Scientific African 27 (2025) e02534

Contents lists available at ScienceDirect

Scientific African

journal homepage: www.elsevier.com/locate/sciaf

Managing climate change through social justice in Africa: Key lessons from the Libode area of Eastern Cape, South Africa

Amos Apraku [a,*], Benjamin Apraku Gyampoh [b], John F. Morton [c], Simon Mariwah [d]

[a] University of Energy and Natural Resources, Department of Languages and General Studies, P. O. Box 214, Sunyani, Ghana
[b] Kwame Nkrumah University of Science and Technology, Department of Fisheries and Watershed Management, Kumasi, Ghana
[c] Natural Resources Institute, University of Greenwich, Kent ME44TB, United Kingdom
[d] Department of Geography and Regional Planning, University of Cape Coast, Cape Coast Ghana

ARTICLE INFO

Editor: DR B Gyampoh

Keywords:
Climate change
Social justice
Libode
Eastern cape
South Africa

ABSTRACT

Climate change is considered as one of the greatest challenges to humanity, with Africa seen as one of the most affected continents due to low resilience and adaptive capacities. The complex interaction between multiple socio-ecological and economic stressors pose a great challenge to the application of the concept of social justice and its associated principles in managing climate change in Africa. Based on empirical research with 150 respondents and interactions in Libode, this paper highlights that water, food and settlement insecurities, floods, crop and animal losses and water-borne diseases remain some of the key negative impacts of climate change to rural residents in the Eastern Cape Province. Despite these adverse effects, the application of the core principles embedded in social justice as a tool for managing climate change impacts in the study area is elusive due to inadequate socio-economic and natural adjustments in response to actual and/or expected climate change adverse effects. The paper concludes that various forms of socio-economic and environmental inequalities can be reduced to the barest minimum and increase social transformation drastically in the Eastern Cape through the application of the principles of social justice to enhance adaptive capabilities.

Introduction

Climate change is considered by many to be one of the greatest challenges to humanity, with Africa seen as one of the most affected continents [8]. It is argued that climate change has further widened the various forms of inequalities that exist between nations and different social groups in various settlements [9] and has disproportionately affected the poor and rural communities in the developing world [16]. The intensity of climate change related weather events in developing countries vis-à-vis the available coping and adaptation mechanisms suggest that developing countries will continue to face more and complex challenges if the current trend of changes in global climatic conditions continue [16]. Some of the key impacts of climate change which are the subject of most research include rising sea levels, changing precipitation patterns, increase in extreme weather events, rising temperatures, decline in agricultural productivity, water security, and severe destruction of ecosystems and biodiversity [12].

The negative effects of climate change have further widened equality between individuals, households and communities on the

* Corresponding author.
E-mail addresses: amos.apraku@uenr.edu.gh (A. Apraku), bagyampoh@knust.edu.gh (B.A. Gyampoh), J.F.Morton@greenwich.ac.uk (J.F. Morton), smariwah@ucc.edu.gh (S. Mariwah).

https://doi.org/10.1016/j.sciaf.2025.e02534
Received 14 July 2024; Received in revised form 14 November 2024; Accepted 8 January 2025
Available online 11 January 2025

continent of Africa. Experts believe that, if left unchecked, the impact of climate change in Africa in the near future is likely to be severe due to high inter-connectivity between climate change and other socio-political variables, limited capacity to adapt and inadequate political commitment to climate change related issues [9]. It is argued that nations and communities that design and implement climate actions through local residents and grassroots stand the chance of addressing inequalities and sustainably tackling the impacts of climate change on livelihood systems [7]. It is highlighted that the adverse environmental and health effects of climate change severely affect low-income earners, the marginalised, the elderly and rural dwellers [7]. Again, studies have shown that climate change negatively affects vulnerable communities and individuals in sensitive areas of health (water and air-borne diseases, respiratory and allergic disorders and malnutrition), agricultural productivity and water resources [3]. These negative impacts of climate change on individuals, households and communities with less adaptive capacities threaten the social, civil, political and economic rights and freedoms which are the core elements of social justice and participatory governance - of such vulnerable individuals, households and communities.

Meanwhile, issues of social justice, equality, fairness and participatory governance remain some of the key concerns of developing democracies across the world, especially in the areas of environmental management. The struggle for equal rights, inclusivity and fair treatment for all in the context of managing climate change and its related issues represent some of the critical issues facing young democracies, particularly in Africa [3]. However, the complex interaction between multiple socio-ecological and economic stressors – including climate change and debt crisis – pose a great challenge to the realisation and genuine application of the concepts of social justice in Africa, participatory governance and their associated principles.

Despite the growing interest in how various social groups and poor communities manage ecological and climate change related issues – especially in Africa – there has not been enough studies focusing on the voices of the marginalised social groups and rural communities across Africa to provide ample empirical evidence for analysis. Drawing on the voices of the disadvantaged and marginalised in the Eastern Cape Province of South Africa, this paper discusses the role of social justice as a guide in managing climate change in the context of the reality that the poorest and most vulnerable clusters of society are those who suffer the biggest impacts of any form of crisis: yet they are the same section of society that lacks representation in local climate change policy formulation.

Literature has already established that the adverse effects of climate change on various forms and sources of livelihoods and their corresponding policy decision-making processes pose a great challenge to the operationalisation and realisation of social justice in young democracies – especially in Africa (see [3,13]). The key question is, to what extent do climate management stakeholders give consideration to the core principles of social justice and participatory decision making in an effort to fairly manage climate change as a global phenomenon, and 'democratically' adapt to climate change impacts at national and local levels? This paper therefore seeks to answer this question in a local context by critically examining the level of local community engagement in environmental and climate change related issues as well as the process(es) through which local people contest 'environmental injustices' to reclaim community power and social justice.

Such an analysis is crucial because the concept of social justice as enshrined in the Universal Declaration of Human Rights (1948) stipulates, among other things, equal and fair access to basic rights and opportunities and all-inclusive decision-making approaches. However, careful analysis of events and climate records indicate that the adverse consequences of climate change, adaptation strategies and the decision-making processes behind them either infringe on the basic rights and freedoms of some individuals and their societies; or deny some individuals and their communities the right to participatory governance. This observation contravenes the concept of social justice which further advocates the right to a good standard of living in a safe and dignified environment by all and at all times (United Nations, 2016).[1] Thus, the right to freely and equally determine one's political status in society, the freedom to partake in public decision-making processes and the opportunity to pursue one's social, economic and cultural development are the main pillars of social justice in modern day democracy; yet they are the same democratic rights violated in one way or the other by the status quo in the context of climate governance/management. The objectives of this paper are: to identify some of the key impacts of climate change on livelihood systems in the study area; and to analyse the extent to which the core principles of social justice are upheld in the context of climate change discourse and adaptation strategies in the study area.

