Africa and Climate Change

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Abstract

Africa is affected by climate change in multiple ways. Like other continents, its coastline is in danger of being flooded, and its islands are in danger of being inundated. Many people are forced by climate change to migrate, and this increases the flows of refugees moving both north towards the Mediterranean and south towards the Cape, seeking a viable homeland. It is in the interest of African countries to develop in ways that are climate-friendly. More electricity needs to be generated to enhance people's quality of life, but this should be generated in environmentally friendly ways. Large schemes of tree-planting are also needed, to restore the forests of areas where they have been lost in civil conflicts (as in central and northern Ethiopia) and at the same time to sequester some of the carbon dioxide of the atmosphere. As well as mitigation, collaborative efforts are needed in the field of adaptation, so as to limit the impacts of climate change. Developing countries should assist such measures, but they should be adopted whether or not such assistance materialises.

Keywords

climate change mitigation – climate change adaptation – African countries – forest restoration – development

1 Introduction

Africa is undergoing multiple threats from climate change, and needs to reflect on policy options for responding to these threats. A beginning is made below to specify these threats and begin to chart a way forward in response to them.

This is an essay in applied philosophy. It incorporates the empirical findings of scientists and journalists, reflects on the international agreements made at

Paris in 2015¹ and at Katowice in 2018 (United Nations Framework on Climate Change 2019), and applies ethical principles to consider their application in the form of policy options for African governments. The needs of Africa for economic and social development, and for a future immune from poverty and malnutrition, are not forgotten. What is needed are policies to move away from poverty and malnutrition without simultaneously exacerbating climate change and the evils that it brings, and at the same time to mitigate climate change and adapt to its unavoidable impacts.

Africa is already being impacted by climate change in many ways, and is set to be further impacted unless sufficient effective international action is taken. Climate change in the first place involves increases in average temperatures, with consequent changes both to human societies and to natural ecosystems. Increased temperatures involve threats to human health and resilience, together with the expansion of deserts and increased difficulties for people living in the semi-arid margins of deserts, in their efforts to continue to support themselves. Climate change also causes an increase in both the intensity and the frequency of extreme weather events such as storms, hurricanes, floods, droughts and wildfires, and these derivative changes in their turn cause more than a few human communities to migrate to more hospitable regions, usually away from the equator and towards the poles, with many in Africa moving either north towards the Mediterranean or south towards the Cape of Good Hope. This in turn leads the vectors of diseases (such as mosquitoes) to extend their activities to higher altitudes and higher latitudes, adding to the problems already suffered by vulnerable communities and by healthcare staff (Intergovernmental Panel on Climate Change 2013).

Nor should it be forgotten that climate change involves rising sea-levels, through the melting of ice-caps and glaciers, and that rising waters involve threats of inundation both to coastlines, where many major cities are situated (think of Lagos, Cape Town, Alexandria, Dar es Salaam and Mombasa), and to islands, including such endangered islands as the Seychelles, Mauritius and Aldabra, Zanzibar, Sao Tome and the Canaries. Some islands, such as Aldabra, are in danger of disappearing under the waves of their surrounding oceans.

To illustrate the impacts of climate change on normal life in the African countryside, it is worth quoting a passage here on the impacts of changing rainfall on Ethiopian farmers (McQuistan 2019: 4).

1 In December 21, 2015, the Conference of the Parties (COP) to the 1992 conference on the United Nations Framework on Climate Change Conference (UNFCCC) signed what is called the Paris Agreement.

In Ethiopia, for example, generations of rural farmers have built their lives around regular rainy seasons: the short rains from February to May, and the long rains in June to October. In the long, wet season they grow their grain crops, which can be stored to provide year-round food. In the shorter season they grow vegetables and pulses which provide essential nutrients for families.

But rising temperatures have changed the familiar weather patterns. The short rains are starting later, and, although the same amount of rain is falling, it is more intense. When the rains come in a deluge like this, the water does not have time to sink into the soil properly, but runs off, leaving the ground parched. These shifts are leaving communities with a problem: they are prioritising grain crops to secure their income, at the cost of losing vegetables and beans. This deprives them of essential vitamins and minerals, leading to malnutrition.

