

COVID-19, Climate Change and the Edge Effects

Shastry Njeru

Team Leader, Research Advocacy Unit, 4 Donaldson Lane, Avondale, Harare, Zimbabwe

Tyanai Masiya

Senior Lecturer, School of Public Management and Administration, University of Pretoria

Adrino Mazenda

Senior Lecturer, School of Public Management and Administration, University of Pretoria

Abstract

This paper analyses how communities living near parks and wildlife sanctuaries have interacted with the compounded problems of climate change and COVID-19 in Africa. The paper further examines how African governments responded and the consequences thereof. Using the meta-data existing on COVID-19 and climate change in some parts of the continent, we were able to determine the effect of the pandemic and climate change on the communities living near parks and wildlife sanctuaries. COVID-19 is believed to be a disease that was transferred from the wild to people as a result of unsustainable exploitation of nature; hence, the pandemic is impacting protected areas and other parts of human existence. Some say that COVID-19 is a green swan, that is a 'symbol of radically better times to come' for the environment and the people on the edge. This is when the lockdowns prevented the tour-hungry populations from visiting on the suspicion that they bring invasive cultures and practices that cause the spread of the pandemic and climate change. But to others, it is a black swan flying with climate change. It increases resource competition, use of resource rents by governments, quick degradation of the environment and reduction of the social contract between citizens and the state. The findings of this paper reveal that for many protected areas, COVID-19 and climate change have already had significant negative impacts on the management capacity, budgets and effectiveness, and the incomes of local communities adjacent to wildlife areas. Further, climate change, aided by COVID-19, has disproportionate impacts on the people living near the protected areas. We recommend that governments in Africa need to be decisive in coming up with win-win solutions for the communities living near protected areas on the continent. A well-managed system for the protected areas and the communities around those areas can be part of the response to the pandemic and changing climate, reducing potential recurrences of such events and building a more sustainable future.

Introduction

This paper comments on the invidious nexus between climate change and COVID-19 for the people living adjacent to wild protected areas. COVID-19 and climate change affect people 'differently depending on their social class or caste, their gender and age, and the country where they live'.¹ The Indigenous communities living near and in wildlife-protected areas are also affected by these hazards differently as a result of their structural circumstances. Limited literature is focusing on the double effect of both COVID-19 and climate change in communities adjacent to wildlife areas in Africa. These communities and wildlife areas are of interest at this time because African countries already face impaired conservation operations, degrading of wildlife-protected areas and increases in rural poverty as the communities living in or near the protected areas compete for natural resources with the animals.

Although COVID-19 was predicted to have a negative impact on the sustainability of economic systems, more importantly, it revealed that societies can also be affected by other social factors that must also be taken into consideration. Yet, this is not part of the environmental experts' bigger picture when they envisioned:

By 2030, protect and conserve through a well-connected and effective system of protected areas and other effective area-based conservation measures at least 30% of the planet with the focus on areas particularly important for biodiversity.²

On the surface, the two challenges appear to be a formidable force of destruction. Shakil et al. posited that COVID-19 protected the environment. In their view, 'greenhouse gas emissions, nitrogen dioxide, water pollution, noise and pollution of the beaches were reduced'.³ However, this was incomparable to challenges caused by what is called the 'Global Human Confinement'.⁴ While there appeared to be initial positive effects of this 'experiment' such as improved air and water quality and reduction in noise pollution, the authors also noticed negatives like 'exacerbated unemployment and economic insecurity'.

Research on climate change and COVID-19 effects on the communities living near or in the protected areas is still scanty. Prior studies discussed the impact of COVID-19 on the local economy due to the loss of tourism, direct site-level impacts such as disruption of the lives of the Indigenous communities and the ecological impacts when zoonotic diseases impact wildlife sustainability.^{5,6} Such studies did not include the climate change element. This paper goes beyond the impacts of a single phenomenon on a group of people to consider the impact of climate change on the communities living on the edge. A comprehensive review of the challenges facing the communities on the edge will assist in policy design both in the short and long run.

With this paper, we contribute to the debate on the impacts of COVID-19 and climate change on the lives of communities living near protected (edges) areas. The study provides a cross-sectoral analysis of the vulnerability and effects of climate change and the COVID-19 pandemic on communities domiciled at the edge and the mechanisms being developed to address them.

This paper contributes towards the knowledge of the twin effects of COVID-19 and climate change on communities adjacent to conservation areas. Understanding this will provide

evidence of the value of current conservation strategies. Further, it will make suggestions for policies that are more adept in protecting biological diversity and communities adjacent to wildlife areas in Africa in times of pandemics such as COVID-19.

