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The emerging threats and opportunities for implementing nationally determined contributions (NDCs) and sustainable development goal 7: policy insights from sub-Saharan Africa and Malawi

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Abstract:

Aim: Despite the implementation of the Sustainable Development Goals (SDGs) and Nationally Determined Contributions (NDCs) to reduce climate change vulnerability and inequality particularly in the Global South, it is probable that the SDGs and NDCs might not achieve their objectives. The aim of this article is to identify how countries in Sub-Saharan Africa (SSA) can address their climate change governance and cross-sector coordination challenges in order to reduce climate change vulnerability and augment SDG 7 (universal energy access) implementation.

Design / Research methods: A qualitative content analysis was undertaken using research articles, project reports, a case study and policy briefs exploring the nexus of climate change governance, SDG 7 implementation and SDG 13 implementation in the context of SSA and Malawi.

Conclusions / findings: The study suggests that climate change governance and attaining SDG 7 in the Global South might be improved by harmonising NDC activities so that NDC activities can be aggregated and monitored from a regional perspective similar to the case of the Clean Development Mechanism (CDM) Programmes of Activities (PoAs).

Originality / value of the article: The paper is of value to global policy makers as it shows that increasing climate change ambitions and ratcheting-up in the context of SSA should include increasing the deployment of renewable energy technologies as well as initiating new international institutional arrangements for climate change governance through South-South Climate Change Cooperation modalities.

Keywords: Clean Development Mechanism (CDM), climate finance, renewable energy, South-South Climate Change Cooperation, Sustainable Development, Malawi.
JEL: G38, O13, O55, Q01, Q28, Q54, Q56.

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1. Introduction

The Sustainable Development Goals (SDGs) are calling for State and Non-State Actors in both developing and developed countries to implement effective climate change policies and programmes that can also end poverty and reduce inequality within and across countries (Northrop et al. 2016). However, climate change is still considered as one of the greatest development challenges of the World and as it is compounding the socio-economic constraints to development in the Global South (Partey et al. 2018; Berchin et al. 2017). One of the factors that make managing climate change problematic is that an individual country, company or citizen has little impact on the climate. Furthermore, individual action is costly, while the benefits are felt by all countries and inhabitants of the world. This creates the well-known problem of collective action (Ostrom 2008; Brechin 2016). Consequently, policy maker have implemented various global treaties and mechanisms such as the United Nations Framework Convention on Climate Change (UNFCCC), SDG 13 (manage climate change and its impacts) and Paris Agreement as a means for simultaneously regulating the amount of greenhouse gases that are emitted into the atmosphere and providing incentives to promote sustainable development. Added to this, the main international climate change governance architecture comprises of voluntary commitments by governments in the form of Nationally Determined Contributions (NDCs). Unlike other previous international governance architectures for environmental management and climate change management such as the Montreal Protocol and Kyoto Protocol, which were top-down and prescriptive in nature (Kaku 2011; Woodcock 2009), the NDC framework is a bottom-up, country led approach for improving climate change governance (Mbeva et al. 2015; Jiang et al. 2017).

However, since the NDC framework does not encompass legally binding emission reduction targets for any country, some authors consider this new model for climate change governance to be less stringent since it gives national governments the opportunity to formulate their climate change pledges with more emphasis on maintaining their own rights, interests and economic development space (Zhang, Pan 2016), rather than formulating pledges based on drastically reducing greenhouse gas emissions and promoting transitions towards the

sustainable utilisation of resources. Unfortunately, the NDC framework has failed to galvanise commitments for limiting greenhouse gas emissions sufficient enough to reach the Paris Agreement's target of limiting global temperature increase to 2 °C (Röser et al. 2016). Without innovations in NDC development and implementation, Sustainable Development Goals (SDGs) are unlikely to be achieved and the existing inequality in development and growth can be expected to continue (Bak et al. 2017).

Global South countries such as those in sub-Saharan Africa (SSA) face a dilemma since they are the most vulnerable to the impacts of climate change as they have inadequate resources for adaptation and coping. Moreover, since such SSA countries were not major emitters of greenhouse gases their precarious position and dilemma might be considered a "double injustice" (Weiler et al. 2018). Accordingly, it has been suggested that climate change will not only impede economic development in the Global South and cause social unrest in the region but it will also slow down progress on attaining the SDGs since it will exacerbate the rates of migration, forced displacements and extreme poverty. Some estimates therefore point out that by 2030 the number of poor people whose poverty will be attributable to climate change will be 100 million and by 2050 the forcibly displaced people in the regions of SSA, South Asia and Latin America will be more than 140 million (Rigaud et al. 2018; Dowla 2018). To further compound these issues, attaining sustainable development will be constrained even further as the use of natural resources and environmental stress will increase due to rapid population growth and economic growth demands (Berchin et al. 2017), hence the SDGs aspirations of ensuring that no-one is left behind in accessing modern energy, education, health services, etc. will become more challenging.

NDCs may be considered as climate change policy instruments that can initiate societal and institutional changes to minimise the adverse impacts of climate change. Accordingly, various studies on NDC development and implementation have been undertaken globally. Most of these studies have primarily focused on providing insights into aspects that can enable different countries to increase their greenhouse gas mitigation commitments. For example, Jiang and Hanaoka (2017) looked at actions that could be undertaken within the NDC framework to reach the global target of limiting the global temperature increase to 2°C above pre-industrial levels.

