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REVIEW OF Rural Resilience Praxis

RRP 3 (1&2), 2024

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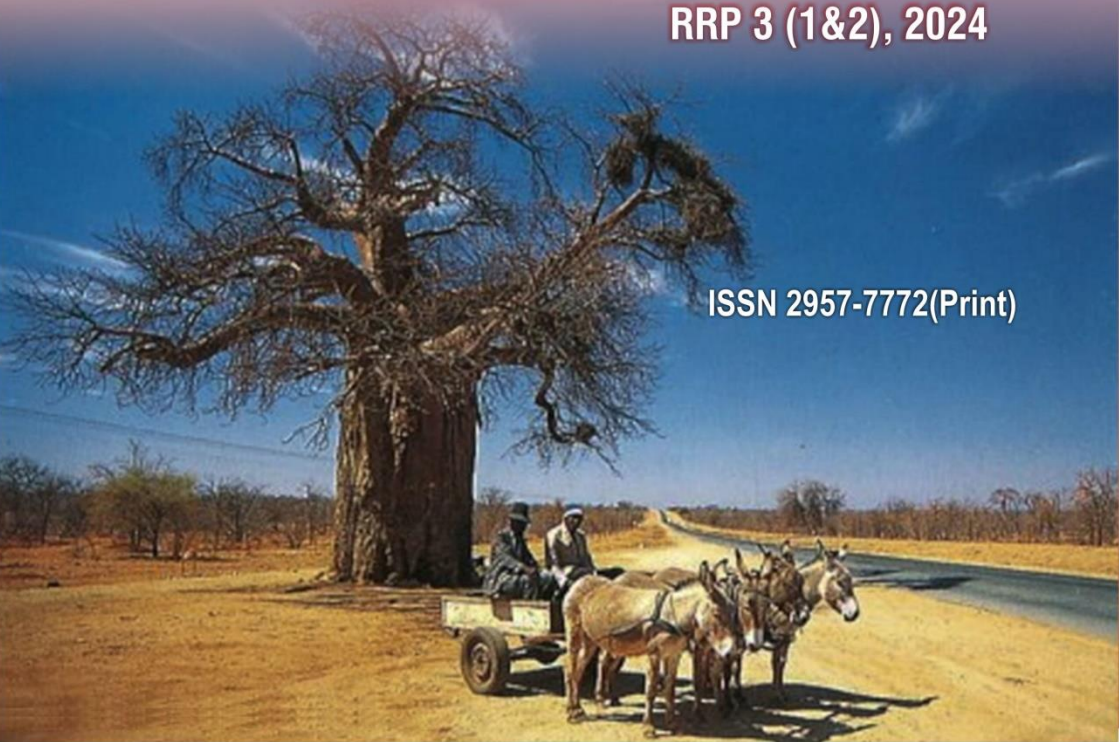

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About the Journal

JOURNAL PURPOSE

The purpose of the *Review of Rural Resilience Praxis is* to provide a forum for disaster risk mitigation, adaptation, and preparedness.

CONTRIBUTION AND READERSHIP

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

JOURNAL SPECIFICATIONS

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SCOPE AND FOCUS

In as much as the urban economic trajectory is increasing by each day, the rural economy, especially in many developing countries, still comprises a great proportion of the extractive and accommodation industries. Retaining some spaces as rural areas remains critical given the integral role rural areas play in providing ecosystem services to both wildlife and humanity. In this light, rural resilience as practice beckons for critical studies especially in the face of the ever-threatening extreme weather events and climate change that then impact on the livelihoods and lifestyles of the rural communities. Review of Rural Resilience Praxis (RRRP) comes in as a platform for critical engagement by scholars, practitioners, and leaders as they seek to debate and proffer solutions to the rural sectors' sustainable growth trajectory, which is resilient to the vagaries of climate change. This journal is also aimed at championing the philosophy of the right to be rural. The issue of conviviality between the different constituencies of the sectors, compiled with the competing challenges of improving rural spaces while also making the conservation, and preservation debates matter is the hallmark of this platform of critical thinking and reflection. The journal is published bi-annually.

Guidelines for Authors for the Review of Rural Resilience Praxis

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

Manuscript Submission: Articles submitted to the *Review of Rural Resilience Praxis* 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
Affiliation of authors: must be footnoted, showing the department and institution or organisation.
Abstract: must be 200 words
Keywords: must be five or six containing words that are not in the title
Body: Where the authors are more than three use *et al.*
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 in 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).

Referencing Style: Please follow the Harvard referencing style in that:
— In-text, citations should state the author, date and sometimes the page numbers.
— The reference list, entered alphabetically, must include all the works cited in the article.

In the reference list, use the following guidelines, religiously:

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Contents

Finance: The Footing for Rural Resilience in Africa

MOREBLESSING GEOGINAH MSUNDIRE[1], ROSELINE NCUBE KATSANDE[2] AND BEATRICE HICKONICKO[3]

Abstract

This article critically discusses rural finance as the basis for engendering rural resilience in Africa. This position emanates from the fact that African countries are amongst the most susceptible to the adverse effects of natural hazards, whilst also showing an increasing obligation to address disaster risk through diversification by encouraging rural financing initiatives. Rural financing as a mitigation strategy to the adverse effects of climate change is urgently needed if the continent is to protect the development gains demonstrated by an economic growth rate. In recent times, the scale and occurrence of disasters and crises have been on sharp rise. More than 60 percent of the African population relies on agriculture for food and income, and they are extremely affected by these crises. Methods engaged are secondary data analysis of existing literature related to the topic. Results from the research, *inter alia*, include the finding that globally, 1.7 billion adults still lack access to formal financial facilities, with a large fraction living in South Asia and Sub-Saharan Africa, respectively. The following recommendations flow from the research: there is need to redefine out-dated financial literacy, with important implications for nations considering financial development approach to refining households' long-run financial resilience. It is also important to warrant that these communities can be resilient to such shocks by providing cross-sectorial and innovative solutions. The solutions put forward must no longer be reactive but confront the root causes of instability.

Keywords*: poverty, risk, household income, assets, economic growth, policy makers*

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INTRODUCTION

Worldwide, financial inclusion has become an influential framework for building financial resilience by decreasing exposure to adverse climatic conditions and provide a shield against economic difficulties. In fact, most national financial inclusion approaches have expanded and now target to improve individuals' livelihoods and construct more inclusive and financially resilient communities. According to the World Bank, about 1.7 billion adults still lack access to formal financial services. Most of these financially excepted individuals (representing over 75% of the adult population) live in the developing world, with a large percentage living in South Asia and Sub-Saharan Africa. Policy makers and other stakeholders claim that more inclusive financial systems empower individuals particularly the most vulnerable to save, borrow, develop properties, guard against risk, and therefore build resilience (Gash and Gray, 2016). Those populations are most susceptible include the poor, those living in rural areas, and women (Lyons, Kass-Hanna and Greenlee, 2020). Thus, resilience building has fast become a global concern directed at improving individuals' capacity to manage threats, whether environmental, social, or economic (Jones and Tanner, 2017).

Jacobsen, Marshak and Griffith (2009) posit that financial resilience and vulnerability are two sides of the same coin. Building financial resilience begins by understanding the susceptibilities that result from exposure to risk and lack of access to suitable resources (Moore et al. 2019). Unanticipated tremors (such as the illness or death of a family member, career loss, natural catastrophe, crop failure, or livestock loss) can leave families less capacitated to overcome hardships. Ideally, households would use their reserves, borrow money, or depend on insurance pay-outs or transfers from family and friends. Nonetheless, low savings rates and failures in insurance and credit markets are main causes of insecurities and vulnerabilities in the face of exposure to climatic, resilience-related and economic risks.

To this end, access to resources such as well-designed and reasonable financial services is assumed to offer the resources to build resilience in the face of economic vulnerabilities. However, not all households have the same access to financial services. Economically vulnerable populations face numerous obstacles to financial inclusion and are most at risk, depending on

coping mechanisms that frequently lead to long-lasting financial uncertainties and hostile developmental consequences (Gash and Gray 2016). These coping approaches often encompass decreases in food consumption, the sale of properties, and the build-up of incontrollable debt loads. Financial inclusion signifies a vital pathway for marginalised households to mitigate risks and increase their ability to manage and forge disaster adaptation strategies (Hussain *et al.,* 2019).

A wide variety of tools are being employed to improve the efficiency of national financial inclusion strategies so as to stimulate inclusive and participatory financial resilience. Existing approaches go beyond simply providing access to bank accounts, as they include fostering access to and usage of an all-inclusive set of financial services (such as payment and money transfer services, loans, insurance, and investment products). Financial literacy is acknowledged as an important apparatus for promoting the financial consciousness, knowledge, abilities, attitudes and behaviours essential for individuals to efficiently access and use these services. As a result, nearly all national strategies for financial inclusion contain financial literacy as a significant element. Digital financial services (DFS) have gained currency internationally and are now regarded as possibly the most capable mechanism to enable financial access and nurture universal financial inclusion (OECD/INFE 2018; Lyons, Kass-Hanna, and Greenlee 2020). With more than 67% of the global population having a mobile phone, many parts of the developing world have experienced rapid growth in DFS, most remarkably in South Asia and Sub-Saharan Africa due to the surge in access to and use of mobile phones. Countries in South Asia and Sub-Saharan Africa have made fast progress in advancing from outdated financial services (brick-and-mortar banks and automated teller machines, ATMs) to DFS (digital payment tools such as mobile money and digital wallets (Lyons, Kass-Hanna and Greenlee, 2020).

This digital financial revolution has permitted individuals around the world to use their mobile devices to access and conduct a wide assortment of DFS. The point that large sections of the world's unbanked inhabitants live in South Asia and Sub-Saharan Africa further escalates the potential for DFS to increase financial inclusion rates. Present and expected growth in DFS intensifies the need for more advanced financial literacy creativities that can adapt to the fast changing digital economy (OECD, 2017, 2018). There is a growing need to increase digital financial literacy, which is now considered as

a mediator of the relationship between financial literacy and financial inclusion, and is presumed to increase the efficiency of both (Lyons, Kass-Hanna, and Greenlee 2020). For individuals to successfully participate in the digital economy, they need be equipped with competencies and skills which enable them to perform digital financial transactions and control digital devices such as mobile phones, smart phones, and tablets. Therefore, in the current digital world, financial transactions need to be enhanced and financial literacy has to be enhanced in rural areas for communities to be resilient to shocks.

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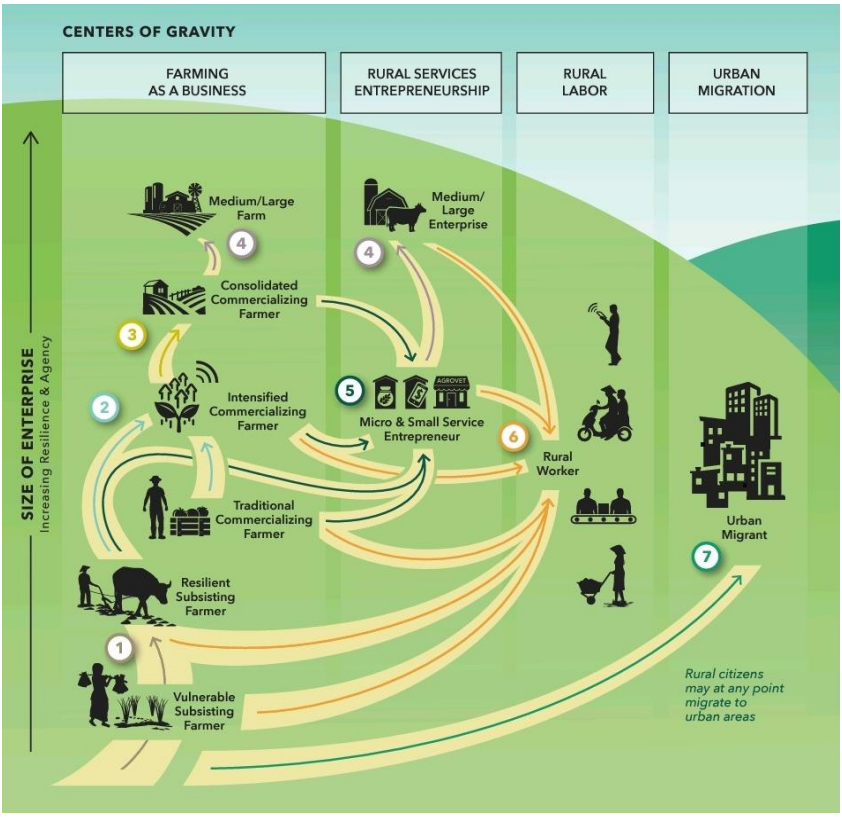
CONCEPTUAL FRAMEWORK

The conceptual framework underpinning this paper is based on the rural pathways model which will also be used to guide the analysis of the research data.

RURAL PATHWAYS MODEL

The rural pathways model transfers us from a stagnant understanding of rural households centred on their features at a particular moment, toward a dynamic view of how households and their needs might progress over time. This model lays out the diverse transition pathways rural households may take as they follow increased resilience and agency through numerous livelihoods strategies. These pathways confluence around four centres of gravity: farming as a business; rural services; rural labour; and urban migration. Over the sequence of a lifetime, a single household may move forward or backward along a pathway, change pathways completely, or consecutively follow various pathways. By mapping out the possible transition points for rural households, financial service providers will be able to construct a plan for engagement that provides the right services at the right time. The rural pathways model intends to capture probable development routes smallholder households may take as they pursue greater resilience and agency. When applied to a particular context, these pathways can offer micro- and macro-level intuitions into how smallholders' needs may change over time and how that will outline the rural economy (Steinbach *et al.*, 2017). The image below shows how rural households can diversify their income sources as means of building better financial outcomes and promoting resilience to external shocks.



Source: IIED 2017

LITERATURE REVIEW

The literature review or survey accomplishes numerous purposes in research. It shares outcomes of other studies that are closely related to the one being undertaken by the research. This segment of the paper offers literature in the scholarship canon on rural resilience strategies and inclusive financing models aimed at mitigating the adverse effects of shocks especially those related to the adverse effects of climate change, highlighting previous work that has been done in relation to the current study. This will help to fill out research gaps in the area of interest.

DEFINING RESILIENCE

Resilience is conceptualised as the ability of humans, societies, or systems that are threatened by disasters or crises to endure the damage or recover

rapidly (FAO, 2023). Currently, 100 million people in Africa face severe hunger, and the continent's population is projected to increase from 1.2 billion to 2.5 billion in 2050, with the percentage of people depending on agriculture for food and income rising to 70 percent. Moreover, the continent faces increasing natural tragedies 2,000 since 1970 and it is home to prolonged and multi-faceted human-made calamities. The trend necessitates commitment to more significant focus and resources to forging resilience determinations that are effective in protecting the lives and livelihoods of millions. Smallholder farmers, pastoralists, and fishermen are the main change proxies in restoring and improving livelihoods and societies in rural areas dependent on agriculture as a source of sustenance. There must be influential action taken to provide capacity for them to intensify productivity and income through access to financial and technical support, skills training, and comprehensive and innovative business models. Building self-sufficient smallholder farmers, pastoralists, and fishermen strengthen the capacities of susceptible communities to rebound from crises and unlocks the innovative potential of communities to find resolutions to shocks and build a resilient society (FAO, 2023).

Well-crafted social protection programmes can build the resilient capabilities of the most vulnerable groups. FAO has established a strong expertise in implementing cash- cash-based programmes aimed at building agricultural livelihoods, particularly in fragile and prolonged disaster settings. When farmers, pastoralists and fishers can no longer buy food or much desired productive inputs because their possessions have been damaged or exhausted, FAO's cash-based transfers offer instant relief. They increase agricultural production, increase food security and nutrition, and decrease rural poverty. They support the change from humanitarian support to development. FAO's cash aid helps families meet their instant needs while re-establishing their food production. It is a vital safety net against shocks and pressures and, when joined with productive support and technical training, has the potential to build resilient livelihoods. It is particularly vital in rural areas, where families lack food and income to buy food due to extensive crop failure and livestock losses (FA0, 2023).

FINANCE

Finance is the raising and exhausting of funds by individual, cooperative initiatives, firms and governmental organisations for the day-to-day administration and management of their professional undertaking. As a discipline, finance is only a body of facts, principles and theories which deal with raising and using of capitals by individual, enterprises, businesses and

governmental organisations for the day-to-day administration and management of their business activities. Finance is essential to businesses due to, it is always considered as the life blood of any association, it offers foundation for business planning, investment, diversification and cash flow statements, it offers the base for control and employee upkeep, and it provides basis for business progression and expansion, through reinvesting back profits. Finance can be categorized into two broad classifications, namely micro and macro finance. Macro finance relates to the financing choices and performs of the entire economy. Micro finance relays to financing decisions and practices of individual households, businesses and non-business organisations (Gregory, 2020)

DEFINITION OF RURAL FINANCE (RF)

Rural Finance is defined as the provision of financial services to a varied, rural, farming and non-farming population at all income stages through an assortment of formal, informal, and semiformal official arrangements and varied forms of products and services, such as savings, leasing, loans, insurance and remittances. Rural finance is a spatial idea, which incorporates the financial side of nearly all economic methods in rural areas. These include savings, financing and insurance of financial risks. It includes the provision of diverse financial services to households and enterprises in rural areas for both productive and consumptive purposes. Rural financial services comprise of loans, savings, payment and money transfer facilities, and risk management such as insurance, hedging and guarantees (Nagarajan & Meyer, 2006). Rural finance, as defined by the World Bank (2012), includes a variety of financial services such as savings, credit, payments and insurance to rural people, households, and enterprises, both farm and non- farm, on a sustainable basis. It contains financing for agriculture and agro processing/ agribusiness. However, rural finance includes agriculture finance, micro finance and is a subdivision of the bigger financial division.

KEY CHALLENGES

While all rural households, irrespective of income level, are usually exposed to a variety of types of shocks, poor rural households are often mostly susceptible if they live in peripheral and fragile ecosystems or practise rain fed agriculture. They also tend to be mostly vulnerable because they have a restricted asset base to fall back on when tremors strike, limited capability and apparatuses to manage risks, and weaker institutional, infrastructural and service linkages. Normally, households and individuals who suffer from numerous systems of marginalization centred on age, gender or ethnicity are

the least resilient, causing, inter alia, more precarious tenure of productive possessions and more restricted access to financial risk management tools (UNSDSN, 2013).

Regardless of their nature of livelihoods, poor rural households confront a variation of coinciding shocks, which is a key fact to take into account when crafting plans to increase resilience. Personal and household-level risks are frequently substantial. For example, malnutrition and illness can have major impacts on the household economy through a direct and indirect influence on family labour. Other personal risks relate to exposure to violence, which is a risk predominantly high in fragile and conflict-affected nations, often particularly for women and girls. Poor governance may also be a basis of risk leading to unanticipated costs, such as bribes to evade harassment, transport produce and access simple government services, as well as to undependable provision or inconsistent quality of public services. Other sources of risk relate to ill-functioning markets and instability of the prices of inputs and food. Mainly in poor, food-deficit states, substantial seasonal price variations are a feature of rural life, and inter-annual price variations can also be severe, certainly, since rural producers are generally price-takers, they are extremely exposed to price associated shocks (UNSDSN,2013).

A main classification of risks relates to environmental factors. Across much of the industrialising world, the natural resource base in rural areas is being degraded, depleted or becoming scarcer owing to the adverse effects of the triple planetary crisis- pollution, climate change and the loss of critical ecosystems and endangered species. Meanwhile, population growth drives people into peripheral zones, where they are frequently forced to overuse the delicate resource base. This adds to deforestation, soil erosion, desertification, and increased water scarcity, reduced recharge of aquifers, and deteriorating fish and marine resources. Natural resource degradation in turn has an undesirable bearing on agricultural productivity and also leaves land and societies more susceptible to extreme weather patterns. Climate change has a multiplier consequence in hastening ecosystem degradation and making agricultural production riskier.

