Investigating how Development Corridors Interact with the Sustainable Development Goals in East Africa

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Abstract:	Investment in infrastructure and industry has reached record levels across the global South, leading to claims that the world is at the dawn of a fourth industrial revolution. This claim is reflected in the central position that infrastructure and industry occupy in the Sustainable Development Goals (SDGs). Sustainable Development Goal 9: Industry, Innovation and Infrastructure has been described as fundamental to the achievement of the 2030 Agenda for Sustainable Development. With this in mind, it is important to investigate how Goal 9 interacts with other SDGs. Informed by SDG interactions literature, this article considers emerging trade-offs between Goal 9 and other SDGs in East Africa – where infrastructure and industry are dominating development planning and financing. Based on in-depth, qualitative research along two new 'development corridors' in East Africa, we highlight the complexities and nuances of SDG interactions and offer insights into why certain SDGs are often prioritised over others.

1. Introduction

The UN recently stated that we are 'at the dawn of a fourth industrial revolution', with investment in infrastructure and industry reaching record levels across the global South (UNCTAD 2019, v). As global development actors collaborate with national governments to unveil ambitious plans for infrastructure and industrial development, investors are turning to these sectors as lucrative financial opportunities. The 'global infrastructure turn' and 'new industrial revolution' are particularly obvious in East Africa, where mega-infrastructure projects and industrial strategies dominate national and regional development plans. New multi-donor platforms – such as the Programme for Infrastructure Development in Africa and the Emerging Africa Infrastructure Fund – have been established to promote infrastructure and industrial investment across the continent. At the same time, China is playing an increasingly prominent role in developing infrastructure and industry in East Africa through its Belt and Road Initiative (BRI).

In addition to boosting economic growth and generating foreign direct investment, investment in infrastructure and industry is central to the UN's Sustainable Development Goals (SDGs). There is a growing consensus in global development circles that infrastructure and industry are foundational to all three pillars of sustainable development, including economic, environmental and social sustainability. Neither infrastructure nor industry were explicitly referenced in the Millennium Development Goals (MDGs), which preceded the SDGs. Yet, during the MDG-era, infrastructure and industry were recognised as central to the elimination of poverty and to the achievement of sustainable development (UNHabitat 2015). Today, infrastructure and industry feature prominently in the SDGs, with the *2030 Agenda for Sustainable Development* outlining an ambitious vision of sustainable transport systems, quality and resilient infrastructure and inclusive industrialisation to be realised by 2030 (UN 2015).

In fact, the UN suggests that all 17 SDGs are underpinned by infrastructure and industrial development (UNOPS 2019). Goal 9 explicitly refers to building resilient infrastructure, promoting inclusive industrialisation and fostering innovation (UN 2015). However, infrastructure and industry are also said to play a critical role in the achievement of other goals. For example, it is believed that progress toward Goal 9 will support the achievement of Goals 1, 2 and 8, as infrastructure development and industrialisation drive job creation, which in turn helps address poverty, improve food security and better livelihoods (UNHabitat 2015). Similarly, achieving Goal 6 – ensuring availability and sustainable management of water – and Goal 7 – ensuring access to affordable, reliable, sustainable and modern energy – requires investment in infrastructure. Thus, progress toward Goal 9 is promised to contribute to Goals 6 and 7 as well.

Yet, investing in infrastructure and industry can have negative implications for sustainable development. Infrastructure is directly linked to Greenhouse Gas (GHG) emissions. Linear transport infrastructure, such as roads, railways and pipelines, are one of the largest and most consistent factors contributing to deforestation (Rudel et al. 2009). Research also increasingly links the global infrastructure turn to biodiversity loss (Ermgassen et al. 2019). Furthermore, the construction of mega-infrastructure projects and re-zoning for industrialisation disrupts and displaces rural communities, linking infrastructure- and industry-led development to human rights concerns (UNHR–HBF 2018). These and other negative impacts threaten to undermine progress toward the *2030 Agenda*, causing the UN to ask: 'What kind of infrastructure is being developed and whose needs will it serve? Who may lose out in the process? How will it affect our development pathway?' (UNHR-HBF 2018, 7). This article contributes to discussions around these questions by engaging with trade-offs between Goal 9 and other SDGs in East Africa.

In discourse, all parts of the *2030 Agenda* are deemed to be of equal importance and no single goal is meant to be prioritised. However, in practice, national and regional development actors

prioritise certain aspects of certain goals. Trade-offs are 'inevitable given that no country is in a position to meet all goals and targets immediately and difficult policy choices and prioritisation cannot be avoided' (Donoghue and Khan 2019, 7). Thus, although the SDGs were designed to be 'integrated and indivisible' (UN 2015), there is a clear trend whereby SDGs concerned with economic growth carry greater impetus than those that promote environmental protection and social inclusion (Kopnina 2015). In this article, we engage with further evidence of this trend by reflecting on progress toward Goal 9 in East Africa and on trade-offs associated with pursuing this goal through development corridors. We argue that in addition to aligning with outdated assumptions that privileging the pursuit of economic growth will reduce inequality and poverty, the prioritisation of Goal 9 in East Africa also reflects the interests of influential development actors. Our analysis makes use of in-depth, qualitive data to highlight the complexities and nuances of SDG interactions and to provide additional insights into why certain SDGs are prioritised over others.

This article proceeds with a review of the literature on SDG interactions, which is concerned with synergies and trade-offs between SDGs. The next section provides background information about Goal 9 of the *2030 Agenda* globally and within East Africa. Before proceeding with our analysis and discussion, we provide more information about the research design and methodology behind this article. This includes contextual information about our case studies of the Lamu Port–South Sudan–Ethiopia Transport (LAPSSET) Corridor in Kenya and the Central Corridor in Tanzania. We then analyse discourses of sustainable development attached to LAPSSET and the Central Corridor as well as the development implications of both corridors in practice – based on the experiences and perceptions of people who live along each corridor. Before concluding, we discuss the synergies and trade-offs revealed by our analysis and reflect further on what our analysis suggests about why Goal 9 is being prioritised over other SDGs in East Africa.

2. Synergies and trade-offs between SDGs

The *2030 Agenda* was adopted by the UN General Assembly in 2015. The agenda is meant to serve as a comprehensive blueprint for all countries – developed and developing – as they work to achieve sustainable development at a global scale. The agenda is underpinned by 17 goals and 169 targets aimed at tackling complex and interlinked global challenges that stand in the way of sustainable development, including those related to poverty, inequality, climate change, environmental degradation and conflict. According to the UN, the SDGs are 'an integrated, indivisible set of global priorities for sustainable development' (2014, 18), which depart from their predecessors, the MDGs, by balancing the economic, environment and social dimensions of sustainable development (UN 2015).