Global climate change debate: a panorama

Global records on changes in weather patterns observed since the 1950s have led to a general conclusion that indeed world climatic systems are changing. Climate change indicators show that amounts of snow and ice have diminished drastically, sea levels have risen and the concentrations of greenhouse gases in the atmosphere have increased [10,14]. According to the Inter-governmental Panel on Climate Change [11], the atmospheric concentration of carbon dioxide, for example, has increased by 40 per cent since pre-industrial times due to various factors, including fossil fuel emissions and net land use change emissions. The emissions of greenhouse gases from natural sources together with other anthropogenic activities have caused a change in global climatic conditions with corresponding negative effects on livelihoods (most importantly agriculture), human health and other socio-political indexes. Thus, anthropogenic and natural emissions of greenhouse gases have increased the atmosphere's ability to absorb the earth's outgoing infrared radiation which has caused a worldwide trend of rising temperatures and other forms of climate conditions [8]. Other studies project that the world is at risk of experiencing changes in annual average precipitation patterns; increased hailstorms, more intense rains leading to flooding, and longer dry spells [11,13]. In Africa, the DST [8] projects warm weather conditions on the continent in the 21st century,

[1] http://www.un.org/en/universal-declaration-human-rights/index.html accessed on 8th March 2024

with the warming likely to be greater than global annual mean in all seasons characterised by prolonged dry spells.

Given the various adverse effects of climate change on key sectors of the world economy, the global community has designed various adaptation strategies to counter the negative effects of climate change on citizenry. The focus of this paper however, is not to evaluate the feasibility or otherwise of local or global climate change impact on adaptation strategies; rather to explore the extent to which managing climate change locally takes into consideration key principles of social justice and participatory governance in ensuring equity and fairness. In other words, the paper interrogates the management of climate change through social justice and inclusivity in local settings. The juxtaposition of climate change management and social justices is critical in understanding how the two variables are related in averting incidence of injustices in decision-making processes and at the same time to effectively manage climate change (impacts adaptation processes and actions).

Experts highlight that policy makers and stakeholders in climate change management should incorporate human rights, participatory governance and social justice issues in key programmes and projects [28]. The United Nations Framework Convention on Climate Change (UNFCCC) further indicate that human rights, participatory governance and social justice considerations should guide the development and implementation of climate policies to help strengthen institutions and mechanisms related to climate change impacts mitigation as a means of projecting social equality at local levels [3,28]. This argument is borne out of the fact that in contemporary democracies and development processes, issues of social justice and equity are closely linked with key national and local development programmes and projects – one of which is climate change. It is again argued that the successful balance between social equity, climate management and resources allocation is founded on the prudent political judgments of decision-makers [3]. Similarly, a proper balance between social justice, inclusivity and climate management would ensure sustainable development and citizen participation in local development processes. Despite all these arguments and submissions, the extent to which national and local climate change policy frameworks and action programmes in Africa are consistent with the demands of social justice and participatory democracy remain an open question to academics and development practitioners alike.

The South African climate change discourse: a brief impacts and adaptation analysis

Available evidence shows that indeed Africa's climatic conditions are changing at a faster rate and that these trends would continue throughout the 21st century [18]. Expert assessment of South African weather and climatic conditions using different models conclude that warmer and extended dry weather conditions are highly expected in both inland and coastal regions of the country with a corresponding decreased precipitation and annual rainfall volumes till the end of the 21st century [3,14]. It is further argued that such climatic conditions are expected to adversely affect various socio-economic and health related variables of vulnerable sub-groups within the population – particularly rural and low income households [23].

Mostly, national and local climate change studies in Africa tend to focus on climate change forecasting, risk and vulnerability assessment and the viability of various adaptation strategies through the lenses of globally designed assessment models. Consequently, a negligible research attention seems to be paid to interconnectivity between climate impacts management and the core principles of social justice and participatory governance, particularly in rural African communities. The current study deems it appropriate to characterize climate change as both a crucial governance issue as well as a socio-ecological issue which needs to be placed at the forefront of democratic development processes. This study is motivated by a number of questions: To what extent are the principles embedded in social justice (equality and fairness) upheld in climate change impacts management in the study area? What are some of the effects of climate change on participatory governance as a democratic principle and procedure in rural settlements of Libode?

The Eastern Cape Province is ideal for this study because according to Johnston and Schultze [13] the province is experiencing, and would continue to experience, increased frequency of extremely hot and cold days; higher evaporation rates due to increase in temperatures; up to ten per cent (10 %) reduction in suitable cattle farming area; up to ten percent (10 %) reduction in run-off water (irrigation is affected); and ten to twenty percent (10–20 %) reduction in suitable maize farming area. All these make the Eastern Cape one of the most vulnerable provinces to climate change, thereby threatening sustainable livelihoods in the province especially in rural areas where poverty levels are high [13].

Social justice and climate governance: a conceptual analysis

This paper adopts the concept of social justice as the theoretical framework for the discussion of the study findings. The concept of social justice covers a broader terrain of ideas and philosophies with varied principles and assumptions. This therefore makes the concept subjective and selective. However, the broadness of social justice makes its application feasible across disciplines, including socio-political and environmental analyses. It is therefore used in this paper to analyse how the fundamental rights of individuals, households, communities are either infringed upon by climate change management stakeholders or, how such rights are recognised and observed by climate change legal frameworks, policy makers and institutions alike. Social justice is defined as a philosophy and practice of fair and equitable distribution of both good and bad things among individuals, households and communities in a given geographical area without prejudice to social class, age, gender, race or any other forms of ascriptions [5,17]. Thus, the concept of social justice advocates equal rights for all and fair access to resources by all. However, studies show that the rural poor and marginalised generally lack access to protective and preventive services, socio-economic resilience and the general capacity to withstand the adverse effects of environmental conditions on their livelihoods [3] partly because of lack of participation in key decision making processes.