It should be noted that these Ethiopian farmers are not at the stage of joining the widely-publicised migrations which are another recognised impact of climate change. Rather, their regular annual cycle of activities is being disrupted, to the detriment of their own and their children's health. For every family obliged to migrate, there are likely to be others who have not migrated but whose lives and prospects are adversely affected by global warming. These phenomena are so widespread that governments need to take them into account, and consider remedial policies.

2 Problems for Coastal Communities

In addition to farmers, coastal communities dependent upon fishing as well as farming are being affected, as the same writer attests (McQuistan 2019: 4):

Climate change is also having devastating consequences for coastal communities. Rising sea levels inundate coastal areas with seawater, making the soil saline and difficult to farm. Seas are warming, and becoming more acidic as carbon dioxide concentrations rise. This is destroying coral reefs, the nursery ground for vital fish stocks.

The context here concerns African coastal communities, which are doubly affected by the salination of their land and also by the undermining of the fish-stocks from which they make part (or in some cases all) of their living. Other tropical and semi-tropical countries are affected in parallel ways, but for

present purposes we are considering the cumulative impact of climate change on Africa, even where people are not directly affected e.g. by deforestation, the spread of infectious diseases, or the growth of deserts.

Coastal communities have other problems to contend with, such as the pollution caused by oil extraction in the Delta area of Nigeria, and the dumping of toxic chemicals along the coasts of West and East Africa (Kelbessa 2012). These other processes are not caused by climate change, although in both cases climate changes contribute to the negative effects of toxic waste dumping and the off-shore oil drilling industry. The point is rather that coastal communities are often affected by problems with more than one origin, and that the consequences of climate change often add to these problems, to an extent that governments can no longer afford to ignore climate change (if they ever could); instead governments need to address it.

3 Africa's Need for Increased Generation of Electricity

At the same time, Africa suffers the routinely cited problems of poverty, malnutrition, disease, limited healthcare facilities, illiteracy, limited educational opportunities, and limited transport facilities, all exacerbated by the effects of structural adjustment policies introduced in the 1980s. Life expectancies were, until recently, increasing on average, except in areas where Acquired Immune Deficiency Syndrome is rampant.² But much greater efforts are going to be needed to avoid the wastage implicit in the absence of electricity, which limits reading, writing, and productivity in all sectors to daylight hours; and, more tragically, which contributes to avoidable premature deaths. One necessary condition of most of these remedies, and also of the infrastructure development needed to tackle the problems of African cities and transport, is increased generation of electricity. Electricity makes possible the functioning of the schools and hospitals that Africans need, the construction of improved road and rail systems, and the lighting of homes, allowing people to study and to communicate after nightfall. Electricity is also a crucial element in the development of medical research and interventions required to address tropical diseases that contribute directly to Africa's preventable mortality rates.

But if the increased electricity were to be generated from coal, gas or oil, then this process would exacerbate the global problem of climate change, and the same holds true of the generation of electricity worldwide. Instead,

2 The pathogenicity of recent rates in morbidity and their overall impact on recent population growth rates in Africa is contestable. See P. Duesberg et al. 2011.

electricity will need to be generated from renewable sources. Nuclear energy is not included here among renewable sources, since it is not known how to decommission nuclear power stations safely, nor how the waste products of these facilities can be disposed of without risk to hundreds of generations to come. Nuclear fusion might be more benign, but no one knows how to make such nuclear generation viable, except by using even more energy inputs than the likely outputs.

Besides, renewable energy sources are often close at hand. Coastal communities could derive their electricity from wave-power or (in some cases) from harnessing tides. Areas with significant rainfall can employ hydro-electric schemes, some of them based on large rivers, and supplying electricity to hundreds of thousands of people, and others based on much smaller sources, and supplying electricity to communities not linked to national or international grids. Some places have winds, suitable for the generation of electricity from windmills. Above all, most places in Africa are suitable for solar energy generation, using solar panels, and capable of fuelling large areas. Replacement of desert ecosystems with unlimited fields of solar panels is not the only route to providing solar energy; investigations of where and how solar panels could be introduced without becoming eyesores, and allowing adjacent arid areas to be beneficially cultivated, is an important research agenda item for resource assessment specialists.