The paper is organised as follows: following the introduction which sets the direction for the discussion, a background section is included to contextualise the climate and COVID-19 problem. This is followed by a methodology section. A detailed findings section of the study is used to analyse the effects of COVID-19 and climate change in communities adjacent to conservation areas.

Background and Context

Climate change and COVID-19 have proved to be powerful change agents with paradoxically conflicting demands, yet they have similar outcomes on the people living on the edge of the protected areas.⁷ Both have been disruptive of the social order and both have introduced serious social suffering which has created the so-called ‘new normal’. Climate change impacts tend to displace people (for example, Cyclone Idai in 2019) while COVID-19 pins them down in one place (lockdown), restricting human movements in order to control the spread of the disease. The mantra has been that ‘COVID-19 does not move, people do’.

In responding to COVID-19, governments have directly and peremptorily interfered with the citizen’s daily behaviour ostensibly to control the spread and the possible costs attributable to the pandemic. We do not get this rapid response when it comes to climate change unless a disaster occurs. The results of the climate change and enforcement of COVID-19 restrictions have led to the vulnerability of the communities affected, their increased impoverishment, and reduction of their agency. For the people on the edge, both climate change and COVID-19 can be regarded as structural outcomes of the colonial legacy of dispossession and neglect which left many colonised people unable to fall back on their capacities to address perturbations. Hence, climate change and COVID-19 create an overlapping crisis for the people on the edge.

The hegemonic forces of governance and the powerful lobbyists in the environmental spaces view Indigenous communities who are in contact and often in conflict with the protected areas with scepticism when it comes to keeping the natural environment as a going concern.^{8,9} This attitude is inherited from the colonial state which, as a practice globally, displaced many natives from their ancestral lands in order to ‘protect the delicate biodiversity assets’.¹⁰ The post-colonial states continued with this ambitious binary goal by setting aside part of the global terrestrial and marine areas for protection because of their ecological importance by 2030. This is a continuation of the colonial land grab phenomenon by other means. Research findings show that this move negatively and seriously affected more than 300 million Indigenous people¹¹ living in or near protected areas. There is also evidence that displacing people to create carbon sinks or leasing out such lands to big commercial foreign companies has long-term ecological consequences, particularly for the Indigenous communities. The affected Indigenous people may be reeling under the weight of structural poverty, climate change and COVID-19, and their recovery from these challenges will take a long time.

The Indigenous populations near the protected areas are at high risk from COVID-19 as well as the impact of changes in climate. For instance, COVID-19, which has zoonotic origins and in one of the Severe and Acute Respiratory Syndrome (SARS) family of viruses has demonstrated enormous power that changed everything on the globe. It threw the human species into a deep tragedy, killing hundreds of thousands, and altering the lives of billions. In fact, no single person has been spared.

Governments made decrees that communities and individuals be restricted to their homes. Those infected needed to be quarantined or self-isolate to reduce the spread. Other preventive mechanisms such as sanitisation and social distancing were introduced. In Zimbabwe, the government managed the pandemic through more than 10 statutory instruments with varying degrees of impact. Those living near zoonotic spaces were sometimes relocated to reduce contacts with the vectors of the virus and this may have affected many people's livelihoods¹² as was done in Cameroon. Furthermore, drastic changes responding to the pandemic that included travel restrictions and lockdown measures were introduced in every country, reducing economic activities to a bare minimum with a range of adverse effects. In Africa, the pandemic had negative effects on protected areas and communities living around them. Besides the 'exploitation of wild species and wild places, deforestation, uncontrolled expansion of agriculture, intensification of farming, and infrastructure development may have increased and modified the interface between people and wildlife',¹³ thereby creating conditions conducive for disease transfer from wildlife to people.¹⁴ Diseases from animals can be spread to people and can at times become pandemics¹⁵ because of the co-existence between people and nature.