Schlosberg [[22]:452] concludes that the range of capacities necessary for people to develop free and productive lives they desire for themselves is central to the concept of social justice in climate change discussions. This assertion is supported by the fact that a

dignified life free from adverse environmental effects should be self-defined and self-coordinated and not the one imposed by others or institutions. Drawing on the above submissions and various expert arguments, the concepts of social justice and participatory governance/democracy are used as interpretive lenses to analyse the 'fairness' and 'inequalities' in climate change impacts distributions and their mitigation policy procedures and programmes in rural Libode of the Eastern Cape Province. The operationalisation and reinforcement of social justice as part of the climate management process could go a long way to nurture a new 'breed' of responsible citizens in most modern democratic dispensations. In discussing climate change and social justice, what is important is not only the allocation of material resources and relief measures; but also how such distributions are determined and achieved. Thus the moral aspects of the whole policy discussion process relating to the engagement of society in the entire process. The concept states that everyone should have the right and opportunities to develop out of poverty and hardships.

The concept of social justice in the context of environment and climate change can be discussed through three key dimensions or parameters namely: distributive justice, procedural justice and recognitional justice [19], although in practice there is considerable overlap between these pillars. These key dimensions have critical ramifications in areas of fairness and equity in climate change impacts distribution and the adaptation strategies and processes thereof. Distributive justice – as a strand of the concept of social justice – in climate change discussions refers to: (1) the extent to which environmental outcomes, risks and hazards are equitably and fairly distributed in relation to the available socio-economic facilities and resources; (2) how benefits, entitlements, capacities and needs are equally shared among individuals and communities [5,19]. Applying this to climate change impacts management, expert analysis and submissions reveal that social justice concerns are evident in the fact that it is the poor people in disadvantaged areas with less adaptive capacities and resources that bear the disproportionate share of the negative consequences of climate change (see [13]). Hence the interest of this study to use didstributive justice as one of its guiding principles.

Procedural justice, on the other hand, refers to the processes and procedures that shape and manage environmental outcomes (including legal frameworks and public policies). Thus, procedural justice covers the openess and inclusiveness of policies, programmmes and legal frameworks as well as how such policies and programmes avail themselves to public scrutiny and democratic accountability. Linking this to climate change, there is a question of how procedural justice affects or ensures equity, fairness and public participation of citizenry in climate change policies and actions both at local and national levels. In other words, it is about who takes climate change policy decisions and whose interests are most served by such decisions and policies. [2]. It is argued that the sustainablity of most local level climate change adaptation policies somewhat depends on how the interest of all beneficiaries are fairly and equally catered for by such policies through public participation [2]. This is one of the key concerns of social justice in development process.

The final principle of social justice used in this paper is recognitional justice. Recognitional justice refers to the extent to which all stakeholders in development and its associated issues (including climate change management) are granted the needed respect, status and legitimacy to adequately defend or represent their postions and interests in policy discussions [2,19]. These three key principles (distributive, procedural and recognitive justices) are used in different ways to analyse inclusisvity in decision-making, public participation in climate governace and the various forms of 'inequalities' and 'unfairness' surrounding climate impacts adaptation decisions in selected communities in the Libode area of the Eastern Cape Province in South Africa. The identification of gaps in the study area, particularly in relation to climate change impact adaptation policies and opportunities, using the core principles of social justice participatory governance/democracy, play an important role in ensuring that fairness and inclusiveness become part of climate change impact mitigation actions and processes at local levels. Bond [4] indicates that climate change poses a number of socio-developmental challenges to developing economies, including the sense of justice. Thus, climate change issue consists of a broader and systematic crisis highlighted by processes of domination that are still the core of contemporary world-systems ([9]:2). This suggests that practices of domination by the global North over countries in the global South still influence the way economic development and environmental management are thought of and practiced in the global South thereby denying local communities and households the opportunity to actively get involved in local climate change management processes and procedures.

Based on the submissions and discussions presented so far, it is crucial to analyse everyday environmental community challenges in various settlements of the developing world – especially Africa – through the lenses of fair distribution of rights, benefits and responsibilities (distributive justice); participation and access to decision-making processes by local residents (procedural justice) and finally recognizing existing forms of inequalities and disadvantages from local context perspectives (recognitional justice) [6].

Methodology

This paper is developed from a study on the role of various stakeholders and political/administrative tools in managing the impacts of climate change on key sectors in the Eastern Cape Province of South Africa. More specifically, the paper is based primarily on the voices of marginalised rural communities in the Libode area of King Sabata Dalinyebo (KSD) Municipality who are minimally responsible for climate change and have the least political power to influence climate change action and policy in South Africa. The study triangulated different qualitative data collection methods and visual sociology to validate the results of the study. Specifically, focus group discussions (FGDs) were used to discuss some of the key adverse impacts of climate change on the livelihood systems of residents, adaptation strategies available and level of local residents' involvement in such adaptations strategies and processes; observations – to ascertain some of the key issues mentioned during the various FDG sections; interactions and various forms of interviews to validate the data gathered through other data collection methods mentioned earlier. The whole study area was divided into four zones. One FGD was conducted in each of the four zones (details of the membership and gender composition are given in the next paragraph). Again, the study interrogated how such strategies adhere to the core principles of social justice and participatory democracy in some selected communities through key informant interviews with selected Ward Councillors, community leaders and

municipal officials. Purposive sampling method was used to select these key informant participants based on their various politico-administrative roles and positions in the communities, professional knowledge in handling local issues the longevity of their stay in the study area.

A total of 150 respondents participated in the study (at that figure, a theoretical saturation point was reached). Strauss and Corbin [[25]:212] explain theoretical saturation as a situation that occurs when the researcher establishes that no new or relevant data seem to be emerging from the respondents, and that enough applicable information has been gathered to satisfactorily and comprehensively answer the research questions. The 150 respondents were selected through non-probability (purposive) sampling methods from the study communities. As a qualitative study, the selection of the sample size was not based on established statistical methods and procedures; it was rather determined by the principle of theoretical saturation as explained earlier.

The sample sizes for the various categories of respondents were: 96 community members older than 30years were randomly selected across males and females (for in-depth interviews); two senior municipal officials in departments of environment and disaster management, eight opinion and traditional leaders from the study communities (key informant interviews) and 44 FGD participants (11 members each for 4 sessions/groups). The 4 FGDs were conducted in four different zones of the study area as mentioned earlier. The composition of the groups was made up of males and females with no specific number of participants attached to any gender. This allowed for fairness and freedom of expression without intimidation from anyone. A content-analysis process was used to analyse the data by first grouping the raw according to the key variables of the study to identify the major themes for further discussion.

