation]

Perhaps the most serious indirect threat resulting from the massive development of BRI infrastructures in Africa is the emergence of new mining areas, particularly illegal ones (Edwards et al. 2014). Africa has ca. 30% of the earth's remaining mineral resources, and almost all countries in sub-Saharan Africa are rich in mineral reserves, much needed for a rapidly expanding economy like China. Africa has vast deposits of oil and natural gas, uranium, iron ore, aluminum, coal, manganese (used in steelmaking), cobalt, coltan (used in the production of cell phones and tablets), copper, phosphates, and of course diamonds and gold, among others (Taylor et al. 2009; African Natural Resources Center 2016). Paradoxically, only a small part of these resources was extracted, and large parts of the continent remains geologically unexplored. The African BRI will certainly be designed following the major deposits of mineral resources, and this may represent a major threat not only for the environment and biodiversity, but also for local people. For example, illegal gold mining results in the spread of gold ore-related heavy metals to nature, such as arsenic, lead, cyanide or mercury (Edwards et al. 2014); and people living in the neighborhood of an artisanal cobalt mine in DR Congo had much higher levels of cobalt in their urine and blood (Nkulu et al. 2018).

Also worryingly, but less noticeable, illegal sand mining is destroying pristine areas and represents a major threat for the livelihoods of several communities across Africa. According to the United Nations Environment Programme (UNEP), it is estimated that ca. 40 billion tons of sand are processed worldwide every year. In fact, sand and gravel are the most extracted material group in the world, exceeding fossil fuels and biomass (Torres et al. 2017). It is a key component of cellphones and microchips, and most importantly constitute the bulk of primary materials used in construction and transport infrastructures – e.g. each kilometer of highway built requires ca. 30,000 tons of sand. However, together with coal, natural gas and oil, sand is a non-renewable resource, it is not renewed as quickly as people remove it,

requiring constant extraction and destruction. China itself has recently experienced the dramatic consequences of intensive and illegal sand mining, leading to the decline of the largest freshwater lake, the Poyang Lake, and the Yangtze River basin, impacting water availability for people and habitat for biodiversity (Lai et al. 2014; Chen 2017). However, despite its in-house damages, Chinese companies show no signs of slowing their activity abroad.

Overall, all biodiversity and particularly the large mammals are under increasing pressure with the expansion of roads and other infrastructures associated development across the African continent under the BRI (Lahm et al. 1998; Sitati et al. 2003; Laurance et al. 2008, 2015; Blake et al. 2008; Vanthomme et al. 2013; Maisels et al. 2013). This is even more alarming if we consider that many development corridors are expected to have major impacts on existing Protected Areas. Recent studies report that over 2,200 existing nature reserves are to be bisected by linear infrastructures or could experience a significant deterioration in their ecological integrity and connectivity, as well as increased urban encroachment, including World Heritage Sites, Ramsar Wetlands, and UNESCO Man and Biosphere Reserves (Laurance et al. 2015; Sloan et al. 2017).

3. Unpredicted costs

The investment in infrastructures for economic growth and prosperity does not always consider all costs, particularly those that are not immediately perceived in excel spreadsheets. The most noticeable are those related to human injuries and vehicle damage resulting from collisions with large mammals. However, many other impacts (direct and indirect) of transport infrastructures have less obvious costs. They can cause cascading negative effects on biodiversity which ultimately are the human populations paying the highest price. For example, many mammalian species have critical influences on the structure and functioning

of African natural ecosystems and provide important services such as biological pest control in human-dominated landscapes (Malhi et al. 2016). In one study, researchers experimentally removed the large grazing mammals from a fenced area and recorded the succession of cascading effects, beginning with the doubling in abundance of a small grazing mammal, the pouched mouse (*Saccostomus mearnsi*), which in turn attracted venomous snakes such as the olive hissing snake (*Psammophis mossambicus*), reduced seedlings of the dominant tree (*Acacia drepanolobium*), led to an increase in abundance of fleas, which potentially increased the risk of transmission of flea-borne pathogens (Keesing and Young 2014). Similar disruptive cascading effects are to be expected with changes in the communities, for example when migratory routes are hampered by linear infrastructures.

Likewise, West African rainforests currently provide food, fuel, fibre and a range of ecosystem services for over 200 million people. However, deforestation due to logging and agricultural expansion leads to significant losses of forest species and their services (Norris et al. 2010; Searchinger et al. 2015). On the other hand, the decline of megafauna will have a significant impact in tourism revenues. As of 2014, tourism contributed to 8.5% of Africa's gross domestic product, according to the United Nations trade arm, generating 7.1% of all jobs (UNCTAD 2017). Wildebeest migrations and other large mammals are important focus of attention of tourists and thus contribute significantly to national economies. It is estimated that poaching of elephants represent losses of US$25 million per year for African countries (Naidoo et al. 2016). Hence, any loss of wildlife migrations, or their habitats, could undermine key tourism products with significant impacts on national economies.