Jiang and Hanaoka (2017) concluded that there was space for four regions to undertake more mitigation actions than given in their NDCs in order to put the world on a trajectory to meet the 2 °C target. Zhang and Pan (2016) undertook an analysis of 160 NDC reports (covering 188 Parties) submitted to the UNFCCC Secretariat in order to determine the financial demand, mitigation cost and priority investment areas for developing countries. Their results indicated that among 160 NDC reports, 122 reports clearly included the finance content and 64 reports proposed specific amounts of financial demand for greenhouse gas mitigation in 2030, hence they pegged US$ 474 billion as the approximate amount of financing that Global South countries will need for various climate change programmes in 2030. Kissinger et al. (2019) explored the potential of climate finance to support developing country efforts to shift away from unsustainable land use patterns in the context of the 2015 Paris Climate Agreement. Kissinger et al. (2019) concluded that while much attention is directed to the inadequate quantities of international climate finance, agriculture, forestry, land use, etc. have significant impacts on climate change mitigation and adaptation actions but yet in the absence fiscal reform there will be no transformative change for improved climate action. Abramskiehn et al. (2017) undertook an assessment of how National Development Banks can drive investment in the NDCs of South American countries. Abramskiehn et al. (2017) concluded that National Development Banks can mobilise climate investments that can help to meet NDC objectives but their full potential is yet to be realised as they lack the technical abilities to identify and undertake climate change adaptation projects.

Nonetheless, contemporary studies are now arguing that climate change will continue to impede progress towards attaining the SDGs if existing climate change governance architectures are not improved (Alves et al. 2020; Mpaire et al. 2017; Pardoe et al. 2018). On one hand, this means that the NDC framework has two great challenges to overcome, that is to increase climate change mitigation actions to a level commensurate with reaching the Paris Agreement's 2°C target and to establish institutional arrangements that can enable the NDC framework to foster successful low carbon development transitions. On the other hand, this suggests that there are knowledge gaps on how policymakers in SSA can improve NDC development and implementation to augment sustainable development, more particularly the

simultaneous implementation of SDG 7 (ensure universal energy access) and SDG 13 in SSA. Accordingly, to address this knowledge gap, an exploratory study focusing on NDC implementation in the context of SSA and Malawi was undertaken in order to determine the innovations that can be incorporated in NDCs to enable NDC governance architectures to accelerate inclusive growth and renewable energy deployment in SSA and Malawi.

The paper is arranged as follows: section 2 follows with a narration of the paper's methodology and research framework. Section 3 provides an analysis of the challenges related to achieving SDG 7 in SSA. In section 4, insights into NDC and climate change policy implementation in Malawi and SSA are provided. The discussion in section 5 argues that the development and implementation of NDCs and improving climate change governance could be improved by instituting new protocols that can replace public communication with public participation as the main public engagement strategy for policies. The paper concludes in section 6 with suggestions on how the harmonised implementation of NDCs at SSA region level can strengthen South-South Climate Change Cooperation and augment SDG 7 implementation.

2. Methodology and research framework

In order to achieve the aim of this paper (i.e. to determine the NDCs innovations that can address climate change governance and cross-sector coordination challenges in SSA), an exploratory study based on analyses of research articles, project reports, a case study and policy briefs exploring the nexus of climate change governance, SDG 7 implementation and SDG 13 implementation in the context of SSA and Malawi was undertaken. SSA was selected as the region of study as SSA is amongst the regions that will be the most adversely affected by climate change. SDG 7 implementation was chosen as a focus area because many Global South countries have low access to electricity and it has been emphasised that in the context of SSA priority should be given to ensuring that SDG 7 is attained before 2030 for the countries to stand a better chance of attaining the SDGs by 2030 (AfDB

2016a). The paper has also used Malawi as a case study on NDC implementation, climate change policy implementation and climate change governance as Malawi is a Least Developed Country (LDC) that is considered to be very vulnerable to the impacts of climate change because of a lack of resources for adaptation and influence of weather hazards (Olson et al. 2017; GoM 2015). Malawi is also reported as one of the least electrified countries in the world as country's electrification rate stands at 9% (Hancock 2015).

Since the research was exploratory in nature, the documents analysed were identified through internet searches on NDCs in the region and they were selected through purposive sampling. The data used in the research was not intended to provide a representative or statistical sample of how all the NDCs in SSA are trying to integrate and coordinate climate change issues with other development priorities such as renewable energy deployment, but rather to provide an indication of how NDC priorities and institutional arrangements in NDCs can potentially constrain the potential of NDCs to have the dual roles of promoting climate change actions and sustainable development. The methodology and research framework adopted therefore bears resemblance to some secondary data based studies such as England et al. (2018) and Alves et al. (2020). In the research by England et al. (2018), the study sought to determine how national governments can harmonise their national policies in order to maximize their potential to move towards Climate Compatible Development. The methodology used in the study included undertaking a cross-sectoral comparison of government policy documents in the Southern Africa Development Community (SADC) region and undertaking a qualitative content analysis of SADC countries' national sector policies to determine their priority approaches for water, agriculture, forestry and energy. In this research internet searches were conducted in order to locate the sector policies on government and other relevant websites. Additionally, for policies that could not be located online, staff members working for relevant government departments were contacted by email in order to obtain the policies (England et al. 2018). In the study by Alves et al. (2020), the study sought to analyse the status of climate change policies by using a sample of 13 countries to understand how such countries were developing their National Adaptation Plans (NAPs) to overcome the observed climate adaptation

limitations and guide their responses. The methodology in this paper included analyses and comparisons of public policies on climate change (e.g. objectives, stakeholders, participatory mechanisms) by looking at both NAPs and complementary plans and measures (Alves et al. 2020).