The study site

The study was conducted in Thembeni, Ngeleni, Zandukwana and Mhlanganisweni villages all in the Libode area of the King Sabata Dalinyebo (KSD) Municipality in the Eastern Cape Province of South Africa. The KSD Municipality is predominantly rural in nature with a total population of 451,710 people (Stats SA, 2013). The major economic activity in the municipality is agriculture (subsistence in particular). According to the Statistics South Africa (Stats SA, 2013), the municipality has youth unemployment rate of 48.3 per cent with only 10.7 per cent of the population having higher education (post matric) qualification and only 26.1 per cent flush toilets connected to sewerage. Only 19.1 per cent of the total population of the municipality has piped water inside dwellings (Stasts SA, 2022).[2] With such comparatively low socio-economic indexes, it is evident that adverse impacts of climate change on the basic living conditions of residents could be enormous and thereby denying residents basic human rights and dignified life in the context of the prevailing global climatic conditions, hence the choice of some Libode rural communities for this study.

Scholars argue that Eastern Cape rural residents are particularly vulnerable to the adverse effects of climate change partly because their lives and sustenance are closely tied to the natural environment – agriculture and ecotourism (see – [27]). Thus, the ability of the people in rural settlements of the province to enjoy good quality food, shelter, water and social recognition (which are key elements of social justice) depends greatly on local and global climatic and environmental conditions because land and natural environment are an integral part of their culture and social identity. This makes the negative consequences of climate change a major threat to the physical, social, economic, emotional and political well-being of rural residents of the Eastern Cape Province of South Africa. There is therefore the need to place the management procedures and processes of climate change impacts in South Africa under scrutiny using social justice as an operational concept in the Libode area of the Eastern Cape Province as a case study.

Given the long political history of South Africa which is characterised by different forms of marginalisations and the silencing of different social groups; the conceptualisation and focus of this paper and the selection of Libode area in the Eastern Cape could contribute towards correcting some of the historical socio-economic and environmental imbalances in the country.

Results

The study found interesting stories and narratives about the impact of climate change on key livelihood systems in the study area; vis-à-vis the involvements of local residents in the management of such impacts for the well-being of humans, animals, crops and ecosystems. Even though the findings are not presented on village-by-village basis, where necessary, names of villages or places are mentioned for purposes of clarity. In line with the objectives of the study, the findings are presented under the following thematic issues: impacts of climate change on livelihood systems, local adaptation strategies, distributive justice and climate change management, procedural justice and climate change management, recognitional justice and climate change management.

For the purposes of proper understanding and positioning of the findings in the broader climate change discourse, this paper contextualises the concepts of vulnerability and adaptation to mean the following:

According to Kelly & Adger [[15]:328], vulnerability is the ability or inability of individuals and social groupings to respond to, in the sense of cope with, recover from or adapt to, any external stress placed on their livelihoods and well-being. This suggests that vulnerability to climate change and its related issues are to some extent socially, economically and politically constructed and not entirely natural. The social construction of vulnerability as used here connotes how various socio-politico and economic characteristics and processes (including the key pillars embedded in social justices) control levels of vulnerability of a given society or group of people.

Adaptation on the hand is used here to mean the adjustment in human and to some extent natural systems in response to actual or expected climate stimuli or their effects and moderates harm or exploits beneficial opportunities ([20]:25). Such adaptive procedures

[2] https://www.statssa.gov.za/?page_id=993&id=king-sabata-dalindyebo-municipality. Accessed on 12th August 2022.

include, but not limited to, adjustment in various systems and structures that can help lessen the adverse effects of climate change on livelihood systems and consequently take advantage of such damage for growth. The elements of marginalization in the whole climate change management process (with social justices as the operating principle) in the study area underpinning the presentation and discussion of the results in this paper are hinged on low levels of socio-economic development – as captured in section 5.1 of this paper - denial of decision making rights and capacity, recognition, the power to choose from options, etc. – which are all captured in various narratives from respondents as presented below.

Impacts of climate change on livelihood systems

The study highlights various adverse impacts of climate change on key livelihood systems (environmental and socio-economic) of the local residents. Such impacts have disproportionately affected low income communities and the poorest among the poor in such communities. Among the key impacts of climate change in the Libode area of KSD Municipality as mentioned by the respondents are prolonged dry spells and heat waves, floods, wildfires, water insecurity, crop and animal loses, poverty, spread of air and water borne diseases and settlement loses. During an interaction with a 61year old farmer at Thembeni village, she narrated as follows:

I have spent my entire life in this village. I was born here, got married and stayed here with my husband until he passed away about six years ago. I know a lot about the environment and climate story of this village. The climate situation now is not the same as it used to be when we were young. Growing up as a small girl in this village, the only work I saw my parents doing was farming and that is the same work they trained us – *referring to herself and her four other siblings* – to do, but I can tell you that a lot have changed here in this village and all the other villages surrounding us in relation to our weather and climate. What is happening now is beyond my understanding because we now experience unreasonably long dry weather conditions extending into sometimes mid-summer resulting in countless wildfires and delayed farming seasons. To tell you the truth, agriculture is no longer an interesting work as it used to be in the past because of the continuous changes in our weather and climatic conditions [sic]. (In-depth interview, 2021).

This narrative about the realities of climate change and its associated sentiments among affected individuals and households in the study communities was re-echoed by different respondents in majority of the villages visited. It cements the national and global submission that increasing in temperature levels over the years have resulted in an increase in the frequency of heat waves and their related issues (see [3,14]). This has allegedly caused an increase in a variety of heat-related heath disorders like cardiovascular diseases – especially among poor farmers who work in the dusty fields. Collectively, all these have corresponding negative impacts on agricultural productivity and wealth creation in the study area and beyond.

Closely related to the issue of increased frequency of heat waves and prolonged dry spells as reported by respondents is water insecurity as a result of reduced annual rainfall volumes attributed to climate change (see [11]). As a way of showing how climate change and its related issues have denied most of the rural residents in the Libode area access to quality water, a 65year old retired police officer at Ngeleni village lamented that:

I am a retired senior police officer. During my active service days, I worked in different parts of the province where I enjoyed good services including good quality water. However, the kind of water we are using in this village sometimes makes me wonder whether we are indeed part of the country or not. Do you know that we still draw water from rivers, streams and dams in the village for domestic use (*asking the research team a rhetorical question*)? The most painful part of the story is that we share such water bodies/sources with our livestock, so you can imagine the kind of water we use and its implication on our health. During the winter season, women and children in various households have to walk long distances before they could get us some few gallons of water for household use because the rivers and dams always dry-up during winter. The drying-up of water bodies is severe these days because of the unusual extended dry weather conditions we are experiencing. This is not normal at all. Again, in summer when the rains finally start falling, we experience heavy fluvial floods which either wash away some of our farm crops or stock our surroundings or rivers with filth-including human feces. You can go around the village and ask other residents to confirm what I am telling you [sic]. (In-depth interview, 2021).

