



Research article

**Increasing the value of climate finance in an uncertain environment:
Diaspora financial resources as a source of climate finance for
Sub-Saharan Africa**

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Abstract: Climate change may create and increase world inequality and social conflicts. Moreover, regardless of the various developments in science and technology, there are still uncertainties regarding the precise extent and consequences of climate change. Additionally, financial resources to support climate change mitigation, adaptation and capacity building programmes in Africa may be considered to be far from satisfactory in terms of their size, source and distribution. Global policymakers are therefore keen to discover how climate finance resources can be mobilised from a wide variety of sources, instruments and channels to complement public sources. To address this knowledge gap, this paper undertook an analysis of project reports, policy reviews, policy briefs, and academic literature reviews on the barriers and opportunities for private investments in climate change programmes. The paper highlights that Sub-Saharan Africa has the potential to mobilise over US \$100 billion annually from its diaspora population, and these funds can be channelled towards climate change investments and programmes or leveraged with other conventional climate finance modalities. This paper therefore provides insights into the measures that can be undertaken in order to enable Africa's diaspora to become important financiers of climate change programmes.

Keywords: climate change uncertainty; Intended Nationally Determined Contributions (INDCs); multi criteria analysis; renewable energy; Sustainable Development Goals (SDGs)

1. Introduction

Climate change is an issue of global importance as it can potentially cause devastation to ecosystems, affect social and economic development, and influence the attainment of the Sustainable Development Goals (SDGs) [1,2]. Climate change might also increase world inequality as some geographic regions are anticipated to suffer more from the impacts of climate change than others since adaptation capacities vary across countries and localities, with the poorest and most vulnerable groups and countries likely to be the least capable of adapting to climate change [3,4]. Arguably, an aspect that makes the management of climate change issues problematic, regardless of the existence of a treaty on climate change (i.e., the United Nations Framework Convention on Climate Change (UNFCCC)), is that there are still uncertainties over the precise extent, time-scale, and consequences of climate change [5]. This consequently leads to the climate change policy domain to be complex, both with respect to climate change science and projected impacts, and to the governmental/institutional framework for policy discussions and actions [6].

Climate change touches upon a myriad of inter-related and multi-dimensional aspects of societies, economies and the environment. Consequently, climate change policy planning and analysis involves contributions from climate scientists, politicians, economists, engineers, sociologists, ecologists and others [7], arguably all with different views, priorities and perspectives about how best to address climate change issues. To add to this dilemma, aspects such as public policies (shifting public policies), unreliability and costs of (new) technologies, indefinite future economic growth prospects, and indefinite future emissions paths from different countries [8-11] have an influence on household and institutional behavioural adjustments and rates to which greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide, etc.) are emitted globally, thereby further confounding the uncertainties regarding the projected climate change impacts, and mitigation and adaptation costs [12,13]. It has therefore been suggested that government investments and policies for climate change should focus on both the provision of physical infrastructure and soft measures, such as change in institutions and policies, capacity building, and strategy development in order to reduce the risks that individuals and societies face from extreme weather events and other climate and weather related impacts [13].

The mobilisation of climate finance to facilitate the funding and financing for climate change mitigation and adaptation activities, climate change capacity building and Research and Development, as well as broader efforts to enable the transition towards low-carbon, climate-resilient development [14] is an integral part of the climate change and SDGs debate [15], and also an area that is highly affected by uncertainties regarding the precise amount of funding and investments that are required to adequately manage climate change. This follows that successfully managing climate change and its adverse impacts on people's livelihoods requires the mobilisation of funds and resource from both public and private resources at an unprecedented scale. For example, Africa alone requires about US \$100 billion a year in investments in order to cope with its projected climate change impacts [12] but public and private stakeholders are likely to make a commitment to be jointly mobilising only US \$100 billion per year by 2020 to support climate change mitigation and adaptation activities in all developing countries in different regions [16]. Additionally, factors such as the global political and economic performance, in-country priorities, and divergent opinions of the structuring of global climate change architectures have an influence on the commitment and mobilisation of support and funding for climate change activities from both the private and public

sources [8,9]. Arguably, these issues do not only influence the sectors to which international and national organisations fund and invest in (e.g., renewable energy for climate change mitigation, irrigation systems for climate change adaptation, etc.), but also the level of funding that is provided to different countries. Consequently, in some countries, notably in developing countries, funding and commitment towards climate change initiatives has fallen short of the resources and investments needed for the countries, and climate finance levels to Africa are far from satisfactory in terms of their size, source and distribution [17-19], regardless of equity considerations and the need to provide more investments in Africa's infrastructure to facilitate sustainable development.