These forms of electricity generation can be commended on grounds of efficiency, due to the accessibility of the needed energy sources: waves, tides, rivers, winds and sunlight. These alternatives also require the introduction of suitable technology, provision for which will be discussed below. These renewable energy sources are all very familiar; but in the context of this discussion they are especially commendable on the grounds that they could help to solve the demand for electricity without contributing to the more recently recognised problems of climate change.

Population growth is still sometimes considered an obstacle to development away from poverty.³ Relatedly, there is often held to be a prospective problem of feeding all the people of the African continent, in view of expected population increases. While these issues cannot be taken lightly, it is advisable not to be alarmist about them. Hans Rosling (Rosling and Rosling 2018), a statistician widely recognised in Europe who died in 2017, used to explain that population has already reached a plateau, with births and deaths approaching equilibrium, not only in most of Europe, but also in most of Asia and Latin America.

3 The hypothesis that population growth is chiefly responsible for Africa's entrenched poverty has been challenged for some decades. See Jacob Songsoore (1996).

His expectation was that after some decades of delay, Africa too would reach this situation well before the close of the current century.

If Rosling was right, then the problem is not insuperable. Government policies, however, may have an influence on how soon the population over all of Africa stabilises. For example, female education widely serves not only to boost development, but also to reduce rates of population growth. Accordingly, the adoption of national policies intended to boost female education is likely to contribute significantly to overcoming the obstacle to development that population growth is often feared to be. At the same time, teamed with rational policies for agricultural reform, a stabilised population overall increases the prospects of food security in Africa. It is also likely to mean that the problem of generating enough electricity is more likely to be met, and thus that development can go ahead without generating runaway climate change.

4 The Paris and Katowice Climate Agreements

The reason for investigating international climate accords that are due to be implemented, and possibly enhanced in policy review conferences, is that African countries can play a crucial role in the success of these initiatives, granted the strength of African environmental cultures, the abundance of their relevant natural resources and the continent's entrenched problems.

The Paris conference in December 2015 attained agreement about climate targets, agreeing to a ceiling in the rise of average temperatures of two degrees Celsius above pre-industrial levels, and of 1.5 degrees Celsius if possible. As for the contributions of individual states, each participant state made its own commitment. Unfortunately these commitments, when aggregated, would involve an improvement on the status quo in management over business-as-usual, but would fall far short of attaining the two-degree ceiling envisioned by the agreement. If these commitments were fulfilled, it is anticipated that they would collectively produce something closer to a three-degree average increase in global warming (from the same base-line).

Fortunately provision was made for racheting up these commitments in a series of subsequent conferences, and for developed countries to help poorer nations by providing 'climate finance' of \$100 billion per year from 2020 to adapt to climate change and switch to renewable energy (BBC News 2017). A subsequent Intergovernmental Panel on Climate Change report [hereafter IPCC] related that there is a vast difference between a 1.5-degree ceiling on average emissions increases and a two-degree ceiling. The report asserted that the former ceiling is vital for the preservation of islands threatened with inundation.

It also predicted that the world has just twelve years to bring greenhouse gas emissions under control (Intergovernmental Panel on Climate Change 2018).

The Katowice agreement of 2018 took important steps towards the implementation of the Paris agreement, instituting procedures for reviewing and verifying the discharge of national commitments and a committee to consider action in cases of non-performance (United Nations Framework on Climate Change 2019). This initiative was retarded by the United Nations' delegations from USA, Russia, Saudi Arabia, Kuwait and Poland; but it was a success nevertheless for so significant an agreement to be reached. The opportunity for revising the national commitments which appear inadequate to meet the IPCC goals for intervention in global warming is due for discussion at an international climate change conference which the UN Secretary-General, António Guterres (2018), has convened for later in 2019.