In this regard, 'there is a recognition of the threat that epidemics, disasters, and public health emergencies pose to global health security and the livelihoods of people'.¹⁶ In view of such threats, countries unite to promote a safer world that is not susceptible to infectious diseases. This community of nations is supposed to be ready at all times to curtail disease outbreaks and natural disasters. One way of controlling the spread of diseases is putting every inch of the land under state control, including the areas under Indigenous communities. Africa has a history of interfacing and dealing with emerging diseases, having dealt with the Ebola in the West African region and the DRC in the recent past. This experience has shown that pandemics disproportionately impact vulnerable populations. In the USA and the UK, strategies to combat COVID-19 testify to the fact that minority ethnic communities that are often poor are affected the most. In West Africa, the Ebola outbreak was concentrated in deep rural areas where there was most socio-economic deprivation which reduced communities' ability to prevent the spread of such pandemics, including COVID-19.¹⁷

With regard to COVID-19, many countries responded with drastic measure to contain its spread. The measures to contain the spread of the disease included:

intensive tracking of contacts, isolation of confirmed cases, halting nonessential services and cutting off routes of transmission through suspension of international flights, dusk-to dawn curfew, partial lockdowns and most recently closing borders with high-intensity neighbouring countries.¹⁸

This was, however, challenging because most of the populations lived in high-density neighbourhoods where there was poor infrastructure, and self-isolation and social distancing proved to be a huge challenge. Many informal sector workers could not work from home due to the nature of their businesses. Many people often suffered malnutrition, infectious diseases such as HIV/AIDS, and other chronic diseases that increased their chances of contracting and dying from COVID-19. These challenges were exacerbated by the high prevalence of poverty, poor health systems and limited access to healthcare particularly in the areas on the edge.¹⁹

A combination of climate change and COVID-19 intensified the already challenging situation for the people living in the protected areas²⁰ such as dealing with unauthorised logging and poaching. The areas where Indigenous communities are located are generally remote from capital settlements, and the local people share with the animals what they grow as food and herbs for medicines. This implies a hostile and competitive relationship between the animal and man. At the human level, factors such as discrimination, social exclusion, and land dispossession are commonplace as some citizens with power and influence can influence the policy choices on environmental management.

Many countries, across all regions, including the majority of those rich in natural resources exhibit weak and often worsening governance standards, including leadership failures; a retreat in 'voice' and democratic accountability; and, related, high levels of corruption and capture by political and economic elites.²¹

The choices in the context of the pandemic tend to increase the social gradient of risk by making it more apparent, thus exposing the vulnerability of Indigenous people to the contagion, failure to meet their basic human needs, give insufficient support or provide adequate treatment of the infected.²²

In similar spaces, community development is very poor and the health amenities are sparse. This is because the communities live far from the locus of development, the capital settlements. In this dichotomy, it is the Indigenous people who often suffer the most.²³ The food system in those areas is fraught with uncertainties as a result of climate change-induced droughts and animal competition;²⁴ there is also a high prevalence of malnutrition in these communities, particularly their children and mothers.²⁵ Some of the strategies used to respond to COVID-19 have disrupted food supply systems leading to an increase in malnutrition.^{26,27} This is notwithstanding that these protected areas are rich with animal and fish protein; however, the exploitation of these resources is often criminalised through environmental legislation. This criminalisation seeks to discourage the communities' attempts to source food in the protected areas. Criminalisation is a result of protected areas being declared strategic in order to conserve biodiversity.²⁸ In that regard, any efforts to protect the environment are perceived to be in favour of animals leading to human conflicts between local actors and animal lovers.²⁹

The creation of protected areas through land grabs altered the land-use rights of the people living in or near protected areas.³⁰ The Indigenous communities have held historical rights to the flora and fauna in the areas where they live and the altering of these rights leads to their alienation from the land they regard theirs by virtue of ancestry.³¹ Besides this alienation, these

communities regard the land and natural resources found in them as central to their existence.³² Dispossession and eventual poverty, changes in culture and losses in social subsistence for communities adjacent to protected areas increase their vulnerability to hazards. Hence, the exposure of such people to COVID-19 and climate change impacts may account for a high mortality rate, loss of economy and poverty.

By and large, climate change disproportionately affects the Indigenous food systems as it does anyone else. It is argued that climate change impacts are felt early by the poor whose lives depend on the natural resources.³³ Lockdowns disrupt humanitarian responses and often block access to life-saving nutrition services. This situation is exacerbated by the Indigenous communities' weak asset base in their remote locations and makes such communities vulnerable and susceptible to food insecurity. However, the exact impact of COVID-19 on local food systems is still to be determined. The coronavirus is still an evolving and novel pathogen whose social, economic and political impact is still unknown. What is now understood are the direct medical effects of COVID-19 that include mortality from severe illness of those exposed and infected, lack of food, changes in diet and lockdown-induced economic losses.^{34,35} These problems compound outcomes already influenced by crop production failure due to prolonged droughts or extreme rainfalls³⁶ and competition from wild animals.