Poor rural families face both climate-related shocks such as floods, storms, droughts, hailstorms and climate-related stresses (e.g. loss and degradation of coastal ecosystems, glacial melt and sea-level rise). To cope with the effects of a capricious climate, they have always drawn on traditional information and historical interpretations, nonetheless, the speed and intensity of change is overtaking their ability to manage its effects, and past experience is no longer

a dependable guide for the future. Given their exposure and susceptibility to shocks, the choices of poor rural households on how to apportion and use cash, land and labour normally mirror not only accessible opportunities, but also the need to reduce exposure or vulnerability to shocks. Whether or not successful, such approaches can undermine people's ability to move out of poverty by inhibiting or discouraging them from taking the risks involved in chasing new opportunities (IFAD, 2015).

For instance, lack of protected tenure rights may discourage investment to upsurge the productivity of a plot of land, or to change to new crops that have high but uneven market demand, or to new practices that produce positive returns only in time. This is a situation shared by large numbers of rural households: between 1 billion and 2 billion people worldwide live on and use land over which they have no legal ownership. Risks attached to lack of protected occupation are increasing in many regions, since many families and individuals, particularly rural women, are vulnerable to improper land acquisition and disintegration. Demand for land for agricultural production, mining, carbon sequestration and tourism is increasing, which is leading to rising competition in which poor households and individuals are repeatedly on the losing end vis-à-vis more influential actors. An additional factor of vulnerability is linked to weak governance of tenure structures and land dealings.

RESEARCH METHODOLOGY

The research methodology will highlight the data collection methods that were engaged to gather information on the topic. This research paper is descriptive and exploratory in nature; it discloses comprehensive, structured, accurate, and thorough report of everything explored. As this study is descriptive, qualitative enquiry is used in that all data are collected and grouped to be further examined. The analysis is based on a mixture of existing literature on rural financing and resilience. The research methodology draws upon an academic and grey literature review conducted as a primary stage of research. While not directed at providing a full methodical or complete review of existing literature on the topic, the method involved outlining clear search terms and a series of search approaches, followed by a review of the most related literature. Secondary data analysis was done through an internet-based search for documents and a desktop review of printed & online literatures were used to enable enquiry. The peer reviewed literature in the form of journal articles in English which were published between with the exclusion of grey literature including unpublished work, reports, and books, was examined. A mixture of the grouped articles which met a search criterion was

combined with the patterns, themes and trends identified, followed by the thematic analysis. Thematic analysis (Clarke and Braun 2013) was desired because it is a simple, flexible and robust technique to group problems, perceptions and recommendations together.

RESULTS

This section discusses rural financing as a potential basis for building resilience in African communities. It discusses the importance of rural financing highlighting its effectiveness if properly applied.

The providing of financial services to rural smallholder households, including savings, credit, insurance and payments, remains among the most challenging encounters in finance and development. Regardless of growth in the extension of these services to rural areas, rural finance ecosystems in low- and middle-income nations remain disjointed due to high transaction costs linked with the irregular and scattered distribution of populations, inadequate infrastructures and unanticipated threats to agricultural productivity. As an outcome, small-scale actors and most marginalized groups such as women and youth continue largely excluded from access to finance and investment. Developing and scaling up inclusive financial solutions is important to improve the livelihoods and resilience of the most vulnerable persons, reduce imbalances and poverty, end food insecurity and malnutrition, and support the sustainable use of natural resources in order to build sustainable and inclusive agrifood systems that leave no one behind.

Even when societies living in rural areas do have an account, for example, with a bank or a mobile money service, usage normally remains very little as financial products and services remain to be principally intended for the needs of urban clienteles. Consequently, large numbers of people in rural areas remain effectively omitted from the financial services they need to upkeep their resilience and expand their livelihood prospects. While microfinance services have been successful in some areas and mobile money services have extended access to basic digital payments and transaction accounts, only 20% of rural inhabitants in developing countries saved with a formal financial institution while access to insurance and credit outside small working capital loans remains very restricted. Of the estimated USD240 billion demand of smallholder households for agricultural and non-agricultural finance, financial institutes are presently only providing around USD70 billion. This leaves

around 70% of the worldwide request for smallholder finance unmet. The financial needs of women, young people, people with disabilities and other vulnerable groups are mostly poorly assisted by the existing rural financial systems, with products and services often too general and intended for the needs of urban, wealthier clients (Ibid, 2020).

THE IMPORTANCE OF FINANCIAL INCLUSION IN RURAL AREAS

Inclusive and participatory financial services have a critical part to play in supporting and refining rural livelihoods. This is particularly pertinent for those from vulnerable community groups who are more probable to be underprivileged and less likely to be financially resilient. Financial services are required to help people and households in rural areas and their communities living in or close to poverty to manage their cash, increase resilience and capitalize in livelihood opportunities. Improving rural financial inclusion is essential to support growths in agricultural productivity and raise agriculture-related profits, help the poor to diversify their source of livelihoods and develop non-agricultural revenues, improve nutrition and reduce starvation, build resilience to climate associated and other periodic tremors, and protect against the risks of falling into poverty snares. Smallholder households regularly supplement seasonal agricultural income with labour on other farms or in non-agricultural trades (e.g. non-farm microenterprises such as transportation or tailoring). They can also be the beneficiary of remittances and social protection payments.

Persons living in rural areas, mainly women, also dedicate much of their time to unpaid labour, on and off-farms and in the home. For rural financial services to fund enhanced rural results, it is imperative that policymakers treat the improvement of financial services in rural areas as a means to an end, not an end in itself. Financial inclusion should be seen as an enabler of positive real-world results. The numerous pathways through which financial inclusion can enhance rural livelihoods can be summarized as: farming as a business; rural services entrepreneurship (non-farming); rural labour; and migration to an urban area. In actuality, rural households often employ some combination of these pathways to earn their livelihoods, so it is crucial that a suitable variety of financial services are accessible to support their activities in and between these pathways.

RATIONALE AND JUSTIFICATION ON RURAL FINANCING AS BASIS FOR BUILDING RESILIENCE

The nexus between a comprehensive financial system, economic growth and development has been explored for a long time and several theoretical and

empirical studies show a positive association. This is no different for developing the rural economy and establishing such development on decent work. Nevertheless, rural societies are highly underserved by financial facilities. People living in rural areas need access to financial services for a variety of productive (asset building, working capital) and protective (mitigating risk exposure, including health concerns) purposes: to securing stock, tools, farming inputs, to maintain infrastructure, to contract labour for planting/harvesting, to transport merchandises to markets; to make or receive payments; to manage peak season proceeds to cover expenditures in the low season, to invest in education/housing/ health, or to cope with crises. Customarily, formal financial institutions (such as commercial banks, rural or agricultural development banks) have shunned or failed to offer sustainable services in rural areas.

This exclusion confines rural communities from releasing their potential, this is so because:

- Operational costs in rural areas, particularly in isolated areas, are high due to low population density, shortage of infrastructure (communications, electricity, transport) and small average transaction totals. This makes financial services costly. Prohibitive operational costs also dishearten people from depositing reserves, thereby depriving households of a chance to build financial possessions.
- Levels of financial literacy are generally low in rural populations. This inhibits households and businesses similarly from building effective risk management approaches and, for instance, understanding how insurance works and why premiums need to be paid frequently without a timeline for pay-outs.
- Legal arrangements that do not guarantee saleable property rights add to weak collateral and contract implementation mechanisms that extra limit access to finance. As a result, products such as long-term financing scarcely reach rural areas.
- Consequently, informal or semi-formal financial organisations as well as other providers like traders or input suppliers, or delivery conduits like mobile phone companies have become main actors in financial services delivery. However, these informal providers frequently have weak institutional and administrative ability and provide only a narrow variety of financial services, often without by-law. Furthermore, functioning in seclusion from the financial system has let some of these providers' charge unreasonable and at times even usurious interest rates.
- Climate change is adversely affecting the rural economy most harshly. Rural communities cannot manage and adapt to growing occurrences of

drought, flooding or storms without access to insurance or emergency loans to cope with these unexpected shocks, or to long-term finance for venturing into less risk-exposed trades.

EXPANDING ACCESS BEYOND CREDIT FOR RURAL HOUSEHOLDS

In addition to finance, smallholder families need access to payments, insurance, and savings in order to transact more efficiently, cope with threats, and even cash flows. These products have started to infiltrate rural markets in recent years and signify an opportunity for financial service providers.

DIGITAL PAYMENTS

Over the past years, infiltration of digital payments has improved exponentially, appreciations to the extensive convenience and use of mobile technology, even in rural areas. The advance in digital payments is essential because this technology is a significant stride in increasing financial inclusion of rural households. Digitisation of payments increases accessibility and safety of monetary transactions. In addition, it can allow access to other financial products, such as savings and credit, by providing vital customer information to financial service providers. Of course, digitisation will only fortify financial inclusion if it is done in a gender-sensitive method. Women in low-and middle-income countries are less likely to possess a mobile phone a fraction that differs by region but has consistent consequences for inclusive growth of digital payment systems. Financial establishments targeting to increase their operational efficacy and reach more customers by implementing technological solutions tend to start by digitising payments. That being said, there's only so much that financial institutions can do to digitise their payment procedures if rural economies continue to be nearly entirely cash based. Agricultural SMEs may be able to help rural economies decrease cash dealings by digitising their own payments to their suppliers, therefore making digital transactions a more attractive and holistic preference for farmers. In countries where mobile money infiltration is low, social media may present alternative possibility of opportunity. For instance, Cassava Fintech International publicised the launch of Africa's first integrated social payments platform, Sasai, in corporation with mobile network operators. The application will combine instant messaging, social media, and mobile payments into one combined platform.

SAVINGS

The usage of savings accounts has also improved in rural areas, stimulated by an upsurge of digital wallets. For numerous rural households, these accounts mean more than saving money, they are an investment in better resilience

against climate and market shocks and constitute safety nets in the wake of unexpected exigencies that have capacity to adversely impact on the sustainability of livelihoods in rural areas. Savings accounts smooth consumption and permit households to store money for farm inputs, as well as fixed household and non-agriculture expenditures (such as medical expenses). As the first phase in the financial inclusion journey, savings accounts allow financial institutions to better identify their customers and possibly extend loans to them in the future. Savings accounts are mainly essential for women, as being able to put away money can empower them to have better decision-making power at the household and community levels. Nonetheless, despite the benefits of savings and the increase in savings accounts in rural areas, actual saving behaviour mainly at formal financial establishments remains low. Even in South and Southeast Asia, where more than two-thirds of rural adults hold an account, less than a third of adults appear to actually save through either formal financial institutions or community savings clusters. This information suggests that many accounts are inactive or are being used mainly for transactions. For many rural households, saving spare money is simply not achievable, moreover, these households may distrust financial organisations.

INSURANCE

Regardless of the development of new models of agricultural insurance, mainly index-based products, the majority of smallholder farmers have restricted access to risk management alternatives. This is predominantly true in sub-Saharan Africa, where the lack of government grant means that insurance continues to be cost prohibitive for both farmers and financial service providers. Scaled growth of agricultural insurance could fund improved access to rural agricultural finance. In the nonexistence of warranty and official land rights, well-designed agricultural insurance deeds as a risk mitigation tool that can solve credit preferences. This increase in risk leads several farmers to be reluctant to make the investments required to enhance productivity and increase revenues. Insurance products must also be designed with the requirements of particular groups in mind, for example, studies show that women have less incentive to procure agricultural insurance merchandises that do not include coverage for other sources of risk, such as family wellbeing.

DEMONSTRATING THAT DISASTER RISK REDUCTION INVESTMENT PAYS IN AFRICA

An increasing number of studies are now existing in Africa showing that certain creativities not only donate to firming communities' resilience, they

also make economic sense. For example, investments in undertakings such as terracing and construction of earth dams and embankments that allow households to increase and diversify agricultural activities in the Red Sea Hills of Sudan are also decreasing the beneficiary societies' susceptibility to droughts. The cost benefit analysis showed that these ventures were not only highly useful for ensuring diversified incomes for the contributing communities, they also shrink the cost of responding to future catastrophes.

In another case, the cost-benefit analysis of a drought risk decline and food security programme in a Malawian agricultural community shows that for every 1 USD invested the project undertakings provided 24 USD of net benefits in terms of household income and assets, education, health and reduced death rates (Tearfund, 2010). In addition to the net economic paybacks, decision makers need to take reason of a series of the other value added provided by investments that reduce risk to natural hazards and climate change effects, such as protection of lives and livelihoods, community unity and other social and economic benefits.

CONCLUSION AND RECOMMENDATIONS

There is confirmation that investment in disaster risk lessening pays in Africa, reducing both the short and longer-term influences of disasters on individual households, societies and the wider macro economy and hence strengthening resilience to climate change effects. Despite this fast-growing body of documented evidence, the level of public investment in disaster risk reduction in many nations remains inadequate. Determinations by national and local authorities to address risk to natural hazards in an all-inclusive manner and which actively involve pertinent government actors, civil society and private sector tend to demonstrate more effective in Africa just as in other regions. A valuable objective in this respect is for governments and donors to incorporate both disaster risk reduction and climate change adaptation concerns into appropriate public, private and household investment choices, based on values of cost-effectiveness and tolerable levels of risk to human life. This can build on current efforts introduced in the region. In order to accomplish this, cooperation between the disaster risk reduction and climate change adaptation societies should be improved and institutionalized. A strong emphasis must be placed on an improved understanding of what constitutes real development investments that decrease risk to natural hazards, as a necessary guide to decision-making on climate change adaptation funding. Resilience building is at the heart of determinations to attain zero hunger and poverty as well as the other intertwined global goals of the 2030 sustainable development agenda.

With nearly 60 percent of Africa's population living in rural areas and reliant on agriculture and natural resources for their revenue, food, fuel and well-being, a few concrete actions for building resilience must be immediately fast-tracked and advanced. These include working with farmers and their communities to decide sustainable action they want to take and providing the capacity, access to financial and technical support, skills and training and comprehensive and advanced business models to realize them. Enabling small holder farmers as transformation agents to re-establish and improve their livelihoods in the face of increasing weather extremes and conflict circumstances is fundamental to building resilience. We must continue to advocate and scale-up investment in effective resilience performs and inspire better partnership across the humanitarian-development relationship to meet the needs and actualities of the most vulnerable.

Action must be situation specific and concentrate on cash transfers, agricultural inputs, skills training, knowledge sharing, equal opportunities, inclusion, invention, early action, community productive resources, social protection and strong enterprises. They must integrate the needs of women, youths, and people with disabilities, indigenous peoples and other sidelined groups, guaranteeing we leave no one behind. Farmers and farming groups (including fishers, forest dwellers, pastoralists and agro-entrepreneurs) must be at the centre of transformation. They should be empowered as active and self-starting means to re-establish and sustainably manage their land, reinforce their institutional, technical and financial capabilities and support their current, traditional knowledge to permit them to build resilient farms, organisations, trades and communities. Working together to build resilient smallholder farmers will go a long way in helping vulnerable communities to rebound from disasters.

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Disruption or Confusion? A Critical Analysis of the Mineral Explosion in Zimbabwe and its Implications on Rural Resilience Activities

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Abstract

This study critically examines the consequences of mineral explosion in the rural areas in Zimbabwe focusing on how they are affecting or engendering resilience in the basket of various economic activities undertaken in these areas. Rural areas mostly depend on their resilient livelihoods and livelihoods patterns or trajectories for their functionality and sustainability. The social and economic development of rural areas is tethered to the several livelihoods activities undertaken in these areas constitutive of sources of income for the people and constitute a vital element of rural development. Secondary data sources were used to gather data that was analysed and presented in this study in conjunction with mineral explosion and rural resilience in Zimbabwe. The results indicate that every dimension of rural resilience is affected by the explosion of minerals in the rural set-up thus causing rivals, conflicts and violence among the people. Mining on its own is an activity that requires space and happens within the environment thus disrupting the already existing livelihoods and various land uses in the rural areas and negatively affecting the natural environment. Government policies and strategies to govern mining and mining-related activities should not only focus on the benefits arising from mining but also consider the local communities and the ecology that is often ignored due to the greed of money thus the outbreak of misunderstanding and conflict among the people. It can be concluded that in as much as mineral explosion results in economic growth, rural resilience should not be forgotten, as it is an important pillar for the survival of the rural areas. The study recommends the adoption of mitigation measures as a solution for the creation of equilibrium between rural resilience and mineral explosion and mining activities.

Keywords: *ecology, economic, social, mining, sustainability, development, policy*

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INTRODUCTION

It is noted that rural systems are facing the dilemma of deterioration of livelihoods due to induced human disturbances, natural disasters, the adverse effects of climate change and rapid urbanisation. Mojarradi *et al*. (2016) have identified the development of rural areas as the development of the social and economic dimensions of these places. Development in rural areas is aimed at improving the living conditions of the people who reside in these areas (Mahon, Fahy and Roy 2018). Mukuzunga *et al*. (2021) argue that the idea of resilience has become the main discussion and a topic of international purchase recently due to the rise of adverse impacts of natural and human activities on the environment, economy and society. USAID (2005) assert that minerals constitute one of the scarce resources that have caused sustained violence among the communities. Rural resilience can be achieved within the purview of rural development that are human resources management, physical developments, and agricultural development among others (Gibson *et al.,* 2010). There is, thus, need for social, economic, environmental and political resilience in the rural areas and this is disturbed by the explosion of minerals in these areas causing a lot of havoc, confusion and conflict among the people. Therefore, there is need to explore and understand how the explosion of minerals has become a cause for distress in the rural areas of Zimbabwe.

Yazdi & Khaneiki (2007) argue that though mining has managed to provide for the necessary conditions for rural lives, it has also stripped the possibility of an environmentally- sustainable life and a healthy environment from the local people. Though natural disturbances are the effects influencing the stability of rural areas, human disturbances have become more prominent in affecting the resilience of rural areas due to their role in social, economic, cultural factors shaping the resilience of rural areas (Cinnéide, 2012). UNECA (2008) observes that the geographical and local position of majority of mines in the rural areas and the exploitation of mines influences the programme of rural development that is both positive and adverse for the local people and their surroundings.

The explosion of minerals is a reason for various human activities such as the exploitation and extraction of the minerals leading to several shocks on the environment, agriculture and other livelihoods and rural dynamics on which rural communities rely on for sustainability. Cui *et al*. (2023) argue that the development of rural policies, social connection and industrial developments, among other factors, are the cause of transformation of rural areas and the disturbances on the existing balance, thus affecting resilience efforts being made for these areas. The study is based on secondary data sources that

include journals, reports, policies and articles, among other secondary data sources. The information gathered from these sources was analysed and presented in support of the discourse being canvassed by this research. The finding indicates that the explosion of minerals is on its own a cause of many rivals and conflicts between the government, local communities and the mining companies in rural areas over land and land use changes that affect various existing activities and livelihoods. In as much as rural resilience is yet to be realised, mineral explosion has proved to be a complete destruction to its achievement causing a range of negative influence on the society, the economy and the ecology that are the main foundations of the rural areas. Mineral explosion and mining are more prioritized on the expense of rural life and its resilience thus leading to the rise of conflict and disorder in these areas. The study concludes that though there is economic expansion that comes with mining, an equilibrium should be reached in the process as a way of promoting rural resilience and proper management of these areas that are already suffering from various impacts of climate change and prolonged development. It is recommended that both social impact assessment and environmental assessment should be done before the extraction of the minerals to weigh the implications of the activities on the local areas.