Despite claims about the integrated and indivisible nature of the SDGs, the *2030 Agenda* has been critiqued for glossing over incompatibilities between certain goals (Nilsson et al. 2016). For example, some approaches to improving energy access (Goal 7) contradict Goal 13 by accelerating climate change. Similarly, the adverse impacts of sustained economic growth (Goal 8) on terrestrial ecosystems (Goal 15) and ocean, sea and marine resources (Goal 14) are well-established. As the International Council for Science (ICSU 2017) argues, a lack of internal consistency in the SDG framework means that progress in some areas may come at the expense of progress in others. This leaves planners and policymakers to 'cherry-pick' priority goals without necessarily being able or willing to mitigate the trade-offs (Machingura and Lally 2017).

Thus, policymakers require access to systematic research into interactions between SDGs to support development planning at the national and regional level. In response, an emerging field of research is committed to investigating SDG interactions in support of policymakers. This

research aims to provide policymakers with answers to the question 'If we make progress on A, how does it affect our ability to make progress on B?' by mapping and assessing synergies and trade-offs between different goals (Weitz et al. 2018).

Frameworks have been produced to help guide the way people think about SDG interactions (Le Blanc 2015; Nilsson et al. 2016; Pradhan et al. 2017; Nerini et al. 2018; Scharlemann et al. 2019; Weitz et al. 2018). For example, Nilsson et al. (2016) propose a seven-point scale that helps policymakers 'map out, score and qualify' interactions between SDGs (Figure 1). Weitz et al. (2018) developed an approach for making use of this framework. This approach involves a three-step process of collaborative analysis, where scientists, representatives of government and other stakeholders work together to score interactions between goals within their own context – ending up with a cross-impact matrix (Figure 2). This matrix is meant to prioritise action toward SDGs and their targets, based on interactions between goals in certain contexts.

[Insert Figure 1 around here]
[Insert Figure 2 around here]

To date, most research on SDG interactions has occurred at the conceptual level. This has involved collecting evidence from academic papers to map synergies and trade-offs or having experts make assessments about interactions between SDGs. Although this approach is a useful starting point for understanding SDG interactions, it has limitations as well. Theories and models explaining interlinkages between different goals are often incomplete; the empirical data needed to assess SDG interactions using theories or models is not always available; and, even when data is available, it may only be relevant to very specific contexts (Breuer et al. 2019).

In response, there is a need to continue developing aggregate knowledge on SDG interactions through different research approaches and sources of information (Nilsson et al. 2016). 'This could achieve the dual goals of knowledge collection: overcoming the limitations of the existing single frameworks whilst also serving as a crucial instrument for policy-makers that would be able to select and consider evidence more closely related to their specific case' (Breuer et al. 2019, 17). In contributing to these goals, our analysis demonstrates the value of in-depth qualitative case studies to knowledge about SDG interactions (Fader et al. 2018). This approach remains underrepresented in the literature, despite the fact that in-depth qualitative case studies help reveal the complexities and nuances of SDG interactions in different geographical contexts and across different scales of governance. In-depth qualitative case studies are also useful for uncovering insights into why certain goals and targets are prioritised over others, which is an issue that has also received less attention in the literature (Breuer et al. 2019).

3.0 Goal 9: Industry, Innovation and Infrastructure

The *2030 Agenda* lays out an ambitious vision of sustainable transport systems, quality and resilient infrastructure and sustainable industrial development for all by 2030 (UN 2015). This vision is embedded in Goal 9 – 'build resilient infrastructure, promote inclusive industrialisation and foster innovation' (UN 2015). There are 8 Targets and 12 Indicators to guide and measure progress toward Goal 9, as outlined in Figure 3.

[Insert Figure 3 around here]

The relationship between Goal 9 and other SDGs is complex and contested. It has been suggested that Goal 9 is a vital 'enabler' of all other goals (UN-HABITAT 2015). According to some, Goal 9 directly supports the achievement of Goals 1, 2 and 8 because infrastructure and

industrialisation drives job creation, contribute to sustainable livelihoods and reduce poverty and hunger (UN-HABITAT 2015). UNOPS argues that 'the environmental benefits of infrastructure are manifold', as investment in 'sustainable infrastructure assets can help to address climate and natural disasters, reduce greenhouse gas emissions and contamination, manage natural capital, and enhance resource efficiency' (2019, 8). Yet, others suggest that Goal 9 is negatively correlated with several SDGs, including Goals 1, 2, 4, 6, 8, 11–13, 15 (Pradhan et al. 2017). These contradictory opinions reflect the limited empirical evidence that exists on how Goal 9 interacts with other SDGs in practice, as well as how Goal 9 plays out in specific contexts.

3.1 Goal 9 in East Africa

Over the past decades, industrialisation levels have remained comparatively low on the African Continent and poor access to energy and transport infrastructure continues to hinder economic growth across the continent (Mead 2017). Approximately 60% of Africa's population still lacks access to modern infrastructure, which isolates rural communities, hinders access to healthcare, education and jobs and impedes local economies (OSAA 2015). A recent report suggests that Goal 9 remains one of the biggest development challenges in almost every African subregion (SDG Centre for Africa 2019). Achieving Goal 9 in Africa by 2030 will require leveraging additional resources, creating new partnerships and developing innovative financing mechanisms (World Bank 2019). According to the African Development Bank (AfDB), an additional US $130–170 billion per year is needed to bridge Africa's infrastructure deficit (AfDB 2018; Africa50 2016).

Even though progress toward Goal 9 across the African Continent lags behind what is needed to achieve the goal by 2030, there has recently been a resurgence of interest in infrastructure and industrialisation. PwC South Africa projects that annual global infrastructure spending will reach US $5.3 trillion by 2020, up from US $4.3 trillion in 2015 (Temkin 2016), as governments and development banks implement aggressive infrastructure development programmes and investors come to see these programmes as lucrative investment opportunities.

Renewed global interest in infrastructure and industry in Africa is particularly notable in East Africa. The United Nations Economic Commission for Africa ranked East Africa as the fastest growing subregion on the continent and attributed this trend to strong investment in infrastructure (UNECA 2019). East Africa's infrastructure boom is linked to the growing presence of China in the region: China is now the single largest financier of East African infrastructure, financing one in four projects and constructing one in two projects (Edinger and Labuschage 2018). Recent discoveries of oil and gas, as well as significant deposits of minerals and rare earths, have also increased investor demand for transport infrastructure and connectivity – as has agricultural expansion and intensification (UNECA 2019). Combined, these trends have amplified infrastructure investments and driven forward new infrastructure projects, resulting in significant progress toward Goal 9.