Despite having contributed relatively little to the problem of climate change, developing countries are projected to bear approximately four-fifths of the costs caused by a 2 °C increase in average global temperatures [20]. Arguably, Africa is a developing region that will be the most adversely affected by climate change, and the continent is already at risk of not being able to achieve the SDGs as eradicating extreme poverty by 2030 is aspirational and feasible only under very optimistic scenarios since the region is forecasted to continue to have the highest rate and depth of poverty of all regions of the world beyond 2030 [21]. Since it might be argued that one of the factors that increases the vulnerability of Africa to the impacts of climate change is that the region receives insufficient amounts of climate finance to enable the successful implementation of effective climate change mitigation, adaptation and capacity building programmes [17-19], various researchers and global policy makers have been investigating on how climate finance resources can be mobilised from a wide variety of sources, instruments and channels to complement public sources [56-58]. Additionally, other studies on climate change policy implementation and climate finance mobilisation include Eriksen et al. [22] who looked at how climate change policies can lead to maladaptations; Pasquini et al. [23] who looked at the barriers to mainstreaming climate change adaptation in local government; and Yu [17] who looked at the roles that China could take in increasing climate finance values. However, knowledge gaps still remain on how climate finance flows to Africa may be increased through the actions of individuals and the private sector. To address these knowledge gaps, this inquiry encompassed analyses of project reports, policy reviews, policy briefs, and academic literature reviews on the barriers and opportunities for private investments in climate change programmes.

The paper is structured as follows. Section 2 introduces the impacts of climate change uncertainty on the mobilisation of climate finance, and highlights how diaspora savings and resources could be utilised as potential sources of climate finance to reduce Africa's SDGs and climate change financing deficits. Section 3 follows with an argument on how improving climate change communication and changing the framing of climate change issues can potentially improve the engagement of Africa's diaspora in supporting climate change investments and programmes. The discussion in Section 4 focuses on how increasing investments in renewable energy deployment and providing electricity to Sub-Saharan Africa's (SSAs) off-grid regions provides both mitigation and adaptation benefits, hence can simultaneously address the mitigation and adaptation ambitions presented in the Intended Nationally Determined Contributions (INDCs) framework. The conclusion in Section 5 highlights that despite the existence of various uncertainties related to climate change science and policy implementation, leveraging the resources that the private sector and diaspora have towards climate change programmes can increase the value of climate finance (i.e., both the absolute amount of finance available and the indirect benefits that the implementation of more climate change programmes can bring to society).

2. Mobilising and Leveraging Diaspora Funds for Climate Finance

Climate finance or carbon finance as it is sometimes called has a significant role to play in societal policies and responses to climate change. Climate finance may be considered as a catalyst to leverage private and public resources and promote technology deployment in order to improve resilience to the social, economic and political impacts of climate change which are directly affecting economic growth and development [24]. Aspects such as the unpredictability of the climatic and global systems, economic activities, capacity constraints, priorities of decision makers, and the risk of maladaptation create and influence climate change uncertainties [25], hence directly affect climate finance modalities. From a climate change policy and climate finance policy perspective, these uncertainties need to be adequately considered and understood as they perpetuate risks related to the mobilisation of funds and implementation of climate finance programmes (mainly aimed at facilitating and enhancing climate change mitigation and adaptation).

The Cancun Accords state that adaptation must be addressed with the same priority as mitigation [26]. However, some analysts have pointed out that the implementation of climate finance modalities is highly construed towards mitigation efforts whereby 91% of climate finance flows are for mitigation efforts, 7% for adaptation efforts and 2% for activities with both mitigation and adaptation objectives [27]. More worrying are the assertions that the majority of public and private climate finance to date has focused on mitigation and thus, scaling-up and replicating existing climate finance interventions in developing countries, which have successfully mobilised private climate finance would likely result in a continued focus on mitigation interventions [18], hence further exacerbating the mitigation bias. This situation can prove to be problematic as the INDCs have highlighted that the demand for adaptation finance is likely to be greater than the demand for mitigation finance [28]. Arguably, from a global climate change policy perspective, the existing status quo suggests that stakeholders from the Global South require more climate finance for adaptation, whilst the Global North requires more policies that can enhance investments in low-carbon technologies and increase commitments to reduce greenhouse gases from the energy sector and other sectors.