CONCEPTUCAL FRAMEWORK

This section critically discussed the theoretical frameworks in which this study is premised. The idea of rural resilience was coined by Heijman *et al*. (2007) and is based on the concept that ecological, social and economic systems become increasingly entangled and interactions between these systems increase in intensity and scale. The concept of rural resilience is described as the capacity of rural regions to adapt to changing external circumstances in a way that maintains the standards of living ensuring a balance between the ecology, economy and social systems (Schouten *et al*., 2009). Wang *et al.* (2021) is of the view that rural resilience determines how rural systems respond to external challenges and whether they can maintain a satisfactory level of living. Heijman *et al*. (2007) argue that the resilience of rural areas is their capacity form renewal in a dynamic environment and provides a kind of buffer that protects the system from failure of management or policy action. The management and policy action of rural areas can be disturbed by both external and internal factors in which the explosion of minerals is an internal factor that can constitute to this disturbance. Carpenter *et al*. (2005) argue that the theory of resilience provides from a practical standpoint a conceptual basis for sustainability and sustainable development. Heijman *et al*. (2007) posit that rural resilience is in the ability of rural areas to simultaneously balance ecosystem, economic and cultural functions. This

study critically examines how explosion of minerals in rural areas in Zimbabwe affect the resilience of the social systems, ecological, economic, cultural, agricultural and political systems of the rural communities and their surroundings. It is argued that rural resilience tends to analyse the coping mechanism of the rural ecological, economic cultural, social and political systems to vulnerability. Haddaway *et al*. (2019) argue that the social and environmental implications of mining are underrepresented in the literature hence the focus of this study to explore through this topic and analyse how the arising issues can be addressed in the rural areas of Zimbabwe while promoting resilience.

Heijman *et al*. (2007) are of the view that rural resilience is premised on three pillars that are; are economy, ecology and culture and these are closely related as each one of them contribute to the other. In this case it is argued that the activities of mining in rural areas have an impact on the ecology, the economy and the culture of the people. There is a scholarship gap in literature on how and what is done to synthesise this void on how mining and mineral explosion in rural Zimbabwe has disturbed the peace of the communities, their livelihoods, political, environmental, social and economic wellbeing causing so much havoc and disorder. Therefore, this study intends to examine and proffer solutions on how rural resilience is significant for the development and management of rural areas and how this is threatened by extraction of mineral resources. It ought to explore on the negative implications of mineral explosion in rural areas that is often ignored by literature that focuses on the benefits of mining activities and as well suggest approaches that can be used to maintain the balance between the rural resilience and mining in the outcasts.

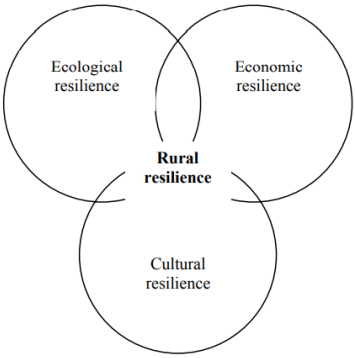

Figure 1: *The Concept of Rural Resilience* (Heijman *et al*., 2007)

LITERATURE REVIEW

This section critically reviews pertinent literature on the effects of mining on rural communities' resilience and adaptation strategies to shocks to livelihoods especially those with a nexus to the adverse effects of climate change. The notion of rural resilience should be embedded in all dimensions of rural areas' sustainable development. Wang *et al*. (2023) revealed that rural resilience has various attributes that include ecological resilience, economic resilience, social resilience, cultural resilience and government governance resilience. Heijman *et al*. (2007) is of the notion that rural resilience determines the degree to which a specific rural area can tolerate alterations before reorganising around a new set of structures and processes. Haung *et al*. (2018) observes that rural resilience tends to vary due to diverse economic development modes, government regulations and the differing degrees of land market development. Colding (2007) asserts that rural resilience is the capacity of rural regions to adapt to changing external circumstances in such a way that satisfy standards of living maintained. In as much as rural resilience seeks to adapt from the changes occurring within due to external and internal forces, mineral explosion and mining activities disturbs the recovering the rural areas.

Wang, Xu & Wei (2023) argue that rural development is facing issues of imbalance in most developing regions due to external shocks and internal demands that is affecting the landscape fragmentation. Haddaway *et al*. (2019) assert that in northern Norway, Finland, Sweden and Russia, the Sami people suffer from external forces that comes with the extraction of minerals and land rights due to mineral explosion and mining activities. Wang *et al*. (2023) argue that the process of resilience focuses on tree stages that are resistance, absorption and recovery of rural resilience development. Resilience is understood as a remedy for a disaster or something that has disturbed the way of doing things that are prevailing in a certain structure (Mukuzunga *et al*., 2021) argue that rural resilience shares many characteristics with social resilience and emphasizes the rural community's transformative capacities regarding the economic, demographic and social challenges caused by urbanisation. In as much as rural resilience try to for the already disturbed rural structures and the explosion of mineral disturbs the already happening process of rural restoration. Schouten *et al*. (2009) argue that the disturbance of one system of resilience affect the resilience of other systems, meaning that mining does not only affect the ecological system but also have influence on the economy and the social system thus causing conflict and disaster to the resilience of the rural regions. Stenbacka (2016) asserts that resilience is the community and municipal capacity to deal with economic and social

transformation, the ability to bounce back and change the prevailing circumstances. Therefore, rural resilience also has the capacity to deal with the transformation caused on the rural regions by the explosion of minerals and mining activities occurring. It can also be argued that the capacity of rural areas to deal with these changes is also affected by mining causing serve problems on the economy, society and ecology of the rural areas.

In terms of rural ecological resilience theoretical lens, it is argued that this is perceived through natural background characteristics of the region and the level of environmental management (Wang *et al*. 2023). Mukuzunga *et al*. (2021) opine that climate change and its effect on the globe is one of the major calls for resilience in recent decades. Heijman *et al*. (2007) is of the view that ecological resilience plays a vital role with its capacity to absorb shocks and disturbances while maintaining the same functions, structure and feedbacks. In this study we seek to identify how the explosion of minerals affect the synopsis of the management of rural physical environment and all its features that resilience tends to adapt and recover from. In Ghana, mining activities in the rural areas are associated with the destruction of forest reserves on that over ten thousands of people rely for their food and livelihoods (Abjei 2007).

The economic resilience of rural areas is conceptualised as the production capacity of different agricultural and non-agricultural economic activities, the income of residents and the level of human resources that is the employment rate. Heijman *et al*. (2007) argue that agriculture is by far the most important activity in rural areas consisting of primary agricultural products that include livestock, fibre and food. This are directly compromised by the explosion of mineral and their activities are contradictory to mining activities as they both require land thus affecting the resilience of the rural areas whose economy is mostly based on agriculture. Wang *et al*. (2023) specify that the production capacity of a rural area consist of its production capital inputs, diversification of economic activities and industrial specialisation that can be argued to be promoted by the explosion of minerals in the rural areas but at the same time the vice versa thus causing various imbalances on rural economy as it disturbs agriculture that is the basis of rural economy. Wang *et al*. (2023) are of the view that that economic resilience is grounded on the capacity of the agricultural labour productivity, grain comprehensive production capacity and the ratio of agricultural processing output that all can be affected by the explosion of minerals in rural area that may attract labour leading to shortage of labour for the agricultural industry. It is revealed that resilience frameworks are developed to bring together various components such as livelihoods,

nutrition and risk reduction concerns under resilience lens as a way of sustaining livelihoods in various areas (United Nations Food Agriculture Organisation, 2014). The economy of rural areas is not only sustained by agriculture but also other various livelihoods including tourism, crafting and artisan among others (Heijman *et al*., 2007).

Social resilience is achieved through the success of several livelihoods, their protection and facility service conditions, social investment and connection (Wang *et al.,* 2023). Medical facilities, sanitation, water supply and infrastructure development mark the social amenities of the rural areas that are crucial and that rural resilience intend to facilitate their availability for the rural people. The explosion of minerals in the rural areas raises high risk for the health of the people especially those involved in illegal mining. Abjei (2007) observes that the use of toxic substances causes adverse effects on the environment and healthy issues on the residents in the mining communities due to the contamination of the air and water sources. Apart from that rural resilience is captured in the ability to promote cultural resilience that is reflected by the provision of cultural public facilities, civility and cohesiveness social networks, level of education and government's financial investment in education and culture (Wang *et al*., 2023). USAID (2005) argues that through the history, minerals have frequently been associated with conflict and as well used to finance these conflicts as the greed to control valuable minerals have led to murder, violence and banditry.

USAID (2005) revealed that mineral explosion in Sierra Leone has caused civil war due to conflict arising among the people. Haddaway *et al*. (2019) posit that mining activities that includes prospecting, exploration, construction, operations, maintenance and expansion among others have both positive and adverse impacts on the social and environmental systems that are both direct and indirect. Zimbabwe Economic Policy Analysis and Research Unit (ZEPARU) (2019) argue that rural communities are disturbed by the exploitation of minerals and large-scale investment projects or wildlife conflicts that often results in economic, political and social pressures that the community must deal with. ACBF (2015) argue that the growth in mineral and natural resources exploitation mostly affect the marginalize communities that are the rural areas in which the resources are located. The resilience of governance is worked on in rural areas and is believed to be determined by the level of government governance input and management of these regions with the intention of neutralising the disparities between the urban and rural areas through the establishment of effective systems.

The challenges posed by various activities occurring in rural areas pose challenges to the management and influence the future of these areas. Hence the requirement for rural resilience that is referred to as the capacity of rural regions to adopt changing external circumstances in a way that provides satisfactory living standards for the people (Schounten *et al*., 2009). However, the activities of mining and the discovery and exploration of new minerals and mining sites have adversely affected the ability of rural resilience to maintain the standards of living of its people as the change in land use normally results in their displacement. The change in land use arising from mining and mineral explosion has disturbed resilience practices in the rural areas due to its adverse impacts on the environment including erosion, deforestation, the contamination of local streams and wetlands thus disturbing the ecological system and its resilience (Sonter *et al*., 2014). Navarro *et al*. (2008) support this view as they argue that soil and water contamination are some of the environmental effects of mining in the rural areas that are negative.

The change in land use is seen not to only affect the environment but also the cause of conflicts between the people (Haddaway *et al*., 2019). Schouten *et al*. (2009) argue that changes in ecosystem conditions is one of the problems faced by rural areas that also lead to socio-economic impacts such as food and financial crisis. Abjei (2007) argue that the introduction of mining prior to the explosion of minerals in the rural areas and the change in land use results in the displacement of the indigenes from their ancestral and communal land where their livelihoods are rooted. Disturbances are noted on crop production and other farming activities that are the major source of income thus leading to the increase of unemployment rate among the rural communities and automatically lowering the standards of living of the people. Rural resilience is adversely impacted as mining does not offer enough jobs for the people as it recruits external people who have more skills in the job thus affecting several people relying on agriculture for their employment (Abjei, 2007). This does not only affect the economic status of rural areas but also the social standards of the local people.

Mineral explosion and mining activities have social implications that are negative to the social well-being of the people in the rural areas such as the effects on the health of the people due to adhesive explosions in the mining surroundings, the effect on the traditional practices of indigenous citizens (Haddaway *et al*., 2019). USAID (2005) argue that the issue of compensation and relocation of people is the root cause of conflict and disputes as in some cases the occupants of the land are given less compensation and are excluded from the decision-making process thus leading to decisions that threaten their

livelihoods. Schouten *et al*. (2009) assert that rural resilience simply describe how rural areas are affected by external shocks and how it influences system dynamics. Mineral explosion can be noted to be one of the shocks that attract external forces to act in rural areas and this affect the general `setup of rural areas and measures for its resilience hence the need to think and act with this new change in mind. It is argued that the explosion of minerals results in conflict over land claims and the access to the resources (USAID, 2005). This can be noted among the communities due to clashes arising from land-uses as land particularly zoned for other uses such as agriculture is acquired from the current users for mining activities to commence. Zimbabwe Economic Policy Analysis and Research Unit. (2019) assert that complex resource conflicts are witnessed in some African countries and negative results are identified following the discovery of mineral resources.

Rural areas in Zimbabwe are faced with compounding and entangled challenges that require resilience. Schouten *et al*. (2009) argue that rural areas are confronted with a spectrum of changes that have multiple characters. Hollings (1973) defines resilience as the ability of a system to resist, absorb, adapt and recover from disturbances that occur slowly or rapidly and it is a dynamic system property. Mukuzunga *et al*. (2021) define resilience as the ability to bounce back after a shock or stress and simply a way of adapting to the events of life. Meerow *et al*. (2015) argue that resilience is the ability to adapt to change and quickly transform systems that limit current and future adaptive capacity. Rural resilience is argued to be the ability of rural areas as a dynamic social-ecological system to adapt to changing external environments to maintain a satisfactory standard of living, emphasizing that rural systems are persistent, adaptive and transformative (Huang *et al*., 2018).

Heijiman *et al*. (2007) describe rural resilience as the capacity of a rural region to adapt to changing external circumstances in such a way that a satisfactory standard of living is maintained. Wang *et al*. (2021) argue that rural resilience determines how rural systems respond to external challenges and becomes a developmental marker of ascertaining whether they can maintain a satisfactory level of living. Wang *et al*. (2023) argues that rural resilience has become a new perspective for studying rural problems that provides an effective way of assessing the current situation and the potential for development. Thus, in as much as rural resilience is being focused on, mineral explosion is identified as a barrier to the achievement of resilient rural areas. Rural livelihoods are based on agriculture and the lives of rural people radiate around agricultural development. Wang et al. (2023) argue that rural resilience focuses on agricultural, ecological and social factors that are closely

related to agricultural development. It is argued that rural disturbances occur in form such as natural disturbances, socioeconomic factors and rural external and internal assistance dynamics (Ge *et al*., 2022; Rathi *et al*., 2022).

At a local scale, Zimbabwe is of the richest countries in terms of natural resources endowment. Zimbabwe Economic Policy Analysis and Research Unit (2019) argue that Zimbabwe is richly endowed with both renewable and non-renewable resources such as land, wildlife, forest, minerals and gas among others. It is noted that mining is identified as one of the pillars to support the vision of the government of making Zimbabwe and upper middle-income economy by 2030 and this has increased mineral exploration and the opening and revitalization of old mines around the country (Government of Zimbabwe, 2018). ZEPARU (2019) argue that mining is one of the main economic sectors in Zimbabwe that is contributing 8.6% to the Gross Domestic Product and 60% of the exports and numerous foreign direct investment opportunities. However, though various benefits are noted mining is causing a lot of tension in the rural areas as the opening of new and old mines is associated by risks that disturb rural resilience. In terms of rural resilience, several measures, strategies, policies and legal frameworks are put forward to govern rural growth and development. ZEPARU (2019) argue that several strategies are used for rural ecological resilience that includes, National Biodiversity Strategy and Action Plan, Community Based Natural Resources Management, Reducing Emissions from Deforestation and Forest Degradation (REDD+) programmes, Ecosystem Conservation programme and Afforestation and Reforestation programmes among others as a way of restoring the ecosystem that is being damaged due to activities such as mining, agriculture, change of land use and establishment of new settlements (FAO 2015; ZEPARU 2019). Among the legislations that aim at promoting rural resilience through the conservation of the natural environment is the National constitution, the Environmental Management Act, Rural Councils Act, the Communal Lands Act and the Forest Act among others (Government of Zimbabwe, 2016).

METHODOLOGY

Secondary data sources were reviewed to gather data presented and analysed in this study. Already existing files and studies were the major sources of information obtained for the examination of how mineral explosion has disrupted rural resilience and caused havoc, conflict and disorder in these areas. Documents including journal articles, reports, policies, legal frameworks and strategies were reviewed to assess the information necessary for this study. As the study seeks to understand the impacts of mineral

explosion and the following mining activities in rural areas, it seeks to ascertain the views of the people involved hence the reason for reviewing the archives to explore data of the same scenarios from previous studies. The rural areas of Zimbabwe were taken as the major area of expertise and several case studies were obtained as a way of articulating the general observances of the study. Qualitative research design was used for the purpose of this research and a thematic approach to data presentation was done.

FINDINGS

Dropping from school by rural students, lowering the literacy rate of the rural people, among other adverse effects of unsustainable mining activities affecting the agency and resilience of rural communities. Marume (2023) argue that mining has become a haven for the less educated people who cannot compete in formal employment hence mining and mineral explosion is becoming a resilient measure for the unemployed and uneducated rural population. The United Nations Population Fund (2022) observe that 62% of the youths below 25 years are active in artisanal mining sector in Zimbabwe and have joined what is known as '*Chikorokoza'.* Gwasira (2022) support this view as they argue that 67% of the youths are directly involved in the mining sector through artisanal mining. Zenda (2022) revealed that given the devastating impacts of climate change on agriculture in rural areas, the explosion of minerals has come as a coping mechanism through the creation of jobs in the artisanal mining sector. Chigumira (2018) concurs with this view through the argument that artisanal mining provides employment option and a way of diversifying income streams for rural population. Madebwe *et al*. (2011) argue that the displacement of people in Marange to give way for the mining of diamonds has affected school children leading to others dropping out of school. It was revealed that the moving of households has caused crisis on pupils as they must adjust to new learning and teaching environments that also comes with additional cost on the parents as they must buy new uniforms and stationery (Madebwe *et al*., 2011).

The results claim that mineral explosion has an adverse impact on ecological resilience of rural areas. Mining in Zimbabwe have adverse results on the conservation of the forest resources and result in ecological shocks that induce climate change, pollution and the loss of critical biodiversity and critical ecological ecosystems. Food Agriculture Organisation (FAO) (2015) claims that mining is one of the activities that have contributed to the 36.6% loss in forest area in Zimbabwe between 1990 and 2015. This does not only affect the ecological resilience of the rural areas but leads to the disturbance of the sustainability of rural livelihoods that rely on forests for their success thus

causing social, economic and environmental challenges (ZEPARU 2019). It is revealed that the increase in mining activities prior to the recent discoveries of diamonds, gold, coal and chrome has led to severe clearance of biomass for the establishment of new mines and the expansion of old mines (ZEPARU, 2019).

The disturbance of rural ecology due to mining and the explosion of minerals have become more aggressive as millions of people countrywide are engaged in illegal mining alone the rivers, in which there is the clearance of trees, digging of river a bed that's leading to soil erosion, river siltation and landslides (Government of Zimbabwe, 2018). Alrumman vd (2016) outline some of the rivers that are contaminated and stilled through gold panning including Mutare, Mazoe, Odzi and Save rivers. Musemwa (2019) argue that there is poor legislation in Zimbabwe governing mining dumps and waste disposal that results in disposal of mining wastes in water bodies leading to the contamination of water that is usually used by smallholder farmers for irrigation downstream. Apart from that, it is revealed that miners use harmful chemicals such as mercury that destroys both land and water and biodiversity as well (Magidi-Hlungwane, 2023).

The rural areas are dependent on agriculture for their food security. However, Marume (2023) observes that the nation is facing serious food security challenges that are because of reduction in production emanating from the increase of artisanal mining activities. It is observed that the rural economy based on agriculture in Zimbabwe employs 70 % of the total population in the smallholder agriculture sector while mining only employ 7.1 % (World Bank, 2019; Chari and Ngcamu, 2021).

The shrinking in agricultural land due to preference being given to mining has led to 7.7 million people to be food insecure around the country. This indicate how mining affect the rural resilience as it demands lots of land that is meant for agriculture and on the other side living a bigger percent of the total rural population unemployed. Madebwe *et al.* (2011) revealed that in Chiadzwa, the explosion of diamond had a shock on the food security of the displaced people as they were evicted before the harvesting period abandoning their produce in the fields. Clapvd (2022) argue that the taking control of land from rural farmers has left the farmers with no control over stable food supplies, production and access. Marume (2023) observe that there is an unprecedented growth in artisanal and small-scale mining in rural areas resulting in a shift from and agro-based rural economy to mineral exploitation. Mkodzongi-

Spiegel (2019) notes anecdotal evidence that suggest that the rapid increase of small-scale miners has increased food insecurity in Zimbabwe.

