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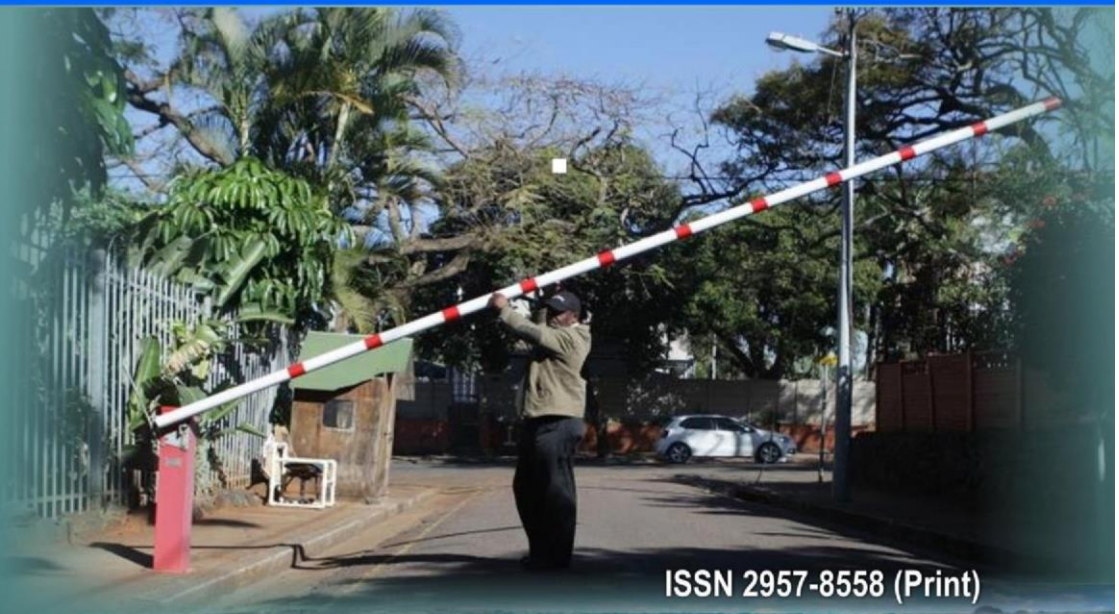
THE ZIMBABWE EZEKIEL GUTI UNIVERSITY JOURNAL
OF COMMUNITY ENGAGEMENT AND SOCIETAL TRANSFORMATION



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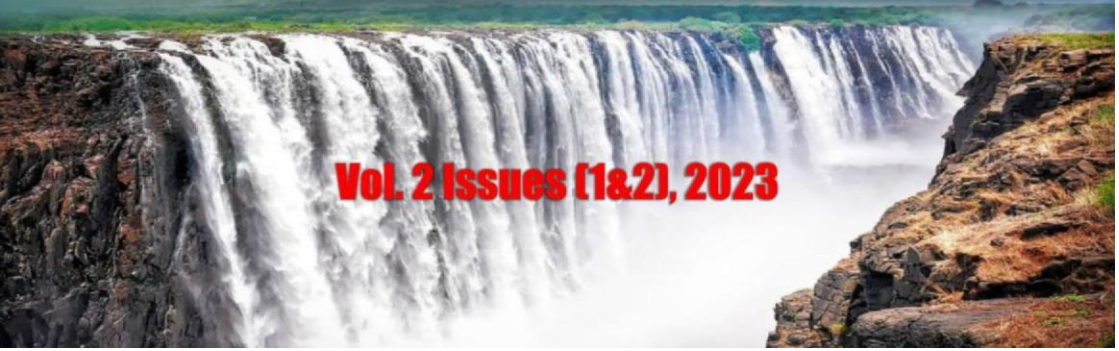

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# About the Journal

## JOURNAL PURPOSE

The purpose of the *Ngenani - Zimbabwe Ezekiel Guti University Journal of Community Engagement and Societal Transformation Review and Advancement* is to provide a forum for community engagement and outreach.

## CONTRIBUTION AND READERSHIP

Sociologists, demographers, psychologists, development experts, planners, social workers, social engineers, and economists, among others whose focus is on community development.