Climate change worsens many of the health inequities experienced by remote communities that live on the edge by undermining their coping mechanisms that are stretched by adverse occurrences such as droughts.^{37,38,39} Addressing the underlying structural inequities, strengthening relationships between the locals on the edge and the protected areas and valuing their local knowledge offer opportunities for building resilience against the socioecological shocks as well as the climate change effects and pandemics.

Methodology

This paper used a qualitative approach based on document analysis to determine the fundamental causes, viewpoints and motives that help to define and explain the essence, challenges and policy recommendations in evaluating how people living on the edge have interacted with the compounded problem of the climate change and COVID-19 in Africa in general. The descriptive desktop approach follows the objectivist paradigm. The objectivist paradigm posits that social phenomena exist independent of social actors. It enables us to accurately comprehend the world as it exists in itself; i.e. it answers questions about reality.⁴⁰ Unobtrusive data collection techniques consist of secondary data collection methods including unsolicited public records and authoritative online articles. The secondary data collection methods were studied using content analysis to unravel the main themes of COVID-19, climate change and edge effects. Conceptual content analysis 'offers rich, insightful information on elements that could not be obtained by other data-collecting techniques, such as surveys, most of which are limited in scope'.⁴¹

Climate Change and COVID-19 Problematique

There are some peer-reviewed comparative studies on the nexus between COVID-19 and climate change and their impact on the people on the edge. There are unverified claims of positives of COVID-19, including that it contributes to a reduction in global warming due to reduced global CO₂ emissions during lockdowns.⁴² It has also been stated that COVID-19 has temporarily mitigated against local pollution that causes global warming by ‘reducing the demands placed on nature by optimizing consumption, shortening and localising supply chains, substituting animal proteins with plant proteins, decreasing pollution’.⁴³ However, these gains are temporary and therefore cannot be ‘banked’ in the reduction of global warming. Conversely, there were other ideas that the increase in global temperatures in the years 2018 and 2019 would see an increase in the prevalence of infectious diseases and noninfectious diseases (e.g., chronic kidney disease, heart failure, strokes and asthma).⁴⁴ COVID-19 could be a direct outcome of this prediction. This link between climate change and diseases leads to physical shocks, that translate into a variety of ‘socioeconomics impacts, and systemic in that their direct manifestations and their knock-on effects propagate fast across an interconnected world’.⁴⁵ The large-scale disruption of natural ecosystems causes conflicts between people and animals and, at times, results in disease transmission from wild animals to human beings.⁴⁶ The ecological situation in a given environment may either safeguard or facilitate animal-human contact as well as the transfer of pathogens between them. Human actions in and near natural forests and other ecosystems disrupt wildlife ecology leading to more contact. Climate change, thus, leads to further contact, competition and conflict between people and animals as a result of the depletion of the ecosystem.

Setting the Stage

Protected and conserved areas safeguard nature. These safeguarded areas are considered as buffers between conserved nature areas and depleted land occupied by human beings.⁴⁷ They also ‘provide food and water security, disaster risk reduction, climate mitigation, and adaptation, and innumerable cultural, spiritual, and health values to the people around them’.⁴⁸ The protection they offer is critical at a time when the world is dangerously progressing towards its tipping point⁴⁹ due to global warming.

In this regard, governments and environmental institutions respond by advocating for mandates that maintain the ecological integrity of these natural ecosystems and attempt to determine how to strengthen and restore a symbiotic relationship between human beings and the natural systems that they rely on.⁵⁰ These environments are characterised by conflicts between local actors,⁵¹ including poaching;⁵² human-wildlife conflicts,^{53,54,55} use of force and violence on local populations;⁵⁶ and local community protests against conservation policies.⁵⁷

However, these areas also experience the disproportionate effects of climate change, due to droughts, the expansion of the animal population, and the encroachment by the Indigenous community into the animal sanctuaries, leading to protracted conflict between humans and

animals. Indigenous People living in these areas, particularly, women and children are most susceptible to epidemics and other social evils.⁵⁸ Often, local communities experience inequities and systemic discrimination. Referring to Indigenous Peoples, they are three times more likely to suffer from abject poverty compared to their non-indigenous counterparts.⁵⁹ An estimated 19 per cent of the extreme poor are Indigenous Peoples in any given region, rural or urban setting and even across international borders.⁶⁰ Nevertheless, 'they are custodians of a wealth of traditional knowledge and practices, languages, and culture, which includes time-tested responses to crises'.⁶¹ Rural Indigenous communities face discrimination from their governments which affects their access to resources vital for responding to COVID-19. Climate change has a serious deleterious impact on the rural Indigenous communities.⁶²