The African Centre for Economic Transformation, Ford Foundation (2017) revealed that the competition for capital, land, labour and water between mining and agriculture in rural areas found agriculture losing to mining thus leading to the effects on food security and agricultural livelihoods in the rural places. In as much mineral explosion is identified to disturb the food basket in Zimbabwe, it is also noted that it adds to food security for various households. Marume (2023) observe that food production are compromised due to the conversion of traditionally fertile arable land into mining space. Mkodzongi-Spiegel (2020) argues that in Mhondoro-Ngezi, artisanal miners have managed to contribute to the raising of capital for the support of households' farming projects and other businesses that brings food on their tables. Marume (2023) argue that mineral explosion and the increase in artisanal mining is beneficial to rural resilience as it brings about diversification and leads to food security regardless of the reduced agricultural activities that are also suffocating from the effects of climate change hence mining has become a relief for rural livelihoods. In other words, it is noted that mineral explosion is adding to food security by injecting capital into the farming sector and this increase the chances of high production. Though mining and mineral explosion is the major cause of the disturbances of agricultural livelihoods for the rural population, the seasonal food shortages occurring in rural areas is being relieved by the rewards of mining. Madebwe *et al.* (2011) argue that the explosion of diamonds in Marange has resulted in the unemployment of several people in the agricultural sector due to the occupation of their land while in the upcoming mining activities they could not fit in as skilled labour was required due to lack of required training and skills to make them hired.

Mineral explosion and mining are identified as the main causes of conflict on the available legislations that governs development in Zimbabwe. TPF (2018) note that there are conflicts in the national legislation that the forest plantations are gapping with. High priority is being given to mining that is one of the most vital pillars for economic growth on the exposure of the environment thus conflicting interests of rural resilience and national goals and expectations. Mudebwe *et al.* (2011) argue that rural communities bear a disproportionate burden of the cost of mining development projects. This is support by Marume (2023) who assert that the situation among rural areas have worsened due to the land tenure system that give the president sole custodian of and with authority over communal land. Musemwa (2019) argue that the inadequacy of the outdated land tenure system is the weapon that is

being used to politically backup miners and disempower communal and indigenous people thus living them with no power to defend their rights to the rural land. ZEPARU (2019) argue that the Mines and Minerals Act is against the Forest Act where the former confers the rights to the miners over the forester thus leading to deforestation and the loss of biodiversity and the regression of the ecology in the rural vulnerable areas. Marume (2023) revealed that the displacement in Insiza and Shurugwi are a result of weak institutions, legislation and lack of enforcement of mining and environmental regulations and laws. ZEPARU (2019) also argue that the Ministry of Mines is offering Special Grants in Gazetted Forests as evidenced by gold panning activities are being conducted in gazetted forests such as Tarka and Maswera Forests.

Apart from that, conflict of land use is noted also in protected areas like Hwange and Mana Pools National Parks where mineral exploration conflicts with the conservancies in which coal and coal-bed methane are being exploited (ZEPARU 2019). Mkodzongi-Spiegel (2021) asserts that the involvement of local and foreign economically and politically powerful players results in challenges in the enforcement of laws and regulations. Chakauya *et al*. (2023) revealed that the explosion of gold is a threat to biodiversity within protected areas of Chewore Safari Area that is being affected by illegal activities of artisanal miners. Gandiwa and Gandiwa (2012) argue that the activities of artisanal miners in Chiwore Safari Area are associated with adverse effects that compromise the sustainable conservation of wildlife and the natural resources in the area through the clearance of vegetation and pollution of the ground, water and air. Chakauya *et al*. (2023) revealed that there is the destruction of soil profile and vegetation in Chewore Safari Area due to illegal gold mining. Besides that, it is noted that unclaimed pits formed by miners in this area have caused much danger to wildlife and humans and the bare soils are vulnerable to erosion and siltation that affect the general water-holding capacities of rivers and streams in the area (Chakauya *et al*., 2023).

Luckeneder (2021) argue that mining is associated with land usage, and it precludes several human uses of land that lead to conflicting interests among different stakeholders. Marume (2023) argue that the influx of small-scale miners and artisanal miners in many rural locales have caused land use conflict between miners and smallholder farmers that has turned into violence. Marume (2023) argue that violence are perpetrated by machete-wielding gangs leading to the invasion of farmland in Mashonaland Central Province and Midlands Province, thus disturbing the peace and farming activities in

these areas. Oxfarm (2013) buttress this view as they argue that severe negative influence on agricultural production are noted to be a result of detrimental externalities arising from artisanal mining. In Chiadzwa, conflict arouse and noted through the compensation of the people where the minority argue that village heads were involved in corruption with the mine officials resulting in them getting bigger houses containing 5bedrooms while others were given 3bedroomed houses (Madebwe *et al.*, 2011). It is revealed that the lack of political and financial power results in rural households' suppression as they fail to lob mine officials (Madebwe, 2011). Chari (2021) revealed that smallholder famers without political or financial stamina are being forced to dislodge due to the violent nature of miners. Madebwe *et al*. (2011) argue that the Chiadzwa people lacked civil societies, and this made it difficult for them to mobilise a critical mass of people to challenge their displacement for the establishment of the Chiadzwa Diamond Mine in Manicaland province.

The results indicate that Zimbabwe is endowed with about 60 known minerals that can be sustainably utilised for the growth of the economy of the contour leading to the transformation of the lives of the people. It is argued that regardless of the explosion of minerals in the rural areas, most of the rural residents are not fully benefiting from them and there is need for the empowerment of these marginalised communities to allow them to benefit from the minerals (Economic Empowerment Act (Chapter 14:33) of 2007.

Garret (2007) argues that poor smallholder farmers have limited chances to fight the miners legally due to the involvement of political and economic heavyweights. The results stipulate a lack of stakeholder engagement and the underrepresentation of the view of the people residing in the rural areas. However, it is noted that though efforts are made to allow rural residents to benefit from the minerals through the introduction of legal framework through the introduction of the Economic Empowerment Act (2007), to guide the exploitation of minerals, less on the enforcement side are done. There is lack of transparency and accountability thus leading to the destruction of rural resilience and social support of the people whose living conditions continues to deteriorate due to the loss of the farming land to mining. ZEPARU (2019) revealed several community share ownership Trusts in Zimbabwe such as the Tongogara Community Share Ownership Trust, the Gwanda Community Share Ownership Trust, Mimosa-Zvishavane Community Share Ownership Trust, Mhondoro/Ngezi/Zvimba Community Share Ownership Trust,

Masvingo and Marange Community Share Ownership Trusts in which the participation of the local communities in the management and distribution of economic benefits arising from the exploitation of minerals are aimed to be achieved.

However, the Community Share Ownership Scheme meant to empower local indigenous communities that are meant to benefit 10% shareholding of mining operations in the local areas lacks proper enforcement and tend to remain on paper than being incorporated into practice (ZEPARU, 2019). Madebwe *et al*. (2011) revealed that the Mbada Diamond Mining Company did not build schools and health facilities for the resettlement areas leading to the people walking more than 8 km to get social amenities and services in Marange area.

Involuntary migration is the other cause of mineral explosion in rural areas that forces people to displace their homes to other areas. Mudebwe *et al*. (2011) argue that displacement is an unintended negative externality of mining development. In Chiadzwa, the explosion of diamonds has resulted in the occupation of 66 640 hectares of communal land by the Mbada diamond mining company (Mtisi *et al*., 2011). Due to the explosion diamonds in Chiadzwa, 600 households were displaced giving way to the mining activities in Marange rural area in Manicaland Province (Katsaura, 2010).

DISCUSSION

Though Zimbabwe has sound legislation and policy frameworks to govern various activities occurring in its urban and rural areas, there is lack of enforcement of these legislative and policy frameworks resulting in mismanagement and adverse results that influence resilience and sustainability. ZEPARU (2019) argues that though Zimbabwe has excellent legal framework lack enforcement and various conflicts arising. Though mineral explosion is argued to have contributed to the abandonment of agriculture, that is the economic mainstay of rural livelihoods, it is argued that smallholder farmers are participating in mining during non-agricultural seasons thus leading to the broadening of their income streams and the reduction of poverty in their households (Marume, 2023). In other words, there is less destruction being caused by mining s it is an alternative for income generation in off-farming seasons thus leading to the development of rural economies, improvement of standards of living and employment generation. The conflicting of interest is the reason for the disruption of rural resilience by mining that is meant to develop rural economies and at the same time promote social development and ecological sustainability. Though the local communities are meant to benefit from mineral explosion and their

exploitation through the development of infrastructure such as roads, hospitals, schools, commercial centres and sanitation facilities among others, underdevelopment continues to increase, and destruction of rural ecology and social amenities is threatened by mineral explosion.

CONCLUSION AND RECOMMENDATIONS

The study concludes that though there is economic expansion that comes with mining, an equilibrium anchored in sustainable development should be reached in the process as a way of promoting rural resilience and proper management of these areas that are already suffering from various impacts of climate change and prolonged developmental shocks. In as much as mineral explosion results in economic growth, rural resilience should not be forgotten as it is an important pillar for the survival of the rural areas. It is recommended that both social impact assessment and environmental assessment should be done before the extraction of the minerals to weigh the implications of the activities on the local areas. The study recommends the adoption of mitigation measures as a solution for the creation of equilibrium and sustainability between rural resilience and mineral explosion and mining activities. The introduction of mitigation measure is one way of promoting a balance between mining activities and rural resilience in Zimbabwe. The study recommends the revision of the legal framework that governs minerals in Zimbabwe, taking into consideration the rights of the people and the idea of rural resilience. The study proposes the devolution of power from the central government to enable the management of minerals and mining at a local scale to allow the community to benefit from these resources and promote local regional development.

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Rural Accessibility under Siege: Extreme Climate Events and Road Infrastructure Damage in Southern Africa

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Abstract

Climate change has had adverse impacts on rural infrastructures especially those situated in areas with poor road infrastructure. Rural accessibility is under threat in Southern Africa due to extreme climatic events. The vagaries of climate change are not only disturbing the livelihoods, but the transport infrastructures and livelihoods in rural contexts. The article critically examines the view that rural accessibility is under siege from extreme climate events that are destroying road infrastructure. Climate change has had adverse impacts on rural areas leaving road infrastructure damaged and that has resulted in poor accessibility in these areas. The article stems from the argument that Southern African countries' rural accessibility is under siege because post-colonial governments have failed to create rural development frameworks that are resilient to climate change. The study used a qualitative research methodology using secondary data, which has the main advantage of easy accessibility. The data was gathered from secondary sources journals and newspaper articles and the data was analysed using narrative data analysis analytical tool. The study revealed that cyclones are destructive to the road infrastructure in Southern Africa with most roads and bridges being damaged rendering accessibility of most areas useless as the road infrastructure is wiped away. The study concludes that post-colonial state development drives are under threat from climate change as it is destroying infrastructure. There is a need for risk and disaster preparedness in Southern Africa through the development of good road networks that are climate resilient in rural areas. Governments in Southern Africa must create resilient communities through multiple rural road transport networks.

Keywords: *cyclone, development, Marxism, periphery, post-coloniality*

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INTRODUCTION

Rural areas is a generic term which refers generally to areas of open country and small settlements but the definition of rural areas in both policy-oriented and scholarly literature are terms often taken for granted or left undefined, in a process of definition that is often fraught with difficulties (IFAD, 2010). In Zimbabwe rural areas are communally defined formerly called reserves or tribal trust lands in colonial days they consist of villages, wards, and districts (Kinsey, 1999). Rural development and planning in Zimbabwe are confronted by a myriad of natural and man-made challenges and shocks among these are socio-economic and environmental disasters mainly attributed to the changing climate (Mashizha, 2019).

Globally rural areas are declining and under threat because of the forces of climate change and urbanisation as rural areas are underdeveloped, they are easily affected by climate change and creation of peri-urban areas (Chirau *et al*., 2020). Developing countries are vulnerable to extreme weather events in the present-day climatic variability and this causes substantial economic damage (Mizra, 2003). Extreme weather events such as floods have potentially damaging implications for developing countries in Africa (Mugambiwa and Tirivangasi, 2017). World Bank (2010) observes that natural hazards, such as earthquakes, fires, floods, and cyclones contribute significantly to infrastructural destruction and human deaths.

Since early 2000, in Southern Africa generally and Zimbabwe in particular, the occurrence of natural disasters and environmental risks has led to the development risks and vulnerability of rural infrastructure and inaccessibility. Rural settlements are continuously exposed to threats due to policy bias and unforeseeable weather calamities as evidenced by the widespread damage of rural infrastructures and livelihoods by natural disasters (Andharia, 2020). Costs are of concern in developing countries, where the additional funds needed to address climate change concerns are limited or non-existent (Chinowsky *et al*., 2015). The limitations of these available funds are challenging developing countries to identify the threats that are posed by climate change, develop adaptation approaches to the predicted changes, incorporate changes into mid-range and long-term development plans and secure funding for the proposed and necessary adaptations (UNFCCC, 2015).

Of particular concern in this area is the impact of climate change on road infrastructure specifically, the construction and expansion of road infrastructure are linked to economic growth, development and social welfare (Chinowsky *et al*., 2015). Because of their exposure to environmental

conditions, transport infrastructure systems, including roads are particularly vulnerable to climate change (Koetse and Rietveld, 2009). Therefore, the risks of climate change to roads threaten the entangled factors of economic growth, development, and social welfare benefits of infrastructure expansion (Chinowsky *et al*., 2015). Rural road infrastructure is lagging behind in developing countries with most of the roads easily affected by climate change and extreme weather events such as floods rendering rural areas inaccessible destroying livelihoods. Most studies have examined the cost of policies to cushion climate change using carbon taxes, but few examine the impacts of climate change on rural road infrastructures and accessibility as climate change can affect the growing rural economies and livelihoods through the destruction of road networks that were already poor in developing countries (Nyasimi *et al*., 2023, Chinowsky *et al*., 2015 and Blanc *et al*., 2014). The impacts of extreme climate change events such as flooding is noted to have remarkable impacts on Southern Africa (Mavhura, 2018, Chitongo *et al.*, 2019) and the impacts of climate change on rural accessibility has not been given attention.

This study seeks to bring to the fore the impacts of climate change on rural accessibility amid the poor road networks that were created prior to climate change (ReliefWeb, 2020). Rural road infrastructure remains behind in many developing countries, and, with the advent of climate change, the study seeks to understand the impacts of climate change on the road infrastructure in Southern Africa. The study seeks to examine the impacts of extreme climate events on road infrastructure. The study seeks to explore the rural inaccessibility induced by climate change. It is at the backdrop of the impacts of the extreme climate change events that this study explores the impacts of climate change on the accessibility of rural areas amid extreme climate change events. The study is significant as it can move beyond academic corridors and move to inform policy makers on ways to develop the road networks in Southern Africa to reduce rural inaccessibility. The study can be important to development agency on how rural development should be modelled top respond to the impacts of climate change. The article is organised in this way, introduction, theoretical framework, literature review, methodology, presentation of findings, discussion of the findings, conclusion and the reference.

THEORETICAL FRAMEWORK

The theory that underpins this study is the Marxist theory of uneven development proposed by Harvey (1989). The theory focuses on the spatial inequities and how some spaces are not developed while some of the spaces

are centres of development. The study adopts the Marxist theory of uneven development on spatial disparities and disintegration. Harvey (1989) interpreted spatial disparities by introducing a concept of uneven geographical development. Marxist perspective and understanding of spatial inequalities started to form around the concept of uneven distribution of resources and development (Gyuris 2014). This theory is a product of Karl Marx's theorising concerned with the uneven social relations between the workers that he termed proletariats and the owners of production that he termed the bourgeoisie (Mkhize 2018). This work was found in the works of Karl Marx although the ideas were more concerned with spatial disparities and unequal development.

David Harvey is the main proponent of the Marxist rural and urban approach to unequal development of urban spaces over rural spaces Marxian spatial planning theorists condemn capitalism for subjecting other segments of society to poverty and fragmented spatial form (Harvey 1989). The theory identifies the vulnerability of rural economies to climate change as being exacerbated by the uneven development of road infrastructure with most urban societies being more developed towards resilience to climate change. The lack of development in rural road infrastructure exposes the rural communities to the vagaries of extreme weather events such as flooding that can wipe away the entire road network leaving rural communities inaccessible. Such spatial arrangements of development leave visible patterns of uneven development and in recent years in Zimbabwe, it has left some rural communities inaccessible because of climate change effects on rural road infrastructure (Nyahunda and Tirivangasi, 2021).

LITERATURE REVIEW

This section of the study critically presents the review of the literature from past studies to guide and situate the study within the historical context and craft the discourse for this study. The literature that was reviewed in this study was about the impacts of climate change on rural road infrastructures and rural accessibility.

THE IMPACTS OF EXTREME CLIMATE EVENTS ON ROAD INFRASTRUCTURE AND RURAL ACCESSIBILITY

Rural road infrastructure is vulnerable to the impacts of extreme climate events rendering these areas inaccessible in some cases and in most developing countries road infrastructures are affected by climate change. Le Roux *et al.* (2019) observe that the climate in sub-Saharan Africa has a direct impact on rural and urban communities' socioeconomic structure evolution

through the infrastructure. African countries rural areas tend to be particularly vulnerable to the effects of climate vulnerability and in the past four decades (1978-2018) have experienced more than 1500 recorded weather-related disasters (Meteorological, climatological and hydrological) causing damages to transport systems in the rural areas mostly (Diouf *et al*., 2020). These impacts on rural areas are heavy on road infrastructure in rural areas as a result of poor road networks that are due to uneven infrastructural development in developing countries that favours urban centres (Moyo *et al*., 2023). These disasters have had significant impacts on countries' economies and rural communities' accessibility and their livelihoods because of the road infrastructure destruction (Le Roux *et al*., 2019).

Communities in Africa are projected to be some of the worst affected by climate change this is due to their high socio-economic vulnerability, growing rural populations high dependency on natural resources low adaptive capacity in resource-stricken environments, but also due to the relatively strong climate change signal over Africa, including a projected increase in extreme events (Mbokodo *et al*., 2015). For African countries, the lack of adequate road infrastructure and the long distances to markets and essential services are the major development hurdles and continue to make rural communities especially susceptible to the impacts of climate vulnerability hindering accessibility of these communities (Le Roux *et al*., 2019). The uneven development is making rural areas vulnerable to the impacts of extreme climate events in Southern Africa as rural road infrastructure remains behind. The design of climate-resilient road infrastructure requires knowledge about climatic conditions that affect materials and structures within the road reserve (Blanc *et al*., 2014). Chinowsky *et al*. (2015) observe that economic growth is widely held to depend on the quality, quantity and orientation of a country's backbone infrastructure and climate change has placed a strain on most of the road infrastructures in developing countries. Chinowsky *et al*. (2015) observe how in Mozambique installed infrastructure is vulnerable to climate change with the most likely threats being shifts in severity and character of extreme weather events as roads are sensitive to extreme heat above certain temperature thresholds, paved roads weaken, causing rapid degradation.

Perhaps more importantly, a higher frequency and severity of floods will increase road washouts already a serious problem in many countries even under the low-end projections of sea level rise, coastal areas will be subjected to greater inundation due to cyclones reaching further inland destroying road infrastructure (Strzepek *et al*., 2010). Engel *et al*. (2017) observe that in Cameroon floods cause scouring and gullying of roads damage the foundation

of the railway tracks and cause overflows on the rails and mudslides that damage the tracks. Mbane and Ezeuduji. (2022) argue that episodes of heavy rainfall disrupt the entire road transport system and loss of traction and control, delays, and reduced speed accidents. Strzepek *et al*. (2014) observe that in Ghana climate change will directly affect road infrastructure in several ways high temperatures will cause roads to easily develop cracks, and rising sea levels can flood gravelled and unpaved roads adjacent to the sea and rural areas where the road transport network is poor. This shows that the uneven development has a huge bearing on the rural areas where road transport network is poor.