## JOURNAL SPECIFICATIONS

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## SCOPE AND FOCUS

The journal is a forum for the discussion of ideas, scholarly opinions and case studies of community outreach and engagement. Communities are both defined in terms of people found in a given locale and defined cohorts, like the children, the youth, the elderly and those living with a disability. The strongest view is that getting to know each community or subcommunity is a function of their deliberate participation in

matters affecting them by the community itself. The journal is produced bi-annually.

## Guidelines for Authors for the Ngenani Journal

Articles must be original contributions, not previously published and should not be under consideration for publishing elsewhere.

**Manuscript Submission:** Articles submitted to the *Ngenani - Zimbabwe Ezekiel Guti University Journal of Community Engagement and Societal Transformation* are reviewed using the double-blind peer review system. The author's name(s) must not be included in the main text or running heads and footers.

**A total number of words:** 5000-7000 words and set in 12-point font size width with 1.5 line spacing.
**Language:** British/UK English
**Title:** must capture the gist and scope of the article
**Names of authors**: beginning with the first name and ending with the surname
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**Abstract:** must be 200 words
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Italicise *et al., ibid.,* words that are not English, not names of people or organisations, etc. When you use several authors confirming the same point, state the point and bracket them in one bracket and ascending order of dates and alphabetically separated by semi-colon e.g. (Falkenmark, 1989, 1990; Reddy, 2002; Dagdeviren and Robertson, 2011; Jacobsen *et al.,* 2012).

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# INFUSING RESILIENCE FOR CLIMATE CHANGE IN PERI-URBAN COMMUNITIES IN ZIMBABWE

NYASHA NDEMO[1], INNOCENT CHIRISA[2] AND NOMALANGA MPOFU-HAMADZIRIPI[3]

## Abstract

***The study explores essential ways to increase the resilience of periurban areas is to invest in social capital by developing civic engagement mechanisms. It advances the argument that climate change in peri-urban settings has affected their resilience and adaptation. Zimbabweans' livelihoods in peri-urban areas depend mostly on the agro-industry. Furthermore, they depend on biofuels for energy hence they need to build resilience to survive the impact of climate change. This article makes use of a desktop study where it reviews available literature cases and experiences in peri-urban communities in Zimbabwe and beyond. Evidence from the sources show that research on climate change resilience in peri-urban areas has been explored but not critically dissected the implications of climate change on peri-urbanites and their livelihoods, hence this study was done to formulate strategy on how to mitigate the impact and build resilience. The study recommends the utilisation of social ties to improve everyone's access to water. In the negotiation of water insecurity, cooperative and familial norms are crucial. Their water security was enhanced by providing fora for civic engagement and creating social capital. While peri-urban water insecurity issues have attracted a lot of attention,***

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***little has been written about the function of social capital in mediating water insecurity. While researchers have been interested in how social capital plays a part in coping with the effects of climate change, there has not been much research done in a peri-urban setting, hence this study aims to close the knowledge gap.***

**Keywords**: *disaster, temperatures, development, weather, sustainability, population*

## INTRODUCTION

Cities in Africa are characterised by high levels of informality and poverty, poor infrastructure and, consequently, a high susceptibility to environmental dangers. This is in addition to the rapid urban population increase and urban land expansion. Cities are under more environmental challenges because of climate change and its effects (Angel, 2011). As a result, guidelines for sustainable development of cities must include climate-resilient circumstances. Urban green spaces (UGS) are a critical component of a range of solutions to increase the general resilience of cities. The ability of a city to handle stress and recuperate from stress is enhanced by UGS. However, the existence of green spaces in cities is threatened by both urbanisation and varying climate circumstances (Baker, 2008). Nevertheless, by making appropriate management and planning decisions that result in urban vegetation being sufficiently integrated into the city matrix, and by sustainably supporting urban climate resilience, their continued existence can be secured. These tactics include ecosystem services aimed at lessening the effects of heatwaves and floods, enhancing air quality, and enhancing food security.