In most rural communities of the Eastern Cape Province of South Africa, women and children traditionally and customarily assume the primary task of drawing water and gathering firewood (fuel) for household and agricultural use. Climate change induced water insecurity (scarcity) as reported by most of the respondents makes this primary and traditional responsibility of women and children very tedious as water has become less accessible due to extended dry spells attributed to climate change. It has again made agriculture less productive- especially crop and animal production. As women and children face various challenges in gathering water and firewood, they are further exposed to risks and other security issues. Relatedly, heavy and erratic rainfalls and their associated floods contaminate the available sources of water to the people, thereby increasing the prevalence of water-related health issue in the affected areas. Inversely, extended dry weather conditions residents complained about which are attributed to climate change have reduced the physical availability of safe drinking water to the people.

Another common impact of climate which was mentioned by almost each and every single respondent was food insecurity. Community members, ward councillors and village heads reported that climate change and its related environmental conditions like floods and extended dry weather conditions have adversely affected people's ability to grow their own food because they all rely on rain-fed agriculture for survival. This therefore makes poor households who do not have enough financial resources to purchase food items from the market more vulnerable to food insecurity and its related health conditions. The head of the Mhlanganisweni village mentioned that:

This thing called climate change which we always hear about in the media (radio and television) is really having devastating effects on us here in the villages, especially in the area of food production. In fact, if you want to understand the impact of climate change on the rural poor in South Africa, just come to Mhlanganisweni and other surrounding villages and you will get all the information you

need from food, water and settlement securities to poverty without reading any book or asking any politician. Because of the extended dry weather conditions, erratic and reduced rainfall volumes; we are not able to produce enough food to feed our families let alone having surplus for sale to make some money. This partially explains the level of poverty you can 'feel' in this village and all the other villages from here up to Port St Johns. Sometimes women and children have to go for wild fruits hunting (especially avocado) to sell before they can feed their families. It is very painful. I know you said you are not part of government, but please help me tell them (*referring to government officials*) when you get back to the city that we are suffering here in the villages [sic]. (Key informant interview, 2021).

After this emotional lamentation from the village head of Mhlanganisweni, the paper looks at some of the available climate change impacts adaptation strategies to the people as reported by the respondents.

Local adaptation strategies

The methods and means of addressing climate change impacts on economic, health, social and political systems fall under two broad categories, namely: mitigation (primary and temporal measures/responses to climate stimuli) and adaptation (secondary and permanent adjustments to systems that could handle climate shocks) [14]. For the purposes of this paper and clarity of discussion, the two concepts are used as complementary terms. Given the wide range of climate change impacts mentioned by the respondents across the four study villages; the most common adaptation strategies available to the people as found by the study are: rainwater harvesting to partially address the issue of water scarcity; growing and rearing of exotic crop and animal breeds/species that could withstand different weather and climatic conditions to ensure improved yield; reliance on government and non-governmental organisations' disaster relief packages/donations; government's food parcels under its social grants initiative for the poor and aged; and *Stokvels* (local group savings and investment associations for emergency and festive occasions) and *Ubuntu* (local communal living scheme/system that instils compassion and humanity in individuals).

Even though some of these measures are not sustainable as they are at the mercy of climate change (for instance rainwater harvesting and exotic crop and animal species), local residents mentioned that those are some of the common strategies through which they try to minimize the impacts of climate change on their livelihood systems. At a focus group discussion in Zandukwana village, a ward councillor mentioned that:

I am speaking not only as a ward councillor, but also as a community member who is equally affected by climate change in different ways. As my fellow participants have highlighted, climate change is really taking a toll on our livelihood systems in this village and beyond. The most painful part of the story is that we do not have any structured government programme(s) running to lessen the negative impacts of climate change on our lives apart from relying on *stokvels(groupconytributions/collections)* and *Ubuntu(communal living system)* which are already parts of our cultural and social lives as Xhosa people in the Eastern Cape Province. Sometimes the seedlings they bring us to plant do not yield as we are made to believe because we do not have money to buy the necessary fertilizers to support their growth. Even with the seedlings sharing, they do not share them equally. Their favourites and ANC members always get the best and first share before the rest of us are even considered [sic]. (FGD session, 2021).

His submission was overwhelmingly supported by all participants at the session as the true reflection of what is happening in their community and its neighbouring villages. True to their confirmation, the same sentiment was expressed in different focus group discussion and interview sessions across different communities in the study area.

Distributive justice and climate change management

Distributional justice as used in this paper as part of the broad concept of social justice in managing climate change and its related issues refers to the equal and fair distribution of burdens and benefits across different societal groups and classes [26]. Trying to find out how benefits, entitlements, capacities and needs are equitably shared among individuals and communities to handle the various negative impacts of climate in the study area, the study found that any form of opportunity and resources available to manage climate change in the local settings favours either the local political class and their cronies, the few educated ones or the relatively richer ones to the disadvantage of the poor who really need such assistance to change their lives. For instance, supporters of the African National Congress (ANC – the political party in government) were mentioned to be the first cluster of people to receive any form of climate change impacts adaptation packages the government offers. Speaking under fear of being classified as an anti-ANC, a 56year old subsistent farmer at one of the villages painfully lamented as follows during an interview and interaction session with him in his farmyard:

My children – *referring to the research team* – the issue of fairness and equity in the distribution of relief packages and any other opportunities and resources to improve our living standards are shared either along political party lines or familial ties. Thus, they first give to ANC members and their families before the rest of us are even considered. There is nothing you can say or do because the ANC is the ruling party and they control everything. Sometimes some of us receive our seedlings (especially potato seedlings) when the planting season is almost over, so in order not to be left behind you have to either borrow to buy your own seedlings or pay bribe to receive some of the seedlings provided by government. Even though it is our right to receive any form of benefit from the government without paying any money, some people have introduced a well-structured nepotism and illegal business scheme to the point that if you do not pay money, you will not receive your seedlings on time. Please, do not go and mention my name anywhere that I told you all that. I do not want their troubles – *issuing a stern warning to the research team and begging for anonymity* [sic]. (In-depth interview, 2021).