Much of the new investment in infrastructure and industry in East Africa is being directed at development corridors. Development corridors are the clustering of industrial activities along a physical backbone of transport infrastructure (Healey 2004). They consist of vast networks of railways, roads, pipelines, ports and other transport infrastructure built to connect sites of (potential) commodity production to global markets. As corridors develop around backbones of infrastructure, it is intended that hub towns, industrial areas, special economic zones and border posts will also emerge and expand along corridor routes (Hope and Cox 2015). In this regard, development corridors are seen as an ideal way to achieve Goal 9, as they simultaneously promote infrastructure and industrial development. Furthermore, although often built with the needs of the private sector in mind, transport infrastructure along development corridors is shared-use, providing the public with new and improved forms of mobility. Thus, in addition to

attracting new investments in infrastructure and industry, development corridors are promised to stimulate rural development, supporting the achievement of other SDGs.

Although development corridors are not a new concept, they have re-emerged as a development spending priority in East Africa. This is partly due to the rediscovery of regional spatial planning as a guiding principle of development in the region (Schindler et al. 2018; Enns and Bersaglio 2019). As a result, development corridors have come to be seen as an effective tool for reorganising economies to address under/uneven development. At the same time, new sources of financing for infrastructure projects have emerged. China has been eager to participate in the financing and construction of East Africa's new corridors as these projects fit neatly with China's own plans for global infrastructure expansion through the BRI. However, other actors are also actively involved in mobilising finance and knowledge for infrastructure-led development, including the United States, South Africa, other emerging economies, new multi-donor platforms and the private sector.

It is widely believed that East Africa's new development corridors have a decisive role to play in the achievement of Goal 9, as well as the overarching *2030 Agenda*. For example, Kenya and Tanzania's most recent reports on SDG implementation suggest that corridor projects are delivering the SDGs (GoK 2017; URT 2019). Corridors are not only linked to the achievement of Goal 9, but to other goals as well. As Kenya's President Uhuru Kenyatta recently explained:

> [China's] Belt and Road Initiative gives our continent the opportunity to make a paradigm shift… It will be a win-win situation when our people have the skills, assets and financing necessary to participate in the development of the infrastructure corridors that will enhance connectivity, support trade and reduce the cost of doing business between our countries… We will all win when the economic corridors we develop hasten industrialization... (China Daily, 2017, para. 4, 10, 13, as cited by Renwick et al. 2018, 15-16).

Similarly, Tanzania's Minister for Finance and Planning explained that the new Central Corridor 'will improve transport, mobility, accessibility, safety and quality of service delivery to the community along the corridor thus linking production areas to markets. I am quite sure that this loan agreement [for the corridor] will generate a lot of smiles for the people and business community' (Mpango 2017, 2–3).

In discourses surrounding development corridors in East Africa, corridor projects are clearly framed as an essential tool for achieving the *2030 Agenda*. It is only recently that researchers have speculated and begun to demonstrate that development corridors come with new hazards and risks for communities, ecosystems and livelihoods (Baxter et al. 2017; Enns et al. 2019). From this perspective, East Africa's infrastructure boom is not without trade-offs when it comes to the pursuit of Goal 9 and other SDGs.

4.0 Interactions between Goal 9 and other SDGs in East Africa

4.1 Research methodology

In this section, we use two qualitative case studies to illustrate how progress toward the achievement of Goal 9 in East Africa interacts with other development goals. These case studies focus on two new development corridors: (1) the Lamu Port–South Sudan–Ethiopia Transport (LAPSSET) Corridor, which connects the Port of Lamu to northern Kenya, Ethiopia and South Sudan and (2) the Central Corridor, which links Burundi, Rwanda, Uganda and the Democratic Republic of Congo (DRC) to the Port of Dar es Salaam via central Tanzania.

[Insert Figure 4 around here]

Given that LAPSSET and the Central Corridor span thousands of kilometres, focused study areas were identified along each corridor as a necessary practicality. In Kenya, research activities focused on a segment of LAPSSET between Isiolo Town in central Kenya and Moyale Town on the country's northern border with Ethiopia. The study area traverses three counties (Isiolo, Marsabit and Samburu) and includes some of the first completed components of the LAPSSET corridor – the Isiolo-Moyale Highway and the Isiolo International Airport. Other projects along this part of the corridor are in the inception or implementation phase, such as a resort city, a Standard Gauge Railway (SGR) and power transmission lines.

In Tanzania, research activities focused on a segment of the Central Corridor between Manyoni Town in the central part of the country and Tabora Town to the east. This part of the corridor spans two regions (Singida and Tabora) and three districts (Manonyi, Itigi and Uyui). Projects planned for this segment of the corridor include upgrading an existing railway to SGR and constructing a new road between Manyoni and Tabora, called the Nyahua-Chaya Road. During the time of the research, parts of the Nyahua-Chaya Road had been completed while others where in the midst of construction. The SGR project is still in the planning stages.

Similar methods were used to gather data for both case studies, including Key Informant Interviews (KIIs), Focus Group Discussions (FGDs) and a Policy Delphi process. KIIs were conducted with representatives from civil society, NGOs and all levels of government and FGDs were arranged among rural communities along both corridors. In Kenya, FGDs involved representatives from Rendille, Samburu and Turkana communities. In Tanzania, FGDs were held in Nyamwezi, Nyaturu and Sukuma communities. However, the research team tried to engage with diverse participants along both corridors, including people of different ages, ethnicities, identities and genders. In total, 255 people participated in this study, including 43 key informants, 167 FGD participants and 45 experts involved in the Policy Delphi process that aimed to validate findings, co-produce policy recommendations and identify priority research areas. These experts included representatives from civil society, NGOs and all levels of government.

4.2 LAPSSET

4.2.1 LAPSSET in discourse

Construction began on LAPSSET in 2012, with most components of the corridor planned for completion by 2030. While the corridor was conceived decades ago, a resurgence of interest in investing in infrastructure and recent discoveries of oil and gas in the region made the project feasible. So far, LAPSSET spans nine counties across northern Kenya, including Lamu, Garissa, Marsabit, Isiolo, Meru, Laikipia, Samburu, Baringo and Turkana. The corridor has also improved accessibility and connectivity between Kenya, South Sudan and Ethiopia. However, the long-term ambition is that LAPSSET will form a land bridge between Kenya and Cameroon, linking the east and west coasts of the continent via an expansive network of transport infrastructure.

LAPSSET consists of a 500-metre wide corridor for transport infrastructure, overlaid by a 50-kilometre wide economic corridor for industrial and agricultural investment (LCDA 2016). The transport corridor includes multiple components, including: a crude oil pipeline, a highway network, SGR, electrical power lines and fibre optic cables. In the wider economic corridor, various development zones have been planned. These include: tourist resort cities, special economic zones, export processing zones, and agricultural growth zones. Each zone is meant to attract further investment to the corridor. The construction of dams near the corridor has also been proposed and planned to supply electricity and water to development zones like resort cities.