Contrary to popular belief, the protected areas gaining support from the government and nature entrepreneurs are not always pristine wilderness, but rather ancestral domains of some tribes, such as the Masai pastoralists and several other communities whose primary wellbeing is dependent on nature in these areas.⁶³ The lives and interrelated social, cultural and economic aspects are intricately linked with these biodiverse spaces, owing to a long and historic association.⁶⁴ In many areas, the communities have adopted sustainable conservation practices of resource use because of their long historical connection with the environment governed by spiritual or ethnic beliefs and customary practices.⁶⁵

Historically, such groups had some leeway in terms of how they used, accessed and managed natural environments. However, the modern state intervention in the day-to-day life of these communities has increased, supported by legislation and policies that facilitate stricter control of the state over the Indigenous land and resources. With this increased control, the customary practices of resource use of communities are curtailed, leading to enormous upheaval in the control and stewardship of such ecosystems. The increased control further curtailed the autonomy and self-determination which the communities had previously enjoyed when their rights became entitlements and their ancestral occupation of land came to be regarded as illegal habitation.⁶⁶

Indigenous Communities and the Protected Areas

Globally, Indigenous communities are found near the protected areas as a result of colonial displacement and land grab.^{67,68} A microcosm example is available to demonstrate how the locals were displaced from their land to make way for the parks in the USA. The Miwok 'redskins' were regarded as superstitious, treacherous, marauders, 'yelling demons' and 'savages' who had to be swept away from their traditional lands to make way for the national parks as a way of conservation of nature.⁶⁹ Thus, Indigenous Peoples are significantly affected by noncommunicable and infectious diseases due to social and health inequities driven by invasion and colonisation of their lands.

The legacy of 'colonisation for these people includes intergenerational and concentrated poverty, poor physical and mental health, transport and housing issues, increased rates of domestic and family violence, shorter life expectancy and inadequate access to culturally safe care'.⁷⁰ This

enduring problem is sustained by the argument that invasions and colonisation resulted in inequities that adversely affect Indigenous Peoples.

Indigenous Peoples in post-colonial nations share histories of invasions, displacement, involuntary assimilation, massacres, annihilation from diseases brought by colonisers and erasure of their cultures.⁷¹ Therefore, their vulnerability to disease and even to climate change is unquestionable. The vulnerability of the Indigenous Peoples is the function of dispossession which compounds poverty and poor health and the severity of the pandemic.

Therefore, poverty affects the capacity of the Indigenous people to address pandemics such as COVID-19 at various levels leading to insecure housing, unemployment, comorbidities, functional illiteracy, lack of health insurance, food insecurity, lack of access to clean water and quality healthcare. This was confirmed in the Navajo Nation case in the USA where over 4 253 positive cases and 146 deaths from COVID-19 were recorded.⁷² It was also observed that in such communities, old people, old housing, inaccessibility of clean water, increased chronic sicknesses and poverty exacerbate the effects of COVID-19. It was estimated by WHO that COVID-19 increased extreme poverty to over half a billion in Africa.⁷³

Talking about the USA, 40 per cent of Navajo households have no access to clean water, and 30 per cent have no electricity.⁷⁴ Limited access to such services makes it difficult to comply with World Health Organisation recommendations for preventing the infection and spread of the coronaviruses, such as the washing of hands with running water and other forms of sanitation. In Uganda, certain Indigenous communities (for example, the Batwa) complied with COVID-19 prevention measures. This compromised food security. Adding to this were delays in food aid distribution. In addition, the Indigenous People dwelling in border districts were restrained from hunting in wooded areas, working for food in adjacent communities and accessing agricultural fields.⁷⁵ The response of governments in West Africa were almost similar. Almost all adopted curfews, travel restrictions and some enforced metropolitan lockdowns – albeit with progressive relaxation of limitations as populations grew tired of government-mandated restrictions.