The countries that have implemented NDCs vary widely in national circumstances and domestic policies hence NDCs across different countries have no standardised format meaning that countries are at liberty to choose different methods to describe and quantify their greenhouse gas offsets. This also means that not all NDCs can be directly compared in terms of scope and ambition (Hedger, Nakhooda 2015; Mbeva et al. 2015). Consequently, rather than attempting to formulate a standardised methodology and research framework for assessing climate change governance and cross-sector coordination challenges in the NDCs for all countries, the research methodology for this paper focuses on theorising and conceptualising how policy makers can identify energy sector institutional and governance weaknesses related to their NDCs and identify how modifications to NDC institutional arrangements can influence the governance of SDG 7 and SDG 13 implementation.

3. Sustainable Development Goal (SDG) 7: the elusive ambition?

3.1. SDG 7 Implementation in the Global South

A lack of access to electricity and modern energy services is often cited as a factor that perpetuates poverty and inequality in the Global South (Urban 2018; McCollum 2018). SSA with an electrification rate of 35% is arguably the least electrified region in the World (Sweerts et al. 2019; Newell, Bulkeley 2016) and also the region with the most number of LDCs. SSA's energy deficit is so dire and retrogressive to the extent that the current low rates of electrification in many African countries is considered as the most pressing obstacle to economic growth, more important than access to finance, red tape or corruption (IEA 2016). With SSA's electricity access rates hovering around 35%, it can be argued that ensuring that investments in renewable energy technologies and infrastructure are to be

successfully undertaken in SSA will require new innovations in technology, policies, institutions and financing models as project developers and utilities in the region have historically failed to facilitate the wide-scale deployment of renewable energy technologies let alone improve electrification rates with fossil fuel energy supply systems.

Between 2010 and 2035, energy-related greenhouse emissions could rise by 20% globally in absence of substantial investments in renewable energy. Currently two thirds of all anthropogenic gas emissions are roughly contributed by the energy sector (Northrop et al. 2016). This therefore means that whilst increasing access to electricity and modern energy services is desirable, what is even more desirable is ensuring that developing countries leapfrog from low electrification rates to universal energy access through renewable energy sources (Amankwah-Amoah 2015; van Gevelt et al. 2018). In the energy sector, there are possibilities for developing countries to directly invest in advanced technologies rather than pursue environmentally damaging pathways that most to industrialised countries pursued. This process is aptly termed "technological leapfrogging" and its advantages in the energy sector include that it can use technology which is fit for the level of economic development, without posing threats to, e.g., employment or draining capital resources (Amankwah-Amoah 2015). Currently, technological leapfrogging is associated with the newly industrialised economies in Asia (ibid), hence SSA's challenge in the energy sector is to ensure that the region becomes the next frontier for technological leapfrogging.

SSA has various renewable energy resources and fossil fuel resources spread across the continent that can enable the continent to easily achieve universal energy access (Lior 2012). However, factors such as lack of finance, lack of appropriate legal and regulatory frameworks and lack of appropriate business models have been highlighted as the issues that have constrained efforts to increase access to electricity in the region through renewable and non-renewable energy sources (Johnson et al. 2017; Chirambo 2018). With regard to financing, some estimates have pointed out that for Africa to attain universal energy access, it has to drastically improve its capabilities to mobilise financial resources for energy sector investments from the current spending of US$ 8–11 billion per year to approximately US$ 40–55 billion

per year (Schwerhoff, Sy 2017). Notwithstanding the aforementioned, there will be a further need for various countries to develop private and public finance for SDGs implementation by an estimated US$ 1.3 trillion annually in developing countries and US$ 342–355 billion in low income countries (UNDP 2015). Additionally, since various countries in SSA have various energy resource endowments, regulatory frameworks, socio-economic profiles, climate change vulnerabilities and demographics, the rates to which investments in renewable energy deployment occur varies from country to country. Consequently, even though attaining universal energy access is desirable to augment economic growth, the grim reality is that not all countries in SSA can be envisaged to be able to achieve universal energy access by 2030. In this regard, projections by Sanoh et al. (2014) showed that 100% electrification by 2030 is unattainable in most SSA countries but a likely scenario is that by 2050 100% electrification will be attained by countries with a current electrification rate of 60% and countries with a current electrification rate of less than 60% may be up to 80% electrified in 2050.

3.2 Accelerating rural electrification through NDCs and climate action

Many developing countries face insurmountable challenges in their efforts to attract investments in the renewable energy and climate change action sectors. However, some reports have indicated that SSA, South Asia, and East Asia & Pacific are arguably the three regions that present the most significant investment opportunities in both energy access and climate change mitigation. For example, high climate efficiency of investment can be achieved in India, South Africa, Mozambique, Cambodia, Mongolia, Uganda, Kenya and Rwanda by using its investment potential of US$ 360 billion for renewable energy by 2030. This investment supports economic development as well as climate change mitigation (Tonkonogy et al. 2018). Outside the scope of these countries it might therefore be argued that more efforts will need to go into building strong institutions and favourable policy environments so as to improve the financing and technology transfer of renewable energy technologies. This follows that the two critical obstacles for the deployment of renewable energy technologies in Africa include the difficulty of attracting sufficient and affordable finance (Sweerts et al. 2019), and

developing business models that can promote renewable energy technology transfers. Since the costs of various renewable energy technologies are drastically decreasing, it also means that the cost-competitiveness of renewables with fossil fuel alternatives will keep on improving (Tonkonogy et al. 2018). For example, technological development seems to proceed faster than predicted, leading to an increased capacity growth of solar photovoltaic (Tonkonogy et al. 2018). This therefore means that the potential and prospects for utilising renewable energy deployment for improving electricity are continuing to improve since the technologies are relatively getting cheaper and more affordable with time.