Arguably, a potential source of climate finance that is not yet part of the climate finance fora but has potential to improve the mobilisation of climate finance from the private sector is diaspora savings. As it stands, Foreign Direct Investment (FDI), the export of commodities, Official Development Assistance (ODA), and remittance inflows are major sources of finance and economic growth in Africa [29]. However, in some SSA countries the implementation of climate change policies and programmes lags due to (i) climate change issues not finding their way into the national budgetary frameworks and therefore climate change policy and programme implementation relies heavily on external assistance [30]; and (ii) a lack of government institutional reforms that recognise the central role of finance ministries in climate change finance delivery [31]. This therefore means that some African countries have meagre amounts of funding from public sources available to enable the successful implementation of climate change policies and programmes. Some estimates point out that Africa requires US \$60 billion per annum by 2030 for climate change adaptation and approximately US \$100 billion a year in investments in order to cope with its projected climate change impacts [12,32]. However, Africa's diaspora and migrants provide around US \$40 billion a year in officially recorded remittances, but they have the potential to provide more than US \$100 billion a year to help develop Africa and there is also an estimated US \$50 billion in diaspora savings that could be leveraged for low-cost project finance [33]. Additionally, since remittance charges to and within Africa

are almost double the global average, reducing remittance charges to reach the world average levels would increase the value of remittances to and within Africa by US \$1.8 billion annually [34]. These underutilised sources of finance and funding can arguably substantially reduce Africa's SDGs and climate change financing deficits. Consequently, outside the realm of the commitments presented in the INDCs and other established climate finance instruments, there is a scope to mobilise more financing for implementing the SDGs and climate change mitigation and adaptation programmes through diaspora resources. On the other hand, South-South Climate Finance (SSCF) modalities are also growing in prominence. SSCF is financing that is instituted by developing countries (the Global South) to promote and support low-carbon, resilient development within and between developing countries [56]. Even though most SSCF modalities are in their nascent stages, SSCF modalities are still considered as an emerging opportunity for additional climate assistance and investment to support the existing climate finance status quo which is characterised by 'North-South', developed-developing, donor-recipient relationships between Global North and Global South countries. In addition to Global South contributions to multilateral funds and new Global South led international organisations like the BRICS Bank, private sector investments in sectors such as renewable energy to scale-up climate finance resources for climate change mitigation may also be considered as a form of SSCF [56]. Arguably, mobilising diaspora resources and directing them towards climate change programmes, and promoting SSCF can enable individuals and the private sector within and outside Africa to become prominent non-state actors that can finance vital climate change programmes, businesses and social enterprises that are related to enhancing climate change mitigation and adaptation. With these aspects in mind, a consideration that is arguably now lacking in most climate change policies is how to develop channels that can incentivise and encourage Africa's diaspora to invest in building climate change mitigation and adaptation infrastructure in SSA; and how diaspora finances can be leveraged with other public financing to increase the total values of climate funds available in SSA.

3. Improving Climate Change Communication and Framing to Enhance the Mobilisation of Climate Finance from the Diaspora

Climate change research and policy formulation deals with particularly complex issues (e.g., uncertainties about ecosystem responses to warming, great heterogeneity in impacts and adaptive capacity, a need for local and context-specific analyses, and long-range interactions through world markets) [35]. Climate policies are also developed and implemented in an extremely uncertain environment where both the benefits and the costs of a particular climate policy are unknown and in the best case could be described by the probability distribution of various outcomes both in terms of economic damage attributed to climate change and the mitigation cost needed to reach the emission target associated with the selected policy [36]. However, researchers, practitioners, and policy makers have a range of tools and frameworks to enhance the design, implementation and monitoring of policies and programmes, and to facilitate the development of strategic choices about funding [56], hence the choice of which tools, frameworks and communication aids to use in different contexts may have a bearing on the public's and industry's climate change responses and decision-making.

