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CLIMATE CHANGE RESILIENCE IN AFRICA

The case of Kenya and Zimbabwe

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Abstract

This paper looks at the current issues related to funding climate change in Africa, specifically in Kenya and Zimbabwe, and shows how industry has worked with the Indigenous population to adapt to and mitigate the effects of climate change. Climate change has led to reduced water resources, instances of desertification, reduced food production, and poor human health outcomes, particularly the health of women and children. Deforestation has led to rivers getting less water and these countries having difficulties in the generation of hydroelectric power. This has led to increased levels of poverty for locals. To adapt to and mitigate the effects of climate change, communities have shared Indigenous knowledge with industry, resulting in improved outcomes such as food production. This paper examines the local and Indigenous-focused adaptation strategies Africans are utilising to overcome the challenges of climate change.

Keywords

climate change, desertification, funding, Indigenous knowledge

Introduction

The United Nations Conference on Environment and Development, also known as the Rio Conference or the Earth Summit, was a major United Nations conference held in Rio de Janeiro from 3 to 14 June 1992. Since 1992, members of the United Nations Framework Convention on Climate Change and the Conference of the Parties (COP) have convened every year. They reflect on their activities and establish how to adapt and mitigate the effects of climate change on the planet.

Africa is among the continents that are most vulnerable to the impact of climate change. In 2023, COP28 took place in Dubai from 30 November to 12 December. In the lead-up to COP28, the Africa Climate Summit (4 to 12 September) was held in Nairobi. The Nairobi Declaration (African Union, 2023) demanded that major polluters commit more resources to help poorer nations. There

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is a huge gap in climate change financing. Access to capital is a strong barrier to climate change mitigation and adaptation.

Many countries in Africa take the effects of climate change seriously and have engaged in implementing adaptations that satisfy the population. They consider the following issues when thinking about adaptations to climate change: (a) the economic barriers to adaptation and mitigation options (Makate et al., 2017; (b) public interest in the options (Singh et al., 2020); (c) whether the options align with Indigenous knowledges (Singh et al., 2020); (d) whether the options affect people's earnings, such as moving small-scale farmers who depend on farming in government forests to conduct reforestation; (e) whether the options displace people from their ancestral homes, affecting their sense of identity, world views and sense of place (Tschakert et al., 2017); (f) whether the options increase or reduce inequalities related to gender or indigeneity; and (g) whether the options displace Indigenous people from their lands.

People in Kenya and Zimbabwe continue to experience increased effects of climate change, ranging from longer and more severe droughts, intense floods, and wide-ranging forest fires and bushfires. Issues related to climate change are numerous, and they cut across all spheres of life. This paper addresses matters related to wood fuel, eco-farming and tree planting. We examine how Kenya and Zimbabwe have responded to these three matters, and we explain what Indigenous communities have done to adapt to and mitigate climate change.

Literature review

African leaders recognise the significant climate change challenges that Africa faces and seek adaptation solutions. African Union leaders at the African Climate Summit (African Union, 2023) expressed concern that

> many African countries face disproportionate burdens and risks arising from climate change-related unpredictable weather events and patterns, including prolonged droughts, devastating floods, out-of-season storms, and wildfires, which cause massive humanitarian crisis with detrimental impacts on economies, health, education, peace, and security, among other risks. (p. 2)

Scholars who have studied the effects of climate change in Africa have argued that climate change causes extreme events such as floods and droughts that have economic and health, social and economic effects on the people (Williams & Kniveton, 2011). Frequent droughts and severe flooding caused by climate change have severely affected farmers in Africa, particularly in Kenya and Zimbabwe. In comparison, small-scale farmers who depend on subsistence farming have been affected more than the extensive farmers (Chepkoech et al., 2018; Government of Kenya, 2012; Ochieng et al., 2016). Women and children also bear the brunt of the effects of climate change (Government of Kenya, 2012; World Bank Group, 2021). This has resulted in poverty for many families. The small-scale farmers rely on rainfall when it comes (Chepkoech et al., 2018; Government of Kenya, 2012; Ochieng et al., 2016) while many of the large-scale farmers have sunk boreholes on their land.