It might be anticipated that African countries would be in the forefront in enacting transformative policies to mitigate greenhouse gas emissions and increase investments in renewable energy because they are the most vulnerable to future climate change and there have been decreases in the cost of renewable energy technologies. Unfortunately, that is not the case. In actual fact, some research has pointed out that many climate change vulnerable African countries such as Malawi, Tanzania and Mozambique are not accelerating their deployment of renewable energy technologies but rather increasing their investments in fossil fuel power supply systems (GoM 2015; Pardoe et al. 2018; Mahumane, Mulder 2019). Arguably, one area in which NDCs can facilitate transitions to enable current development paradigms to succeed in attaining sustainable inclusive growth is by facilitating increased investments in renewable energy in SSA. Furthermore, NDCs should not only aim to accelerate the deployment of renewable energy technologies but should actually focus on directing renewable energy investments to rural areas. Such an approach in NDCs will therefore promote climate change mitigation and also ensure that there is equitable access to electricity in SSA since urban and rural electrification rates in SSA differ significantly as most electrification projects in the region favour urban electrification. To substantiate this assertion, an assessment by the African Development Bank (AfDB 2016b) and Hancock (2015) quantified the urban electrification bias and estimated that SSA had an electrification rate of 35% in 2012, an increase of 3% from the 2010 baseline of 32%. This therefore translated into SSA's urban electrification rate reaching 59% in 2012 and the rural electrification rate reaching 16% in 2012. In fact, it can be argued that during these

years urban areas witnessed energy access growth surpassing population increase by 25 million people whilst the opposite occurred in rural areas with rural population growth outpacing energy access rates. Arguably, this means that even though increasing rural electrification rates could reduce the urban-rural divide and create more employment opportunities in rural areas, energy sector project developers and utilities have a bias towards developing energy infrastructure for urban development. Additionally, this also suggests that SSA's current rural electrification modalities and policies are not providing sufficient incentives to promote the deployment of renewable energy in rural areas and ensure universal energy access.

Similarly, even though NDCs have facilitated the proliferation of various climate finance modalities that have objectives related to promoting renewable energy deployment, anecdotal evidence suggests that such climate finance modalities are not leading to energy sector transitions capable of promoting inclusive growth and wide-scale rural electrification in SSA. For example, even though the development of large renewable energy projects can increase electricity production, such large renewable energy projects have minimal benefits for sustainable economic development as they are mostly connected to the grid (Oji et al. 2016). However, aggregating small renewable energy projects within dispersed African communities does not only reduce energy poverty but also makes a positive contribution towards local economic development (Oji et al. 2016). On the other hand, Multilateral Development Banks, which are the main financing channels for climate finance are noted to provide access to finance for large scale renewable energy projects easier since they have lower managerial transaction costs and increased ability to obtain funding for investment (Soanes et al. 2017). So, despite the knowledge that small scale projects/decentralised energy programmes/mini-grid systems can provide poor communities with access to energy faster and often have various other benefits including (i) proportionally less regulatory approvals and investment costs, (ii) and cheaper and quicker deployment modalities (Kaijage et al. 2017; AfDB 2016b), most renewable energy investments in SSA are still likely to focus on the development of large grid connected infrastructure. Cumulatively, these issues suggest that policy makers should initiate deliberate interventions to direct project developers and investors towards the technologies and initiatives that can

augment small renewable energy projects in rural areas in order to promote inclusive access to renewable energy and electricity. Arguably, with the aforementioned factors in mind, it might be argued that NDCs can create synergies and institutional coordination modalities that can simultaneously foster inclusive growth and decrease greenhouse gas emission rates should they include specific clauses and institutional arrangements that mandate energy related climate change programmes and projects to have specified quotas for renewable energy deployment in rural areas.

3.3 Towards sustainable development and universal energy access in Malawi

Malawi is a land-locked country in southern Africa that is bordered to the north and northeast by the United Republic of Tanzania, to the west by the Republic of Zambia and to the southwest and east by Mozambique. In trying to understand the factors that influence development in Malawi, the Malawi National Climate Change Management Policy (GoM 2016: iii) lists a narrow economic base, dependence on rain-fed agriculture and low adaptive capacity at the community and national levels as factors that perpetuate climate change vulnerability in Malawi. Malawi's profile shows that the country's electrification rates are below those for SSA as the country has an electrification rate of 9%. The low electrification rate means that Malawi has 15 million people without access to electricity, a 33% urban electrification rate, a 5% rural electrification rate, 97% of the population relying on traditional use of biomass for energy and 15 million people relying on traditional use of biomass for energy (Hancock 2015). Malawi's emission rate of 1.4 t CO_2 per capita in 2015 is very low compared to other countries. (GoM 2015). None the less, Malawi as a Party to the UNFCCC intends to move the country's development pathways towards a green economy hence the country developed its NDC to contribute towards global sustainable development aspirations (GoM 2015).