However, little attention has been paid to the influence these measures have on governments' capacity to assure safe and timely agricultural output, maintain international agricultural commerce, and ensure that Indigenous communities have access to nutritious food. Previous epidemics in the West African area, such as the 2013–2016 Ebola outbreak, demonstrated the region's great vulnerability to food systems. More than 40 per cent of ordinary farming areas in Guinea, Sierra Leone, and Liberia, were not used. Consequently, vulnerable communities (e.g. Papuans and Melanesians in Papua New Guinea, inhabitants of informal settlements in Kroo Bay and Moa Wharf in Sierra Leone, overwhelmed by coastal flooding, and the Kpelle tribe in Liberia) are susceptible to severe climate variability and change.⁷⁶

The structural factors that contribute to the vulnerability of communities are i) income and income dispersion; ii) social and physical ecosystem; iii) education and literacy; iv) work opportunities and conditions of work; v) early life income and child development; vi) ethnic origin, cultural heritage, and linguistic abilities; vii) age and handicap; viii) social class; and ix) access to healthcare. These challenges are prevalent in most of the communities living on the edge. Health-seeking behaviour is a function of good incomes. Lack of income can interact with

other environmental problems (droughts, extreme weather) and social factors to increase the risks in the communities. Inadequate resources influence ‘exposure, access to supportive care, an individual’s social safety net during a pandemic, as well as healthcare-seeking behaviour’.⁷⁷

The geographic locations for the people in and near protected areas affect their susceptibility to pandemics.⁷⁸ In addition, for these communities there are low literacy rates which have a bearing on their understanding of public health risk communications during a pandemic. People with low levels of education have been identified to be more susceptible to diseases.⁷⁹ An individual’s employment and working conditions contribute to their capacity to respond to pandemics as well. The nature of employment determines the security of income and level of access to individual benefits (a social safety net including healthcare in cases of sickness or any need to stay home), workplace exposure, and challenges associated with managing multiple role conflicts.⁸⁰ A combination of these factors contributes to the vulnerability or resilience of the individuals and their communities in a pandemic. In addition, an individual’s ethnicity, culture and language may contribute to the range of risk factors during the pandemic. For example, this may affect an individual’s willingness to be vaccinated or seek healthcare or understand health information. Further, such communities may experience discrimination and stigmatisation.

Impacts of Climate Change and COVID-19 on Protected Areas

There are millions of people called Indigenous communities living near or on the edge of protected areas. Most of these communities are very poor by world or even local standards. They live in remote and inaccessible areas, where healthcare services are limited in scope and capacity.⁸¹ These communities rely on traditional knowledge, culture, and practices normally passed from one generation to the other by community elders. These contribute to the health and wellbeing in the communities.

Understanding of the COVID-19 impacts on the protected areas is just beginning even though there are indicators showing some of the obvious signs of the challenges these areas are facing as a result of the pandemic. Nevertheless, there have been many signs of different impacts.⁸² For the people on the edge, there have been economic challenges caused by the growing climate change, compounded by the COVID-19 pandemic. However, climate change has been evident for many years. It affects native species, land and water due to increased human activity.⁸³

Wildlife and nature tourism are considered to be the major contributors to economic activity around the world. Researchers have ‘estimated that the world’s protected areas receive roughly eight billion visits per year, generating approximately US\$600 billion per year in direct in-country expenditure and US\$250 billion per year in consumer surplus’.⁸⁴ The closure of such places of tourism by lockdowns will eat away the potential dividends from the protected areas which may have trickled down to the communities.

We begin from the general experience. These are the drastic steps that were taken by the governments to curb COVID-19. These included restrictions on international travel and economic activity lockdowns. Such actions negatively affected economies and businesses. If one followed

the stock markets, they witnessed volatility and recessions, and for Africa where a great number of people live near the edge, foreign investment, remittances inflows and international aid were reduced.⁸⁵ The impact could be that Africa's economies could experience downturns.⁸⁶ It is estimated that:

Gross domestic products (GDPs) may contract by 4%, and governments face reduced tax revenues and devalued currencies, resulting in severe budget deficits and knock-on effects on African livelihoods. The corresponding lockdown restrictions and economic turmoil could also compromise the conservation of Africa's immensely valuable wildlife and wildlands, and the people who benefit from them.⁸⁷

Yet, with or without COVID-19, the Indigenous Peoples and marginalised populations face huge risks due to the effects of climate change given that their livelihoods depend on resources located adjacent to vulnerable environments.⁸⁸ Such communities experience socio-economic, political and environmental changes due to climate change. They respond to these challenges in a 'deep spatial' way which is 'born of practical lifeway exigencies and experiences accumulated over extremely long periods of time in particular places where home is identified with ecosystems and natural environments, not street addresses'.⁸⁹

Notwithstanding, climate change can result in migration of culturally significant species because of adverse weather occurrences that may force entire communities to migrate. Such is the power of climate over people and their collective continuance.⁹⁰ COVID-19 has shown that it has power over the 'collective' and has the momentum to disrupt everything creating dysfunctional economies. People who are already poor and living on the margins of protected areas can suffer disproportionately.