The Kenyan government has gone to great lengths to attract investment in LAPSSET. As of 2017, the corridor had an investment budget equivalent to half of Kenya's GDP (REPCON 2017). The amount of investment being directed toward LAPSSET reflects the significant development potential attached to the corridor. The government says that LAPSSET is playing a critical role in the development of the nation's infrastructure and process of industrialisation in line with the achievement of Goal 9 (GoK 2017). LAPSSET is also a flagship project of Kenya's *Vision 2030* – Kenya's national development plan that aims to transform Kenya into a newly industrialised, middle-income country by 2030. The government anticipates that the corridor will inject between 2–3% of GDP into the national economy annually, contributing a total of 8–10% of Kenya's annual GDP when investments in the development corridor come to fruition (LCDA 2016).

Both the direct and indirect impacts of LAPSSET are most acutely experienced in northern Kenya – a region that has historically been marginalised and cut off from the rest of Kenya. Proponents of LAPSSET promise that the corridor will 'open up 70% of the country that has been uninvested in since independence' and transform northern Kenya into 'the country's next growth frontier' (Standard Reporter 2015). It is also said that the corridor will 'positively impact the livelihoods of over 15 million people living in northern Kenya' (LCDA 2016, 17). Transhumance pastoralism – which involves sustaining herds by moving them to seasonal sources of pasture and water – remains the predominant livelihood activity across northern Kenya. By some estimates, pastoralism is practiced by over 85% of the population in the region traversed by LAPSSET. The Government of Kenya envisions that LAPSSET will enhance pastoralist livelihoods by improving cross-border and rural-urban livestock marketing routes (LCDA 2016). LAPSSET is also promised to create scope for new investments to support the livestock industry, such as the construction of abattoirs and new dams in strategic locations (LCDA 2016).

4.2.2 LAPSSET in practice

Although LAPSSET is yet to be completed, portions of the corridor are already operational. The study area selected for this research includes some of the first operational components of the corridor, such as the new highway from Isiolo to Moyale, the Isiolo International Airport and the new Moyale border crossing. Even at this early stage of operation, participants reported that the corridor is making it significantly easier and faster to travel and transport livestock to markets (Goal 9). As one participant explained:

> In the past, when you start going from here to Isiolo, you say you are going to Kenya, because we did not feel part of Kenya. It used to take three days to get from Moyale to Nairobi, often sitting on the rails on top of the lorry with livestock. And, when you finally reached Nairobi after three days, what you were selling was not even livestock: You were selling carcases (Interview, Civil Society Representative, Marsabit, July 2017).

Estimates suggest that pastoralism currently contributes to about 13% of Kenya's GDP, with most of these earnings being generated in northern Kenya (IRIN 2013). As LAPSSET improves connectivity, it is anticipated that the contribution of pastoralism to the nation's GDP will increase – reducing long-standing inequalities between northern and southern Kenya (Goal 10) and improving pastoralist livelihoods across the north (Goals 1 and 8).

Another notable impact of LAPSSET is improved security (Goal 16) and better access to health services and education (Goals 3 and 4). Specifically, participants said that acts of banditry have decreased for those travelling in the area as police can now use the Isiolo-Moyale Highway to respond quickly. Access to health services and education has also improved with the completion

of the new highway as the number of public transit vehicles on the road has increased. As one woman explained, 'The best thing about the new road is it has improved our ability to access to emergency services and transport and education, especially for mothers and their children' (FGD 1, Isiolo-Moyale Highway, July 2017). Notably, although easier to access, many of these services are still too expensive for pastoralists to make use of regularly.

Another frequently cited benefit of development corridors is that they create new employment opportunities (Goal 8). Some participants reported benefiting from casual labour opportunities – including manual labour for men, like digging ditches, laying pavement, levelling the ground and clearing brush, and domestic labour for women, like cleaning and cooking. Casual labourers reported receiving between US $3–5 per day, which is above the poverty line for rural Kenya (KNBS, 2018). However, these jobs were short-term and highly insecure. Participants were also critical of their working conditions, explaining that workers were not provided with training or safety equipment and that women experienced sexual abuse and harassment.

Although claims about the number and quality of jobs created directly by LAPSSET were debated by participants, most believe that LAPSSET was indirectly enabling them to diversify their livelihood portfolios. Many stated that new economic opportunities had emerged since the completion of the highway, explaining 'The road has improved businesses for women: tourist vehicles come more often to collect beadwork on market days' (FGD 3, Isiolo-Moyale Highway, July 2017) and 'We used to be just livestock keepers, but now we are business people too' (FGD 5, Isiolo-Moyale Highway, July 2017). These new opportunities and markets are enabling people to supplement their livestock-keeping activities and generate additional income.

Despite these benefits, participants discussed a range of negative impacts associated with LAPSSET. Negative impacts on land were discussed the most frequently and widely (Goal 15). Substantial amounts of land are needed for transport infrastructure development along LAPSSET, as well as for other projects tied to the corridor. The process of securing and acquiring land along the corridor began in 2012 and is still underway as of 2019. In 2016, 28,500 hectares were secured by the LAPSSET Corridor Development Authority (LCDA) for construction. Later, in 2018, LCDA and the National Land Commission of Kenya signed a Memorandum of Understanding for the acquisition of a further 197,000 hectares. This land, which includes private, community and public land, is being 'land banked' so that access is guaranteed as corridor construction progresses (LCDA 2016). Furthermore, as sections of LAPSSET have been completed, new investors and land speculators have arrived to grab land within investment zones along the corridor. Fences and structures are being erected as people lay claim to this land, and land values along the corridor are increasing.

Growing interest in land along LAPSSET was worrisome to participants. They were concerned with the lack of recognition for their land rights and with how future growth along the corridor would impact their access to and control over land. Participants reported being displaced during construction without compensation. By law, landowners must be consulted and compensated by the government if their land is acquired for public use, such as infrastructure projects. However, a complicating factor is that LAPSSET is primarily being built on community land, which is often unregistered. Although those residing on unregistered community land should be informed about the redesignation of their land and fairly compensated, it does not appear that this routinely happened in practice.

Participants were also concerned about the fragmentation of pastoral rangelands (Goals 13 and 15). Certain LAPSSET projects will have major impacts on the quality and quantity of land available to pastoralists, as in-tact ecosystems are fragmented. For example, if the proposed

Crocodile Jaws Dam at Oldonyiro proceeds, it will flood thousands of hectares of grazing land upstream and transform large tracts of land downstream into irrigated, agricultural land. This, in turn, is anticipated to draw additional agribusiness investments in horticulture, mango and sugar cane, among other cash crops, to Isiolo County in particular (LCDA 2016). Similarly, the SGR planned for development along the Isiolo-Moyale Highway will impact the mobility of pastoralists and their livestock, as well as wildlife. For pastoralists who depend on access to contiguous rangelands for their livelihoods, the negative impacts of the new investment climate promised through LAPSSET could be experienced over the course of multiple generations.