In the NDC for Malawi, the country's unconditional mitigation commitments include: (i) produce 2,000 solar water heaters (SWH), (ii) install 20,000 solar photovoltaic systems, (iii) produce 351 megawatts (MW) of hydro electricity, and (iv) distribute energy saving cook stoves to 400,000 households. The country's conditional mitigation commitments include: (i) increase SWH from 2,000 to 20,000

by 2030, (ii) increase solar photovoltaic systems from 20,000 to 50,000 by 2030, (iii) increase generation of hydro electricity by 800 MW by 2025, and (iv) increase the number of households adopting energy saving stoves to 2,000,000 by 2030 (GoM 2015). If reference is made to the preceding section where rural electrification and deployment of mini-grids are highlighted as strategies for creating synergies for simultaneously achieving climate change goals with development goals, then it might be argued that it could be beneficial for Malawi and similar countries to include both conditional and unconditional commitments related to installing and investing in mini-grids in their NDCs. By incorporating specific mini-grid commitments in NDCs, the NDCs framework might therefore be able to mobilise and direct domestic and international financial and technical resources towards electrifying rural areas and this will not only increase rural electrification rates at a pace that might not have been feasible without the NDCs but they will also be providing support to reduce the risks associated with mini-grid development to enable many private enterprises to scale-up mini-grid deployment.

4 NDCs and Climate Change Policy Implementation in Malawi and SSA

4.1 NDCs as Agents of Transformative Climate Change Governance

The Government of Malawi enacted the Malawi National Climate Change Management Policy in 2016 (GoM 2016) with a goal to harmonise and enhance the planning, development, coordination, financing and monitoring of climate change initiatives and programmes. The Malawi National Climate Change Management Policy (GoM 2016) lists Malawi's six priority areas for climate change management as:

(i) climate change adaptation; (ii) climate change mitigation; (iii) climate change capacity building, education, training and awareness; (iv) climate change research, technology development and transfer, and systematic observation; (v) climate change financing; and (vi) cross-cutting issues (i.e. gender consideration, population dynamics and HIV and AIDS) (GoM 2016: 10-13).

The development and implementation of climate change policies can provide countries with various advantages. In this regard, Bird et al. (2016: 101) considered climate change policies as tools for (i) augmenting climate change resource mobilisation, accelerating the pace of development planning and climate resilience interventions, (ii) installing new institutional coordination mechanisms, and (iii) strengthening institutional capacities. Arguably, since Malawi has both a climate change policy and NDC, it might be expected that Malawi will be in a better position to be able to implement comprehensive climate change and sustainable development programs. However, in the context of Malawi, the presence of a climate change policy and NDC might not entail enhanced climate change action and management as other environmental challenges such as pollution and deforestation have continued to worsen in the country regardless of the existence of various environmental legislation (i.e. Forestry Act (1997), Environmental Management Act (1996), National Environmental Action Plan (2002), etc.). Malawi therefore has similar challenges like other SSA countries such as Uganda and Tanzania where researchers such as Mpaire et al. (2017) and Pardoe et al. (2018) highlight that even when pertinent policies are in place there are still chances that the policies might not be implemented effectively. In this regard, aspects that require special consideration to ensure effective policy implementation include increasing awareness and the level of knowledge on the importance of separate environmental administrative units; increasing budgetary allocations; increasing consultation processes with stakeholders; enhancing coordination and cooperation between different administrative units; and improving communication channels between different players at the local, regional and national level. Building the capacity of regulators to improve their capabilities for environmental and climate change policy implementation is therefore arguably more vital than ensuring that policies are developed since in the status quo the actual actions of State and Non-State Actors do not always comply with policies and best practices for environmental governance and sustainable development.

In their analysis, Adenle et al. (2017) considered that a lack of institutional capacity has various implications on the implementation of climate change policies and transitions to low-carbon development pathways since a lack of institutional

capacity has led to Africa's low access to and use of climate finance and a lack of climate change mitigation programmes. Adenle et al. (2017) therefore suggested that improving the development and implementation of climate change programmes could be achieved by creating a regional institution, or a Climate Change Mitigation Institution (CCMI), that specialised in building local capacity and facilitating the integration of African countries into global climate change mitigation efforts. Similarly, with the environmental and climate change policy implementation challenges highlighted in the preceding sections, it might be argued that one way of ensuring the successful implementation of the NDCs framework in the Global South would be for African governments to create regional institutions within their various economic blocks to specialise on building local capacity on NDC development and improving the coordination on NDC activities. Using this approach, the implementation and coordination of NDCs will therefore be monitored at national and regional levels thereby increasing the opportunities of building capacity and transparency on climate change action through South-South Climate Change Cooperation.

Moreover, this is quite ideal when consideration is made to the assertions that in the context of Africa, regional initiatives yield better results than national initiatives by a factor of 8, whilst continental initiatives yield better results than national initiatives by a factor of 6.51 and international initiatives yield better results than national initiatives by a factor of 3.99 (Faiyetole, Adesina 2017). Secondly, a contributing factor to the increasing climate change mitigation cost at global level is arguably a consequence of a combination of limited cooperation between regions in terms of technology diffusion and climate change policy analysis (Leimbach et al. 2018). These aspects therefore suggest that by establishing a regional NDCs implementation strategy for Africa that is based on South-South Climate Change Cooperation, African countries will stand a better chance of successfully achieving their NDC commitments whilst at a global level the actual costs for implementing climate change programmes could be reduced.