Although increasing global urbanisation and its environmental, economic and social problems have been intensively discussed, approaches to enhancing urban climate resilience in developing countries demand further scientific investigation (*ibid.*). As such, this study (1) elaborates on urbanisation in Africa; (2) discusses urban land expansion and environmental challenges in the context of climate change; and (3) examines the potential to contribute to urban climate

resilience. As argued by the definition of resilience in socio-ecological systems, resilience is the capacity of a system to withstand shocks and avoid crossing thresholds that would inescapably result in new states, keeping the system's ability to reorganise itself as change occurs. In line with Banuri (2001), the ability of an urban system and all its underlying socio-ecological and socio-technical networks to maintain or quickly resume desired functions in the face of a disturbance, to adapt to change and to swiftly transform systems that restrict current or future adaptive capacity, is referred to as urban resilience.

Climate resilience in natural and human systems heavily depends on such systems' capacity to both adapt to and mitigate the consequences of climate change (evolutionary resilience). In this context, adaptation refers to retaliatory changes made in reaction to real or anticipated climatic stimuli and their repercussions or impacts, whereas mitigation refers to proactive human actions taken to cut back on greenhouse gas (GHG) sources or increase sinks (Beauchemin, 2011). Both methods contribute significantly to urban climate resilience because their ultimate goal is to reduce the adverse effects of climate change. Zimbabwe is expected to have significant effects from climate change, such as increasing water stress, more frequent droughts, decreased production of crops and cattle, altered wildlife ranges, an increase in wildfire events and possibly expanded malaria zones (Caldwell, 2019).

With support from the UNDP and funding from the Special Climate Change Fund (SCCF) of the Global Environment Facility, the Government of Zimbabwe (GoZ) is working with communities to address climate change and build resilience to its effects (*ibid.*). A project in Zimbabwe called Building Climate Resilient Rural Communities aims at reducing the vulnerability of rural communities to climate change by developing strategies and principles that local governments may utilise when mainstreaming and planning for adaptation. Integrating climate hazards into all development choices and planning entails mainstreaming climate change (*ibid.*). Development activities are more robust to climate uncertainty and more likely to succeed when climate risk is recognised and included in policies, plans and practices.

Cities can either contribute to climate change, adapt to or alleviate the consequences of changing climatic circumstances by taking into account their enormous concentrations of human capital (CoqueryVidrovitch, 2005). Mitigation and adaptation measures work together to increase urban resistance to climate change and its effects. Modifying the built environment and lifelines, promoting urban green infrastructure, taking preventative measures to lessen social vulnerability, fostering climate change governance, bolstering strategic urban planning and conducting routine risk assessments while making this information accessible to decision-makers and urban residents, are all examples of adaptive aspects of climate change resilience in cities (Chen and Ravallion, 2007). Major initiatives to advance urban climate change resilience in Africa have thus far centred on enhancing the infrastructure of low-income communities, implementing legislative changes, implementing emergency measures like building drainage after flood events, launching programmes to combat poverty, and learning from the experiences of other cities (Chen and Ravallion, 2007).

For instance, 3 000 reinforced housing units were built in 2005 for the relocation of flood victims in Dakar (Senegal), which is vulnerable to the coastal inundation and erosion that affects many other coastal cities in Africa. Retention ponds were also built in the floodplains and settlement in the floodplains was prohibited. Effective climate change adaptation necessitates community-based, institutional and infrastructure initiatives, as argued by experience from Kampala (Uganda). The lack of capability, expertise and resource availability within national and local government, however, hinders the successful implementation of climate resilience measures in many African cities (Coquery-Vidrovitch, 2005). Urban areas can contribute to climate change mitigation, even though efforts to adapt to climate change must be given priority. The most essential gas emission mitigation measures are to support public transportation, use renewable energy sources, implement better waste management practices and preserve or grow.

These adaptation and mitigation strategies undoubtedly reflect the social, engineering and planning implications of urban living, but their efficacy has not yet been empirically shown (Jenkins, 2014). However, a

growing body of evidence indicates that cities that were previously considered to be sole producers of atmospheric carbon dioxide ($CO^2$) may also be able to operate as carbon sinks are thought to store a significant quantity of carbon, as argued by estimates from cities in North America and Europe. Nearly 231 000 tonnes of carbon dioxide are stored in the city of Leicester (United Kingdom), which has a surface area of 73 square kilometres (Henderson, 2014). In the United States, where urban areas make up 3% of the entire country's land area, metropolitan trees are estimated to store 630-700 million tonnes of carbon.