The effects of climate change, such as prolonged droughts, extreme flooding, and sea level rise, have displaced people from their homelands. This causes a "loss of connection to country, sense of place and belonging" (Tschakert et al., 2017, p. 7). Extended droughts in many countries in Africa, such as Sudan and Ethiopia, have also forced migration of people across borders. This type of migration places a huge burden on the host countries, such as Kenya, which has for the past decade hosted large numbers of displaced persons and economic migrants.

Climate change poses huge financial challenges to individual countries and their people. Significant funds are required if the world is to adapt to and mitigate the effects of climate change on the planet. Unfortunately, the big polluters are usually not willing to pay for polluting the environment. The Nairobi Declaration (African Union, 2023) demanded that major polluters commit more resources to help poorer nations. The African leaders pointed out that "Africa was not historically responsible for global warming, but bore the brunt of its effect, impacting lives, livelihoods, and economies" (African Union, 2023, p. 1). Africa receives only about 12% of the nearly $300 billion in annual financing it needs to cope with the challenges of climate change.

In the following section, we address climate change adaptation in Kenya and Zimbabwe, where work is underway in reforestation, use of Indigenous knowledge in food production, and partnerships with industry to adapt to climate change.

Adaptations to climate change in Kenya

The Government of Kenya (2018) recognises the following impacts of climate change in Kenya: (a)

social impacts, such as displacement of people and closure of schools due to floods and droughts, local conflicts as livestock farmers displaced by drought search for pastures for their animals, and scarcity of water, which compromises hygiene for women and girls; (b) environmental impacts, such as rising sea levels, melting glaciers on Mount Kenya, which is a source of many rivers in Kenya, landslides and forest fires; and (c) economic impacts, such as floods that destroy roads, cash crops and subsistence crops, and livestock and contributes to food insecurity. Kenya is guided by the Climate Change Act (2016) in its response to the issues that it faces.

The Government of Kenya is proactive in devising climate change mitigation and adaptation strategies, which are outlined in the Climate Change Policy (2016). Some farmers in Kenya, although willing to adapt to climate change, have not done so due to financial constraints, such as the inability to get credit from institutional lenders and a "lack of knowledge regarding adaptation measures" (Ochieng et al., 2017, p. 204). In this paper, we adopt the definition of climate change adaptation in human systems as used by the Intergovernmental Panel on Climate Change (2019) as a "process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities" (p. 804).

Several researchers (Bryan et al., 2013; Chepkoech et al., 2018; Kinuthia et al., 2018; Mudekhere et al., 2023; Okumu et al., 2023; Waaswa et al., 2021) have done some research on climate change adaptation in several communities in Kenya. They found that Kenyan farmers had adopted strategies such as changing the time crops are planted, increasing the use of manure and water harvesting, and planting more trees. Indeed, Kenya seeks to plant more than 15 billion trees by 2032 with the aim of reducing greenhouse emissions and restoring forest cover.

In 2021, Kenya was ranked 152 out of 181 countries that are highly vulnerable to climate change impacts (World Bank Group, 2021, p. 3). The ranking shows that the impact of climate change in Kenya is very high. The report indicated that Kenya's vulnerability is caused by a combination of political, geographic and social factors. Therefore, to mitigate and adapt to climate change, political, social and economic solutions need to be sought. Kenya has a climate adaptation policy (Climate Change Act, 2016) that guides climate change adaptation and mitigation. It states that "climate change adversely impacts key sectors that are important to the economy and society: environment, water and forestry; agriculture, livestock and fisheries; trade; extractive industries; energy; physical infrastructure; tourism; and health" (Climate Change Act, 2016, p. 4). It acknowledges that Kenya needs to prioritise climate adaptation and mitigation. As a result, several adaptation strategies have been devised at both the national and the local level, including planting crops that are more tolerant to little rainfall and the use of irrigation, among others. In their study, Bryan et al. (2013) found that farmers were adapting to climate change in various ways, such as using climate-smart agricultural practices that include changing crop varieties, changing planting dates and crop types, decreasing livestock numbers, diversifying, changing or supplementing livestock feeds, changing fertiliser application routine and adopting new soil and water conservation practices (p. 31). Kabubo-Mariara and Karanja (2007) found that the Government of Kenya provides support to farmers to adapt to climate change in the form of training, credit, farm inputs and advice from extension officers.