4.2 Supporting climate finance through NDCs in Malawi

The global development finance landscape is arguably in transition as such development cooperation and development finance will favour countries that can mobilise domestic resources rather than the status quo where developing countries have a high dependence on Official Development Assistance (ODA) and external debt (Nnadozie et al. 2017). Accordingly, the National Climate Change Management Policy (2016) encompasses measures to promote domestic resource mobilisation by incorporating the establishment of a domestic Climate Change Management Fund to augment the mobilisation and utilisation of domestic resources for climate change activities in Malawi. The intention to establish a Climate Change Management Fund may be considered as a timely addition to Malawi's environmental management framework for three main reasons. Firstly, ODA and climate finance disbursements from developed countries to developing countries are not necessarily determined by various factors to different extents. In this regard, a combination of (i) the governance and accountability history of the recipient country, (ii) the personal interests of donors, and (iii) the climate change need/vulnerability of the country may influence ODA and climate finance flows to a country (Weiler et al. 2018). Secondly, official financial pledges from developed countries to developing countries through multilateral or bilateral channels are not always guaranteed to be honoured hence various countries have experienced funding deficits because of such unfulfilled pledges (Musah-Surugu et al. 2018). Thirdly, Barnard (2015) and Butcher-Gollach (2015) argued that less than 10% (approximately US$ 1.5 billion) of the total climate finance mobilised globally is disbursed to local level actors; and vulnerable households and businesses are amongst the sectors that planning systems and international climate change programmes overlook in their programming and funding. Cumulatively, these issues demonstrate that not only are ODA and international climate finance modalities unpredictable but there are also gaps in the total amount of climate funds mobilised at international level and the total amount of funds accessed and utilised at local level. Since Malawi's Climate Change Management Fund will aggregate funds from various domestic resources it can be envisioned that Malawi's climate finance

landscape will improve in terms of predictability and reliability of financing sources as well as in providing support to the most vulnerable local communities.

In theory, Malawi's Climate Change Management Fund can easily accomplish its objectives, but in practice achieving its objectives could prove challenging. For example, when reference is made to the Malawi Environmental Management Act (1996), it can be seen that the regulatory provisions for a Fund do not necessarily guarantee improved mobilisation and disbursement of resources for environmental action. For example, section 53 of the Malawi Environmental Management Act (1996) (GoM 1996: 22) establishes the Environmental Fund whose main objectives include facilitating the financing of environmental protection and management initiatives, and natural resources conservation initiatives. However, according to Yaron et al. (2011), despite the presence of the Environmental Fund and other accompanying legislation, deforestation, over-fishing, etc. continue to make Malawi to use its natural resources unsustainably to the extent that US$ 191 million annually (in 2007 prices) is the cost to the country attributed to the over-exploitation of natural resources such as soil, forest, fishery and wildlife. To put it in another way, Malawi loses an equivalent of 5.3% of Gross Domestic Product each year due to the over-exploitation of natural resources (Yaron et al. 2011). The continued unsustainable use of natural resources in the country therefore signifies that the institutional and financial arrangements of the Environmental Fund might not be commensurate with the country's challenges. Similarly, it is plausible that there is a likelihood that the country will not be in a position to establish an effective Climate Change Management Fund that will be able to mobilise significant climate finance and this might exacerbate climate change vulnerability since many local actors will continue to have limited access to financial and technical resources to support the implementation of their climate change initiatives. Arguably, whilst mainstreaming domestic mobilisation is a commendable strategy to limit volatility in international climate finance flows, the successful implementation of Malawi's climate change policy programmes and NDC will still principally depend on the three factors that determine ODA and climate finance disbursements (i.e. good governance, country vulnerability and donor interest) unless the country develops new legislation and incentives to improve domestic tax collection and private sector funding through

channels such as Corporate Social Responsibly (CSR). For example, in India, the provisions in the Indian Companies Act 2013 to mandate businesses with annual revenues of over 10 billion rupees (US$ 156 million) to spend 2% of their average net profits on CSR activities led to private sector charitable spend on social activities to increase from 33.67 billion Rupees (US$ 524 million) in 2013 to around 250 billion Rupees (US$ 3.89 billion) after an amendment on CSR contributions in the Companies Act (Prasad 2014; Jain, Gopalan 2017; Balch 2016). Similarly, an approach that can be taken in Malawi to increase private sector funding contributions to the Climate Change Management Fund and augment NDC implementation would be for some NDC activities be to linked to the country's fiscal policies and incentives so that there could be mandates for certain businesses and industries based on revenues or emission levels to have mandatory contributions of money towards the Fund annually. Such an approach can equally be implemented by other similar countries in SSA to increase domestic climate finance mobilisation.

4.3 Climate change impacts – the unintended responses

Climatic phenomena such as rainfall, floods, droughts and prolonged dry spells are anticipated to become erratic and unpredictable due to climate change hence climate change will impact the livelihoods of communities in the Global South differently (Munang, Nkem 2011). Understandably, various water systems in many African countries that are used for energy supply through hydropower will be adversely impacted by such changes. For example, the countries that have a high dependence on hydropower for electricity include Ethiopia, Malawi, Mozambique, Namibia, Zambia where hydropower provides over 90% of the electricity produced. Nonetheless, at regional level the contribution of hydropower to the electricity produced is at 21% but this can be increased as only 8% of Africa's hydropower potential has been used to date (Pardoe et al. 2018; Schwerhoff, Sy 2017). However, climate change and variability is already causing energy security issues as countries such as Tanzania, Kenya and Malawi have already experience reduced hydropower generation capacity due to low water levels and this has reduced the productivity of households and industries. The framing of the Renewable Energy vs Fossil Energy academic and policy debate is therefore changing from the old discourse where