**CONCEPTUAL FRAMEWORK**

Although climate change is having a significant impact on urban and peri-urban agriculture, Lwasa *et al.* (2014) observe that evidence from some African cities such as Ibadan, Dakar and Kampala, also indicates that when properly implemented, adaptation strategies can lessen the vulnerability of these agricultural systems and increase the resilience of urban and peri-urban communities. "Adjustments in natural or human systems in response to present or anticipated climatic stimuli or their effects, which minimise harm or exploit advantageous chances" is one definition of adaptation to climate change (Robinson *et al.*, 2018). As argued by Moser and Ekstrom (2010), "Adaptation encompasses changes in social-ecological systems in response to actual and anticipated impacts of climate change in the context of interacting with climatic changes" (Moser & Ekstrom, 2010:22-26). As argued by Moser and Ekstrom (2010), limitations on adaptation and impediments to adaptation are the main reasons climate change adaptation efforts fail. Absolute challenges, such as the size of the land or the availability of water, are referred to as adaption limits (Jenkins, 2014). Typically, physical, environmental and ecological, these challenges might be hard to overcome through innovation. Obstacles that can be overcome with preparation and effort are referred to as climate change adaptation barriers. These might involve adjustments to institutions and land use policies (Moser and Ekstrom, 2010). Considering the elements that promote or inhibit adaptation, this article discusses climate change adaptation in Kensington.

## LITERATURE REVIEW

Unplanned peri-urban growth (about 7.2% annually) and exposure to climate-related hazards (such as droughts, rising temperatures, falling dam levels and localised flash flooding) in Namibia, continue to degrade ecosystems, basic infrastructure, public services and historical inequalities. For instance, the situation in Namibia's informal settlements was deemed a humanitarian disaster in 2018 and a state of emergency was proclaimed there in 2019 after six years of drought (Kessides, 2012). The accomplishment of many sustainable development goals and the growth of regional economies and healthy communities are all threatened by these issues. In these conditions, proactive involvement and inclusion of local stakeholders, particularly voices from the margins, in urban planning have the potential to enhance decision-making, lessen historical disparities, encourage benefit-sharing and strengthen social-ecological resilience (Simone, 2011). However, there have been few attempts to evaluate the factors that contribute to unplanned informal settlement growth, their reciprocal interactions with social, economic and environmental impacts (such as the security of food, water, energy, land and livelihoods), and how this influences current and future planning processes (Kitto, 2012). Peri-urbanisation and climate change are interacting and intensifying each other all over the world. The decision to relocate from a rural to a peri-urban area is accelerated significantly by more frequent and intense rapid onset (floods and wildfires) and slow onset (drought and biodiversity loss) events caused by climate change, as argued by a substantial body of evidence (*ibid*.). Both phenomena have multiple drivers (IPCC, 2021). For instance, climaterelated shocks and stresses in 2020 included swarms of locusts in the Horn of Africa that resulted in widespread famine; a record 30 severe storms, including Hurricanes Iota and Eta, that caused significant damage along the Atlantic coasts; four million acres of forest were destroyed in California; destructive typhoons in the Philippines; massive floods in Indonesia; and devastating earthquakes in California. Tens of millions of people are being forced to relocate across borders, to more hospitable latitudes, into protected regions, and peri-urban areas, along with an estimated 50% of all other species (Welch, 2017). Because of COVID-19's recent experiences, it has also been argued that one adaptive response to a crisis in a compact

metropolis would be outmigration, which would accelerate the conversion of rural land into peri-urban (or suburban) areas (Dutta *et al.*, 2020).

Peri-urban areas are often thought of as those with both agricultural and industrial economic activity and are characterised by poor administration, limited planning and a lack of utilities like sanitation and waste management. The term "peri-urban" is a bit nebulous, though. It refers to an interface between rural and urban activities, institutions and perspectives. It also refers to the movement of commodities and services between physical areas and the shift from rural to urban contexts as a process (Mabogunje, 2018). The complex, varied, and transitional nature of peri-urban space, and the variety of needs and aspirations of peri-urban stakeholders who may come from many different countries of origin, work in local manufacturing and/or agriculture, commute to the urban core, or own a "second home" are all factors. As argued by Shkaruba *et al.* (2021), "municipal land-use planning at different scales and spatial extents, controlling the use of the land inside the border of the municipality" is one of the many governance or planning instruments that manage peri-urban environments. Peri-urban landscapes fall under the territorial purview of metropolitan, regional, or landscape authorities, which utilise a variety of planning levels and related spatial plans under various governance structures, necessitating an appropriate level of coordination at each of the various levels (Mabogunje, 2018). As argued by Mabogunje, new types of governance are required to address the peri-urban space's escalating issues. They place a strong emphasis on the necessity of teaching decision-makers the specific trade-offs that arise from decision-making in a peri-urban context and enhancing coordination of the heterogeneous network of peri-urban organisations (Simone, 2011).