Climate and the Transmission of COVID-19 among the People on the Margins

The Indigenous People living on the margins are vulnerable. Colonialism dispossessed them of their assets, introducing structural poverty and poor health, which would increase the severity of the pandemic. Poverty, therefore, affects the capacity of Indigenous Peoples to respond to pandemics including COVID-19 at various levels. Poverty results in their living in insecure housing, experiencing unemployment, developing comorbidities, and experiencing functional illiteracy. It also results in lack of health insurance, food insecurity and limited access to clean water and healthcare. The people on the margins thus experience a pandemic in two forms: shock and ignorance. This is because the disease is new in their culture and is difficult to detect early.⁹¹ While the coronavirus is different from climate change, they share a pattern that may be characteristic of the Anthropocene.⁹²

It is important noting that, while greenhouse gases are released in specific locations to benefit certain individuals and companies, these emissions have global effects. The majority of those affected are impoverished individuals who live in marginalised areas but are not at fault. The

same is true for the COVID-19 pandemic. It is reported that COVID-19 broke out in Wuhan, China and swiftly spread around the world. Thus:

climate change and the pandemic suggest a pattern that is characteristic of the Anthropocene, namely, that certain, apparently harmless, local activities turn out to have unexpected, inequitably distributed, problematic effects globally, even if those consequences may not become recognisable as such in the eventual, future geological record.⁹³

The virus causes high fatalities among the vulnerable populations. Such vulnerable populations include the aged and those with compromised immunity. It also includes those who live in poor crowded communities. In many African countries characterised by poor healthcare systems, vulnerable populations are at greater risk.

It is argued that the COVID-19 pandemic is driven by three wheels: '(1) anthropogenically mediated (zoonosis) and amplified, (2) transmission across great distances, thereby becoming globalised, and (3) when reaching vulnerable populations to generate widespread morbidity and significant numbers of fatalities'.⁹⁴ Further, the same elements are found in climate change in causal factors and effects.⁹⁵ Anthropogenic climate change arises from naturally occurring greenhouse gases that are emitted by human systems into the atmosphere. The production of these greenhouse gases is mediated by humans and greatly amplified industrial activity and combustion of fossil fuels. Greenhouse gases are spread across the globe through the air resulting in global warming. Consequent global warming causes unusual storms, floods, heatwaves and droughts. A notable rise in sea level and the acidification of the oceans has also been experienced. This has disrupted both human and non-human activity.

COVID-19, Climate Change and Communities at Risk

Climate change and COVID-19 are akin to the pterosaur twins: 'By day they would yell at each other, by night they would shout... They just never stopped'. In this children's story, the characters depict quarrelling siblings.⁹⁶ However, prior to the COVID-19, climate change was the value that largely united people and there was an acknowledgment that the globe was heading for a disaster if people did not act fast. By 2019, climate change had been reframed from being an 'issue' to an 'emergency'. While the world was coming to a consensus that climate change is a human-induced emergency, coronavirus took centre stage in late December 2019, in proportions befitting a pandemic and global emergency.^{97,98} WHO declared COVID-19 a pandemic on 12 March 2020.⁹⁹ Both climate change and COVID-19 cause global disruptions that transcend borders and threaten millions of people. Besides, they are considered as risk multipliers exacerbating inequalities and affecting the most vulnerable, each in its own way.¹⁰⁰

Both COVID-19 and climate change are a serious threat to global health. WHO predicted that over 200 000 additional deaths per year between 2030 and 2050 will be due to climate change effects on food security.¹⁰¹ Climate change also raises the threat of pandemics in future. Communities on the margins are likely to experience disaster displacements due to COVID-19.

As a result, COVID-19 will increase the problem of protecting the most vulnerable. With government directives, people, particularly those on the margins will not be able to 'leave areas affected by climate disasters because COVID-19 lockdowns can become trapped in dangerous situations'.¹⁰²

Factors to explain this challenge in vulnerable communities exist. One of the explanations is that 'human influences extend across the globe, natural habitats and the species, communities, and ecosystems that they contain are increasingly under threat'.¹⁰³ When the land cover changes and habitats are fragmented, this leads to a higher extinction rate of species. The addition of a pandemic such as COVID-19 and the exposure of the people that are historically marginalised due to colonial dispossession, would be costlier to them.¹⁰⁴ First, COVID-19 would affect the biotic components and neighbouring human, plant and animal communities.¹⁰⁵ What has been seen already is that it contributes to high mortality,¹⁰⁶ morbidity¹⁰⁷ and repressed reproduction,¹⁰⁸ threatening the survival of endangered species.