renewable energy was not the preferred energy supply choice due to perceived high costs (Polzin et al. 2019) to a new discourse where some renewable energy technologies are considered as providing lower levels of energy security than fossil fuel systems. In this regard, reference can be made to Malawi's energy sector as Malawi currently has over 90% electricity supply through hydropower but has now developed plans to construct coal fired power plants to ensure energy security. In order to reflect this new energy policy stance, reference can be made to the carbon emission projections given in the country's NDC. These estimates show that Malawi will witness a 38% increase in annual greenhouse gas emissions between 2015 and 2040 (i.e. approximately 42,000 Gg CO_2 equivalent in 2040 from approximately 29,000 Gg CO_2 equivalent 2015) (GoM 2015). The rise in greenhouse gas emissions are attributed in part due to the addition of coal power plants in the energy supply mix. Climate change is therefore perpetuating policy conflicts as it is causing contradictions in some countries whereby countries will actually increase their greenhouse gas emissions regardless of the knowledge that this can exacerbate climate change and increase their vulnerability to climate change. Addressing this issue might therefore call for closer coordination and collaborations between actors and stakeholders from different sectors and ministries when developing policies and strategies that can influence electricity access and economic development. This follows that ordinarily, stakeholders in the environmental sector are likely to promote a mix of various renewable energy technologies (solar, wind, etc.) as a solution to energy security whilst stakeholders from the energy sector and economic planning sectors are likely to promote the least cost option for electrification. These scenarios can therefore lead to preference being given to fossil powered electricity solutions in developing countries where economic priorities are likely to override environmental considerations. However, through better coordination and collaboration between these stakeholders that have divergent interests, a balance between using a mix of renewable energy technologies and fossil powered energy systems can be achieved, and hence avert a situation where fossil powered energy systems could be considered as the number one solution for averting electricity supply gaps that are caused by climate change induced low hydropower generation capacity. In this regard, NDCs in countries that have a high dependence on

hydropower for electricity generation should therefore ensure that their NDCs promote the deployment of a mix of various renewable energy technologies (solar, wind, etc.) so that a country's energy security can be enhanced.

5. Discussion

The SDGs will provide a framework that can help African countries to eradicate poverty. The SDGs will also help contribute towards Africa's development by also advocating for equitable growth, job creation, infrastructure development and sound environmental management. These aspects therefore make the SDGs more holistic than the Millennium Development Goals (MDGs) (Besharati, Rawhani 2016). The SDGs therefore provide a new development paradigm that is novel in that it has various fundamental differences to the MDGs and as such SDGs implementation is bound to bring forth its own new challenges and opportunities related to creating trade-offs and synergies amongst various priorities such as climate change and renewable energy deployment. Unlike the MDGs, the SDGs have placed responsibilities on State and Non-State Actors from both developed and developing countries to contribute towards the implementation of various development actions in various ways. In contrast, one of the shortfalls of the MDGS was that the role of the private sector was not well defined and as such the MDGs mostly had appeal within the circles of the United Nations, state actors and aid- and civil society organisations (Pedersen 2018). Not surprisingly, many developed countries did not fulfil all their financing pledges and most countries in SSA did not attain all the MDGs. Learning from this experience, it is imperative that climate change actions through the SDGs and NDCs in SSA forge new partnerships, private investments and market-based solutions.

NDCs are a new policy innovation in the climate change domain hence their implementation is likely to face new unforeseeable challenges. Moreover, with the NDCs and SDGs both calling for more input from business and industry, there is a probability that there will be a need to enhance the governance of environmental activities and climate change because of the possibilities of 'green washing' and the

prioritisation of the needs of business and industry (i.e. profit) over community needs (social development) (Banga 2019). Green washing is the practice where project proponents promote green-based projects in order to raise funds, but actually operate in a way that damages the environment. For example, the experience of the Clean Development Mechanism (CDM) shows that even though the CDM was meant to incentivise the private sector into investing in renewable energy technologies in the Global South, some CDM projects have been criticised for perpetuating inequality by among other things having a strong focus on investments in particular countries and regions thereby adversely affecting the livelihoods of local communities. In this regard, Benites-Lazaro et al. (2018) highlighted that some hydropower projects developed with the intention of promoting sustainable development and renewable energy development through the CDM had adverse impacts on the socio-economic wellbeing of local communities. In this instance, it is not unheard of for CDM hydropower projects in South America to be associated with the destruction of indigenous and traditional communities, forced relocation of local populations, dynamiting of indigenous sacred sites and harming biodiversity and fisheries. Similarly, the NDCs framework as a compliment to the implementation of SDG 7 and SDG 13 will require the actions of business and industry to promote investments in renewable energy using market-based and non-market-based solutions that are novel to certain areas and regions. In this case, NDCs monitoring and evaluating mechanisms should be enhanced to not only consider how successful certain renewable energy deployment models and projects are in providing tangible greenhouse gas emission benefits but should also have a focus on mitigating the potential for NDC activities to create new social and environmental problems to local communities.

The need to examine and understand how climate change governance frameworks and NDCs can promote and facilitate low carbon infrastructure development is of crucial importance in SSA as while combating climate change is itself one of the SDGs, climate change impacts have an effect on the long term prospects of reaching almost all of the other SDGs and in areas with very low energy access rates, attaining SDG 7 before 2030 is a precondition for the other SDGs to be achieved. However, since access to energy affects the levels to which