Finally, as more transport vehicles move along the corridor, rural communities in northern Kenya face new health and safety risks (Goal 3). Government representatives and community members reported that Sexually Transmitted Diseases (STDs) were on the rise along the Isiolo-Moyale Highway. As one community leader explained, 'There are more STDs than before … People now come from all different backgrounds and communities were not prepared for this type of rapid social change and interaction' (FGD 8, Isiolo-Moyale Highway, July 2017). Furthermore, quickly moving vehicles on the highway and a lack of speed humps and safe crossing points, such as tunnels or flyovers, are hazardous to people, livestock and wildlife. Indeed, almost every community-level participant along the Isiolo-Moyale Highway has lost livestock to road crossing accidents since the highway was completed – and at least one person in every community has been killed during road crossing accidents as well.

4.3 The Central Corridor

4.3.1 The Central Corridor in discourse

The Central Corridor links the landlocked countries of Burundi, Rwanda, Uganda and the Democratic Republic of Congo (DRC) to the Tanzanian Port of Dar es Salaam on the Indian Ocean. It is a multi-modal transport route, consisting of five components: port facilities, inland waterways, roads, railways and one-stop border crossings. The aim of the Central Corridor is to reduce transport costs by 30% among the countries involved by providing Burundi, Rwanda, Uganda, DRC and the Tanzanian interior with an efficient transport route to the Indian Ocean. The Central Corridor is managed by an intergovernmental organisation, called the Central Corridor Transit Transport Facilitation Agency (CCTTFA). The AfDB, European Union, TradeMark East Africa, Japan International Cooperation Agency, New Partnership for Africa's Development and Kuwait Fund are just some of the key financiers of Central Corridor projects.

The Central Corridor was established in 2006, but initial progress was stalled by a lack of investment. Only recently has the corridor made progress in improving connectivity and transportation, as major new investments from bilateral and multilateral actors have materialised. At the time of this study, the corridor was developing quickly with new projects securing financing and beginning construction across central Tanzania and the Great Lakes region. The renewed interest and investment in the Central Corridor can be attributed to two key developments. First, new mining investments throughout the Great Lakes region have increased demand for efficient and reliable transport and energy infrastructure. Second, the Central Corridor received an additional boost when Uganda decided to export crude oil through Tanzania rather than Kenya. Following a US $3.5 billion investment in the oil pipeline, portions of the Central Corridor that were previously seen as low priority became viable.

The Tanzanian government sees the Central Corridor as central to the country's achievement of Goal 9 and its own national development vision, *Vision 2025,* which aims to transform the country into a semi-industrialised, middle-income nation by 2025. The transport infrastructure being built as part of the Central Corridor is promised to 'unlock' the 'underexploited' potential of extractive industries in the Great Lakes region, as well as the commercial agricultural potential of central

Tanzania (World Bank 2017). As these industries develop, exports will increase and transit demand through the Port of Dar es Salaam is projected to increase from 5.0 million tons in 2015 to 14.87 million tons by 2030 (World Bank 2017). This, it is hoped, will contribute to growing Tanzania's economy and improving the economic performance of the entire Great Lakes region.

At the same time, proponents of the Central Corridor suggest that the corridor will contribute to socio-economic development and poverty reduction at a large scale. Small-scale and subsistence farming are the predominant livelihood strategies in central Tanzania, where farmers primarily grow maize, cassava, millet, groundnuts, sunflower, finger millet, pigeon peas tobacco, cotton and rice (Perfect and Majule 2010). It is expected that the Central Corridor will link these farmers to new value chains while providing more reliable, efficient forms of transport to market centres. The Central Corridor is also promised to attract new investments in agriculture, aquaculture and tourism – creating new opportunities for wage labour and economic diversification and driving rural productivity gains.

4.3.2 The Central Corridor in practice

Although it will be a number of years before the Central Corridor is complete, portions of the corridor are already operational. During this research, participants were quick to explain that the new Nyahua-Chaya Road has made it significantly easier and, in some cases, cheaper for them to travel and transport goods to market (Goal 9). As participants explained:

> People can move a lot better than before. Transport is easier in terms of going somewhere and returning quickly. In the past, people used to be killed by lions when walking or waiting on the road. There are more buses now and more bikes than before (FGD 4, Nyahua-Chaya Road, April 2018).

> When travelling to Tabora, people used to go by train. They would go one day and return the next. But now they can go and return the same day. The fare is much lower now as well. It used to be TSh 14,000 to take a train and pay for accommodation in Tabora, but now it costs only TSh 5,000 by car (FGD 7, Nyahua-Chaya Road, April 2018).

Men in particular reported travelling more regularly than in the past – often to Tabora or Dodoma – for business purposes or to visit family and friends.

In addition to being able to travel easier, participants said that buyers are now more willing to travel to remote villages to purchase agricultural products. Nearly every village along completed portions of the Central Corridor noted growing demand and better prices for their produce as a result, explaining:

> Since the road, more and more people are planting pigeon peas because more buyers are coming. There is also an increase in cash crops compared to before … It used to be difficult to sell goods. Now trucks come regularly to buy products and take them to market. The price received has increased significantly … The price has increased from TSh 70,000 to TSh 200,000 per 120/130 Kgs of pigeon peas (FGD 9, Nyahua-Chaya Road, April 2018).

Participants also said that growing demand and better prices are creating new opportunities in existing value chains. A number of participants explained that there are now more 'middle men' in their villages. These individuals – usually young men – are paid to collect and store produce from villages on behalf of business people in distant urban centres. In this sense, the Central

Corridor is not just enhancing farmers' access to markets, it is also creating new income-generating opportunities for some (Goal 1).

The Central Corridor is also supporting farmers in diversifying their livelihood portfolios (Goal 8). Entrepreneurs have started to open small businesses, restaurants and hotels to service travelers using the corridor. Participants said that investors are also coming to their villages with business propositions and, as a result, new markets are emerging. For example, one man said:

> Farmers' empowerment organisations have been started to encourage the growing of sunflowers. More and more traders are coming to buy the sunflower seeds for oil. Singida is now known for sunflowers and business is growing. Due to that sensitisation, many in this area are recognising this as a good opportunity and sunflower farms are being established (FGD 2, Itigi District, April 2018).

District-level authorities also stated that they are finding ways to support their constituents in accessing emerging markets. For example, Itigi District Officers said that the district plans to provide incentives to encourage farmers to increase their production of sustainably-sourced forest products, such as honey and fruit oils, which will be marketed and sold through road-side stands (FGD 2, Itigi District, April 2018).