There is a gap in the existing literature on the impacts of climate change on the accessibility of rural areas in Africa as incidents of extreme events of climate change have shown the threat that poor road infrastructures in Africa are. Saghir (2021) observe that Africa is particularly vulnerable to the extreme impacts of climate change as it faces exponential collateral damage posing systemic risks to its economies, infrastructure investments, water and food systems public health, agriculture and livelihoods threatening to undo its hard-fought development and reverse decades of rural economic progress. The impacts of climate change and extreme weather events on rural road infrastructure is not well documented and understood along the lines of uneven development in most Southern African countries and this study seeks to close that gap in literature. The study is providing an understanding on how the uneven development in rural road infrastructure is leaving rural communities vulnerable to extreme weather events.

Saghir (2021) argues that the impacts of climate change on infrastructure can be acute or chronic and acute climate impacts which result in a sudden shock to the system, often from an extreme event such as a flood the event may have widespread impacts like coastal flooding leading to the inaccessibility of rural communities. Saghir (2021) argues that in 2000 flooding in south Mozambique destroyed road links between the capital city, Maputo, and the rest of the country for almost one year, including the rail line to Zimbabwe this led to the decline of Mozambique capita economic growth and the destruction of rural economies as the rural areas were inaccessible. It is important to argue that the under development of rural road networks emanates from colonial era Saghir (2021) observed that the colonial governments in Southern Africa only developed highways in Southern Africa as the rural areas were not important for them. This uneven development strategy continued even in the post-colonial states the rural networks are still poor (Mudavanhu *et al*., 2015; Mavhura, 2018; Ncube-Phiri *et al*., 2014). It is

at the backdrop of the impacts of climate change road infrastructures that this study becomes important, as most studies have focused on the impacts of climate change on livelihoods and rural economies rather than the looming danger of climate change on accessibility of rural areas.

RESEARCH METHODOLOGY

This study utilised the qualitative methodology leaning towards a case study research design with a view to understanding the impacts of climate change on rural infrastructure as it is affecting accessibility. The case study research design allows the researcher to build a study in an anthropological way by assessing cases from past studies and experiences related to the problem under study (Blackstone and Parrin, 2015). The case study research design becomes appropriate in this study as it was used to explore emerging cases in this study. The study engaged secondary data is articles and journals available on the internet on extreme weather events affecting rural accessibility.

FINDINGS

This section presents the findings of the study, and it focuses on the objectives of the study that is to understand the impacts of extreme weather event on road infrastructure in line with the uneven development in rural spaces of Southern Africa. The findings of the study also focus on the study objective of understanding the impacts of extreme weather events on the rural inaccessibility.

THE IMPACTS OF EXTREME WEATHER EVENT ON ROAD INFRASTRUCTURE

The study sought to understand the impact of extreme weather events on road infrastructure to understand the magnitude of these events in Southern Africa and how they affect rural accessibility. As observed by ReliefWeb (2019), Southern African rural spaces are not well developed as they lack road infrastructure, and this has exacerbated the impacts of extreme weather events on these areas. ReliefWeb (2017) observed that in Mozambique and Madagascar Cyclone Dineo affected Inhambane Province with areas around Vilankuno, Massinga, Murrombene, Maxixe and Jangano districts having their roads and bridges wiped away. South African Government (2017) observed that Cyclone Dineo affected rural infrastructure in Mpumalanga, Northern KZN, and Limpopo (Vhembe Malamulele, Mopani, Phalaborwa) wiping away road, bridges and communication lines. World Vision (2020) observed that Cyclone Idai and Kenneth left a trail of destructions in the rural spaces of Mozambique (Sofala and Gaza Provinces) and Madagascar (Maxixe) destroying road infrastructure. Chatiza (2019) observed that Cyclone Idai left a trail on the road infrastructure in Zimbabwe affecting the

accessibility of rural areas. These impacts of extreme weather events in Southern African rural areas have affected the accessibility of rural spaces.

THE IMPACTS OF EXTREME WEATHER EVENTS ON THE RURAL AREAS INACCESSIBILITY.

The findings of the study revealed that climate change has had impacts on rural road infrastructure rendering the rural areas and the economies in these areas inaccessible in Zimbabwe. The Herald (21-02-2017) notes that Cyclone Dineo destroyed road infrastructure in Zimbabwe, Midlands (Mberengwa, and Gokwe) and Bulawayo with the Nkankezi River Bridge as one of the infrastructures-that was wiped away by the cyclone-induced floods. The Herald (17-02-2017) indicated that in Mount Darwin and Mutoko Cyclone Dineo wiped out the roads and bridges making the rural areas inaccessible during the flooding as most of the bridges and roads were gone. Chatiza (2019) indicate that Cyclone Dineo affected road infrastructure making it inaccessible for humanitarian support during the floods in 36 districts that were affected by the floods from the Cyclone. Mabaso *et al*. (2021) revealed that Cyclone Dineo affected Midlands, Matebeleland South, Manicaland and Masvingo with most of the road transport infrastructure being wiped out of site making the areas inaccessible leaving the people stranded and straining government resources towards airlifting the aid.

Chivhenge (2021) indicates that Cyclone Dineo had a storm and landslides that caused human deaths and destroyed road infrastructure. The Chronicle (21-02-2017) indicate that the rains during Cyclone Dineo destroyed vital bridges and roads with travellers being stranded after Khami River along the Bulawayo-Tsholotsho Road became impassable due to the floods as motorists waited a whole for water to subside while others had to turn back. Dube *et al* (2018) indicated that the district worst affected by Cyclone Dineo is Tsholotsho as it wiped out the road infrastructure and made the district inaccessible. Moses and Ramotonto (2018) have indicated that during Cyclone Dineo the storm damaged road infrastructure such as roads and bridges in various parts of the country. IOM Zimbabwe (2017) observes that rainfall worsened by Tropical Cyclone Dineo resulted in severe flooding that led to the washing away of road infrastructures such as bridges and roads in most districts.

CNBCAfrica (18 February, 2017) posit that in South Africa the storm from Cyclone Dineo caused severe flooding in the Limpopo Province roads and bridges were destroyed interrupting water and electricity and leaving most rural areas in the province inaccessible and taking months of rehabilitation.

South African Government (17 February, 2017) indicate that the impact of Cyclone Dineo was widespread flooding with impacts on roads and bridges in rural townships mostly. Meyiwa (2019) observes that Cyclone Dineo had a wide impact on the Southeast African regions particularly South Africa, Zimbabwe and Mozambique were affected with bridges and roads being covered by floods and some parts of Madagascar were affected by this flooding.

World Vision (2019) observes that Cyclone Idai and Cyclone Kenneth in 2019 had devastating impacts on Sofala Province in Mozambique, road infrastructure bridges and roads were destroyed especially in the rural areas of the province with accessibility becoming impossible by road. Charrua *et al*. (2021) observed that Cyclone Idai affected the road infrastructure in Mozambique such that it damaged the road infrastructure leaving the province in a 10m depth of floods submerging and wiping away road infrastructure. MSF (2019) observes that Cyclone Idai affected Chikwawa, District, Zomba, Phalombe, and Nsanje districts in Malawi wiping away roads and bridges that were not strong or that had grown old. This rendered these areas inaccessible as the cyclone did not have an impact on lives, but infrastructure was destroyed (ActionAid, 2019).

Chanza *et al*. (2020) indicate that Cyclone Idai in Zimbabwe exposed deficiencies in the country's disaster management and poor road infrastructures in Southern Africa as most of the countries that were affected by the Cyclone had some inaccessible rural areas. Chatiza (2019) indicates that roads and bridges in Chimanimani and Chipinge were severely damaged, and some 1500km of the road network was rendered unusable for months, affecting market access and livelihoods. World Bank (2019) revealed that the roads and bridges infrastructure of approximately 90% of the road networks in Chimanimani and Chipinge were damaged 584km of roads were damaged by Cyclone Idai flooding and landslides. Munsaka (2021) observes that Cyclone Idai resulted in the loss of many human lives, loss of livelihoods and massive damages to infrastructure rendering most of the rural areas inaccessible.

OXFAM (2019) indicates that Cyclone Idai struck Mozambique and Zimbabwe with landslides and floods leaving a trail of destruction on the infrastructures such as roads and bridges in most rural areas where road networks were already weak and in a state of deterioration in the Sofala and Manicaland Provinces. Chivhenge (2021) observes that since the year 2000 up to the present about 1000 people have lost their lives to cyclones and road infrastructure is destroyed in most rural areas with Chimanimani and Chipinge

being the new additions the list. Dube *et al*. (2021) indicated that Cyclone Idai affected road infrastructure such as bridges and roads in the rural areas with direct losses in critical infrastructure such as roads connecting villages and townships in Mozambique, Zimbabwe and Malawi. Humanitarian Coalition (2019) indicated that roads and bridges were damaged in rural areas where the transport network is poor and most of the villages were disconnected from help.

Marango and Chitongo (2021) indicates that most of the road infrastructure in rural areas are poor and in a dilapidated state making them vulnerable to floods and other extreme climate events. Chikowore *et al.* (2019) indicated that due to the extensive nature of infrastructure damage induced by the impacts of Cyclone Idai, not all infrastructure is replaced indicating that some of the rural areas were still inaccessible because of the cyclone. The New Humanitarian (2019) revealed that Chimanimani was cut off from aid as much of the infrastructure was especially badly damaged by Cyclone Idai a large section of the highway was washed away with bridges connecting villages and townships gone. Ndlovu (2021) observes that there was no infrastructure in terms of roads and bridges in the affected areas raising the need for critical recovery building.

DISCUSSION

The findings of the study revealed that Southern Africa floods are the common extreme weather event caused by climate change that affects the road transport infrastructure through the destruction of the roads and bridges. Consistent with the study is Pregnolato *et al*. (2017) who argue that flooding especially flash flooding events that start predominantly due to intense precipitation can affect the road transport infrastructure just as they affected Newcastle City in 2013 as these floods rendered some roads impassable. The study showed that cyclone-induced floods affect areas with infrastructures that were built using weak materials.

The study revealed that rural road infrastructures are vulnerable to cyclones and flooding as these road infrastructures are destroyed rendering the rural areas inaccessible. Buttressing the findings are Haque *et al*. (2023) who observe that floods can have an impact on rural areas that are built on areas that are flat with no high ground like most of the rural areas that were affected by the floods in Bangladesh that wiped away all roads and bridges along the Teesta River Basin leaving the areas around inaccessible. Cyclone-induced floods remain one of the biggest extreme weather events that affects Southern Africa with most road infrastructures being erased to the ground. The study

revealed that most of the areas located in the Manicaland Province (Chimanimani, Honde Valley and Chipinge) that have valleys are affected by the cyclones that migrate from Mozambique and the road infrastructure is affected most of the times. In support of the study is Munyai *et al*. (2021) who observes that rural areas and infrastructures located in valleys and wetlands are more vulnerable to flood risks and disasters. Similar to the study is ReliefWeb (2023) that observes that the Eastern Cape floods caused damages to the roads and bridges in the area at an alarming cost margin making the rural areas inaccessible by road transport.

The findings of the study showed that rural road infrastructures are affected by extreme weather events such that their connection to the townships and all the major towns are mostly affected by cyclones through being washed away. The study revealed that rural economies are vulnerable to extreme weather events as lack of access to road infrastructure after an extreme weather event can affect the whole economy as road transport is the only transport for rural areas in developing countries. In support of these study findings is the conceptual framework of the concept of uneven development that argues that development in capitalist societies focuses on the core relegating the periphery to poor living conditions making the periphery vulnerable to floods and rendering these areas inaccessible. The study showed that the vulnerability of the rural areas' accessibility is exacerbated by the poor networks that are already existing in these rural areas with most of them having one main road that is poorly developed.

Concomitant with the study findings, Koks *et al*. (2021) observe that the Western Europe July 2021 floods that affected most of the road infrastructure had a huge magnitude in the rural areas where the road network was poor and old. The negligence of road development in rural areas is not only common in Africa alone but in Europe as well. Consistent with these findings is the conceptual framework of the concept of uneven development by Harvey (1989) who argues that areas with less economic resources like rural areas are neglected by the capitalists. In Zimbabwe, most of the rural areas with no natural resources like the rural areas in Matabeleland are not well developed as observed by NewsDay Zimbabwe (26 March, 2023) where there is a lack of investment and a generally poor human and development.

The study revealed that rural road infrastructures are vulnerable to cyclones as the two Cyclones Dineo and Idai affected the road infrastructure making the rural areas inaccessible even for humanitarian aid. The study revealed that the cyclones in rural areas of Southern Africa affect the road transport

infrastructure as most of the infrastructures are old with little or no maintenance leaving them vulnerable to climate change impacts. The study showed that cyclones bring with them landslides that affect the road infrastructures closing the roads and bridges and making these roads inaccessible. Concurrent with these findings is He (2021) argues that floods reduce transportation network capacity either directly through physical destruction rendering roads unusable, especially in the rural areas through flood water accumulation on the roads and bridges even washing away these infrastructures.

CONCLUSION AND RECOMMENDATIONS

The study sought to understand how rural accessibility is under siege from extreme weather events and close the literature gap by paying attention to rural road infrastructure vulnerability to climate change. The study revealed that the uneven development between rural and urban infrastructure where urban infrastructures are well developed is exposing the vulnerability of rural areas rendering them inaccessible. The study revealed that Southern African road network is poor and the region is vulnerable to extreme weather events. The study revealed that extreme weather events have had destructive impacts on Southern African rural communities because of the uneven development in the road infrastructure. The rural road transport infrastructure in Southern Africa is under siege from extreme weather events. It can then be concluded that the uneven development of road infrastructure that Southern African post-colonial governments inherited and continued with have rendered rural communities inaccessible due to extreme weather events vulnerability.

In conclusion, it can be concluded that the post-colonial Southern African revolutionary pledges of peace, unity and development are coming short of living less than they aimed as most of the countries in the region rural are becoming inaccessible after every climate change extreme weather event. The post-colonial southern African countries have failed to create resilient road infrastructures that can respond to climate change hence after every flooding event livelihoods' are lost because the areas become inaccessible for rescue missions. The rural areas in southern Africa remain vulnerable to climate change because of poor development and infrastructural development as most of the development is focused on the cities and towns rendering the rural areas inaccessible in times of disasters.

The study concludes that disaster preparedness in Zimbabwe and Southern Africa in general is still lagging behind as the road infrastructure is failing to be resilient to climate change shocks. Lessons can be drawn in Southern Africa from countries in the first world that are largely affected by

earthquakes that have adopted resilient methods of building infrastructures that can withstand these shocks as the same can be done in the region through building road infrastructures that can withstand the shocks from climate change.

There is a need to build improved road infrastructure networks that can allow multiple access to and from rural areas to allow the rescue and revival of the economies. There is a need for improved rural and urban planning that involves the building of strong infrastructures that can withstand the problems of climate change. There is a need for regular maintenance of existing road infrastructures to reduce their vulnerability to flooding and other climate change shocks.

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Rural Planning: Missing Link in Fast-track Resettlement Plots in Zimbabwe

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Abstract

The Fast-Track Land Reform Programme in Zimbabwe was undertaken to address the land question that the liberation struggle war had hitherto sought to use as a way of trying to correct the racial inequalities of resource distribution embedded in settler colonialism in Rhodesia. The land reform was undertaken mainly to address the poverty that was being faced by poor Zimbabweans in the erstwhile reserves who had limited access to productive agricultural land. Agriculture emerged as the key to poverty alleviation in Zimbabwe to lift most of the poor Zimbabweans and those who had returned from the war landless. The study critically explores how rural planning was not implemented in the resettlement process in Zimbabwe. The article examines the missing link in the Fast-Track Land Reform Programme in Zimbabwe as the government tried to resolve the inherent poverty in black African rural communities. The study used a qualitative methodology with a bias towards the case study design. The study concludes that the land reform has not realised its potential so far. This might be because it has a missing link that is it lacked rural planning. The study recommends the decentralisation of the resettlement process from the central government to the rural councils.

Keywords: *government, agriculture, poverty, livelihoods, stratification, infrastructure*

INTRODUCTION

In the wake of the implementation of the land reform in Zimbabwe in 2000, the rural landscape was massively transformed (Moyo, 2011). With the reconfigured agrarian structure, the relationship between the rural areas and urban areas has changed, too (Scoones and Murimbarimba, 2020). There are on-going debates on how to create sustainable rural communities in sub-Saharan Africa. Research has found that development practitioners work with the assumption that rural societies in sub-Saharan Africa are eager to embrace

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modernisation (Phuhlisani, 2009). For this reason, the modalities of rural development in most sub-Saharan communities has focused on transforming them into urban settlements, instead of making them more liveable rural areas (Chigbu, 2013).

Thebe (2018) observes that there is growing dissatisfaction with the post-colonial rural development policies in Zimbabwe, land reform and agricultural developments included. The post-colonial state in Zimbabwe seems to have an official policy of transforming rural areas into modern zones where small-farm agriculture can be promoted as a vehicle for development and growth (Thebe 2018). Chaumba *et al.* (2003) argue that agricultural-related policies of rural development policies in the post-colonial era are an extension of colonial policies of the 1950s. A key area of policy continuity in post-colonial Zimbabwe is the emphasis on centralisation together with agricultural betterment approaches as evidenced by the popularity of the villagisation models after independence (Chaumba *et al.,* 2003).

Thebe (2018) observes that these two assumptions form the basis for planning resettlement schemes (Model A and A1) and by extension communal areas across all five agro-ecological regions. Due to the discriminatory and inequitable land ownership laws of the Rhodesian state, it was to be expected that a popularly elected post-colonial government would adopt a redistribution policy to address the question of access and control of the nation's fundamental yet highly emotive asset land (Gonese *et al*., 2002). This article critically addresses the view that planning is the missing link in the fast-track resettlement in Zimbabwe as the process was fast-tracked with no planning or models to be followed in the redistribution of land.

The study seeks to understand how the resettlement process in Zimbabwe lacked rural planning. The study aims to understand how the resettlement process in Zimbabwe was undertaken and implemented without considering rural planning. The study seeks to reveal the connection between rural planning and the resettlement process. There is a gap in the existing literature as the existing literature focuses mainly on how the land reform addressed the overpopulation in the reserves (Gonese *et al*., 2002, Chaumba *et al*., 2002 and Kabonga, 2020) the literature gap is on rural planning and the resettlement process. It is at the backdrop of the lack of rural planning that the study seeks to explore an understanding on how the land reform programme overlooked rural planning in resettling people. The study can be significant beyond the academic scope and inform policy makers and rural planners on how to deal with the aberrations of the resettlement process such as human-wildlife

conflict. The study is significant in in closing the literature gap in addressing the link between rural planning and resettlement. The study is organised in this way, introduction, theoretical framework, literature review, methodology, presentation of findings, discussion of the findings, conclusion and the reference.

THEORETICAL FRAMEWORK UNDERPINNING THE STUDY

The theory that guides this study is the theory of change as posited by Weiss (1995) theory of change simply and elegantly navigates how and why an initiative fails to work. AUDA-NEPAD (2019) argued that the blueprint that envisages change largely comes from generating political commitment and will, changing the rules of the game, getting and enhancing voices and participation by rural residents. Kabonga (2020) observed that a sound initiative requires a developmental state and political leadership, building multi-sectoral institutions for rural transformation prioritising decentralisation to create competent rural planning strategies at all levels. This envisages rural planning that can bring about development of rural infrastructure stimulating growth of rural non-farm and farm economy strengthening the resettlement areas through improved rural planning (Kabonga, 2020).