The Government of Kenya has partnered with communities in afforestation, reforestation, and documenting and disseminating Indigenous knowledges (Alliance for Food Sovereignty in Africa, 2020). Using Indigenous knowledge, many farmers have resorted to growing Indigenous foods that are drought resistant, for instance, amaranth, sweet potatoes, sorghum, millet and cassava. Such shared Indigenous knowledge has led to improved food production. Surplus food is sold in markets, adding to the family income revenue.

Kenyans are adapting to energy-efficient cooking stoves. The new stoves are more energy efficient because they consume less wood. They have reduced smoke and so offer benefits to users, who can now spend more time attending to household chores or, for students, more time for study, rather than spending time in health centres. Students attend school regularly and so improve their literacy and numeracy skills. Since the new stoves use less wood, there are fewer risks of deforestation, and this leads to more rain and better farming. Consequently, there is more food production.

Studies (Mudekhere et al., 2023; Waaswa et al., 2021) have found that farmers, both large and small, have adapted to new technologies to understand weather patterns and variability, and have used these technologies and Indigenous knowledges to adapt to climate change.

Adaptations to climate change in Zimbabwe

Government policy

Geographically, Zimbabwe is part of the Southern African region and, like other countries of this region, faces challenges of being in a semi-arid region (close to the Kalahari and Namib Deserts). Zimbabwe has been experiencing climate change–induced prolonged droughts and incessant rainfall resulting in floods. There are also problems of deforestation, droughts and dry spells, and cyclones and floods. The Government of Zimbabwe has thus come up with a Zimbabwe Climate Policy (2016), which has suggestions on what needs to be done to mitigate climate change. The suggested approaches include promoting research on climate change, programmes on educational awareness of climate change, implementation of mitigation processes, resource mobilisation, and collaboration with national and international bodies such as non-governmental organisations (NGOs). The majority of Zimbabweans live in rural areas, and climate change, caused by human activities and other natural processes, is a major threat to their livelihoods. They rely on agriculture to feed their families as well as to earn a living by selling some of the produce. Government and NGOs have been working hand in hand to introduce measures that reduce the impacts of climate change.

The Zimbabwe Climate Policy outlines principles on which the policy is based. These principles aim to address issues concerning weather and climate, vulnerability and adaptation, low carbon development, and other cross-cutting issues. The rest of the policy document provides details on approaches and other issues that the government would need to consider in addressing climate change.

The Zimbabwe National Policy Report (Government of Zimbabwe, 2022), a follow-up to the above Zimbabwe government policy and produced by the Participatory Ecological Land Use Management (Government of Zimbabwe, 2022) association, concludes that "there is evidence of clear interest by government and civil society organizations to support the agroecological concept as a responsible and effective approach to climate change challenges" (p. 23).

The following sections of this paper discuss the different approaches that the Government of Zimbabwe has taken in trying to address climate change issues, especially as climate change affects rural small-scale subsistence farming communities.

Government approach to mitigate climate change

As a follow-up on the above policy recommendations, several approaches have been and are being put in place in the country. These include the establishment of an agroecological school; a national tree planting ceremony and a feminist climate action academy, among other approaches.

Zimbabwe offers a useful case of agroecology at the Shashe Agroecology School, where Indigenous knowledge from local communities is used to mitigate climate change. The Shashe farming area is in the Mashava district in Masvingo Province, about 294 kilometres from the capital, Harare. In the early 2000s, the land was barren, with no hope that the soils could be suitable for farming. This land was previously used for cattle ranching and, as a result of overgrazing and adverse weather conditions, had turned semi-arid. Livestock were dying due to hunger while trees succumbed to deforestation. Water levels in the nearby Shashe River had decreased because of siltation. At present, more than two decades later, the Shashe area has transformed into a reputable farming hub. This is a result of agroecology that includes using locally available resources such as growing traditional grains, rehabilitating the area by planting trees, water harvesting to conserve water and venturing into poultry to get manure to improve soil fertility. A subsistence smallholder farmer stated that:

> When I harvest crops in the fields, I make sure that I put aside seeds in preparation for the next season. ...
>
> By digging contours that channel water in our fields, we have improved the chances of receiving rainfall in Shashe. Even during the dry season, we receive rainfall which was not common when we first arrived. (as cited in Matiashe, 2023, paras 6–7)

The Shashe farming area has evolved into a learning area. Farmers around Zimbabwe and beyond the borders come to learn agroecology at the Shashe Agroecology School, a centre of agroecology that basically conserves the land and environment.

The concept of agroecology involves strengthening the resilience of smallholder farmers through the diversification of agroecosystems, that is, organic soil management and water harvesting for conservation. In the Shashe farming area, smallholder farmers grow a variety of food crops, including grains (millet and sorghum), cereals, legumes, vegetables, fruit trees and medicinal

plants. They also rear livestock, including cows, sheep, goats, pigs and chickens. Grains such as sorghum and millet are drought-resistant crops, which means that smallholder farmers can still have some harvest even during droughts.

Almost everything on the farms is recycled. One farmer had this to say: "Livestock are our biggest source of manure. We collect crop residues from the fields and feed the cattle. Then we collect waste and make organic manure in compost" (as cited in Matiashe, 2023, para. 22).

The smallholder farmers in this area also have fish ponds, where they farm different species such as catfish and breams. Fish farming, poultry and crops depend on each other for survival, an example that illustrates the concept of agroecology. A farmer stated, "We feed fish with chicken droppings and worms. We keep worms in the composts we make for manure. The water from the fish ponds after harvesting is channelled to the garden because it is highly nutritious" (as cited in Matiashe, 2023, para. 25). Smallholder farmers in the area are also able to feed and clothe their children and grandchildren using proceeds from agroecology farming in the Shashe area.

Smallholder farmers keep seeds for the next agriculture season to ensure that traditional grains critical in providing high yields amid climate change do not run into extinction. They supply other farmers in Shashe and around the country with seeds and pass agroecology knowledge and skills to them. For example, knowledge about planting and maintaining Indigenous trees as part of reforestation efforts is shared in the community. A farmer explained: "Agroecology is the way to go. As a woman, I have been able to look after myself and my family" (as cited in Matiashe, 2023, para. 35).

The agroecology initiative in Mashava and Bikita has reached about 500 smallholder farmers, according to a regional project manager for Voluntary Service Overseas, a charity supporting farmers in the area. Affordable and less resource-input farming practices such as agroecology are important to enhance agricultural production and increase food security at the household level. In Zimbabwe, agriculture production is dependent mainly on rainfall. Smallholder farmers in marginalised areas contribute more than 70% of food production in the country, yet they do not have the financial capacity to purchase synthetic inputs. The regional project manager for Voluntary Service Overseas had this to say:

> In Mashava, most soils are loamy sands to sandy which are prone to acidification, leaching and poor structure and can barely support plant life. The use of organic fertilisers and green cover crops that bind the soil help to replenish such soils and enhance microbial activity that supports plant life while sequestering carbon dioxide from the atmosphere. (as cited in Matiashe, 2023, para. 39)

Agroecology in Mashava has empowered women and the youth, who are usually marginalised and vulnerable. It has enhanced their productive capacity and empowered them to have diversified food sources and income-generating activities. Agroecology promotes the growing of Indigenous crops and crop diversity that are well suited to low rainfall areas like Mashava. As a result, farmers are guaranteed to get some food despite severe droughts. It has promoted local diets and culturally acceptable foods that are nutritious and healthy for the local people.

Zimbabwe has set aside the first Saturday of every December as a national tree planting day since 1980. The motive is to create awareness of forests, mitigate against climate change and encourage the nation to plant and conserve trees. People are encouraged to plant trees throughout the year—any tree anywhere across the country. In 2021 the national target was 25 million trees, which is estimated to translate to about two trees per capita. Zimbabwe loses 300,000 hectares of trees each year to deforestation. The drivers of deforestation are agriculture, settlement expansion, wood energy harvesting, bricks moulding, mining activities and veld fires. Subsequently, land degradation becomes a threat to many rural citizens whose livelihood depends on natural resources (Forestry Commission Zimbabwe, 2022).