## RESEARCH METHODOLOGY

Desktop research was used and relevant information on infusing resilience on climate change was gleaned from current literature. Secondary data was gathered from developed and developing countries' experiences, Word Bank publications, Google Scholar articles,

and previously presented studies on some of the important subjects of planning, development, and urbanisation.

**RESULTS**

Because of growing urbanisation and rising human activity, peri-urban ecosystems are increasingly at risk of degradation and loss due to increased resource consumption and waste. Cities exist under a "sphere of reliance" on their surroundings and their ecosystems rather than independently (GEAG, 2016). As a result, the loss of ecosystem services that support urban and peri-urban people is caused by the degradation of these ecosystems.

A strategic framework for planning and innovation is critical for periurban sustainable development. However, because they will eventually become metropolitan regions, the peri-urban margins also offer enormous potential. This circumstance necessitates a thorough awareness of the opportunities and problems these peri-urban communities provide. The areas of innovation needed to change these urban outposts must be identified (Meerow, and Joshua, 2016). This roundtable aims at investigating these problems and ultimately identify potential strategic research areas required to make these periurban communities self-sufficient. A strategy framework based on issues, challenges, and opportunities is shown Table 1.

**Table 1:1 Summary of Results**

| ▪ Items | ▪ Challenges | ▪ Opportunities | ▪ Innovation |
|---|---|---|---|
| ▪ Infrastructur e | ▪ Incrementalism<br>▪ Maintainability<br>▪ Poor connectivity of all social and physical<br>▪ infrastructure<br>▪ Poor quality of housing | ▪ Availability of land<br>▪ Availability of natural resources<br>▪ Integrated planning | ▪ Growth<br>▪ Containment strategy<br>▪ Land information systems<br>▪ Technology enhancement like solar roadways |

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|---|---|---|---|
| ▪ Energy | ▪ Poor quality of electricity<br>▪ Increasing energy demand<br>▪ Poor systems of energy distribution<br>▪ High generalised cost of transport | ▪ Energy-efficient buildings<br>▪ Energy efficient transport<br>▪ Energy efficient planning<br>▪ Energy management | ▪ Renewable distributed micro-grids<br>▪ Hybrid power systems<br>▪ Energy from waste – biomass |
| ▪ Social conditions | ▪ Sudden socioeconomic change<br>▪ Lack of sense of ownership/participation<br>▪ Lack of adequate employment opportunities | ▪ Local participation<br>▪ Availability of human resources<br>▪ Opportunity to provide skills training | ▪ Livelihood opportunity<br>▪ Peri-urban commons<br>▪ Inclusive planning! |
| ▪ Governance | ▪ Defining peri-urban areas<br>▪ More political will for development<br>▪ The increasing problem of security | ▪ Parameterisation of peri-urban areas<br>▪ Data creation: land database<br>▪ Transparency of land transactions and allocation of resources<br>▪ Public participation | ▪ enhancing the local economy with more linkages with the urban core<br>▪ Technical capacity building of local body |

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| ▪ Environment | ▪ Degradation of natural assets<br>▪ Solid waste (SW) disposal and management<br>▪ Groundwater contamination<br>▪ Ecosystem threats<br>▪ Urban heat islands<br>▪ Air pollution<br>▪ Degrading quality of life | ▪ Less local SW generation<br>▪ Rainwater harvesting<br>▪ Use of biodegradable material resources<br>▪ Policies to reward and penalise<br>▪ citizen to safeguard the environment<br>▪ Carbon trading<br>▪ Air quality improvement | ▪ Reduce/reuse SW<br>▪ Creating baseline status of environment<br>▪ Monitoring of resources<br>▪ Public participation in SW management<br>▪ Technologies to develop renewable and green energy.<br>▪ Improvement of air quality |

**Water supply:** As polluting above-ground rivers and lakes destroys usable sources of surface water, this is frequently the most critical service lost. Groundwater is contaminated by the disposal of sewage and solid/liquid waste in peri-urban regions, which promotes the spread of numerous diseases (Misilu *et al.*, 2018). The demand for this finite water supply rises because of population growth, and water tables fall as underground aquifers are unable to replenish.