Similar narratives were given by different respondents at different interview and interaction sessions in different communities and settings indicating the selective nature of some opinion leaders and public officials relating to the distribution of certain resources and

benefits to residents aimed at helping them to manage climate change impacts. It must be emphasised that the study could not ascertain the veracity or otherwise of such allegations and therefore cannot develop any argument or discussion along political lines as alleged; however, given the pervasive nature of similar narratives at different interview and interaction sessions across different communities (embedded in the concept of data and methods triangulation adopted for the study), such convergence of narratives point to the fact that indeed the principle of distributive justice is not applied in the context of managing climate change impacts in the study communities.

Procedural justice and climate change management

Procedural justice as a pillar of social justice and a tool for managing climate change in Africa refers to the design of just institutions and processes for all-inclusive decision-making [26]. This includes the deliberate provision of opportunities by state institutions to allow local residents to play an active role in the design and implementation of climate change impact adaptation policies and programmes. As a tool for managing climate change and its related issues in the study area, the study sought to find out the level of involvement in decision making processes and procedures related to climate change. From the municipal departments of environment and disaster management, the study found that most of the policies and programmes implemented across various parts of the Province in the context of climate change and disaster management are designed at the provincial level and imposed on the locals. The municipal and local level officials only play a supervisory role during the implementation phase and compile a report back to the provincial level. This clearly suggests that the local residents who are the true beneficiaries of such policies do not take part in all the processes leading to the formulation of such policies and therefore deny them the right to procedural justice. A senior officer from the Department of Environmental Management at KSD Municipality office in Mthatha (the municipal capital) indicated that the lack of proper involvement of local residents in environmental management processes and procedures is a real challenge for the sustainable management of climate change impacts in the municipality. This is how he put it:

To be sincere with you, when it comes to the involvement of our local residents in climate change impacts management procedures and policies in this municipality, I don't think we are doing our best. What I mean by we are not doing our best is that we don't involve them at all as we are supposed to do. The locals only come to the picture at the implementation stage where they are only instructed on what to do without the option of asking questions. This has been an age-long problem. I think the problem comes from two sources: the first one is that, in a sensitive directorate like environment management in the municipality; the politicians here are far more than we the technocrats. As it is characteristic of every politician, they only support polices and ideas that will bring them immediate political fortunes and not a sustainable solution to the problems. Secondly, because most of our programmes and policies are imposed on us by the provincial officials at Bhisho, we are always given very limited space to vary policies and programmes. Here, we work to please our provincial bosses and not to transform the lives of the very people we serve. That is the truth. This explains why we have the same programmes running in all the districts/municipalities in the province even though we have different environmental conditions and livelihood systems [sic]. (Key informant interview at Mthatha, 2021).

This submission by a senior officer in the KSD Municipality was amply confirmed by residents of the study communities who indicated that they literally know nothing about the processes and procedures of climate change policies. They are only instructed on what to do by municipal officials. In all the study communities, the respondents highlighted that the only time they are involved in the whole governance process is when elections are approaching. This narrative was confirmed in the study communities by all clusters of respondents. At Mhlanganisweni village for instance, a participant in a focus group discussion mentioned that:

When it comes to deciding on climate change management policies, everyone here would agree with me that we are not consulted at all. We don't take part in any form of procedures or processes at all. In fact, they *(referring to government officials at all levels)* don't come here during policy formulation stages. We only see them during campaign seasons when elections are approaching. During those times, you will see them all over the village moving from house-to-house promising what they know very well that they cannot fulfill. Once the elections are over, that is all. They vanish into thin air. You won't see them again until the next election time. The only person you would see around here after the elections is the ward councillor who has no powers of formulating climate change policies. He is more or less their political messenger/errand boy who carries announcements to us [sic]. (FGD session, 2021).

Although we could not verify the authenticity of the political statements made by respondents, what is however clear from the various narratives is that there is a widespread lack of community involvement in the various processes and procedures leading to the design of various climate change impacts adaptation policies as enshrined in the principle of procedural justice under the concept of social justice.

Recognitional justice and climate change management

The third and last strand of social justice which the study used as a tool to manage climate change impacts in the study area is recognitional justice. Recognitional justice as embedded in the broader concept of social justice in the context of this study relates to the recognition of historical inequality or acknowledging the existence of a highly even playing field for all in handling the various adverse impacts of climate change on key livelihood systems [26]. Given the socio-political history of South Africa (the Apartheid Regime and its bequeathed imbalances/inequalities), the study sought to find out how all the various forms of historical and current inequalities are factored into the design and implementation of climate change impacts adaptation policies. In discussing recognitional justice, the 65year old headman (chief) of Ngeleni village succinctly put it as follows:

Growing up as a small boy in this village during the Apartheid Regime with my father occupying the same position I am occupying today (the headman), the whole traditional authority set-up was not recognized in any form of decision making process. That was

understandable by then because the Apartheid regime was racially discriminatory in nature. However, it is very strange that in this democratic dispensation our leaders keep ignoring us in all kinds of processes leading to the formulation of crucial policies and programmes in the area of climate change which affects us, the rural residents, the most. This unfortunate situation tends to disadvantage us so much as we are denied the opportunity to craft locally suitable climate change adaptation policies because we understand our own problems more than any other person does [sic]. (In-depth interview, 2021).

In a similar fashion, community members in Ngeleni and all other villages the research team visited confirmed that indeed the processes and procedures of formulating various environmental policies do not address the existing socio-economic inequalities or provide a level playing ground for all in the pursuit of poverty eradication and socio-economic transformation.

Summing up the results, the study noted that some of the narratives given by respondents under different settings go beyond social justice as a concept and become human rights issues. To the local residents, climate change has impacted their standard of living and well-being including shelter, food, good health, right to active participation in governance and other forms of basic social services. It is argued that incorporating social justice into climate change and its related policy issues could guide the smooth implementation of such policies leading to the total social transformation of the people and building a more resilient society to handle climate change impacts [19]. Again, the results show that there is a pervasive lack of consultation on climate change policy discussions in the study area which further exposes residents to the adverse effects of climate change. This is because of their relative lack of capacity to respond to most of the key climate change impacts like droughts, fluvial floods, wildfires, water insecurity and crop, animal and settlement losses.