different communities, areas and regions can improve standards in health, education and gender equality, NDCs should not only be seen as instruments for merely promoting greenhouse gas emissions but should also be considered as policy documents that can ensure that renewable energy investments in SSA have a drastic impact on promoting inclusive development. Accordingly, Corrado and Corrado (2017) argue that there is a gap which needs to be filled urgently by formal and informal institutions in formulating policies that will promote growth and inclusion simultaneously by demonstrating how the poor can participate in and contribute to growth. This is particularly important in the context of SSA where factors such as youth unemployment, rampant poverty, gender inequality, ineffective policy implementation and a lack of appropriate legal and regulatory frameworks do not only engender climate change vulnerability but also make transitions towards the sustainable use of resources more challenging. Arguably, for NDCs to have a meaningful role in contributing towards the promotion of inclusion in climate change issues in SSA and Malawi in particular, there will be a need for changes in the way that stakeholders are consulted during the policy development and implementation cycle, and how climate change issues are framed and communicated to the public and private investors. To better understand this issue, on one hand, it has been suggested that many people and policy makers have ambiguous perceptions about climate change because both the public and private sector usually misinterpret climate policies and their respective impacts due to the tendency of scientists to use sophisticated terms (Rashidi et al. 2017). On the other hand, there are different typologies of public engagement which all lead to varying levels of power to which marginal groups are empowered to govern, influence decision-making processes and enable policy formation in environmental decision making or the level to which companies can prosper at the expense of communities, and affect a community's human rights (Benites-Lazaro, Mello-Théry 2019). Public engagement can be in the forms of: (i) public communication – where companies, regulators and governing bodies provide information and community members are anticipated to be passive recipients; (ii) Public consultation – where questionnaires and other tools are used to establish engagement between the public and project sponsors; and (iii) Public participation – where the public are engaged the

governance of projects through integration in the advisory committees (Benites-Lazaro, Mello-Théry 2019). However, it is not uncommon for renewable energy projects and environmental projects to use public communication as the main public engagement strategy and hence other project stakeholders end up being used to only 'rubber stamp' the policy documents and project details rather than contribute towards their development or understanding the issues that are being analysed (Mpaire et al. 2017). Accordingly, for NDCs to improve local level climate governance and coordination, there will initially be a need to consider how environmental departments can establish new protocols to have public participation as the only means to which public engagement occurs. Arguably, by mainstreaming public participation in local level NDC project implementation, local level power imbalances between State Actors, communities and private investors will be reduced leading to lower cases of green washing, and improvements in local governance and decision making.

6. Conclusion

The global development fora is arguably in a state of excitement and hope with the climate change governance architecture seeing the formalisation of the NDCs framework in 2015 and inclusive development efforts being buoyed up with the implementation of the SDGs. Developing countries in SSA such as Malawi are not only anticipated to be recipients of support from developed countries but they are also required to mobilise their own resources and implement policies and strategies that can ensure that all the targets and goals contained in the SDGs and Paris Agreement are attained. However, as opposed to developed countries, developing countries are anticipated to have greater challenges in achieving SDG 13 and the Paris Agreement. Reasons for this include their current status where they do not only have to consider how to increase their climate change mitigation ambitions so that the countries can be on a trajectory to reach the Paris Agreement's target of limiting global temperature increase to 2°C, but they also have to initiate new strategies to enhance the coordination and governance of climate change programmes at different

levels. This therefore means that rather than just considering what aspects and sectors are included in NDCs as a means of determining the level of a country's climate change ambitions, the level of a country's climate change ambitions should also be assessed by how well their NDCs consider how to improve climate change governance at all levels.

SSA has very low rates of access to electricity hence accelerating the pace and rate to which many SSA countries can deploy renewable energy technologies is arguably dependent on how well the partnerships and coordination of private sector and local government actors are aligned to global climate change and renewable energy targets in SDG 7 and SDG 13. To this effect, it is no longer sufficient for NDCs to only have targets related to the deployment of renewable energy but for NDCs to aim at also having quotas for rural electrification deployment through mini-grids and providing fiscal measures to incentivise more local stakeholders to implement and fund NDC activities. Since one the main research objectives of the paper was to determine how SSA countries can improve the implementations of their NDCs in spite of existing governance and cross-sector coordination challenges, the paper argues that there are now new prospects that these challenges can be addressed by making NDCs to initiate new institutional arrangements that can enable NDC implementation in Africa to be monitored from a regional perspective through such means as South-South Climate Change Cooperation modalities. Regional NDC monitoring is arguably an approach that can yield various economic and environmental benefits at national and regional level since regional climate change efforts are at least 8 times more effective than country-wide approaches and SSA NDCs will be supported with additional technical and financial support from emerging countries such as China, South Korea and Brazil through South-South Climate Change Cooperation modalities. With this in mind, it can be argued that should NDC implementation and monitoring transform to enable the regional monitoring of NDCs, then can it be posited that the climate change fraternity is getting closer to creating new climate change approaches and accountabilities that will be able to contend with the varied political and governance challenges that have hindered effective climate change actions in previous years.

The findings of this paper are similar to the findings of Hedger and Nakhooda (2015) and Antwi-Agyei et al. (2018). Hedger and Nakhooda (2015) looked at the aspects that could improve the implementation of NDCs and concluded that members of the global community need to pay more attention to the role of finance (alongside technology and capacity) in all countries if low emission and climate resilient prosperity is to be achieved. Similarly, Antwi-Agyei et al. (2018) assessed the alignment between NDCs and the SDGs for West Africa, and concluded that some countries can have challenges implementing SDGs and NDCs due to limitations in resources for moving towards integrated implementation of national planning priorities. The findings of this paper do not only support the conclusions from these two papers as the paper has highlighted the various financial and institutional challenges for NDC and SDG 7 implementation in SSA, but additionally suggest that since implementing climate change programmes regionally improves the implementation of programmes, and reduces climate change mitigation costs, there could be merit in African policy makers to consider harmonising NDCs targets and commitments so that NDCs implementation can be undertaken from a regional perspective. Arguably, by having such an approach, not only will South-South Climate Cooperation modalities be reinforced but the finance gaps and leapfrogging challenges that countries face individually could be significantly reduced through the improved transfer of technologies and aggregation of projects within the Global South as the case was with CDM Programmes of Activities (PoAs).

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