Transportation infrastructures themselves may carry significant and unpredicted costs (Collier et al. 2015). According to Dulac (2013), the global cumulative expenditure on transport infrastructure may reach US$ 45 trillion by 2050, representing ca. 0.7% of global GDP. When combined with reconstruction and upgrade costs, annual operation and

maintenance spending, global transport spending on transportation infrastructures is expected to reach nearly US$ 120 trillion by 2050, or an unweighted average of roughly US$ 3 trillion per year over the next 40 years. This equates to 2% of projected global GDP to 2050. Moreover, building transportation infrastructures on inadequate areas, as floodplains or steep terrain, may cost billions of dollars in maintenance (Alamgir et al. 2017; Laurance and Arrea 2017). More broadly speaking, the massive development and expansion of transportation infrastructures and industries will require increasing amounts of energy, and there are serious concerns that the promotion of BRI fossil fuel investments (especially coal plants) could lock African countries into fossil fuel dependency for the coming decades and hamper them from reaching their nationally determined contribution carbon targets as established under the Paris Agreement on Climate Change (Gallagher and Qi 2018; Zhou et al. 2018; Ascensão et al. 2018).

Perhaps the main unforeseen cost associated to the African BRI, will be the lack of gains by local communities, as shown in other regions of the globe (Bebbington et al. 2018). For example, despite the overall expansion of the extractives sector and the rise in commodity exports, the conversion of growth into poverty reduction in Africa is much slower than in the rest of the developing world. People living in Africa's resource rich countries are three percent less literate, have shorter life expectancy by 4.5 years, and have higher rates of malnutrition among women and children, compared to other countries in the region (Chuhan-Pole et al. 2017). Hence, despite such richness, few African people have access or benefit from it. Likewise, transportation infrastructures may have negative impacts on Indigenous Peoples, include the loss of land, territories and resources, displacement, increased conflicts, alteration of traditional livelihoods systems, industrial land conversion, and consequently the collapse of cultures and traditions (Edwards et al. 2014; Starkey and Hine 2014). Hence, the

infrastructures may also come with a high toll for the economies and people, and therefore a rigorous cost-benefit analysis should precede its construction.

4. Challenges of the African BRI

The main challenges that China and host African countries face under the BRI is the low environmental responsibility that Chinese companies operating overseas are demanded to obey. As of 2017, the only policy document focusing on reducing the environmental impacts is the 'Guidelines on Environmental Protection in Overseas Investment and Cooperation', issued in 2013 (Gallagher and Qi 2018). Its goal is to guide Chinese companies in identifying and preempting environmental risks in a timely manner and actively fulfill their social responsibility in environmental protection. To facilitate the implementation of these Guidelines, a second official document was published, in April 2017 entitled 'Guiding Opinions on Promoting Green Belt and Road', which put forward more detailed suggestions for enterprises to embrace their corporate social responsibilities. Therein, Chinese companies engaging in overseas projects are encouraged to release annual environmental performance reports, to adopt low-carbon and energy-saving materials and techniques, and to step up efforts in the development and application of major technologies to address climate change, among other measures. However, both the Guidelines and Guiding Options are voluntary in nature, and furthermore there are no penalties for non-compliance with these official documents (Gallagher and Qi 2018). More recently, during the second Belt and Road Forum for International Cooperation (April 2019), the Chinese president Xi Jinping and the accompanying BRI progress report, stressed China's commitment to environmental sustainability. At the time of writing, it is too early to gauge commitment to that will, but it is also true that most of China's investment in the energy sector has been in fossil fuel projects (Zhou et al. 2018).

On the other hand, China's foreign investment is ruled by the "no strings attached" approach, meaning African governments can manage their own affairs without political and presumably without environmental interference by China. This is a contrasting approach when compared to projects sponsored by Western governments and development agencies, which tend to include policies on anticorruption, transparency, and competitive bidding, but which also take a long time to investigate the financial and financial viability of the projects. These 'constraints' often delay the delivery of the projects, which makes Chinese assistance an attractive alternative for African governments committed to providing new infrastructures. Symptomatic, the Chinese President Xi Jinping declaration "Toward an Even Stronger China-Africa Community with a Shared Future" in the Forum on China-Africa Cooperation (FOCAC) briefly mention the Environment as concern but referred no conditions to the fulfilling the investments in Africa.