Improved communication of climate change issues may be considered as an effective way to stimulate positive action towards climate change [5]. Moreover, in keeping with the arguments of the preceding section, where there will be a need to improve the engagement of Africa's diaspora in climate change programmes, the way that climate change information is communicated might

become vital for the success of a climate change policy or strategy since public perception and public scepticism about climate change have an influence on the attitudes and actions of people and institutions towards various climate change measures [37]. An aspect that can improve climate change communication, encourage engagement among different segments of the public which do not usually engage in environmental issues, and improve laypeople's attitudes to various climate change programmes is to leave the traditional framing of climate change as an environmental problem and reframe it to better resonate with the framings of the target audiences [59,60]. For example, alternative climate change framings include (i) framing climate change as a public health issue, emphasising potential health benefits of emissions reductions, less use of car transportation, altered dietary habits, etc.; (ii) framing climate change as a security issue, emphasising risks to personal security posed by drastic climate change, and highlighting links between energy supply and security concerns; (iii) framing climate change as a religious or moral issue, emphasising a moral obligation to protect the Earth and God's living things; and/or (iv) framing climate change as an economic issue, linking climate change with national economic performance and framing energy efficiency as a cost-cutting and waste-saving measure [59]. Arguably, there is therefore a strong possibility to encourage and engage the public—individually and collectively—in participating and contributing in cash or kind towards local or national climate change programmes by presenting or framing climate change messages and issues in different ways.

On the other hand, there are also various tools and approaches that have been developed to support scientists and policy makers to make credible decisions in uncertain environments; and to improve the communication of various socio-economic data to stakeholders from various backgrounds. Such tools and approaches include Adaptive Policy Making, Real Options Analysis, Monte Carlo Analysis and Multi-layer Decision Analysis [13]. However, in the context of SSA, the utilisation of tools such as Multi Criteria Analysis in the climate change domain might be more beneficial as they can also portray and communicate complex issues to stakeholders from diverse backgrounds. Multi Criteria Analysis evaluation approaches have also demonstrated to be useful for the identification of positive and negative interactions of climate policy instruments and adequately evaluate the trade-offs between social, economic, political and environmental issues for proposed projects [38,39]. Moreover, the Multi Criteria Analysis approach is also appropriate in a climate finance setting because it facilitates the user to identify weaknesses and strengths of the policy options they have, thereby providing a basis of recommendations for forming, redesigning and modifying specific design characteristics of a particular instrument [40].

Some African countries have problems in collecting data for climate change analyses hence the Multi Criteria Analysis framework is also ideally suited for developing countries which are characterised by lack of data. For example, Kalim and Shah [41] showed that Multi Criteria Analysis methodologies infuse political and social criteria within an analytical framework for policy makers more especially in regions with low administrative capacities and a lack of input-data for environmental policy decisions. Additionally, since climate change issues affect environmental, economic and social aspects of society, Multi Criteria Analysis methodologies enable efficient integration of diverse issues (e.g., economic, environmental and social) when there is a need for the identification of trade-offs where conflicting objectives are involved by providing an interactive medium with verbal, numerical and visual representation of preferences/alternatives even where there are criteria, objectives, costs and/or benefits that cannot be quantified and monetised [38,39]. A Multi Criteria Analysis has therefore got the advantage of being able to portray and communicate various types of information to various stakeholders in different formats to aid in their understanding

of the issues. These considerations therefore can arguably improve different stakeholder's (i.e., laymen and experts) understanding of how to mobilise and utilise climate finance from various sources. A Multi Criteria Analysis Framework is illustrated in Figure 1.