**Flood buffers:** This is frequently one of the most important services in danger since unauthorised construction on areas designated as open/green belts prevents natural drainage and worsens flooding. Floods and severe waterlogging increase the risk of property damage and fatalities.

**Waste treatment:** The ecosystem's capacity to filter trash out of water supplies is undermined by the degradation of wetlands. The remaining streams are polluted by waste from peri-urban industries, excessive untreated human waste and garbage.

**Food production:** As the urban fringe grows, industry and housing developments (both formal and unofficial) take the place of productive

agricultural land. This frequently displaces poor farmers and can result in lower food production and higher food prices, especially in cities that are heavily dependent on nearby agricultural supplies (Taylor and Camaren, 2014). Peri-urban land maintains green vegetation cover that absorbs air pollution and ambient heat, but clearing vegetation slows the process of filtering hazardous substances from the local atmosphere. This helps to regulate climate and air quality. A "heat island" effect may develop, raising temperatures in a region when once-permeable, shady environments turn dry and solid.

**Fuel wood and timber:** Farmers in the area rely on a source of fuel wood and timber that is removed by deforestation. Ecosystem services offered by these transition zones have a substantial impact on the sustainability of both urban and rural development. Managing the environment of this interface is important in the current setting (Özden and Chigoyie, 2012). Understanding population trends, socio-economic change, on-going urbanisation process, anticipated climatic change, influence on natural resources and livelihoods in these transition zones becomes crucial. To manage the resilience of these ecotones, new collaborative governance systems with several levels are needed. The United Nations' Sustainable Development Goal No.11 also emphasizes the importance of making cities inclusive, safe, resilient and sustainable by implementing integrated policies and plans for resource-use efficiency and climate change adaptation (UN, 2014), which is impossible without protecting these peri-urban areas. Periurban areas are rapidly changing and now provide true environmental services outside but close to cities and towns. These new areas relieve over-tourism pressures on productive forests and reserved ecosystems, including protected areas. Suburban parks and other ecosystems, such as bodies of water, agriculture farms and horticulture nurseries, among others, provide significant facilities to satisfy crowds and are highly valued by visitors (Özden and Chigoyie, 2012). They are used for sports and recreational purposes. However, because of the influence of developed European nations, expectations in some periurban areas are more demanding and complex. New health demands are emerging, and forests and bodies of water are increasingly seen as contributing to health, not just by individuals, but also by institutions whose perceptions of forests are

changing (Walker, 2002). The role of peri-urban forests as sources of wellness is an intriguing concept that should be investigated further and applied to other environments such as mountains, coasts and so on (Parker and James, 2014). The environmental and forestry sectors are now expected to manage such new social demands, especially through collaboration with the health sector (along with urban and rural development).

## DISCUSSION

Achieving long-term, broad-based economic growth in developing countries requires resilience. To succeed, development professionals are starting to understand that building resilience across all programmes and initiatives is essential (Walker, 2002). Recent years have seen the rise of the idea of low-carbon, climate-resilient development as a crucial framework for addressing policy and action to combat climate change, capturing the necessity of fully integrating mitigation and adaptation activities into development planning and implementation (Parker and James, 2014). A peri-urban area, located next to the margins of the city where many intricate socio-economic activities take place, is a constantly changing zone of interaction and transformation (Watson and Agbola, 2013). As a result, its ability for resilience is primarily influenced by two sets of input-output dynamics: on the one hand, with the nearby metropolitan region, and on the other, with its subsequent exclusively rural systems. Moving away from existing reactive techniques and toward the creation and implementation of proactive strategies is essential for increasing urban and peri-urban resilience to natural hazards and climatic extremes (Quagraine, 2011). The approach's major goal is to keep natural ecosystems resilient and their services available so that communities may endure and withstand harsh catastrophes. Climate change is known to increase the likelihood of disasters by increasing the frequency and severity of hazards and by adding new layers of hazards. It also increases the factors that make people more vulnerable in two ways: through ecosystem degradation, decreases in water and food availability that cause food and health insecurity, and changes to livelihoods due to an increase in weather and climate hazards (Sudmeier-Rieux *et al.*, 2013).