Rural planning is the process of improving the quality of life and economic well-being of communities living in unpopulated areas (Queensland Farms' Federation, 2024). Thus, the study chose the theory of change because the theoretical lens sharpens the rural planning and implementation of the resettlement process. The theory becomes appropriate in this study as the resettlement process in Zimbabwe had a missing link that is it lacked rural planning as Ndlovu (2015) observed that the process of resettlement in Zimbabwe resettled people into areas reserved for wildlife causing human-wildlife conflict limiting change of quality of life and economic well-being. The study becomes applicable to the study as it encourages political commitment and will to transform rural communities through adding rural planning to the resettlement processes.

LITERATURE REVIEW

This section provides the literature review that will guide the crafting of the discourse on the rural planning and resettlement process providing a contextual historical background on the resettlement issues in Zimbabwe. The review show how the current models of resettlement come short of producing productive results in Zimbabwe as rural planning is the missing link.

RURAL PLANNING AND THE FAST-TRACK LAND REFORM IN ZIMBABWE

Rural planning is the process of improving the quality of life and economic well-being of communities living in relatively unpopulated areas rich in natural resources (Queensland Farms' Federation, 2024). Rural development has traditionally focused on the exploitation of natural resources such as agriculture forestry and mining (Queensland Farms' Federation, 2024). Planning in rural areas aims to allow the establishment and operation of productive agricultural industries while conserving important natural areas allowing urban activities in appropriate areas (Dandekar, 2002). Rural planning is about developing and practicing physical and human capital and addressing the at times conflicting goals of economic development and resource conservation (Dandekar, 2015). Tomaney *et al*. (2019) observed that regional planning provides a critical framework for rural development and planning. Rural planning encompasses both the development of agriculture and natural resources minerals, forests, fisheries improving the access of rural people to infrastructure, education, housing and amenities (Dandekar, 2015).

Gallent (2015) observed that rural planning combines land-use and spatial planning elements with community action, countryside management and the projects of national and supra-national agencies and organisations. OECD (2017) posits that rural planning navigates the key challenges facing rural communities and the ways that public policy and community action shape rural spaces. Rural planning offers a broad analysis of entrepreneurial social action as a shaper of rural outcomes with particular coverage of the localism agenda and neighbourhood planning (Gallent, 2015). Marabuka (2013) observes that the land legislations during the colonial era were discriminatory and by 1979 when it was clear and obvious that the liberation movement would in the event of an outright military victory institute a radical land redistribution and agrarian reform policy several options were put forward that aimed at deflating and obviating such an eventuality. The Fast-track Land Reform in Zimbabwe lacked rural planning as it only constituted making the economic lives of the people better notwithstanding the fact that there was a need for improvement of infrastructure and other amenities.

At independence in 1980, whites who constituted 3% of the population controlled 51% of the country's farming land (44% of Zimbabwe's total land area), with about 75% of the prime agricultural land under the Large-Scale Commercial Farming (LSCF) sector (Weiner *et al.,* 1985) and hence inaccessible to the black majority. Farm sizes in the Large-Scale Commercial Farming Sector ranged between 500 and 2000 hectares, with most of them located in the better agro-ecological regions I, II, and III (Marongwe *et al*.,

2011). This necessitated the Fast-track Land Reform in Zimbabwe as the land question remained unanswered in the post-independence era. Communal Areas (CAs), that were home to about 4.3 million blacks that constituted 72% of the rural population, had access to only 42% of the land, three-quarters of which was in the poor agro-ecological regions IV and V. Poverty was concentrated in the Communal Areas with Government estimating that more than half of the households had few or no cattle to use as draught power (TNDP, 1982, Kabonga, 2020).

Given this background, land reform became welfarist in settler selection criteria that emphasised the landless, the poor, and war-displaced were not allowed to be in formal employment, giving credence to the use of land resettlement as a tool for fighting poverty (Marongwe *et al*., 2011). The liberation struggle that claimed the lives of thousands of Zimbabwe's sons and daughters was waged to ensure that the historical dispossession was reversed, and the land was returned to its rightful owners (Mangena, 2014). The need for land redistribution was evident at the independence with highly skewed land distribution, with around 6,000 white-owned farms and several large agro-industrial estates occupying more than a third of the country's land area, much of its areas of higher agricultural potential (Chaumba *et al*., 2003). Moyo and Chambati (2013) rank land redistribution among the major reasons that underlined the nationalist movement in Rhodesia. It is an uncontested truth that the land in Zimbabwe had to be redistributed given the historical imbalances (Kabonga and Marime, 2017). Munemo (2016) argue that during the Lancaster House discussions Lord Carrington wittingly made sure that the clause on land redistribution only stipulated that any form of land reform had to be done 10 years after independence without a guarantee that Britain would finance the land Reform Programme.

Land reform in Zimbabwe has emphasized poverty alleviation and this is operationalized through the programme objectives that sought to allocate land to the poor (Marabuka, 2013). Land allocation in the country is done through respective resettlement models, with the most relevant to the discussion on poverty alleviation being Model A, that has since assumed a new name as the A1 resettlement model and A2 emphasized commercial farming and increasing production to alleviate poverty (Marabuka, 2013). The Fast Track Land Reform Programme in Zimbabwe facilitated the transfer of land to nearly 170000 households excluding the informal settlements that are largely excluded from the official fast track programme (Moyo, 2011). The idea of redistributing land is not only peculiar to Zimbabwe but is practised in both developed and developing countries, more so in the developing world where

historical inequalities in terms of access to land demanded changes in such inequalities (Kabonga, 2020).

The reviewed literature has shown that the land issue in Zimbabwe's post-colonial state presented an area of contention as the area was fraught with imbalances and inequities from the past that needed to be corrected and the post-colonial government tried to correct the mistakes of the past by trying to create social cohesion through the land reform co-existence between settlers and natives. The literature also showed that land reform created tension between the West and Zimbabwe plunging the country into economic turmoil as the process of land reform was fast-tracked. The reviewed literature presented the Land Reform Programme as a strategy by the post-colonial government to address and alleviate poverty among the natives there are gaps in this literature as it does not highlight that most of the people in communal areas lacked the knowledge to operate commercial farms and the literature does not highlight how the economy took a nose dive after the programme and how rural poverty increased.

RESEARCH METHODOLOGY

The study adopted a qualitative research methodology with a case study research design. A case study research design focus on holistic description and explanation, flexibility in the design and data collection methods, reliance on multiple sources of evidence, and emphasis on the context in which phenomenon occurs (Crowe, 2011). In the setting of this study, the article used secondary data from published books and journals comparing sources and revealing that rural planning is the missing link in the Land Reform Programme in Zimbabwe. The study used narrative data analysis to analysis.

FINDINGS

The study findings indicate that the Land Reform Programme in Zimbabwe has a missing link that is rural planning as the findings of Kabonga (2020) revealed that the land reform in Zimbabwe was done to address the inequalities of the past and answer the land questions of the War of Liberation. The findings of Marongwe *et al*. (2011) revealed that Zimbabwe attained independence in 1980 and embarked upon its land Reform Programme thereafter for a period spanning almost 30 years, the country's land Reform Programme has undergone changes in terms of its key implementation characteristics, including methods of land acquisition and quality of land acquired, scale of beneficiaries, objectives of land reform and provision of support services, among other issues. The rationale for the land reform was that the historical inequalities in Zimbabwe demanded action by

the government and its citizens' policy shift have, over the years since 1980, however, been necessitated by the need to achieve a reasonable balance between equity objectives and efficiency of production through various approaches to land acquisition and redistribution (Chaumba *et al*., 2003, Gonese *et al*., 2002).

The findings from the Government of Zimbabwe (1985) indicate that in the early stages of resettlement, poverty alleviation and decongestion of the communal lands were central objectives of land reform thus, initially the criteria for resettlement emphasized, among other categories, the landless or those with too little land to support themselves and their dependents, the unemployed, the poor and the returning refugees this strategy only looked at the need to address the inequalities and give land to the landless without considering the impacts of these moves on production and rural development. The findings from (Thierfelder *et al*. 2015) indicate that there was a significant agricultural production shift during the FTLRP (Fast-Track Land Reform Programme) period affecting the major crops and livestock and the infrastructure and technologies around the agricultural industry also collapsed the optimal utilisation of available technologies especially for the peasantry was constrained by limited access to inputs, such as machinery, equipment and infrastructure seeds, fertilizers chemicals thus, limiting the areas planted to most crops at the back of droughts hence missing in this resettlement was rural planning.

Marlowe *et al*. (2011) observes that gradual emphasis shifted to production-oriented goals, although this was abandoned in the Fast-Track resettlement (post-2000) period, the overall, changes in the implementation characteristics of land reform had a bearing on the performance of land reform, especially its ability to reduce poverty among beneficiaries and even beyond. Marabuka (2013) reveals that what never changed in almost 30 years of the implementation of the land reform and resettlement is the political set-up and governance systems providing policy direction to the programme and work on the assessment of the land Reform Programme has often overlooked the limitation that from the fact that only ZANU-PF, a liberation war based political party is at the helm of governance of the country. Bangwayo *et al*. (2010) observe that the colonial legacy left a disproportionate distribution of fertile lands in the hands of few white settlers showing the need to redistribute land. Marongwe *et al*. (2011) observe that whilst it is understood that land reform, seeks to address poverty alleviation, not much is invested in unpacking poverty at the local level as the discussion has failed to unpack

social differentiation among smallholder farmers has not been factored in the land reform.

The findings of Gunning *et al*. (2000) indicate that households in resettlement schemes had higher incomes, lower income variability and more evenly distributed incomes but worryingly higher childhood malnutrition levels than their counterparts in the communal areas showing that the missing link in resettlement is planning. The findings from Scoones and Wolmer (2003) show that resettlement had a missing link in rural planning as the process became violent and politically charged such that the beneficiaries became political party supporters rather than the intended targets the poor and the landless and this affected production leading hunger and starvation. The findings from Scoones and Wolmer (2003) posit that the fast-track planning process was to merely ratify and formalise the self-allocations of the land done during the Jambanja in 2000 and it rarely involved considerable reallocation of land, and this had no rural planning but it only had a plan to ratify what had been done to placate the war veterans that campaigned for the 2002 elections using land as the reward.

Ndlovu (2015) observes that in Matobo District land reform lacked rural planning as the people were resettled in areas that formerly housed wildlife as commercial farmers were replaced by less experienced subsistence farmers. Ndlovu (2015) argue that these subsistence farmers brought too many domesticated animals in areas with limited pastureland. Ndlovu (2015) argues that the land reform programme in Matobo District introduced small-scale farmers into farms that were originally occupied by commercial farmers who knew how to deal with wildlife and these farmers have converted these farms into subsistence farms using traditional techniques. This indicates that the land reform programme in Matobo District lacked rural planning. Williams (2011) revealed that one other area that the land reform lacked rural planning was the Save Valley Conservancy where people were resettled in areas that were used to conserve wildlife and this created human-wildlife conflict with the newly resettled subsistence farmers struggling with keeping wildlife away from their domesticated animals. This evidence observes that land reform lacked rural planning in Zimbabwe.

Chaumba *et al*. (2003) observe that the resettlement process was too hasty, incoherent, haphazard, unsystematic, chaotic, and lacking in rigour the criteria for settler selection was not transparent, vague and subject to cronyism, and there is frequent and sustained criticism of the dumping of people on land without adequate infrastructure (roads, shops, clinics) and with insufficient

provision of inputs, credit and marketing assistance and agricultural extension advice. The findings of Scoones and Wolmer (2003) indicate that there was no planning in the resettlement process as the government just grouped people and settled them in a bush with no adequate infrastructure this led to the lack of poverty reduction and the resettlement process missing out on its goals of poverty reduction and correcting the inequities of the past. The findings of Ndlovu (2015) indicated that the government resettled people in the Matobo District in areas that used to be reserved for wildlife. Williams (2011) indicates that the land resettlement in Save area resettled people in conserved areas that formerly housed wildlife such that they had to clear the land and set traps for wild animals to avoid livestock predation.

DISCUSSION

The study show that the land reform programme had a missing link as the main goal of the programme was to address the inequalities from colonialism without proper rural planning. The study revealed that the resettlement programme was done to answer the Liberation War land question and placate the war veterans and the electorate for the ruling party in Zimbabwe showing the lack of rural planning. The study showed that the ruling party was starting to lose popularity and therefore, introduced land reform hence, the process lacked rural planning as it was driven by political motives rather than rural planning and development. In support of these findings is Thierfelder *et al*. (2015) who observes that the resettlement process in Zimbabwe lacked planning as it was just to placate the electorate to vote for the ruling party in the 2000 and 2002 general elections after the party had lost the referendum vote for the new constitution. Similar to the study are Scoones and Wolmer (2003) who observe that the resettlement process in Zimbabwe was just the ratification of the Jambanja it lacked rural planning as it was to rubber stamp the political tensions between the government and the war veterans on the land question. This is consistent with the theoretical framework as it signals the need for change in the resettlement process with the inclusion of rural planning as observed by Weiss (1995) that there is a need for change to transform rural lives through infrastructural development,

The study revealed that the resettlement lacked rural planning as the implementation characteristics keep changing even the land acquisition and the quality of land acquired. Consistent with the study are Chaumba *et al*. (2003) who observed that the resettlement process lacked planning as it ended up resembling the colonial land apportionment. The study showed that the resettlement programme in Zimbabwe lacked rural planning as it only targeted decongestion and poverty alleviation in the reserves without considering the

human capital, financial capital, and natural capital. Concurrent with these findings is the theoretical framework the theory of change as observed by Connell *et al.* (1995) that there is a need for a change in political will through decentralisation and including rural planning in the resettlement process to change economic well-being.

The study revealed that the land reform programme lacked rural planning as it created human-wildlife conflict by resettling people into areas where wildlife resided. In line with these findings is Chimimba (2015) who observes that land reform created human-wildlife conflicts and the hunting and trapping of endangered carnivorous species. The study showed that the lack of rural planning in the process led to the shift in production of the major crops in farms as the incoming farmers lacked human and financial capital due to a lack of training and financial resources to undertake large-scale farming. From the findings of this study it can be deduced that rural planning remains the missing link in the resettlement programme in Zimbabwe as the process was done as a corrective measure rather than a development measure it lacked the foresight and hindsight of what the outgoing farmers had to poses the land as despite having the white skin these farmers also had intensive training, skills and financial capacity to operate these lands while the incoming farmers had at most the black skin and slogans. The resettlement programme in Zimbabwe had a missing link that is rural planning it missed the human and financial capital on the selection of the beneficiaries of the programme as the people that benefited could not develop infrastructure, technologies needed for large-scale farming, and even the capacity to produce the livestock needed for the country to meet the required quantity for poverty alleviation.

The study revealed that the resettlement programme in Zimbabwe had a missing link that is rural planning as it was spearheaded along political party lines, rather than through national development strategies as this would have incorporated rural planning. Consistent with the findings is Munemo (2016) who showed that the resettlement process was hijacked and ended up favouring people along the lines of sloganeering dexterity rather than the people in need of land that are good at farming. The study showed that resettlement targeted poverty alleviation, but it overlooked social differentiation among the beneficiaries of the programme as it lacked rural planning it did not understand the financial capitals of the beneficiaries hence, they failed to develop infrastructure and acquire technologies that propel productivity. The findings of the study indicated that there was no planning in the resettlement programme as the government grouped people in bushes with no infrastructure or technological tools for productive farming this made

agriculture come short of rural development as this strategy lacked rural planning. Similar to the study Moyo and Chambati (2013) observe that the real resettlement favoured the government elites, and the rest of the beneficiaries were just grouped in places with no developed infrastructure signalling a lack of rural planning in the resettlement process.

CONCLUSION

The study revealed that the land resettlement programme in Zimbabwe targeted to address the land question raised in liberation struggle and alleviate poverty. The study revealed that the land resettlement programme did not factor in rural planning as it offered land along political party loyalty lines. The study showed that the Land Reform Programme lacked rural planning as it brought the human-wildlife conflict by resettling people into areas inhabited by wildlife leading to livestock predation. It can then be concluded that the resettlement process in Zimbabwe had a missing link than is rural planning as it deviated from its core tenets that is to address the mistakes of colonialism by giving back land to the rightful owners hence the process ended up being captured along political party lines and political elites gained more than other people. The resettlement process in Zimbabwe lacked rural planning as some people ended up being resettled in areas with no infrastructure with no chance of development hence the goal of resettlement to alleviate poverty was thwarted in the process making rural development impossible.

The resettlement programme lacked rural planning matrixes as the compensation of white settlers after the land reform goes against the Kissinger Plan of 1976 with the second republic on the re-engagement drive the gains of the resettlement are exposed as something that lacked planning through the compensation of the white farmers instead of the white farmers compensating Zimbabweans for ill-treatment during colonial rule. From the study, it can be deduced that the Land Reform Programme lacked rural planning as the beneficiaries of the programme were never trained on how to utilise large scales of land this made the process lack planning as this impeded poverty alleviation through the underperformance of the beneficiaries in agriculture that the government believed would alleviate families from poverty.

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Agricultural Productivity Enhancement on Land: Challenges, Options and Strategies in Zimbabwe

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Abstract

Land productivity enhancement remains a pipeline dream in the African agrarian landscape as climate change continues to ravage the continent with most of the countries in dire need of productivity improvement as populations are food insecure and disproportionately vulnerable to the adverse effects of climate change. The post-colonial African state has addressed the land issue through land reform, but the regained land remains unproductive or less productive than it was before causing the quest for land productivity enhancement strategies clearer than before. The article critically examines the strategies and options of the farmers in Zimbabwe on land productivity enhancement amid the vagaries of climate change that are transforming land into barren land. The study was guided by the climate-smart agriculture concept as the conceptual framework that attempts to reduce the impacts of climate change while, improving productivity in the agricultural sector. The study adopted a qualitative methodology with a bias towards the case study research design. The study used secondary data as the source of data gathering. The study found that lack of institutional support is the main challenge encountered in enhancing land productivity. The study revealed that climate-smart agriculture has become one of the strategies to improve productivity and reduce crop failure through the growing of small grains that are drought resistant. The study concluded that climate-smart agriculture can be the only way towards land productivity enhancement. The study recommends the inclusion of technology-based agricultural productivity enhancement strategies.

Keywords: *food insecure, climate change, climate-smart agriculture, post-colonial, institutional support, small grains*

INTRODUCTION

Most of the African economies are based on agriculture as economic mainstay and the food security of this country of late is erratic and questionable because of climate change and other drastic policies that are pushed in Africa by post-

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colonial states (Mangena, 2014). Starvation, food shortages, and lack of safe foods remain significant global problems as hunger tops the list of SDGs (FAO, 2018). Grappling with hunger, starvation and food insecurity is the major challenge that global communities, and Zimbabwe in particular, are experiencing since the 1990s (Muzerengi and Tirivangasi, 2019). In 2016, Zimbabwe declared a state of emergency as drought caused crop failures across the country, rendering many communities vulnerable and food insecure (Tirivangasi, 2018). This resulted in approximately 2.5 million people or more than a quarter of the population requiring aid (Buchanan, 2016).

Mandisvika, Chirisa, and Bandauko (2015) concurred with the findings of Chirimuuta and Mapolisa (2011) that 80% of Zimbabwe's total land is made up of fertile agricultural land, yet the country struggles to be food secure. Food insecurity is attributed to many factors, political and socio-economic factors, however the most gruesome are the effects of climate change (Muzerengi and Tirivangasi, 2019).

Most households in the country struggled to meet their food needs while both rural and urban households were subjected to this turbulent environment (Tawodzera, 2012). The rural areas of Zimbabwe are usually seen as the epicentre of poverty, hunger and malnutrition however, unlike most other countries in SADC where food insecurity is viewed almost exclusively as a rural problem (Tawodzera, 2012). Harare has a substantial history of food insecurity as well showing that there is low productivity in the farms and smallholder farms (Tawodzera, 2012). Thierfelder *et al*. (2015) observes that the real cause of crop failure and lack of productivity in Zimbabwean farms. This is attributed to be the result of unplanned land reform as the process that was implemented without due assessment of the beneficiaries' capabilities in the farming sector as the programme was hijacked and politicized to placate the ruling party supporters for the party to stay relevant (Thierfelder *et al*., 2015).