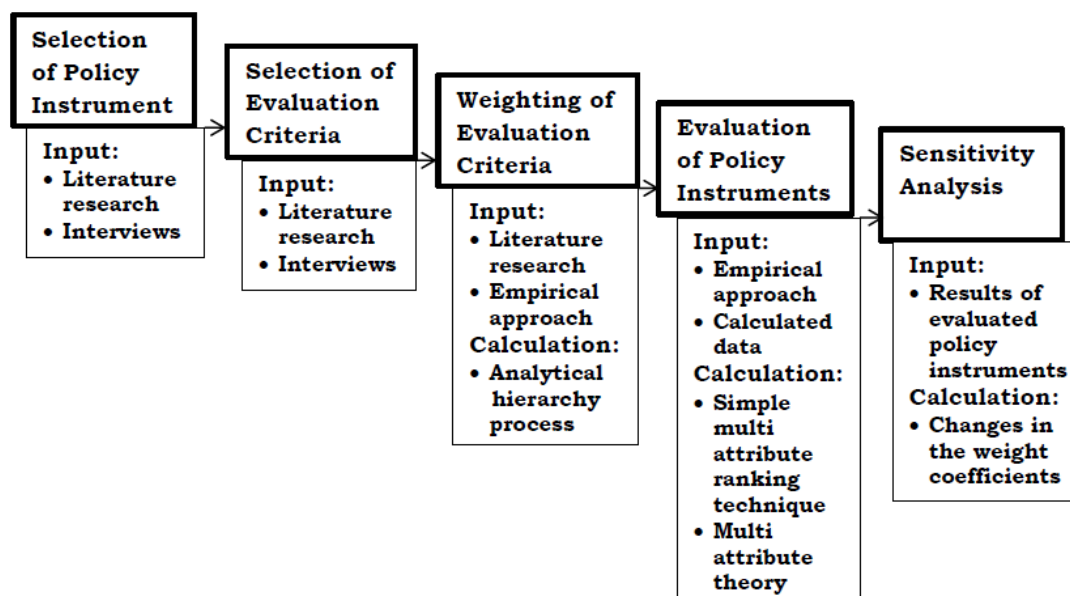


Figure 1. Multi Criteria Analysis Framework. Source: Kalim and Shah [41]

4. Discussion

The implementation of the post 2015 development agenda in SSA is fraught with several challenges. For example, up to 156 INDCs were submitted to the UNFCCC by the closure of the UNFCCC Conference of Parties (COP) 21 and the adoption of the Paris Agreement in December 2015, but the current ambition of INDCs falls far short of reaching any of the goals in the Paris Agreement and the global goal to limit temperature increase to 2 °C [42,43]. The global agreement on enhancing climate change financing, mitigation and adaptation is therefore not yet consistent with what is required to stand a good chance of limiting the global temperature increase to 2 °C above pre-industrial levels [44]. This suggests that there is an urgent need for the countries that submitted their INDCs to increase their climate change financing, mitigation and adaptation ambitions since a failure to increase climate finance levels and climate change mitigation ambitions could increase climate change adaptation financing gaps and the future costs for adapting to climate change [28].

As suggested in the previous sections, SSA can potentially leverage diaspora savings and resources with established climate finance modalities and other public sources. Additionally, since climate change policy implementation is hampered by a lack of awareness of the implications of climate change for future economic growth and development [45], the importance of reframing climate change issues and utilising tools such as the Multi Criteria Analysis framework in order to improve communication between policymakers, practitioners, and the general public can become imperative. This might therefore minimise the differences and misunderstandings that emanate from stakeholders having different knowledge frames and priorities due to differences in their backgrounds, experiences, values and beliefs. Closely tied to these issues is also the need to

maximise any available climate finance by utilising funds towards activities that have the greatest value by simultaneously achieving multiple socio-economic benefits and having wide ranging positive impacts on communities. As it stands, some estimates point out that 68% of total anthropogenic greenhouse gas emissions emanate from energy related-activities [46] and that SSA is the region with the least access to modern energy (Table 1). Arguably, the need for more investments to go towards the deployment of renewable energy technologies in SSA can accelerate socio-economic progress in the region whilst promoting the global ambitions to promote low-carbon climate-resilient growth. The renewable energy sector is therefore a sector that can facilitate multiple socio-economic benefits and wide ranging impacts not only because of its climate change mitigation attributes but also because improved access to renewable energy can help in facilitating climate change adaptation and reducing the vulnerabilities of communities that are currently off-grid.

Table 1. Africa and world electricity access aggregates (2009).

	Population without electricity (millions)	Electrification rate (%)	Urban electrification rate (%)	Rural electrification rate (%)
Africa	587	41.8	68.8	25.0
North Africa	2	99.00	99.6	98.4
Sub-Saharan Africa	585	30.5	59.9	14.2
Developing Asia	675	81.0	94.0	73.2
China and East Asia	182	90.8	96.4	86.4
South Asia	493	68.5	89.5	59.9
Latin America	31	93.2	98.8	73.6
Middle East	21	89.0	98.5	71.8
Developing Countries	1314	74.7	90.6	63.2
World*	1317	80.5	93.7	68.00

*World includes OECD and Eastern Europe/Eurasia. Source: Javadi et al. [47]