Ecosystems and cities have a mutually beneficial interaction that frequently involves reciprocity. Ecosystems offer cities and their citizens a wide range of physical and environmental services that also contribute to increasing a city's resilience (Rakodi *et al.*, 2006). However, the cities' fast urbanisation and unplanned expansion are posing a threat to ecosystem health. The "extractive" aspect of urbanisation sets a low value on protecting the environment, having an impact not just on individuals whose livelihoods are immediately impacted but also on the city itself (White and Paul, 2014). Periurbanisation results in the encroachment of environmentally fragile regions for housing and other development projects. These alter how agriculture is practised, constrict green spaces and open areas, and put more strain on water and other natural resources (Satterthwaite, 2001). Inadequate delivery of basic services, industrial effluent, air pollution and a lack of infrastructure for hygiene and sanitation distinguish these places. The peri-urban regions, which offer ecosystem services to urban areas, are used as landfills for urban solid waste, sewage, etc., causing environmental degradation, contaminating groundwater and negatively affecting the quality of life and health of those who live there. A national urban policy tool has been developed by the UNHABITAT (2015) to address concerns related to climate change in cities and human settlements (*ibid*). The tool's primary goal is to provide national, municipal and other stakeholders with the knowledge and tools they need to create successful policy frameworks to address urban climate change, with a particular emphasis on urban governance, adaptation and mitigation (Satterthwaite, 2007).

**Table 2: National Urban Policy Tool** (UN-HABITAT, 2015).

| ▪ **Focus** | ▪ **Recommendations** |
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|---|---|
| ▪ **Promoting lowcarbon urban development (Mitigation)** | ▪ Encourage and aid in the creation of neighbourhood-level plans and initiatives to cut GHG emissions.<br>▪ Energy should be obtained from low-carbon and renewable sources more frequently, especially through decentralised or distributed energy delivery, and more efficient energy use should be encouraged.<br>▪ Promote urban planning strategies that are more suited to lowering GHG emissions, such as reducing commute times. Promote more environmentally friendly forms of transportation at the same time: promote (i) the more environmentally friendly design and construction of new buildings; and (ii) the retrofitting of existing structures to reduce GHG emissions.<br>▪ Improve the sustainability of municipal solid and liquid waste management. |
| ▪ **Building Climate**<br>▪ **Resilience**<br>▪ **(Adaptation)** | ▪ Encourage applied study on the dangers posed by the effects of climate change and other threats in urban settings. Allow for the use of results to guide decisionmaking.<br>▪ Inform decision-making at all levels, encourage and promote the creation of local-level climate change risk assessments that incorporate an examination of climate resilience and adaptive capability. Encourage multihazard analyses.<br>▪ Encourage the mapping of risks, especially those that may change over time due to the climate.<br>▪ Planning human settlements, managing land use, and delivering essential infrastructure and services in a way that accounts for risks and fosters resilience, including climate resilience, are all important aspects of this. Encourage and support local-level plans and initiatives to increase climate resilience to achieve this.<br>▪ Emphasize initiatives that help marginalised and vulnerable populations become more resilient. Upgrade slums and informal communities locally wherever possible to increase resilience to shocks and strains, especially those brought on by the effects of climate change.<br>▪ Encourage the preservation and restoration of ecosystems and natural buffers as a component of adaptation efforts.<br>▪ Make provision for regional planning as a way to safeguard ecosystems and prevent "maladaptation." |

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|---|---|
| ▪ **Addressing**<br>▪ **Urban Climate**<br>▪ **Governance** | ▪ Coordination of municipal, state and federal efforts is necessary to combat climate change in metropolitan areas while promoting local authority. When appropriate, engage in cooperative action.<br>▪ Urban managers should be given resources and their institutional ability to confront climate change should be strengthened.<br>▪ Increase knowledge of the economic prospects and side effects of climate change among the general people.<br>▪ Ensure that all national urban policies, legislation, regulations, investment plans and other frameworks are completely compliant with national climate change policies. |