Marongwe et al. (2011) argue that productivity on farmland in Zimbabwe started after the Land Reform Programme as the government grouped people in areas that lacked infrastructure or the technology to start production and this reduced the yields from the national agricultural sector. Tirivangasi and Nyahunda (2021) observe that climate change has also caused a sharp decline in the productivity of land in Zimbabwe as extreme weather events are occurring more frequently affecting the national yields and causing crop failure. It is against the backdrop of the challenges in the Zimbabwean agricultural sector emanating from political, economic and climate change that

this article seeks to explore the challenges, options and strategies for land enhancement in the Zimbabwean agricultural sector. With the vagaries of climate change and other various global crisis that are underway around the world productivity has dwindled in developing countries where climate change is affecting the most (Nyahunda and Tirivangasi, 2021, Chazovachii, 2020, Nyasimi *et al*., 2023). The agricultural productivity enhancement challenges and strategies are important to understand for Zimbabwe if the country is to attain Vision 2030 status of an Empowered and Prosperous Middle Income Country status while leaving no one behind. Hunger and starvation have terrorised developing countries Zimbabwe included (World Vision, 2020) hence productivity enhancement challenges and strategies become important to understand at this juncture. The article seeks to critically explore and understand the agricultural productivity enhancement strategies in Zimbabwe. The study seeks to understand the challenges faced in the agricultural productivity enhancement in Zimbabwe. It is at the backdrop of the view that lack of agricultural productivity in an agrarian economy results in low economic performance of the country that this study becomes important beyond academic corridors. The study is important for policy makers and development agencies as it provides an understanding of how productivity can is enhanced in Zimbabwe inclusive of the challenges therein. The article is lined in this way, introduction, theoretical framework, literature review, methodology, presentation of findings, discussion of the findings, conclusion and the reference.

CLIMATE-SMART AGRICULTURE CONCEPTUAL FRAMEWORK

The conceptual framework underpinning this study is climate-smart agriculture as agricultural productivity is widely affected by climate change in Zimbabwe with some agro-ecological regions moving further downwards in terms of productivity. This framework has three pillars that are to enhance food productivity, adapt to climate change and reduce greenhouse gas emissions (Khatri-Chhetri *et al*., 2017). The vagaries of climate change and variability need drastic action by farmers and community to combat potential detrimental impacts on productivity, the environment, resilience sustainability and livelihoods capturing the pillars of climate-smart agriculture can help the farmers enhance productivity and reduce the challenges experienced (Chitakira and Ngcobo, 2021).

Phiri *et al*. (2021) observe that productivity is dwindling because of a lack of enhanced productivity. Climate-smart agriculture has emerged as the solution to enhance productivity in agriculture and Zimbabwe has adopted it. The concept of climate-smart agriculture emerged as a solution motivated by

the need to develop solutions for the integrated goals for increasing agricultural productivity and yields, reducing greenhouse gas emissions from the agricultural sector enhancing resilience and adaptation for farmers and agricultural systems (Andrieu *et al*., 2017). The potential and sustainable action include an adaptation of strategies that enable farmers to cope with socio-economic environmental and agricultural production challenges such as implementing climate-smart agriculture (Chitakira and Ngcobo, 2021). Climate change has adverse impacts on local farming communities and the effects are heterogeneous and tightly coupled with persistent poverty and inequalities (Chandra *et al*., 2017).

Inequalities have become a plausible theoretical an entry point in the study of vulnerability studies to analyse the uneven social distribution of impacts on rural and natural-dependent communities (Tschakert *et al*., 2013). Climate-smart agriculture has enhanced production amidst the vagaries of climate change terrorizing agriculture in Zimbabwe and its adoption in Zimbabwe can create enhanced productivity in the agricultural sector while saving livelihoods.

LITERATURE REVIEW

This section provides a review of the literature that guided this study and the review for this study focused on the strategies that are used to enhance agricultural productivity globally, regionally and locally.

AGRICULTURAL PRODUCTIVITY ENHANCEMENT

There are a few agricultural productivity enhancement strategies around the world and in Africa that are used to make the countries food secure. Mutiro and Lautze (2015) observed that there is schemes to improve agriculture and enhancing productivity through smallholder irrigation. This has worked as a strategy for poverty alleviation and improving livelihoods in rural communities as the majority is dependent on agriculture (Mutiro and Lautze, 2015). Woltersdorf *et al*. (2015) observed that in Israel and Spain there is the extensive planned reuse of treated water for irrigation while Egypt and Chile use untreated wastewater as a process to enhance agricultural productivity in arid areas. The use of irrigation schemes is dominant in both developed and developing countries to enhance agricultural productivity. Chitongo *et al*. (2019) indicate that there is the construction of dams and the desiltation of existing dams to enhance agricultural productivity through irrigation schemes. Hut (2008) posits that in Kenya to enhance agricultural productivity sub-surface groundwater dams are constructed to store water for irrigation and

livestock. The enhancement of agricultural productivity through irrigation schemes is dominant across the world improving climate-smart agriculture.

Naorem *et al.* (2023) observed that there is the use of plastic mulching to prevent the soil moisture from being lost through evaporation. Akutse *et al*. (2020) observed that in Uganda and Ghana there is the use of salt to dehydrate insects in a less expensive way while enhancing productivity. Ndebele and Mubaya (2019) argued that in Masvingo Province there is the introduction of the growing of small grains to avoid the crop failure and enhance agricultural productivity in the province amid the vagaries of climate change. Nciizah *et al*. (2021) observed that small grains adoption is done in semi-arid areas like Zvishavane, and farmers have curtailed food insecurity and enhanced agricultural productivity. These various strategies of agricultural productivity enhancement have improved productivity and reduced crop failure while proofing the impacts of climate change.

There is the development of the agroforestry practices pushed to assist the farmers enhance agricultural productivity and adapt to the impacts of climate change (Beyene *et al*., 2019). Agroforestry has advantages that is carbon sequestration, water and air purification all that enhance agricultural productivity (Jahan *et al*., 2022). Agroforestry improve soil fertility, protect crops from wind, repair damaged land promote water conservation limits pests while minimising soil erosion all that move towards productivity enhancement (Jahan *et al*., 2022). Flores *et al*. (2016) has observed that agroforestry has for centuries enhanced productivity and food security and with the advent of agro-entrepreneurship it is providing income security in Mexico. The revealed literature has revealed that agricultural productivity enhancement is done in the world and in Africa through various strategies.

RESEARCH METHODOLOGY

The study adopted a qualitative research methodology with a bias towards a case study research design. The study used a literature review approach to sample case studies that are relevant to the study. A literature review-based study uses a collection of accessible both published and unpublished theme documents that contain facts, concepts, data and evidence published from a particular viewpoint to obtain or express those viewpoints on the subjects' nature and how it should be examined (Templier and Pare, 2015). The literature review will be used in this study to understand how productivity is enhanced on land in Zimbabwe post-land reform.

FINDINGS

CHALLENGES TO AGRICULTURAL PRODUCTIVITY ENHANCEMENT

In Zimbabwe after independence agriculture emerged as the dominant method that can alleviate households' poverty however, agriculture in Zimbabwe has not been fully mechanised and modern technology is still heavily complemented by a greater reliance on rain and with climate change, rain-fed agriculture has not been productive. Mutasa (2015) revealed that productivity enhancement in Zimbabwe is facing the challenge of the technological advancement in the agricultural sector, lack of infrastructure to enhance productivity and a lack of financial resources to develop irrigation systems. NewsDay (2020) indicated that traditional leaders have presented challenges for farmers in the enhancement of productivity through the growing of small season grains that are tolerant of the arid areas as the traditional leaders ban the growing of certain grains arguing against these grains using tradition and taboos as the reason for the decrees.

Relioefweb (2020) observes that in Mashonaland West under Chief Chundu, the traditional leadership is overlapping its power going against the government directive for the growing of small grains as a way to mitigate against climate change and enhance land productivity through the rich nutrients in small grains as the traditional leaders banish people from growing pearl millet because the founding chief died from poisoned beer grown from Peal Millet. Phiri *et al*. (2021) showed that the hindrance to the adoption of small grain and enhancement of land productivity is the farmers who hold on to the past unable to accept new interventions that are science-backed. Mukate *et al*. (2018) indicated that there is a lack of institutional support for the enhancement of land productivity as there is a lack of knowledge among the new farmers that got land after the land reform. Phiri *et al*. (2019) observed that there is a challenge in the uptake of the growing of the small grains they are labour intense and the birds can attack the whole field making the farmers lose all their yields.

AGRICULTURAL PRODUCTIVITY ENHANCEMENT STRATEGIES

The study revealed that Zimbabwe has implemented adoption of strategies to enhance agricultural productivity and alleviate poverty. Phiri *et al*. (2021) revealed that to improve productivity and survive the vagaries of climate change farmers in Umguza and Ntabazinduna started growing small grains, conservation and the rearing of small livestock to respond to crop failure induced by rainfall variability and enhance productivity on their land. Corbeels, *et al.* (2015) revealed that conservation is a combination of soil

management practices that includes crop rotation, soil cover through mulching and reduced soil disturbances that are incorporated into climate-smart agriculture. Phiri, *et al.* (2021) has indicated that the growing of small crops in Umguza improved food security and enhanced productivity in Matebeleland as most of the farmers in the area are producing excess small crops and selling them to beer breweries. The findings of Dube *et al*. (2018) have indicated that the ecological Regions 4 and 5 have become more arid and to enhance productivity in these areas farmers have adopted the growing of small grains as small grains are ecologically compatible with semi-arid and arid areas compared to maize and small grains are drought tolerant while they have long storage life with seldom attacks from pests unlike maize that is easily attacked.

Tirivangasi and Muzerengi (2019) have revealed that farmers in the Mangwe district have used the strategy of growing small grains to enhance productivity on their lands after enduring years of crop failure in maize farming with small grains they have realized food accessibility eradicating food insecurity experienced in the past. the government of Zimbabwe (2020) indicated that The Ministry of Agriculture and Climate Change adopted the Intwasa or Pfumvudza farming concept that involves the utilisation of small pieces of land applying the correct agronomic practices for higher returns also it is based on the conservation of agricultural principles that seek to climate proof agricultural production and low profitability of farming among smallholder farmers that continue to be negatively by climate change. Mutoko, *et al*. (2014) indicated that farmers in the resettlement areas have adopted using mulching as a conservative method to enhance productivity in the soil. Phiri *et al*. (2021) observed that in Matobo Khulasiswe an NGO is helping farmers adapt to climate change through adoption of small livestock to increase agricultural productivity. Dube *et al*. (2021) posits that there is the provision of irrigation schemes in Tsholotsho that has enhanced agricultural productivity. These findings indicate that people are triggered to action through the availability of water enhancing agricultural productivity.

Mashizha (2019) indicated that farmers in Zvimba District have adopted solar-powered irrigation systems to enhance land productivity amid climate change and rainfall variability. Mashapa *et al*. (2013) observed that in Chimanimani there is the local adoption of sustainable agro-ecology practices of direct seeding and mulch based cropping system to enhance agricultural productivity. Mapanje *et al*. (2023) showed that farmers in Manicaland have adopted agroforestry to enhance land productivity and mitigate the impacts of climate change on maize farming and other crops that are failing. Parwada *et*

al. (2022) indicated that agroforestry is used in Zimbabwean farmlands to create environmental economic and social benefits through combining high agricultural and biodiversity goals. Parwada *et al*. (2022) indicated that agroforestry is used in land productivity as trees are sequesters of carbon from the atmosphere and secure rural livelihoods as leguminous trees such as Acacia torticollis and Adenanthera povonina build the soil-healthy and fertility as this could be useful in the smallholder farming areas in Zimbabwe. The findings of Phiri, *et al.* (2021) indicated that the option of farmers in Zimbabwe are climate smart agriculture if the farmers are to enhance productivity as the traditional crops continue to fail because of climate change. The adoption of climate-smart agriculture remains the possible way to navigate and enhance land productivity in Zimbabwe if the country is to realize the benefits of land reform.

DISCUSSION

The study revealed that land productivity enhancement in Zimbabwe has faced challenges in the technological advancement in the agricultural sector, lack of infrastructure to enhance productivity and lack of financial resources to develop irrigation systems. Zimbabwe is facing challenges in technological development as other countries continue to develop the country is still grappling with socio-economic hardships making it hard to develop intelligent farming systems such as smart irrigation systems, and smart remote sensors on farms. Consistent with the study is Zhou (2023) who revealed that a lack of technology and infrastructure is the major drawback in the enhancement of productivity.

The study show that traditional leaders present a challenge in the enhancement of land productivity as they use their authority to banish the growing of small grains going against the government directive of promoting small grains production. The study revealed that in certain areas that are under threat from climate change traditional leaders are overlapping their power and authority confusing. Concurrent with the findings is Mutasa (2015) who revealed that there is confusion in rural areas and resettlement areas as to the authority in in-charge with traditional leaders continue to give decrees against certain practices. The study revealed that the enhancement of productivity in Zimbabwe is suffering from a lack of institutional support and farmers' tendency to hold on to the past rejecting new interventions. In support of the study Mazwi *et al*. (2019) revealed that most agricultural practices in Zimbabwe suffer because of a lack of institutional support.

The study revealed that to improve productivity and survive the vagaries of climate change farmers started growing small grains, conservation and the rearing of small livestock to respond to crop failure induced by rainfall variability and enhance productivity on their land. The study showed that the ecological Regions 4 and 5 have become more arid and to enhance productivity in these areas farmers have adopted the growing of small grains as small grains are ecologically compatible with semi-arid and arid areas compared to maize and small grains are drought tolerant while they have long storage life with seldom attacks from pests unlike maize that is easily attacked. Similar to the study Moyo-Nyoni (2022) revealed that to improve land productivity in smallholder farms in Zimbabwe small grains have reduced crop failure and increased food accessibility. Concurrent with the study is Mutami (2015) who revealed that small grains have increased productivity in smallholder areas reducing poverty and starvation as the strategy has enhanced food accessibility. In support of the study is the conceptual framework that argues that climate-smart agriculture reduces crop failures and enhances productivity as observed by Beyene *et al*. (2019) who argues that climate-smart agriculture reduces crop failure and enhances productivity. Climate-smart agriculture has grown to become one of the farming strategies that has enhanced productivity improved livelihoods and improved food security.

The study revealed that the farmers in Zimbabwe through the government have adopted the Intwasa or Pfumvudza farming concept that involves the utilisation of small pieces of land applying the correct agronomic practices for higher returns also It is based on the conservation agricultural principles that seek to climate proof agricultural production and low profitability of farming among smallholder farmers that continue to be negatively by climate change. Similar to the study is Mavesere and Dzawanda (2023) that revealed Pfumvudza improved yields and reduced donor aid in the smallholder farms. In support of the study is Tanyanyiwa (2021) who observes that the Pfumvudza programme is a success because it promotes high profile conservation agriculture technique that requires little financial input. The study revealed that farmers have adopted agroforestry to enhance land productivity in Zimbabwe. Similar to these findings, Nazu *et al*. (2021) argue that in Bangladesh farmers are enhancing the productivity of the land through agroforestry while improving the livelihoods of smallholder farmers. The study revealed that climate-smart agriculture is the option that farmers have in Zimbabwe as climate change continues to reduce productivity. In support of these findings is the conceptual framework the climate-smart agriculture as

observed by Lipper *et al*. (2014) that climate-smart agriculture aims to enhance productivity while reducing greenhouse gas emissions from agriculture.

CONCLUSION AND RECOMMENDATIONS

The post-colonial Zimbabwe is confronted with a series of developmental problems and most of the problems in the country emanate from the Fast-Track Land Reform that reclaimed land from the white settlers and gave the land to the native Zimbabweans triggering a decrease in the productivity of the land under farming. The study showed that productivity in Zimbabwe had decreased but efforts are made to enhance productivity through climate-smart agriculture. It can be concluded that the lack of technological advancement remains the stumbling block against the enhancement of productivity as the world has moved towards climate-proofing and embraced technology introducing remote sensors. The adoption of climate smart agriculture is a step in the right direction in Zimbabwe as the introduction of small grains has resulted in enhanced productivity and access to food in most rural areas making the land reform a success as people in the rural areas are food secure. It can be concluded that climate-smart agriculture remains the option for farmers to enhance land productivity as climate change continues to affect developing countries with no technology that depends on agriculture.

- There is a need to mainstream climate smart agriculture across all the provinces of Zimbabwe.
- There is a need to teach farmers about climate smart agriculture as most farmers are still holding on the traditional grains that are failing.
- There is a need to develop agroforestry in Zimbabwe, as it is a way that can reduce the carbon sequestering.

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The Land Invasions Plague: The Quest or a Lasting Land Governance Solution

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Abstract

The Fast Track Land Reform Programme in Zimbabwe could be said to have come to an end but, it was followed by another wave of land occupation that was more serious and damaging to the economy and the image of the country. The land invasions in Zimbabwe are largely seen as unlawful with land invading adversely affecting the commercial farming in Zimbabwe. The article critically explores how the land invasions have become a plague to the country reversing the government land reform and government Western re-engagement drive. The article is premised on the argument that; land invasions have a more damaging impacts on the national development strategy as it makes investors shun investing in the country because of lack of land tenure security. The study used a qualitative methodology and secondary data as the source of the data. The study revealed that land invasions are rampant in Zimbabwe with most of the state land under threat of being invaded resulting in the loss of grazing lands. The study show that the some of the land invasions are government sanctioned against perceived enemies of the state that are vocal against the state human rights violations. The study concludes that land invasions remain a thorn in the flesh haunting the post-colonial governments showing that the liberation struggle land question was not fully addressed after the independence attainment.

Keywords: *commercial farming, independence, post-colonialism, liberation struggle, tenure security, Western re-engagement*

INTRODUCTION

The Fast Track Land Reform Programme (FTLRP) is inscribed on Zimbabwe's political and socio-economic map since 2000 in the early years of the reform, the programme captured international attention and imagination, while in Zimbabwe itself it radically altered people's lives and livelihoods, and at the same time reawakened people's memories of the past (Mutondi, 2012). Events in the last decade around the land question in

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Zimbabwe and the broader political context in which they have played out are dramatic and transformational (Cliffe, Alexander, Cousins and Gaidzanwa, 2011). Sparked by land occupations locally referred to as 'Jambanja meaning' violence or angry argument and involving contested land expropriation and violent episodes, the process has not surprisingly proved contentious among policymakers, commentators, nationally and internationally and among all those who have sought to explain or justify or criticize it (Cliffe *et al*., 2011).

With a few exceptions, those who have engaged in writing or political rhetoric have tended to take positions on one or other end of the spectrum in what is highly polarized debate, between welcoming a reversal of a racial distribution of land some of them bewailing the manner of implementation and its distorting of the state and those who condemn the end, in principle, and the means (Cliffe *et al*., 2011). Regional debates on land reform have centred mainly on the social and political rationale of land redistribution as a way of addressing colonial disparities in access to and ownership of land and other productive resources (Mandizadza, 2009). Kepe and Cousins (2002), observe that development in Southern Africa can only be achieved through reducing the inequality in the ownership and effective control of both productive assets and benefit streams derived from them. Land reform thus, is framed not only in its role in achieving social equity but also in delivering social justice in the background of colonial land expropriation and alienation in the region (Sachikonye, 2005). Zimbabwe's Fast Track Land Reform Programme (FTLRP) formally began with the Land Acquisition Act of 2002 (Mkodzongi and Lawrence, 2019).