5 Implementation of These Agreements: The Role of Africa

African nations play a crucial role in the implementation of these agreements. The need for increased electricity in Africa and for greater reliance on renewable energy generation has already been established, even though African nations have many other problems to attend to at the same time. While the funding agreed upon in the Paris talks may prove insufficient to secure a worldwide change in the direction of renewable energy, it seems clear that it is in the interests of Africans to collaborate with these funding plans. This involves initiating proposals for a transition to renewable energy generation so that the funding can be put to its intended use as soon as possible after it becomes available in 2020. The way to show that the proposed funding is inadequate is to find ways to deploy the full total already agreed upon, and to show how much more could be done if the funding available were increased.

Accordingly, each African nation should begin drawing up plans for conversion of its electricity generation to one or more sources of renewable energy. Countries with lakes and rivers should consider hydro-electricity, while coastal ones should consider wave-power and, where appropriate, tidal energy. Some countries may be in a position to consider geothermal sources, while almost all African countries are in a position to consider solar energy schemes. Several countries are in a position to consider several of these; for example, Nigeria could consider adding to its hydro-electric generation from the Kainji Dam on the River Niger both wave-power and solar power. Due regard would have to be given to the sharing of rivers; for example, new hydro-electric dams on the Blue Nile in Ethiopia could have an impact on downstream countries (in this

case Sudan and Egypt). But despite the difficulties, making an early start on preparing these strategies is likely to make it possible to discuss funding before much delay has taken place, and then to construct and implement plans as soon as possible, bringing a more significant benefit both to the countries concerned and to the international community sooner rather than later, and possibly soon enough for the 1.5-degree ceiling to be honoured and attained.

6 Carbon Mitigation Strategies for Africa

Besides, other forms of carbon mitigation should be considered, where they are consistent with development in one African country or another. The planting of trees is a widely celebrated initiative. Developed countries have hitherto been allowed their sponsorship of tree-planting projects to count as part of their mitigation contributions, and tree-planting is also likely to be allowable as the kind of project that the funding agreed at Paris would support. There again, countries which become re-afforested stand to benefit, both because of improved water retention and because of the side-effects of the presence of trees, whether from fruit, fodder or building materials. The restoration of trees to much of northern and central Ethiopia is likely to be beneficial to the climate and to reduce the incidence of droughts in that region. Ethiopia is not the only country to have lost many of its trees, and there is scope for restoration of forests in most of the countries in the sub-Saharan region and in those watered by the Congo and Zambesi Rivers. If at all possible, local people should be involved in planning the restoration of woods and forests, so that, when the new trees are planted, they have a sense of ownership, and seek to defend the trees, and present the case for more tree-planting to others.

7 Adaptation to Climate Change in Africa

As well as mitigation, collaborative efforts are needed in the field of adaptation, so as to limit the impacts of the climate change that has already taken place. For African countries are likely to carry their share of extreme weather events of increasing intensity and severity, and to suffer from ever more and ever stronger hurricanes, storms, floods and wildfires. Coastal areas are at the most obvious risk, as are the areas adjacent to large rivers. Forest fires set at risk both the remaining forests and their human and non-human inhabitants. Droughts are a problem both for forests and for areas of savannah, with crops often ruined and traditional forms of agriculture undermined. Meanwhile

storms and hurricanes are a danger for all areas, bringing in their train the destruction of towns and villages, and urban trees as well as woodlands.

Forms of adaptation include improved coastal defences, of which some will be artificial and others natural, such as defences achieved through the restoration of shoreline mangroves along the Atlantic coast of West Africa. Constructing raised roadways in areas prone to flooding is a further example; this is particularly relevant to plains, and to places where rivers are prone to burst their banks. Some countries, such as Congo, have not yet built an infrastructure of roads, and building them in the coming decades would give an opportunity at the same time to curtail flooding and promote resilience against such impacts of climate change as its liability to block many forms of transportation.