Much like the case of LAPSSET, there was less positivity about the employment opportunities generated directly by the Central Corridor (Goal 8). Participants noted that higher paying and secure employment opportunities created by construction, such as vehicle drivers or machine operators, were usually taken by 'outsiders' from elsewhere in Tanzania. The opportunities available to them were short-term and involved tasks such as clearing forests, digging ditches, or moving construction materials. They were paid between TSh 6,000 and 10,000 per day for casual labour. Although technically above the national poverty line of TSh 36,482 per adult per month (World Bank 2015), participants claimed that food prices increased significantly during construction of the Nyahua-Chaya Road making it harder for them to feed their families at this rate of pay. As one man exclaimed: 'It was better that you go home without eating, otherwise your wife will think you have a concubine, because you are bringing home such little money after each day's work' (FGD 7, Nyahua-Chaya Road, April 2018). Participants also noted problems with working conditions, including no contracts, delayed payment and redundancy without remuneration.

Negative impacts associated with the Central Corridor extend beyond employment opportunities and labour standards. Again, land was a recurring issue (Goal 15). While most farmers that lost land along the corridor were provided compensation, the compensation process lacked transparency and information about resettlement procedures was poorly communicated. Community members in one village described the compensation process as 'compensation by force' (FGD 3, Nyahua-Chaya Road, April 2018), as armed guards escorted them away from from TanRoads officers before they were permitted to open sealed envelopes containing their money. In other cases, farmers were told that their land was being acquired for the Nyahua-Chaya Road immediately and, thus, should no longer be used for agriculture, but more than three years passed before construction started or compensation was provided. As a result, farmers lost multiple growing seasons because they were afraid to plant on land that might soon be taken.

Furthermore, no compensation was provided for loss of customary land, cultural or sacred sites or areas that provide ecosystem services (Goal 15). As one participant explained: 'We have a village forest. But we only get compensated for murram [taken from our land], not for trees. We were told that this is a national project for the public good, but trees were felled and used by

people in the construction camps' (FGD 6, Nyahua-Chaya Road, April 2018). Another local government official reiterated this concern saying: 'Construction is taking place in village forest reserves, which includes a wetland. … One of the environmental risks is that the forest will cease to function as a carbon sink and source of ecosystem services because of corridor construction' (FGD 5, Uyui District, April 2018). In addition to conflicting with provisions of Tanzania's *Environmental Management Act of 2004* (*Section 5(2)(f)* and *88(2)(c)*), the lack of consideration and compensation for village forests during construction of the Nyahua-Chaya Road is incongruent with national and global development goals related to the sustainable management of forests and terrestrial ecosystems.

Finally, the Central Corridor has created new health challenges (Goal 2). Moving vehicles, few or poorly placed caution signs and the lack of speed humps and safe cross points along the Nyahua-Chaya Road were all raised as problems created by the new infrastructure. It was also reported that certain health issues are on the rise along the corridor, such as STDs. As one local government official explained, 'STIs may be increasing … There is also a lack of STI data in the district. The risk of STIs was already high, but now it is increasing, especially because of truck drivers' (FGD 1, Manyoni District, April 2018). These health risks disproportionately impact already marginalised individuals and groups in society, such as the elderly, women and children.

5. Discussion

East Africa's new development corridors are clearly congruent with the achievement of Goal 9. Development corridors drive the upgrading and retrofitting of existing infrastructure and the development of new infrastructure, increasing the proportion of the rural population who lives within 2 km of roads in line with Targets 9.1 and 9.4. Corridors also facilitate large and small-scale industrialisation, in line with Targets 9.2 and 9.3. Furthermore, development corridors support Target 9.a by increasing official development assistance plus other official flows directed at infrastructure. Even though the burden of transport infrastructure provision and maintenance has fallen on governments in the past, the development corridor model attracts new types of stakeholders to contribute resources and knowledge to infrastructure development, including private sector actors and less conventional donors – a point that we return to shortly.

Looking beyond Goal 9, new development corridors in East Africa provide useful insights into the complexities and nuances of SDG interactions. New development corridors have synergies and trade-offs when it comes to making progress toward SDGs other than Goal 9. The UN, as well as other governmental and multilateral development actors, have been quick to highlight the synergies between Goal 9 and the overarching *2030 Agenda*. For example, it has been suggested that Goal 9 will contribute to reducing extreme poverty (Goal 1); enhancing the ability of agriculture and food systems to deliver on food security, nutrition and sustainability objectives (Goal 2); creating new employment and entrepreneurship opportunities (Goal 8); and mitigating rural-urban migration pressures through better rural-urban linkages (Goal 11) (UN 2017). Our analysis of LAPSSET and the Central Corridor evidences some of these claims. However, it also reveals a number of trade-offs that result from infrastructure-led development.

For example, LAPSSET and the Central Corridor demonstrate that the relationship between Goals 9 and 1 is complex and non-linear. Our findings show that both corridors are creating new economic opportunities (Goal 1, Target 1.1) and improving access to basic services (Goal 1, Target 1.4). Yet, the corridors are simultaneously decreasing peoples' control over land and natural resources, which works against the achievement of Goal 1, Target 1.4. Furthermore, lost access to and control over land and natural resources reduces peoples' exposure and

vulnerability to economic, social and environmental shocks and disasters, hampering progress toward Goal 1, Target 1.5. Thus, in East Africa, key trade-offs exist between Goals 9 and 1.

Additionally, there are trade-offs between Goal 9 and SDGs related to environmental sustainability. For example, LAPSSET and the Central Corridor are contributing to the degradation of land and natural resources, like rangelands in northern Kenya and forests in central Tanzania. There is a paradox here. On the one hand, changing land use for the purpose of infrastructure development and industrialisation has the potential to deliver certain economic and social benefits. On the other hand, it leads to the decline of human welfare and drives biodiversity loss by altering ecosystem functions. This presents a challenge for decision-makers as they must navigate between corridor development (Goal 9) and maintaining the ability of ecosystems to provide for humans and non-humans both now and in the future (Goal 15).

Another trade-off between infrastructure and industrialisation goals and environmental goals relates to climate change. The UN argues that new investments in infrastructure and industrialisation will reduce carbon emissions, particularly in the global South (UN 2015). Yet, LAPSSET and the Central Corridor raise questions about this claim. In both cases, the construction of new highways has been priortised, followed by new SGR and pipeline projects. These types of infrastructure encourage – rather than reduce – the use of fossil fuels and are directly linked to GHG emissions and soil/water contamination. Moreover, much of the industrial development planned for these corridors is not climate-friendly. Oil and gas development and industrial agriculture are high-emission industries that underpin both corridors. Thus, once again, new development corridors leave decision-makers to negotiate the achievement of Goal 9 and action to combat climate change (Goal 13).