The pandemic also affects the socio-economic conditions of protected areas. For instance, it may affect tourist arrivals due to altered visitor perceptions. In the past, these tourists provided employment for the locals who earned a living as tour guides or interpreters or provided other services. Instead, this facilitates the promulgation of inconsistent economic policies and costly medical interventions.¹⁰⁹

Lack of rain, high temperatures and overuse of water directly link to droughts.¹¹⁰ Droughts have resulted in serious agricultural and biodiversity losses. Where droughts occur, famine has also been a common occurrence.¹¹¹ It is noted that:

In 2018, approximately 3.7 million people in South Africa were affected by drought, which was caused by below average precipitation rates (and)... in Madagascar at the end of 2019, more than 2.6 million Malagasy were affected by drought, resulting in severe food shortages, which led to famine.¹¹²

In Lesotho, nearly 500 000 people faced hunger in 2020, and an estimated 30 per cent of the population were food insecure because of drought.¹¹³

Southern Africa experiences frequent droughts which are often attributed to climate variability. It is also home to many national parks that teem with wild animals and beautiful scenery. Its history is characterised by contagious bovine epidemics in the 1850s, the rinderpest in 1896–97,¹¹⁴ and severe depletion of endemic species and wildlife due to over-hunting. In the view of the foregoing, wildlife areas were identified and fenced off from people.¹¹⁵ This meant that the subsistence reliance of communities on wildlife was stopped which alienated the local communities from wildlife. In the 1960s, a broad array of legislation was introduced in many southern African countries with a view to transferring land to private landowners. Such private landowners were granted exclusive rights to control and benefit from wildlife instead of the locals. It is noted that

this resulted in a diversification of the scale, type, and ownership of protected areas in the region. Protected areas in Southern Africa now include private, community, and state-owned initiatives,

and range from small-scale game reserves, to large-scale Transfrontier Conservation Areas, which span multiple countries.¹¹⁶

These areas remain no-go areas for the unauthorised Indigenous communities in terms of the national legislation for each country.

Climate Change and COVID-19 in Policy

There is no evidence that climate change caused the COVID-19, but it is true that climate change alters the way of life for many people. Experience has also shown that COVID-19 is a game-changer for matters of human health and risk of infections. It is also common-sensical that people living in areas with high levels of pollution are susceptible to respiratory infections.

Climate change is hastening the spread of some exotic species, communicable diseases, waterborne diseases, and mosquito-borne sicknesses. Reduced greenhouse gas emissions and limiting global warming to 1.5° Celsius might help to decrease the spread of infectious diseases and other challenges.¹¹⁷ Furthermore, governments should deliberately prioritise and invest as much in public health as they do in climate change. The focus of these changes should be the people who were historically disadvantaged by colonialism and have lived on the edge for generations. As a result, adopting climate action now would help to cushion the impact of the next pandemic. For example, preventing deforestation – a root cause of climate change – can help stem biodiversity loss as well as slow animal migrations. For example, it is believed that the coronavirus started with animals and was transferred to the human species, increasing the risk of infectious disease.

Conclusions

Combined, COVID-19 and climate change place a disproportionate and unbearable burden on the people living in and near protected areas. The restrictive regulations governing these areas and unacceptability of ‘trespassing’ in the protected areas make the movements of the communities to gather food from these areas and even hunting a criminal offence. Climate change increases the transaction costs for the communities, putting them into invidious situations with the authorities when they are pushed into spaces which are restricted or forbidden. COVID-19 brought with it lockdowns: coupled with climate change, this pushed people out of the protected areas. This creates a lot of uncertainty in the affected communities which may impact the strategies to address the natural phenomena. The conflicting demands of these challenges pose harsh realities for the people on the edge resulting in protracted conflicts. The intersectionality of poverty for the people on the edge magnifies their challenges and vulnerabilities. For instance, women and girls with disabilities and living on the edge face many barriers which will be exacerbated by COVID-19 given the disruption of social services and loss of livelihoods.

The pandemic has, however, laid bare the lack of sustainable policies and structural and societal support to meaningfully address and respond to the needs of the people on the edge. The COVID-19 and climate change present an uncertain terrain for the communities in protected areas. The experience also points to the fact that the impacts of these phenomena may be localised and shaping of the interventions to address them may require local specific approaches.

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