Another example of adaptation in Africa involves collaboration between neighbouring countries to develop regional electricity grids, which can both assist the development of schools and hospitals and facilitate the improved communications that adaptation requires. Thus in many the construction of dams could supply electricity to countries on both sides of a river, as happens with the Zambezi Dam at Hwange. Besides, regional electricity grids can be so constructed as to harness more than one source of energy, and thus to become resilient even at times when water-levels are low, or the wind does not blow, through other forms of electric supply being available.

Developing countries should assist such measures, because adaptation is often of almost equal importance to mitigation. Grounds for such assistance stretch far beyond benevolence. For it is a plain requirement of principles of justice to make reparations for the exploitation of the past, and to put back into Africa some of the resources exported both in the colonial era and in the period since then. In addition, there is the ground of self-interest; for successful adaptation is a recipe for stable governments, from which trade results which is advantageous to developed countries as well as to developing ones.

8 Objections to Policies of Mitigation and Adaptation in Africa

To these suggested policies, a number of objections can be put forward. Africans, it might be suggested, have no obligation to help out the rest of the world, having suffered from colonial and neo-colonial policies and related on-going exploitation. For example, multiple plantations were imposed on different parts of Africa by colonial regimes, or, in the case of Liberia, by the powerful American company, Firestone: plantations of tea, coffee, ground-nuts, sisal and rubber, to the great detriment both of Africans and of African

ecosystems. Africans have suffered from systems of land deprivation and taxation that forced many to become labourers under adverse conditions, and ecosystems have suffered through fertile areas with varied flora and fauna being converted into monocultures (Ponting 1991: 211-212). In consequence, the formally independent countries of Africa need to apply their efforts to rectifying all this exploitation, or so it might be said, rather than doing favours to the descendants of the former colonial intruders.

Besides, exploitation has not ceased with the ending of colonialism. Land-grabs, whereby non-African countries (including Malaysia and China) have purchased large tracts of land from governments, often to the detriment of peasant-farmers, have increased the flow of resources out of Africa, and worsened the situation of contemporary Africans.⁴ How can the victims of this ongoing exploitation be expected to play a role in alleviating or solving global problems elsewhere, it might be asked.

There again, the main contributors to climate change are the developed countries, including Japan, and the more successful of the developing countries, such as China and, to a lesser extent, India. The difference capable of being made by African countries pales into insignificance beside the difference that developed countries plus China and India could make; meanwhile Africans continue to suffer from climate change, without having made historically significant contributions to it.

These are formidable objections, and it is true that African governments need to put effort into rectifying the anomalies resulting from plantations owned by non-Africans and from the dispossession of many former farmers. It is also true that land grabs have in some ways worsened the situation, although they have also brought increased opportunities for employment, and increased productivity. However, to claim that Africa is being asked to play a role in alleviating or solving environmental problems situated elsewhere is to ignore the fact that Africans are themselves suffering from climate change, and for that reason need to contribute to mitigating it.

There again, while the difference that Africans can make is smaller than the difference open to countries such as USA and China, the difference that national policy can make might still be enough to affect the overall level of greenhouse gas emissions. In the unlikely event of the rest of the world as a whole cutting its emissions, and African countries allowing their emissions to rise, the outcome could still be that humanity fails to curb total emissions enough to limit average temperatures to 1.5 degrees. Certainly the fact that non-Africans have caused most of the current problem, and that Africans are

4 Regarding recent land grabbing in Africa see Kerstin Nolte and Wytke Chamberlain (2016).

among the majority that are directly victimised by the adverse effects of climate change, means that there is a strong argument based on principles of justice for non-Africans to carry most of the burdens of mitigation. Yet given that Africans are suffering from climate change, it is contrary to their interests, and to principles of prudence, to allow their own carbon and other greenhouse gas emissions to continue and to increase.