Land use planning and master plans, the ecosystem in peri-urban areas is getting worse. There is less biodiversity and the landscapes are getting smaller. The peri-urban regions are neither "the waiting room" nor "lagging zones" (Mitra *et al*., 2015; Satterthwaite, 2007), thus it is important to strike a balance between pressures for urban expansion and living standards. Without developing the areas around a metropolitan area, it is impossible to sustain a constant input/output of materials. Therefore, a planned and transformational approach is required to promote the inclusive, egalitarian, and sustainable development of urban and peri-urban zones. Regional and urban master plans are thought of as blueprints that should be revisited by professionals in city planning. The strategy must be interdisciplinary, involving professionals from all disciplines and local communities in the planning and management process (Satterthwaite, 2007). It is time we started working with individuals who are knowledgeable in rural planning and are cognisant of the transitional rural dynamics that have significant effects on the "character" of peri-urban areas.

Concerning the role of peri-urban ecosystems in adaptation and the resilience of urban systems against climatic and water-related disasters, this advice offers help to practitioners and policy-makers. Although the advice is primarily directed towards the Asia-Pacific region, it provides pertinent information for circumstances in other growing nations also (Seto *et al.*, 2018). The basis is an understanding of urban carrying

capacity that considers the supporting and absorbing capacities of urban and peri-urban zones and their ecosystems (White and Paul, 2014). To mainstream the integration of disaster risk reduction and climate change adaptation into a more comprehensive framework of urban resilience, it is necessary to acknowledge the significance of ecosystems, particularly those in peri-urban regions (World Bank, 2000). Greater comprehension and integration of ecological infrastructure together with social resilience in peri-urban regions of a city or big township are necessary due to infrastructure and engineered systems' redundancy, sustainability, dependability, and operability.

## CONCLUSION AND RECOMMENDATIONS

Understanding that urban resilience to the effects of climate change is a significant, complex challenge handled via multiple approaches, is critical given the increased awareness of urbanisation. Supporting climate resilience in cities requires a variety of actions, and green areas must play a major part in this endeavour. Using Kumasi as a case study to highlight the potential for climate resilience of African cities, this study examined urban population increase and urban land development in Africa in connection to climate change and the function of green areas. Without a doubt, urbanisation accelerates the loss of natural land cover and worsens the effects of human activity on the environment. To strengthen a city's resilience to climate change and its effects, urban green areas offer opportunities for both reactive (adaptive) and proactive (mitigate) solutions.

Urban vegetation blocks the flow of water and air across land surfaces and above them, reducing the likelihood of floods and air pollution. The removal of GHGs from the atmosphere by vegetation, particularly trees, is crucial for improving air quality and reducing both regional and global warming must be effectively planned, well integrated into urban space and supported by strong institutions to significantly increase urban resilience. Under these circumstances, green areas might be created from abandoned roads, structures and other compacted bare surfaces in cities that otherwise sit idle and useless. A city's ability to withstand climatic stress is increased by vegetation because it increases

biodiversity, breaks up soil compacted concretes and eventually restores ecological balance to such areas.

Due to inadequate enforcement of current laws and a dearth of ad hoc measures, traditional and corporate interests are given the initiative. De facto bottom-up procedures, therefore, control our existence and administration. Chieftaincies, or traditional leaders, and individual landowners, play particularly important roles in this situation. For African towns to maintain and increase their green cover, the government, traditional leaders and civil society must all be involved in setting priorities, simplifying processes and enforcing laws. Therefore, this study suggests that there is need to encourage the development of inclusive and participatory urban climate resilience solutions to secure regional economic success and social-ecological sustainability. Given Zimbabwe's chronic drought, promoting public awareness of the need for urban development that is climate-resilient and future resource flows for food, energy and water. Create and submit a grant request that was jointly drafted (by foreign partners) to introduce our method to other GCRF ODA countries. Train a young group of Zimbabwean researchers studying the social-ecological system and climate in cutting-edge methodology and fieldwork techniques.

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