Another major challenge is the unfortunately recognized African poor governance (Assa 2018). Poor governance contributes to poor elections, which, among other things, produce the domino effect of undermining institutions, justice and equality of opportunity in Africa. Importantly, it may skip or shorten some key steps in assessing the sustainability of the plans and projects, with the consequent risks to the environment and human populations. Using two indexes that reflect the governance health of various countries around the world, it is possible to conjecture about the intrinsic risks to the environment under China's investments in some countries. The indexes are the TRACE **Bribery Risk** Matrix (www.traceinternational.org/trace-matrix), which measures the business bribery risk in 200 countries, and where the overall country risk score is a combined and weighted score of four domains – Business Interactions with Government, Anti-bribery Deterrence and Enforcement, Government and Civil Service Transparency and Capacity for Civil Society Oversight. This index uses a scale of 0 to 100 where 0 represents high risk and higher levels

stand for low bribery risk countries. The second index, the **Corruption Perceptions Index** (www.transparency.org/cpi), scores countries on how corrupt their public sectors are seen to be. This index ranks 180 countries and territories by their perceived levels of public sector corruption according to experts and businesspeople, also uses a scale of 0 to 100 but in this one 0 is highly corrupt and 100 is very clean.

In Fig. 3 it is plotted the relation of the two indexes, per global region (Eastern Europe, Western Europe, Northern Africa, Sub-Saharan Africa, Asia, Middle east, Oceania, Latin America and Northern America), where crosses represent each region. The cross intersections are the mean values, and the size of the horizontal and vertical lines stand for the standard deviation of each index (across countries of each region). North America and Western Europe were scored as having low bribery risk and low corruption perceptions (top left in Fig.3), while the worst performing regions were Northern Africa and Sub-Saharan Africa (bottom-right, Fig.3). The symbols in the plot are the relative position for the African countries (one symbol per country), and the shape of the symbols stands for countries belonging to BRI (circles) or not belonging (triangles). Finally, the size of the symbols represents the relative amount of Chinese investment, where larger symbols stand for higher investment. As we can see, Chinese investment under the African BRI is very high in countries with high risks of bribery and corruption. Therefore, the chances of poor infrastructure planning are significant, namely of its routing, design and mitigation, which could have huge negative implications on biodiversity. For example, there is evidence that the cost of road development is higher in countries with higher levels of corruption (Collier et al. 2015). Interestingly, China and African countries launched in the FOCAC last year the African Anti-Corruption Year, pledging to take it as an opportunity to jointly fight corruption and promote integrity. This gives some hope on a brighter future for conservation.