Discussion

The flexibility and face-to-face nature of the various approaches adopted (semi-structured interviews, key informant interviews, observations and interactions, etc.) helped the research team to engage the respondents in an interactive way in order to delve deep into the study variables. For instance, the key informant interviews with Village Heads, Ward Councillors, Municipal officials from the directorates of environment and disaster management, allowed the researchers to confirm some of the impacts of climate change on key livelihood systems as highlighted by the local residents. This category of officials, professionals and opinion leaders, by virtue of their positions and responsibilities in some specific institutions, departments and communities helped the research team to critically analyse how social justice and participatory democracy principles constitute the core ingredients of local climate change impacts adaptation policies or otherwise. They further helped in validating the data collected through other methods.

Based on different kinds of interviews, interactions and focus group discussions with different individuals, such as household heads, opinion leaders and ward councillors, this paper highlights that prolonged dry spells and heat waves, floods, wildfires, water and food insecurities, crop and animal losses, poverty, spread of air and water-borne diseases and settlement losses are some of the key impacts of climate change in the Libode area of the Eastern Cape. These adverse effects of climate notwithstanding, the study further noted that residents' level of involvement in various climate change policy formulation processes and procedures available to the people who matter most is virtually non-existent. Meanwhile, in discussing climate change in the context of social justice as a concept in Africa; community or household-level engagement is the perfect starting platform to understand power relations between policy formulators (national or provincial or local government) and policy beneficiaries (local residents). Evidence from the study suggests that communities need to be empowered to set their own agenda of managing climate change impacts as this could contribute immensely towards overcoming inequalities in local settings. Instead of looking at vulnerable and marginalised communities and social groups as passive recipients of climate change impacts mitigation policies and processes; this paper demonstrates that the same people can become changers of their own destinies if properly empowered and strategically included in climate change policy formulation and discussions. For easy reading and understanding, the rest of the discussion is presented under the three key pillars of social justice (distributive, procedural and recognitional justices). It is important to note that there is a considerable overlap between these three pillars.

Recognitional justice and climate change management

It is an established fact that climate change has implications for social justice, with climate justice (a fusion of the concepts of climate change and social justice) playing an important role in modern-day climate change debates and negotiations [1]. Contemporary climate justice approaches argue that there is the urgent need to protect the rights and interest of the marginalised and the most vulnerable social groups in society. This could be done by involving such vulnerable social groups in climate management decision-making processes; making them key stakeholders in climate policy implementation processes, and sharing the benefits and impacts of climate change fairly and equitably among the groups. Thus, the whole approach of managing climate change through social justice should begin with the recognition that those individuals, households and communities who already show high levels of vulnerability to climate change impacts are the ones suffering the most from the adverse effects of climate change and must be protected. This is exactly the case of Libode local area of the Eastern Cape which relatively lacks key social infrastructure and other resources [24] to support vulnerable groups and communities against adverse climate change effects.

Procedural justice and climate change management

Interventions and solutions to most of the impacts of climate change on key livelihood systems require the disempowering of unequal systemic structures through designing and implementing more inclusive decision-making processes (procedural justice) as

well as recognizing pre-existing inequalities when addressing climate change impacts and events. It is very important to critically look at how climate change impacts mitigation and adaptation policies are implemented nationally in Africa to highlight how the needs and voices of the rural poor and vulnerable communities are being considered. This argument resonates with the submission of Schlosberg and Carruthers [21] that to promote social justice in the context of climate change impacts management is basically about decreasing the unequal distribution of resources through procedural opportunities to positively impact the general well-being of people and communities as a whole. This implies that communities' well-being should be placed at the centre of climate justice policy discussions by clearly defining their needs and priorities. This point further suggests that the kind of societal transformation needed to effectively and sustainably address climate change and its related issues requires the active involvement of citizens at various stages of political engagements. Thus, an engagement with residents in debates and processes leading to a collective climate change policy formulation is a prerequisite in properly and sustainably handling climate change impacts on key livelihood systems in less developed areas like the Libode local area and Africa as a whole with social justice as a guiding principle.

Distributive justice and climate change management

Looking at it from a distributive justice perspective, the findings highlight that climate change impacts mitigation and adaptation strategies cannot be implemented in a social vacuum. Thus, if a small cluster of the population is comparatively responsible for most of the damage caused in the whole value chain of extraction and production, a holistic approach is required in the reparative justice kind of approach and processes by way of distributing fairly all the necessary resources and processes aimed at the restoration of the damaged socio-economic structures and environmental systems. Advancing social justices as an operational concept in the context of climate change crisis management in Africa implies the strengthening of the dialogue between research and practice in order to fashion out local and context specific strategies to combat climate change impacts on local livelihood systems. At the center of climate change discussion globally, experts believe that one is right to define it as an 'ecological debt' from the industrialised global North to the South through land occupation, minerals extraction and waste disposal in the global southern regions have caused so much injustice to the poor and vulnerable in Africa [9]. It is further highlighted that there is a strong link between climate change and poverty in global South – particularly in Africa where evidence shows that climate change reproduces and intensifies pre-existing socio-economic inequalities.

Conclusion

Anchored by the concept of social justice in discussing climate change impacts management, this paper has demonstrated, using the various narratives from Libode in the Eastern Cape Province of South Africa as a case study, that lack of distributive, procedural and recognitional justices negatively affects the sustainable management of climate change and its related issues in Africa. Importantly, the paper highlights the salient critical role people at the grassroots and their active involvement could play in mobilising and promoting community participation in environmental management and climate change as a whole. Using social justice as an operational concept in discussing climate change and its associated impacts, the paper has demonstrated that various forms of socio-economic and environmental inequalities can be reduced to the barest minimum and increase social transformation drastically in South Africa and Africa as a whole through fair distribution of resources and opportunities, proper recognition of relevant stakeholders and transparent procedures.

In conclusion, this paper demonstrates that those most vulnerable to climate change in the Libode local area and many other communities in the Eastern Cape with similar socio-economic and political characteristics have the least political and economic power to affect and influence social change to ensure climate justice. This submission aptly supports Dietz's [7] argument that access to power is a critical factor in shaping communities' ability to properly plan for, cope with and adequately respond to the adverse impacts of climate change on key livelihood systems. It is therefore not surprising that almost all the participants of the study complained about their high levels of vulnerability to climate change since they are unable to participate and /or influence key climate change related decisions and policies that directly affect them and their daily activities.