Tensions between economic growth versus social inclusion and environmental sustainability in relation to Goal 9 reflect wider tensions across the SDGs. Many have commented on the incompatibility of economic, social and environmental goals within the *2030 Agenda* (ICSU 2015; Kopnina 2015; Machingura and Lally 2017; Spaiser et al. 2017). For example, after a thorough review of the SDGs, ICSU concluded that the goals were not 'internally consistent' and that conflicting relations between the goals were being overlooked or downplayed (ICSU 2015). Similarly, the Overseas Development Institute argues that progress toward the achievement of certain economic goals is 'cancelling out' progress toward certain environmental goals (Machingura and Lally 2017, 10). Kopnina (2017) suggests that when goals come into conflict with one another, those that sustain economic growth are more likely to be priortised than those that promote social and environmental sustainability.

This aligns with our analysis in this article, as the economic objectives of new development corridors appear to trump concerns about the environment and social equity. Plans for infrastructure and industrialisation are a top priority of the Government of Kenya and the Government of Tanzania. As a result, new development corridors are being constructed at a rapid pace, even though these mega-infrastructure projects contradict environmental and social development goals at the subnational level, as well as goals related to climate change at national, regional and global levels. The priortisation of Goal 9 over goals supporting social inclusion and environmental sustainability is aptly demonstrated by a recent court case in Kenya. In 2018, the High Court of Kenya ruled that the Government of Kenya had violated both national environmental law and people's fundamental human rights during construction of the Lamu Port – a key component of the LAPSSET Corridor – and ordered that compensation be paid for damages to the livelihoods of local fishing communities. The prioritisation of Goal 9 can partly be explained by the persistence of neoliberalism as a guiding force in development planning and policymaking in East Africa: Even though more credence is being paid to investing in ecological and social

sustainability, the myth that privileging economic growth through competitive market conditions will inevitably reduce inequality and poverty remains pervasive.

The priortisation of Goal 9 in East Africa is also reflective of how this goal aligns with the interests and priorities of key donors and investors. China's BRI aligns neatly with Kenya and Tanzania's own visions for infrastructure- and industry-led development. Given the amount of resources that China has committed to the BRI and the number of BRI-relevant projects in the East Africa, China is clearly playing an important role in fueling progress toward Goal 9 in countries like Kenya and Tanzania (Shah 2016). For example, China's Exim bank will lend Tanzania US $7.6 billion to finance the construction of the SGR along the Central Corridor. However, other less-traditional bilateral actors have also been keen to participate in the region's infrastructure boom. For example, the Kuwait Fund for Arab Economic Development has provided loans for Central Corridor projects while the Government of South Africa has signed various agreements with the Government of Kenya to support investment in LAPSSET. In this regard, emerging geopolitical interests and trends may contribute to the realisation of Goal 9 in East Africa, but they also contribute to trade-offs between this goal and other SDGs.

Finally, infrastructure- and industry-led development appeal greatly to the private sector, and this further explains why Goal 9 has been prioritised in East Africa. The potential for increasing private sector participation in SDG implementation is greater in some sectors than others. As UNCTAD explains:

> Infrastructure sectors, such as power and renewable energy (under climate change mitigation), transport and water and sanitation, are natural candidates for greater private sector participation… [whereas] other SDG sectors are less likely to generate significantly higher amounts of private sector interest, either because it is difficult to design risk-return models attractive to private investors ... because they are at the core of public service responsibilities and highly sensitive to private sector involvement (e.g. education and health care) (2019, xxvii).

In Kenya and Tanzania, the private sector is playing a key role in financing development corridors and, in doing so, supporting the achievement of Goal 9. For example, a joint venture between Tullow Oil Kenya, Africa Oil Kenya and Total Oil will finance the oil pipeline along LAPSSET while a similar venture between Tullow Oil Kenya, Total Oil, CNOOC Limited and the Governments of Tanzania and Uganda will finance the oil pipeline along the Central Corridor.

This final point is important, as it suggests that it is not just national governments that need to be held accountable for trade-offs between SDGs that result from progress toward Goal 9. Rather, donors and investors are also contributing to the prioritisation of Goal 9 over other goals, such as those that promote environmental protection or social equity. The implication is that local and national authorities are left to accept or mitigate trade-offs without adequate resources, as the same level of finance is not made available for SDGs with lower returns on investment. As Mhlanga et al. (2018) explain, the private sector primarily engages with SDGs that are most 'material' or 'relevant' to their business strategy. The same is also true of governments that may seek financial and/or geopolitical returns on investment, which is why China often exhibits a willingness to finance mega-infrastructure projects that align with the BRI while demonstrating relatively little concern for the environment or social responsibility.

6. Conclusion

Nearly five years into the *2030 Agenda*, growing awareness about the 'internal inconsistency' (ICSU 2017) of the SDGs is motivating efforts to understand synergies and trade-offs between different goals and targets. Research into SDG interactions demonstrates that progress toward one goal can set back progress toward others. In response, researchers have developed frameworks aiming to help policymakers 'map out, score and qualify' interactions between goals (Nilsson et al. 2016). These frameworks have facilitated collaborations between researchers, planners and policymakers and other stakeholders to anticipate interactions between SDGs and to prioritise action toward certain goals and targets in response (Weitz et al. 2018). As important as these frameworks are for shaping high-level discussions about possible SDG interactions, there is a need to continue developing aggregate knowledge on actual interactions and on why certain goals are prioritised in certain contexts (Breuer et al. 2019).

In response, this article engages with in-depth, qualitative data from East Africa to reveal the complexities and nuances of SDG interactions on the ground. Through case studies of two development corridors – LAPSSET in Kenya and the Central Corridor in Tanzania – we analyse emergent synergies and trade-offs between Goal 9 of the *2030 Agenda* and other SDGs. For example, even though LAPSSET and the Central Corridor are associated with new economic opportunities (Goal 1, Target 1.1) and improved access to basic services in some areas (Goal 1, Target 1.4), they are also associated with decreased control over land and natural resources (Goal 1, Target 1.4); increased exposure and vulnerability to economic, social and environmental hazards (Goal 1, Target 1.5); and the degradation of land and other natural resources (Goal 15) as well as oceans, seas and marine resources (Goal 14). In these ways, progress toward Goal 9 through LAPSSET and the Central Corridor is negatively impacting progress toward other SDGs in Kenya and Tanzania.