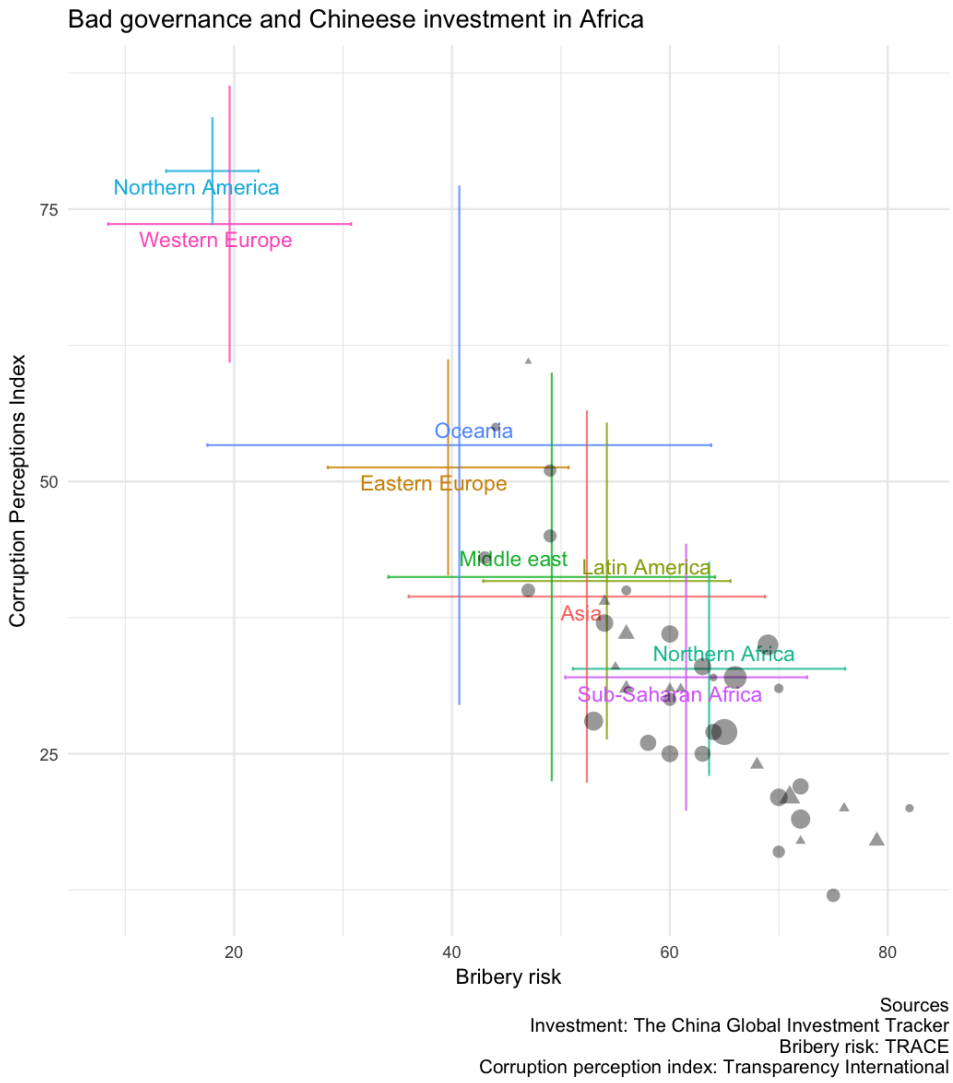

Figure 3 – Relation between Bribery Risk and Corruption Perceptions Indexes, per global region, depicted as crosses (9 regions). Cross intersections are the mean values, and the size of the horizontal and vertical lines stand for the standard deviation of each index (across countries of each region). The symbols in grey are the relative position for the African countries (one symbol per country), and the shape of the symbols stands for countries belonging to BRI (circles) or not belonging (triangles). The size of the symbols represents the relative amount of Chinese investment, where larger symbols stand for higher investment.

5. Opportunities under the African BRI

The African BRI, if properly planned and built, can become an opportunity for the environment. By raising country and regions' income, governments have more budget to invest in education, which can help reduce environmental damage, namely deforestation, by

providing better jobs, free people from the subsistence economy, and teach about the negative consequences of unsustainable forest use; whereas lack of development may actually increase pressure on forests to meet the basic needs of the human population (Jha and Bawa 2006). On the other hand, diversifying sources of income can help reducing the economic and social instabilities that plague nations largely dependent on just a few natural resources or commodities for export revenue, the so-called 'resource curse', whereby resource-rich economies show poor economic growth performance (Edwards et al. 2014). Also, most of Africa's agriculture is relatively unproductive and vast areas are exploited for meager returns. Improved transport networks promoted by the BRI could increase small farmers' access to fertilizers, and other farming practices, and reduce transport costs and wastage, thus improving farm profitability (Faye et al. 2004). Under this scenario, Africa's food production could rise significantly without a major expansion of the area under cultivation, to the benefit of biodiversity (Phalan et al. 2011).

The Green financing of African BRI projects and plans is also an opportunity for the finance sector, contributing to the sustainable development by mitigating negative environmental impacts of infrastructure and investing in natural capital. The green financing is a process in which the financing is conditioned to the comply of best environmental practices in infrastructure planning, design, construction, and operation (Kirchherr et al. 2018). As so, the spread of new infrastructures could be confined to areas where they are most required, avoiding environmentally important areas (Laurance and Balmford 2013). Following WWF recommendations, BRI actors should follow three sustainable investment principles to help decision-making: i) only invest in sustainable infrastructures – i.e. those that integrates environmental, social and governance aspects in the planning, building and operating phases – in compliance with environmental regulations, best practice planning approaches, strong stakeholder involvement, transparency and monitoring of impacts; ii) aim

to invest only in future-proofed environmentally friendly infrastructure; iii) only invest in assets outside or not negatively impacting natural habitats with a critical role for the ecosystem (Kirchherr et al. 2018).

For these opportunities to be successfully attained, some critical directions should be considered by all key players involved in the BRI. In particular, BRI should invest in local people, exhort environmental scientists to become involved in decision making processes, rely on carbon-trading initiatives, and provide a pan-continental zoning project to map areas that should remain free from infrastructures (Laurance and Balmford 2013; Caro et al. 2014). As so, the African BRI could improve the growth of the economies, aiding Africa's structural transformation and inclusive green growth, and to advance the Sustainable Development Goals, particularly in the land-locked countries where the majority of the population live in rural communities.

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