Development practitioners at both local and international levels and governments at all levels (national, provincial and local) should therefore ensure that social justice and its related concepts are placed at the centre of the development and implementation of climate change impacts adaptation strategies. This could be done by adopting a multi-sectoral approach of bringing various agencies, institutions and departments to ensure that the interests and rights of the vulnerable are catered for in such policies.

Policy recommendations

Based on the key findings of the study, the paper suggests the following specific policy and practice options for consideration by policy makers and practitioners alike:

- ➢ Considering the increase in the call for attention to be given to marginalised groups and communities; this paper proposes a special attention to be focused on community level approaches to climate change management. This could help to bridge the inequality gap between different societies and ensure social justice and fairness for all at all levels.
- ➢ The paper strongly recommends public participation in climate change policy formulation processes in the Libode area and communities alike in South Africa and beyond to ensure that people are involved in all processes and collectively own local climate change impacts adaptation policies.

- ➢ The paper recommends collaborative and empowering relationships between governments and communities to effectively manage climate change impacts at local levels.
- ➢ It is critical to empower various climate change stakeholders to organise and coordinate a multi-sectorial participation of institutions and agencies in protecting climate vulnerable populations; thereby ensuring social justice for all in the context of climate change management.
- ➢ Finally, the involvement of local residents in climate change impacts management policies to enhance the government's transparency and accountability on climate change and social transformation issues in the Eastern Cape and beyond is non-negotiable.

CRediT authorship contribution statement

Amos Apraku: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Benjamin Apraku Gyampoh:** Writing – original draft, Writing – review & editing. **John F. Morton:** Writing – review & editing. **Simon Mariwah:** Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] M.F. Alves, E.B. Mariano, Climate justice and human development: a systematic literature review, J. Clean. Prod. 202 (2018) 360–375, https://doi.org/10.1016/j.jclepro.2018.08.091.
[2] S. Amruta, Climate change and social justice, Climate Change 1 (4) (2015) 498–502.
[3] S. Barry, A. Jonathan, Climate change, human rights, and social justice, Ann. Glob. Health 81 (3) (2015) 310–322.
[4] P. Bond, Politics of Climate justice: Paralysis above, Movement Below, Durban: University of KawZulu Natal Press, 2012.
[5] B. Brian, Why Social Justice matters? Polity press, Cambridge, UK, 2005.
[6] E. Chu, K. Michael, Recognition in urban climate justice: marginality and exclusion of migrants in Indian cities, Environ. Urban. 31 (1) (2019) 139–156, https://doi.org/10.1177/0956247818814449.
[7] K. Dietz, The political ecology of vulnerability: how the rural poor are excluded from climate policy. A case study from Morogoro, Tanzania, in: B. Engels, K. Dietz (Eds.), Climate Change in Africa: Social and Political impacts, Conflicts and Strategies, Peter Lang GmbH, London, 2018, pp. 107–125.
[8] DST, South African risk and Vulnerability Atlas, DST,CPD print, Pretoria, 2011.
[9] M. Fernandes-Jesus, B. Barnes, R.F. Diniz, Communities reclaiming power and social justice in the face of climate change, Commun. Psychol. Glob. Perspect. 6 (2) (2020) 1–21.
[10] IPCC. (2007). *IPCC assessment report 4*. Retrieved July 28, 2012, from Intergovernmental Panel on Climate Change: http://www.ipcc.ch.
[11] IPCC, Fifth Assessment Report of the Intergovernmental Panel On Climate Change, Cambridge University Press, Cambridge, 2013.
[12] IPCC, Summary for Policymakers, in: H.O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, et al. (Eds.), Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel On Climate Change, Cambridge University Press, Cambridge, UK and New York, USA, 2022, pp. 3–33, https://doi.org/10.1017/9781009325844.001, pp.
[13] P. Johnston, R. Schultze, Report On Climate in Eastern Cape, ECDC, East London, 2010.
[14] J. Kam, S.K. Min, P. Wolski, J.S. Kug, CMIP6 model-based assessment of anthropogenic influence on the long sustained western cape drought over 2015–19, Am. Meteorolog. Society 102 (1) (2021) S45–S50, https://doi.org/10.1175/BAMS-D-20-0159.1.
[15] P.M. Kelly, W.N. Adger, Climate theory and practice in assessing vulnerability to climate change and facilitating adaptation, Climate Change, Issue 47 (2000) 325–352.
[16] R.D. Manzanedo, P. Manning, COVID-19: lessons for the climate change emergency, Sci. Total Environ. 742 (2020), https://doi.org/10.1016/j.scitotenv.2020.140563.
[17] D. Miller, Principles of Social Justice, Havard University Press, London, UK, 1999.
[18] I. Niang, O.C. Ruppel, M.A. Abdrabo, A. Essel, C. Lennard, J. Padgham, et al., Africa. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel On Climate Change, Cambridge University Press, Cambridge, United Kingdom and New York, USA, 2014, pp. 1199–1265.
[19] J. Popke, S. Curtis, G. Gamble, A social justice framing of climate change discourse and policy, Geoforum (2014) 1–11.
[20] SADC & UNEP, Southern African sub-Regional Framework of Climate change: Adaptation and Mitigation Actions, Supported By Enabling Measures of Implementation, Not indicated: SADC & UNEP, 2010.
[21] D. Schlosberg, D. Carruthers, Indigenous struggles, environmental justice, and community capabilities, Glob. Environ. Polit. (10) (2010) 12–35, https://doi.org/10.1162/GLEP_a_00029.
[22] D. Schlosberg, Climate justice and capabilities: a framework for adaptation policy, Eth. Int. Aff. 26 (4) (2012) 445–461.
[23] A. Schlosser, A. Sokolov, K. Strzepek, T. Thomas, X. Gao, C. Arndt, The changing nature of hydroclimatic risks across South Africa, Clim. Change 168 (28) (2021) 1–25.
[24] S. Statistics, 2011 Census Report, Pretoria, Stats SA, 2013.
[25] A. Strauss, J. Corbin, Basics of Qualitative research, Sage Publications, Thousand Oaks, CA, 1998.
[26] T. Thaler, S. Fuchs, S. Priest, N. Doorn, Social justice in the context of adaptation to climate change—Reflecting on different policy approaches to distribute and allocate flood risk management, Reg. Environ. Change 18 (2018) 305–309, https://doi.org/10.1007/s10113-017-1272-8.
[27] N. Tsakani, Rural Development in South Africa: The role of Agriculture, Government Printer, Pretoria, 2012.
[28] United Nations, United Nations Framework Convention on Climate Change, UN, New York City, 1992.