SSA's low rate of electrification is considered as the most pressing obstacle to economic growth, more important than access to finance, red tape or corruption [48]. To add to this, the energy sector has to achieve universal access to energy before 2030 as a precondition to enable SSA to stand a good chance of achieving most of the SDGs by 2030 [49]. However, even though improving energy access is more imperative in developing countries, some studies have pointed out that climate finance instruments that are specifically designed to promote the diffusion of renewable energy technologies have had marginal success in developing countries [50-52]. The low deployment of renewable energy technologies in developing countries is a consequence of developing countries being characterised by a lack of political and macroeconomic stability, a lack of sound regulatory frameworks (and efficient supporting institutions enforcing the relevant laws and regulations), and a lack of good physical and social infrastructure (including roads, communication systems and skilled labour) [50-52]. This arguably suggests that there is a need to re-strategise on how renewable energy deployment is implemented in developing countries/SSA and how renewable energy climate finance instruments are designed, funded and accessed. In some instances, accelerated development of markets for renewable energy technologies and achieving universal energy access through renewable

energy technologies has been constrained by shortfalls in financing and business frameworks [38,39] rather than the unavailability of suitable technologies. Additionally, financial investments and funding of projects in Africa is lagging not as a result of a lack of availability of funding sources locally and internationally, but because of a lack of ‘packaged’, ‘bankable’ projects [53]. Arguably, SSA can therefore be in an opportune position to enhance renewable energy deployment by focusing on creating more bankable projects in the renewable energy sector and linking these projects to the monetary and non-monetary ambitions of Africa’s diaspora population. Such a strategy would therefore mean that non-conventional climate finance resources such as diaspora savings would be leveraged with existing climate finance modalities to address the shortfalls in climate finance for renewable energy and adaptation projects in SSA. Since Multi Criteria Analysis methodologies have been used in the energy sector to help in the design of coordinated energy and environmental policies [54] and incorporating stakeholders’ preferences into energy and climate change policy interactions [38], it can be deduced that Multi Criteria Analysis methodologies can become a valuable component in facilitating this link between diaspora financing and climate change investments. In this case, Multi Criteria Analysis methodologies would be used as tools, frameworks and communication aids to depict the economic, environmental and social costs and benefits for pursuing different programmes in verbal, numerical and visual formats (in both monetary and non-monetary terms), in order to engage and raise awareness amongst stakeholders from various disciplines.

5. Conclusion

Climate change policy planning and analysis, and the mobilisation of climate finance is characterised by many uncertainties. Such uncertainties arise from the science and socio-economic aspects relating to geography, climate change and patterns of development. It is widely agreed among atmospheric scientists that atmospheric concentrations of greenhouse gases are rising rapidly, and that emissions should be reduced. However, there is little agreement about how much emissions should be cut in any given year, and there is no guarantee that stabilising at any particular concentration will eliminate the risk of dangerous climate change [55]. Consequently, for sustainable development and a climate-resilient post 2015 development agenda to be feasible, there will be a need to increase climate finance levels, balance the levels of funding towards climate change mitigation and adaptation and encourage the deployment of renewable energy technologies particularly in off-grid regions in the developing world.

There are various tools for analysing data, shaping policy and communicating strategies for managing climate change. For example, Multi Criteria Analysis evaluation approaches can be utilised to shape perceptions and enhance communications about the monetary and non-monetary benefits of increased investments in infrastructure such as renewable energy technologies. On the other hand, in order to improve the engagement of the public in the mobilisation of resources and implementation of climate change programmes, more attention should be given to the framing of climate change issues. This therefore means that framing climate change as an economic, public health or security issue can arguably improve laypeople’s attitudes towards climate change programmes; and also enable people and private sector entities which do not usually engage in environmental issues to discover the socioeconomic opportunities that they can embrace whilst contributing to national goals for improving climate change mitigation, adaptation and finance.

In SSA, ineffective climate change policy and programme development and implementation has largely been hampered by low levels of funding being provided to climate change initiatives and a general lack of awareness about climate change impacts on society. The financing requirements for effective climate change mitigation and adaptation even though not definite and precise, all point out that they will be a need for substantial investments in infrastructure as well as other soft measures, and that public resources might not suffice in meeting this financing need. Consequently, greater attention needs to be given to prioritising specific climate change actions and exploring new ways of mobilising funds for climate change programmes. In the case of SSA, there is a potential for the region to attract over US \$100 billion annually from its diaspora population, and these funds can be channelled towards climate change investments and programmes or leveraged with other conventional climate finance modalities. Looking ahead, there is still therefore significant potential that the value of climate finance, that is, the value in absolute monetary terms of available climate finance, and the value in the positive impacts and benefits to society that climate finance investments can bring (e.g., electrifying off-grid regions in order to enhance economic diversity and facilitate adaptation), can be increased with greater engagement of various non-state actors such as Africa's diaspora, and developing bankable climate change infrastructure projects to which the diaspora and private sector can be the main stakeholders.

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Conflict of interest

The author declares that there were no conflicts of interest in producing this paper.

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