A Zimbabwean local NGO, the Economic Justice for Women Project (EJWP; Feminist Academy for Climate Change [FACA], 2023) established a feminist-focused climate action academy in a bid to enlighten women on how they can meaningfully contribute towards the agenda of climate change mitigation.

FACA was launched in Hwange, one of the semi-arid areas of Zimbabwe, and became one of the first organisations to place young women at the centre of spearheading the climate change agenda. Speaking to NewZimbabwe.com media on the development, the EJWP executive director said the academy sought to comprehensively train women from the grassroots level and strengthen a community-based transformative feminist movement of climate justice activists. The executive director had this to say:

> The Hwange community seconded a committee that will coordinate and lead their agreed follow-up actions. FACA will provide a unique platform for empowering women and gender non-conforming individuals to actively engage in climate action, addressing the intersectional challenges of climate change and gender inequality.
>
> By combining feminist principles and climate advocacy, FACA will foster knowledge, skills, and leadership development to drive sustainable, inclusive, and gender-responsive solutions at all levels. (Vinga, 2023, paras 3–4)

The project is in sync with climate challenges bedevilling women in Zimbabwe, who are often at the receiving end of the changing environmental order. During extreme weather such as droughts, cyclones and floods, women tend to work more to restore and secure household livelihoods. This leaves them with less time to access training and education, develop skills or participate in the economic mainstream; thus, gender equality remains low.

The program targets women and gender non-conforming individuals from diverse backgrounds, including rural communities and communities at risk of climate emergencies, local activists, community leaders and civil society organisations working on climate change and gender equality. FACA intends to develop a comprehensive curriculum integrating climate change, gender studies, feminist principles and sustainable development. The organisation also recruits and trains a diverse team of qualified instructors, including experts in climate science, gender studies and advocacy.

The above are only three of the many approaches that the Government of Zimbabwe, working with some NGOs, has taken to try to mitigate the effects of climate change, especially as it affects rural subsistence farmers in the country. Only with time will the results of these approaches be fully realised. At the moment, the above discussion on activities at the Shashe Agroecology School, the National Tree Planting Ceremony and FACA has shown that there are some positive outcomes from the government's attempts to mitigate the effects of climate change.

Discussion and conclusion

The strategies to mitigate the effects of climate change presented here include the introduction of energy-saving stoves, an increase in the planting of Indigenous trees that are usually drought resistant and the planting of drought-resistant crops such as sorghum and millet as well as tubers such as cassava, yams and sweet potatoes. Several success stories show increased food production and the sale of surplus food to feed other populations. Indigenous people have partnered with agricultural extension officers, industry and NGOs to keep rural communities informed about climate change, resulting in improved educational outcomes, particularly in literacy and numeracy related to climate change. Industry has also helped with the construction of boreholes. This has led to increased production of healthy Indigenous foods that are drought resistant and easy to produce. Families have turned to Indigenous foods, shunning expensive processed foods. In addition, farmers are involved in organic soil management by using manure generated from the livestock (pigs, goats, cattle and chicken) to improve the soil quality. Fish farming has also led to an interesting agroecology in which fish are fed with chicken droppings and worms from the poultry compost manure. Highly nutritious water from the fish ponds is used in the gardens. These activities positively adapt to and mitigate the effects of climate change.

In this paper, we have demonstrated that climate change poses huge challenges in Africa. Some of these challenges are extended droughts, extensive flooding and poor health outcomes. Africans continue to use Indigenous knowledges to assist in adapting to and mitigating the effects of climate change. Poor nations may have the knowledge to assist in mitigating climate change but they have limited resources to meet such challenges. The cost of mitigating climate change can best be met by governments and industry working together. Better still, the huge polluters should be encouraged to pay more towards adaptation and mitigation of the effects of climate change.

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