In line with broader trends, our analysis also demonstrates that in East Africa Goal 9 is being prioritised over goals supporting social inclusion and environmental sustainability. We argue that this is due to at least two factors: First, discourse surrounding development corridors in East Africa demonstrate an adherence to outdated assumptions that privileging economic growth will have trickle-down effects that inevitably reduce inequality and poverty. Second, relatively new influential actors in the region see development corridors as lucrative investment opportunities from a financial and geopolitical perspective. This is particularly true of China, which is playing a major role in delivering Goal 9 in East Africa by financing and developing corridor projects that align with the BRI while demonstrating less concern for issues related to environmental or social sustainability (Shah 2016). These dynamics are pertinent to growing concerns about 'What kind of infrastructure is being developed [through Goal 9] and whose needs will it serve?' (UNHR-HBF 2018, 7). Ultimately, trade-offs between SDGs are not simply a result of internal inconsistencies: They reflect ideological tensions and political struggles being played out on a global stage through the *2030 Agenda*.

As a final note, some trade-offs emerging with progress toward Goal 9 in East Africa may be difficult to undue, like biodiversity loss, ecosystem fragmentation, and GHG emissions – not to mention emergent public health problems and rising tensions over land use and access along corridor routes. Yet, many of these trade-offs may be possible to address if taken seriously during the early stages of project planning. During the planning stages of development corridors, affected communities could be given the chance to collaborate with natural and social scientists, local governments and policymakers to plan corridors in ways that minimize negative environmental and social impacts. Institutional and policy mechanisms could be established to ensure that affected communities have more control over land, natural resources, and compensation/resettlement procedures. Decent working conditions and equal employment opportunities could be guaranteed; strategies for 'greening' the production, transport, and

processing of raw materials could be implemented; and further due diligence could be required of donors, investors and contractors.

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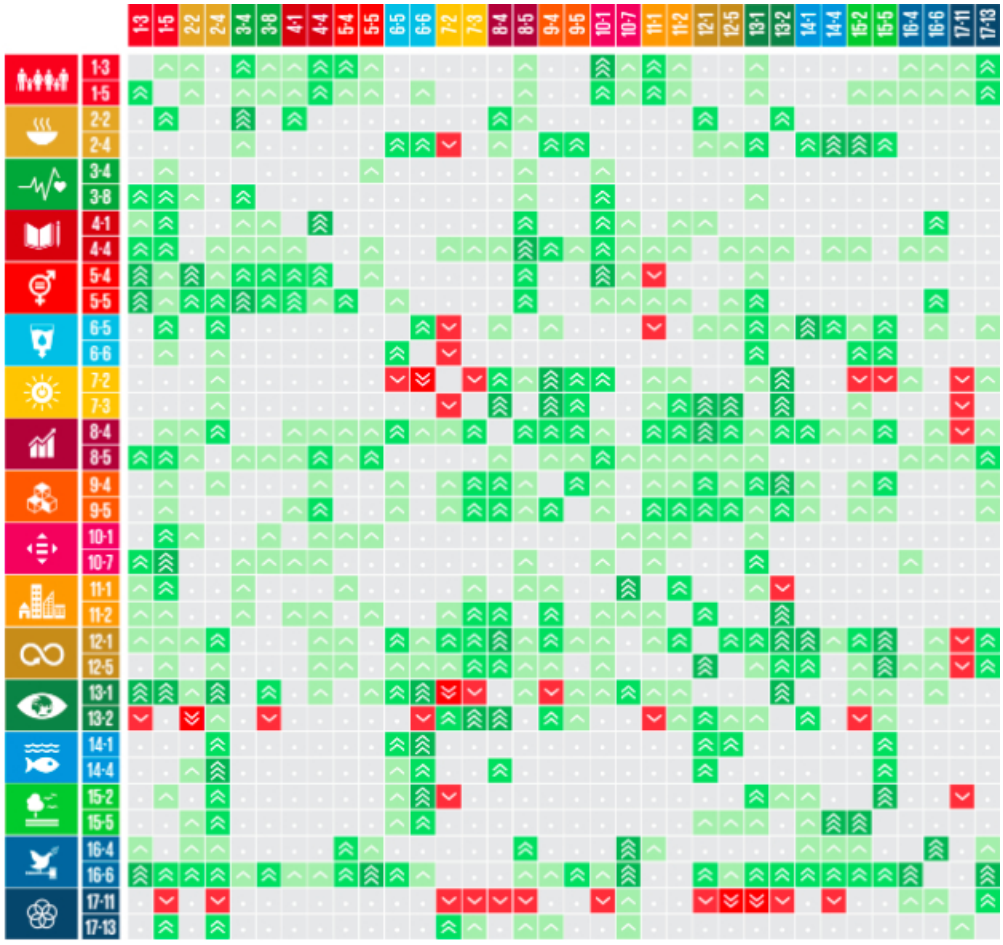
Interaction	Name	Explanation
+3	Indivisible	Inextricably linked to the achievement of another goal
+2	Reinforcing	Aids the achievement of another goal
+1	Enabling	Creates conditions that further another goal
0	Consistent	No significant positive or negative interactions
-1	Constraining	Limits options on another goal
-2	Counteracting	Clashes with another goal
-3	Cancelling	Makes it impossible to reach another goal

Suggested seven-point scale of SDG interactions (Nilsson et al. 2016)



Example cross-impact matrix: Green indicates positive interactions, red negative interactions, and shading and chevrons indicate score. 'Interaction scores relate to the impact of progress towards the target listed on the left on progress towards the target listed along the top. Thus, while progress towards Target 1.3 would somewhat promote progress towards Target 1.5, progress towards Target 1.5 would have a stronger positive effect on Target 1.3' (Weitz et al. 2019, 2).

53x49mm (300 x 300 DPI)

SUSTAINABLE DEVELOPMENT GOAL 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
Target	**Indicator**
9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	9.1.1 Proportion of the rural population who live within 2 km of an all-season road 9.1.2 Passenger and freight volumes, by mode of transport
9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries	9.2.1 Manufacturing value added as a proportion of GDP and per capita 9.2.2 Manufacturing employment as a proportion of total employment
9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	9.3.1 Percentage share of small-scale industries in total industry value added 9.3.2 Percentage of small-scale industries with a loan or line of credit
9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	9.4.1 CO2 emission per unit of value added
9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	9.5.1 Research and development expenditure as a percentage of GDP 9.5.2 Researchers (in full-time equivalent) per million inhabitants
9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States	9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure
9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities	9.b.1 Percentage of medium and high-tech manufacturing value added in total value added
9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020	9.c.1 Percentage of population covered by a mobile network, by technology

Targets and Indicators for SDG 9: Targets specify the goals while indicators represent the metrics to track whether these targets are achieved (UN 2015).

Map of LAPSSET and the Central Corridor in East Africa: Note: This map does not show the East Africa Crude Oil Pipeline in Tanzania, which is planned to follow the Central Corridor route from Uganda to Singida, where it will diverge and proceed to the Port of Tanga north of Dar es Salaam.

130x181mm (300 x 300 DPI)