Besides, in matters of adaptation, it is important for African governments to participate in protecting their populations against floods, storms, hurricanes, droughts and wildfires, and to protect their ecosystems and wildlife at the same time. Global opinion has come round to a recognition that worldwide investment in the cause of adaptation is necessary, and that developed countries need to grant financial assistance (and in some cases technical assistance as well) to developing countries such as the countries of Africa. In these circumstances, to take no part in adaptation schemes would amount to a form of self-harm not far removed from suicide. While it is hard to deny that reparations are due to many African countries for the harms perpetrated under colonial rule, international conferences are not prepared to make this explicit; yet at the same time their offers of funding to rectify some of the resulting suffering effectively amounts to acceptance in principle that a debt is owed to African and other developing countries by (most of) the developed ones. In these circumstances, it is wise for African countries to collaborate in adaptation schemes, so that current and future generations of Africans do not have to suffer in the ways that their predecessors did.

9 Bottom-up Approach to Climate Change Mitigation

It goes without saying that particular requirements for adaptation in Africa should be identified and proposed by the Africans whose interests and environments are at stake. Thus the siting of flood defences, raised roads and railways, and demarcating areas for tree-planting should be proposed by Africans, and Africans should have a say at all stages of the implementation of such schemes. This must include poor Africans, who may in some cases be at risk of being moved to make way for the forms of development that adaptation involves. But this constitutes neither an objection nor an obstacle to the implementation of adaptation. Rather, as is widely recognised, community participation in planning makes implementation more effective, increasing the likelihood that measures taken will bring about their intended salutary effects all the sooner.

Further, granted that it is wise for Africans to welcome and take part in measures of adaptation, it cannot be wise for them to ignore and take no part

in measures of mitigation. For it is greenhouse gas emissions that cause the problems which make adaptation necessary, and to contribute unnecessarily and avoidably to these problems is thus contrary to the interests of African countries themselves, as well as those of humanity in general. Accordingly, African governments should cooperate not only in schemes for adaptation, but also in implementing world-wide policies of mitigation, including policies to generate electricity from renewable sources, as has been the focus of the discussion above.

10 Conclusion

African countries are endangered by climate change in multiple ways. These range from the inundation of coastal plains and cities as well as of islands, to increasing frequency and intensity of extreme weather events such as storms, hurricanes, floods, droughts and wildfires. They also include the spread of diseases such as malaria and dengue fever, as their vectors spread to higher altitudes and latitudes, the prospect of human migration to north and south, and threats to African ecosystems and wildlife.

There is now, as a result of the conferences held at Paris (2015) and Katowice (2018) a global agreement on tackling the global problem of climate change, in which most governments are participating through making voluntary offers involving reductions of greenhouse gas emissions. Another provision concerns a large fund to support adaptation and the generation of electricity from renewable sources.

African governments, because of their focus on increasing productivity as a means to economic development, are going to need to generate increased amounts of electricity. Thus it would be wise to participate in such schemes of adaptation for their own interests. Otherwise coastal and other highly vulnerable populations will continue to suffer from the effects of rising temperatures, a situation which is capable of worsening drastically even in the next generation.

At the same time, African governments need to rectify problems still lingering from the colonial era and to protect themselves and their populations from contemporary styles of foreign exploitation. Yet this does not mean that these governments can ignore issues of climate change. Rather, there is a need to incorporate local knowledge of the problems to which adaptation is needed and a need to adapt age-old indigenous methods of the environmental ethics of conservation to central state agendas, and for local people to share in planning solutions.

It might be asked whether African governments should undertake schemes of adaptation even if developed countries default on their promises and commitments. In this undesirable scenario, the reasoning presented above indicates that effective adaptation remains in the interests of Africa and of African nations. Africa is suffering from climate change already, and will suffer more in the absence of wisely deployed adaptation. Further, adaptation will in the end prove futile unless mitigation of carbon and related emissions is undertaken. But undertaking this is a global challenge, in which African leaders will need to play their part. Even if countries such as the USA and Brazil reject their obligations to amend the effects of anthropogenic climate warming, African countries should play their own part, largely for reasons of self-interest, but also for reasons of global solidarity.

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