The Programme that effectively co-opted the farm occupations since 1998, redistributed land from white-owned farms and estates, and state land, to more than 150.000 farmers under two models, A1 and A2 the A1 model allocated small plots for growing crops and grazing land to landless and poor farmers, while the A2 model allocated farms to new black commercial farmers who had the skills and resources to farm profitably, reinvest and raise agricultural productivity (Mkodzongi and Lawrence, 2019). Studies on FTLRP have indicated that the programme led to decreased aggregate national production, Richardson (2004) observes that agricultural production has plummeted since the programme was initiated in 2000 and by 2004 it had dropped by 30%. The decrease was due to the backward and forward linkages that had been established between the agricultural and the manufacturing industries, this contraction of the agricultural sector also saw the manufacturing sector and the whole economy shrinking by 15% by 2003 (Richardson, 2004).

Mandizadza (2009) observes that the FTLRP was accompanied by a lack of support for resettled farmers, victimization of white farmers and loss of livelihoods for the former farm workers among others. Therefore, the Fast Track Land Reform Programme was not simply about land, but also about people, especially the farmers and the communities they lived, originated from and settled in it was about the institutions they interacted with on multiple levels as it represented the dismantling of institutions that had dominated society for decades and the final embodiment of empowerment after independence (Mutondi, 2012). The article explores the lasting solutions for the problems created by land reform as people continue to invade land 20 years after the Jambanja in Zimbabwe making land reform more of a social problem for planners and the government as land barons continue to unlawfully pass out land illegally.

THEORETICAL FRAMEWORK

The theory that underpins this study is the conservative theory of land that sees living customary tenure as providing sufficient tenure security because land acts as a social, political and economic tie between kinship groups (Chinock, 2001). This viewpoint stems from a multi-functional, multi-generational understanding of land from a broadly African perspective that land, forms the foundation of socio-economic, religious, and political systems (Arko-Adjei, 2011). Such African customary tenure systems are based on social legitimacy through kinship ethnicity land titling programmes in these sorts of contexts may fail because titling breaks down the social structure of rural African communities hence, de jure tenure security may erode pre-existing socially embedded de facto tenure security (Nkwae, 2006) thus this system is used in the land Reform Programme to reclaim the ancestral land lost during the colonial era disregarding the existing laws of land tenure.

The role of traditional leaders is of crucial importance as that of land barons in the conservative theory because they are largely responsible for land allocation and administration. While a popular view of pre-colonial traditional leaders is that they were autocratic rulers who paid little heed to their subjects' wishes however, Delius (2008) observes that traditional leaders were consultative and democratic and allocated land to their people unlike in the modern age where land barons are parcelling out land. However, the nature of traditional leadership has changed considerably with the advent of colonialism many traditional leaders now live up to such prejudicial views of in a way to get back the former colonial masters (Kabonga, 2020) as the indigenous tenure and modern tenure carry with them colonial traits. Tenure insecurity may arise for commercial farmers under customary tenure if they become

targets and this may happen due to greed and abuse of power (Kingwill *et al*., 2017). Ubink and Quan (2008) observe that the conservative tenure system can experience problems of gender discrimination, or abuse of power by land barons and traditional leaders. The theory becomes applicable in this study as the people who are still invading land 20 years after the Land Reform Programme in Zimbabwe are using the customary tenure and the conservative stance of reversing the errors of colonialism and advocating for the empowerment of the traditional owners of land.

LITERATURE REVIEW

This section presents the literature review on land reform and how the land reform has shaped the socio-economic situation in Zimbabwe. To craft a discourse for this article the researcher reviewed literature to situate the study within the historical context to understand how the land reform has shaped the lives of the beneficiaries and those who lost.

LAND REFORM IN ZIMBABWE

The Land Reform Programme in Zimbabwe has spawed debates with some scholars defending it for resolving the inequities or legacies of colonialism by giving the land to the natives that had unjustly lost their land (Mutasa, 2015, Chaumba *et al*., 2003) with some scholars arguing that it was an unplanned programme that lacked foresight of the socio-economic impacts of such a venture as it had impacts on productivity and the livelihoods of the rural dwellers employed in the agricultural sector that lost their jobs (Scoones, 2012, Mkodzongi and Lawrence, 2019, Richardson, 2005). Putzel (1992) argues that land reform refers to the changing of land ownership and tenure, often through government-initiated modifications of the law and regulations or customs regarding land ownership generally of agricultural land to allow those who did not previously own land to do so. The term land reform is used interchangeably with agrarian reform that has a similar meaning to land reform, but it is a more complex term that refers to the multi-dimensional and comprehensive package of land rights to also include transforming rural relations to balanced power relations (Putzel, 1992).

Musodza (2015) observes that land reform has re-emerged on the front burner of the global development agenda of the Global South as land reform was identified as a key strategy for alleviating poverty, hunger and starvation and growing food insecurity in the less developed countries in the Global South especially sub-Saharan Africa. These countries share a common history of massive land dispossession from the indigenous people by foreigners through colonization (Mkodzongi and Lawrence, 2019). The land reform in this case

becomes justified as the native people were dispossessed from their lands by the colonial regimes and relegated to the unfertile lands with unfavourable climatic conditions. Most of the critics of land reform have focused on the dynamics of the land occupations such as the displacement of farm workers and political violence in the countryside rather than engage with the changing agrarian structure (Hammar *et al*., 2010, Rutherford, 2003).

Smith *et al*. (2010) claimed that the land reform only benefited political cronies, the so-called cell phone farmers with no interest in farming. A recurrent theme underlying the major criticism of the fast-track process is that the land reform turned the land into dead capital as the new tenure arrangements comprising 99-year leases and user permits were deemed to promote tenure insecurity (Mutenga, 2011, Tupy, 2007, Richardson, 2005, De Soto, 2000). Moreover, criticism of the new agrarian structure carries with them an implicit assumption that peasant households lack the technical skills to farm and hence could not match production levels set by the white commercial farmers (Mkodzongi, 2013). Such criticisms lament the loss of white farmers whose removal has presumably led to food shortages and general industrial decline; however, these assumptions ignore other factors that had an impact on agriculture such as climate change-related droughts and wider economic difficulties that hampered agricultural production in the aftermath of land reform (Mkodzongi and Lawrence, 2019). Sharp production decline was noticeable immediately after the FTLRP was implemented apart from the socio-economic and political complexities surrounding Zimbabwe during the post-land Reform Programme indicating that the FRLRP contributed towards the fall in production (FEWZ NET, 2014).

To be sufficiently food secure, Zimbabwe needs a minimum of 2.1 million tons of maize annually including 1.7 million for human consumption (FAO, 2010). From the early 1990s to 2001, total maize production averaged 1.6 million tonnes, with fluctuations between periods of high or low rainfall, after 2002, the national maize production averaged 1.04 million tons per year, with a steep sloping negative trend during the 2014 harvest season (NewZimbabwe, 2014). In 2013, a decade after the official end of the FTLRP, national maize harvest was estimated at merely 800, 000 tons, a shortfall that exposed more than 2.2 million Zimbabweans to severe food insecurity. The land reform in this case becomes a negative venture as its main goal as observed by Chaumba et al. (2003) is to alleviate poverty and put an end to households' food insecurity that crippled the rural natives that had been moved to unfertile reserves by the colonial government. To supplement the food deficit, Zimbabwe's government increased food imports however, due to

a liquidity crisis, the government was not able to import enough grain to meet the food demand (Musodza, 2015).

Although the neighbouring countries face food production challenges, the case of Zimbabwe is very disturbing because production levels are much lower than the regional average, even though, from the early 1980s through the mid-1990s the country was recognised as the regional breadbasket (Musodza, 2015). When the FTLRP was launched in 2000, and effectively ran until 2003 when its official end was announced though it continued thereafter at a much slower pace, the overarching objective was to address colonial injustices of skewed land distribution and ownership inherited at independence in 1980 (Mandizadza, 2011). The injustice favoured the European settlers at the expense of native black Zimbabweans having failed to implement an effective land Reform Programme after a series of land reforms over almost two decades, the expectation was that the FTLRP would finally put an end to the nagging problem of unbalanced farmland distribution between native black Zimbabweans and whited commercial farmers, mostly former European settlers (Musodza, 2015).

To be effective, a land reform must be redistributive, that is to say, it must result in a net increase in poor peasants' and rural workers' power to control land resources with a corresponding decrease in the share of power of those who have used such power over the same land resources and production process (Borras, 2007). From the above review it can then observed that land reform was a double-edged sword on one hand it addressed the colonial legacies of a skewed land distribution that was skewed in favour of the white settlers and on the other end it failed to reach the production levels that the white commercial farmers set, and this led to food shortages and loss of many livelihoods.

RESEARCH METHODOLOGY

The study adopted a qualitative research paradigm with a bias towards a case study research design. To craft the discourse forming this article, the researcher engaged in literature and document review, providing critical case studies. Constructing research and linking it to existing literature is the building block of academic research activities regardless of the discipline understudy (Snyder, 2019). A literature review-based study can give directions on where the research is interdisciplinary and direct the researcher towards gaps within the research process (Snyder, 2019). This study builds on a literature review reviewing case studies from different sources trying to find the linkages, the ideological and philosophical, aspects of how the land reform

has become a plague to Zimbabwe affecting productivity and the economy through the uncertainty it brings to the agricultural sector halting long term development of land as farmers fear unlawful occupations.

FINDINGS

The land reform in Zimbabwe has proved to have many loopholes affecting productivity in the country with most of the indigenous farmers missing out on the farming as they lack the technical know-how to boost production resulting in food insecurity. The Zimbabwean (2019) indicated that the Zimbabwe Land Commission that oversaw the auditing process that involved over 18.000 farmers revealed that there were fraudulent land allocations and other gross irregularities that resulted in the low agricultural output in the country. The Herald (2019) indicates that the late Minister of Agriculture Perence Shiri issued a warning to land invaders that the time for land invasion had ended and those caught doing that were going to be punished with imprisonment as land invasions of commercial farms were disturbing production and development. The Herald (27 September 2022) indicates that President Mnangagwa of Zimbabwe issued a warning to land barons and those buying the land saying that "it is unlawful to buy agricultural land you can only buy freehold land that is urban land".

The Herald (31-08-2021), indicates that some farmers are unlawfully leasing and selling land while others are occupying land without offer letters from the government in Goromonzi. FleMandipaza (2023) indicates that income and productivity from agriculture are reduced by illegal grazing land occupation as people continue to settle in areas that are not legally designated for occupation and without proper documentation. The Herald (22-01-2019) observes that people in their thousands are occupying state land in Masvingo Province around Mutirikwi Dam and other reservoirs to end the unlawful occupations that are causing catchment siltation and eviction notices were being offered to these unlawful occupants. Chigwere and Chikwati (2021) indicated that the government of Zimbabwe resorted to the issuing of new securitized A2 Model Settlement Permits with advanced security features as people were using forged offer letters to grab land unlawfully.

The Zimbabwe Mail (25-11-2020) observed that the Land Reform Programme was not only under threat from unlawful occupations but, also from unlawful leasing of the land to the former white commercial farmers negating the land reform while creating black land-owning rentier class whose sole function is to extract rent from the land. The Herald (30-12-2023) indicates that in Mashonaland East land barons were arrested for unlawfully invading farms

without going through the proper channels and the ministries responsible for that. New Zimbabwe (14-01-2024) indicates that the ruling party ZANU-PF has taken disciplinary action against its members who are involved in the illegal occupation selling and parcelling of land using falsified documents. The Chronicle (26-08-2022), revealed that Chegutu West Member of Parliament Dexter Nduna was arrested for occupying land without lawful permits. New Zimbabwe (31-12-2023) indicates that the ZANU-PF National Commissar Patrick Chinamasa warned the party members in Manicaland invading and selling land in Gimboki posing as land barons with connections and the blessing of the party were going to be held accountable by the law. Landportal (2021) indicate that the government is accused of using unlawful invaders to invade black-owned farms that are owned by the people in opposition to the government and ruling party. New Zimbabwe (31-10-2021) revealed that former ZANU-PF minister Obert Mpofu invaded the Eskadini farm that belonged to Malunga a university lecturer who is vocal against government human rights violations.

DISCUSSION

The study has revealed that land reform has continued in Zimbabwe even though it officially ended in 2003 when then President Robert Mugabe declared an end to it but, land invasions continue to occur in the country. These land invasions have now stretched into commercial farms that are helping in the revival of the country's economy as the first wave of land reform deepened the economic crisis in the country as the other governments in the West imposed sanctions against Zimbabwe. Concurrent with the study is Shonhe (2022) who observes that the breakdown of commercial farms in Zimbabwe did not simply lead to farmers and workers being displaced and evicted, it resulted in the collapse of a complex sector of interconnected businesses and the result was the catastrophic collapse of the national economy.

The study revealed that the land audit in Zimbabwe found that there were fraudulent land allocations and gross irregularities that have led to the low agricultural productivity and food insecurities in Zimbabwe. The study revealed that land invasions are rampant in Zimbabwe with Ministers issuing warnings against land invaders as the problem now affects productivity encroaching into commercial farms that are the backbone of the agrarian economy. Concurrent with the study is the Commercial Farmers Union of Zimbabwe (2019) that posited that the continued unlawful invasions of commercial farms were standing in the way of development, as farmers feared developing the lands amid fresh invasions. Consistent with the study is

Chibanda (2020), who observes that the invasions influenced the confidence of the farmers as they lost trust in the land tenure security.

The study revealed that land reform gains were being reversed as farmers were unlawfully leasing the land they benefited from. The study showed that income and productivity had been reduced as grazing lands were being occupied illegally by land invaders affecting the livestock business as people continue to settle in areas that are not designated for occupation. The study revealed that illegal land invasions in Zimbabwe are becoming problematic with people occupying state land around reservoirs causing catchment siltation affecting the water bodies. Similar to the study are the South African Government's (2020) sentiments that land invaders invading state land in the Western Cape must be arrested as they were disturbing the peace of the country and productivity. The study revealed that people are forging papers as A2 Model Settlement Permits invading commercial farms.

The study revealed that there are arrests of land barons in Mashonaland East after a failed attempt to invade a commercial farm. Consistent with the study is the Daily Maverick (2022) that argues that in KwaZulu-Natal more than 70 people were arrested after a land grab attempt at the iSimangaliso World Heritage Site in KwaZulu Natal (KZN). This shows that the land question is still unanswered in Africa and most of the invasions are failing endangering the economies of most African countries as land reform can lead to the country being blacklisted in the international community. The study revealed that the ruling party has issued a warning against errant party members who were posing as land barons with authority from higher places within the party and the party indicated that the culprits were to face the full wrath of the law. The study revealed that the state is vindictive against those who are front-running and echoing for human rights by sending party loyalist to invade their land. These findings are inconsistent with the theoretical framework of the conservative theory (Chinock, 2001) as land tenure security is no longer guaranteed even among the native Zimbabweans based on their political affiliation people are being removed from their land because of political views eroding the social legitimacy of land ownership.

CONCLUSION

In a nutshell, land invasions remain a thorn in the flesh haunting the post-colonial government's developmental trajectory showing that the liberation struggle land question was not fully addressed after the attainment of independence. The Land Reform Programme has resulted in land invasions that have become a plague to the economy of Zimbabwe and the image of the

country even when the Second Republic tries to do damage control by compensating white farmers who lost their property to the Land Reform Programme the process still unlawfully continues derailing the re-engagement drive for Zimbabwe into the international community. The land invasions in Zimbabwe have affected commercial farming through the loss of land tenure security, as commercial farmers cannot make long-term land development plans due to the fear of being unlawfully removed after developing the land. Zimbabwe remains a pariah state because of the plague of land reform that has forced the economy to take a nosedive because of the land invasions that have halted productivity and removed commercial farmers with farming knowledge.

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Health as a Rural Development Matter: How Safe and Secure are Rural Populations in Zimbabwe Since 2000

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Abstract

This study provides a comprehensive overview of the intricate developmental nexus between health and rural development in Zimbabwe, specifically focusing on the safety and security of rural populations from the year 2000 to the present. The primary objective of this essay is to shed light on the challenges and opportunities that rural communities in Zimbabwe encounter concerning their health and well-being within the broader context of development initiatives. To achieve this, the study adopts a mixed-methods approach, integrating quantitative analysis of health indicators with qualitative investigations into the socio-economic factors influencing rural health. Quantitative data for the study is sourced from the Zimbabwe Demographic and Health Survey, emphasising key health metrics such as contraceptive use, teenage pregnancies, sexual and gender-based violence, HIV&AIDS prevalence, and HIV testing. In tandem with this quantitative approach, qualitative data is collected through interviews and focus group discussions conducted in carefully selected rural communities. The combined findings of this research aim to contribute significantly to a nuanced and holistic understanding of health as a pivotal component of rural development in Zimbabwe. In rural areas, the levels of contraceptive use is slightly lower, at 63%, compared to urban areas, which stands at 71%. The level of HIV testing in rural areas is slightly lower, 35%, compared to the higher rate observed in urban areas, which stands at 38%. It is important to note a significant gender-based disparity, with higher HIV prevalence among women at 17% compared to men at 11%. In rural settings, the prevalence of sexual violence is higher, at 14%, compared to 13% in rural areas. The prevalence of physical violence is higher, at 35%, compared to the slightly lower rate observed in urban areas, which stands at 34%. The prevalence of malnutrition in children is higher in rural areas, at 29%, compared to 22% in urban areas, with the level of vaccination slightly lower in rural areas, at 75%,

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compared to the higher rate observed in urban areas, which stands at 81%. This research's outcomes are expected to be valuable for policymakers, healthcare practitioners, and development agencies, providing evidence-based insights for formulating targeted interventions. The study recommends formulation of effective strategies that can improve the safety and security of rural communities in Zimbabwe.

Keywords: *health, rural development, safe, secure, rural population, post 2000, Zimbabwe*

INTRODUCTION

The persistent global phenomenon of inequitable resource distribution between rural and urban areas, leading to socioeconomic differences, is particularly pronounced in developing countries in the global south. A significant proportion of extreme poverty is concentrated in rural areas, with an estimated 79 percent of those in poverty residing in such settings (World Bank, 2018). In the global context, approximately 736 million people live in extreme poverty, a significant decrease from nearly 2 billion in 1990 (World Bank, 2018). Sub-Saharan Africa, home to about 413 million poor people, experiences a notably higher poverty rate of 41 percent compared to other regions globally (World Bank, 2018). Notably, Africa remains the world's most rural region, with 60 percent of the population living in rural areas, a figure expected to decline to 44 percent by 2050 due to rapid urbanization (UNDESA, 2015). Rural areas often face a scarcity of public investments and lack essential infrastructure, further contributing to social exclusion and the marginalization of large segments of the rural population. Rural development is essential to achieving the 2030 Agenda for Sustainable Development. It is also a reflection of the Agenda's guiding principle of leaving no one behind. This study explores the multifaceted challenges faced by rural populations in Zimbabwe in accessing healthcare services. The general objective of the study was to establish the trends and determinants of health in rural areas of Zimbabwe, using data from Zimbabwe Demographic Health Surveys conducted between 1999 and 2016. The findings aim to contribute to a nuanced understanding of the complexities involved in ensuring equitable health care delivery, particularly in rural settings, and inform potential interventions to address these challenges.

This article is the outcome of a study that sought to investigate the nexus between health and rural development. The study bore the title, Health as a Rural Development Matter: How Safe and Secure are Rural Populations in

Zimbabwe Since 2000.This article gives the background to the study and highlights the research problem. Literature gaps will be identified on Health as a Rural Development Matter in Zimbabwe. It also gives an insight into the objectives which provides direction to the study. The Theoretical framework underpinning the study and the methodology employed will be presented. The major findings and discussion will be presented. The article will end by giving the conclusions and recommendations.

THEORETICAL FRAMEWORK

This study employed the Ecological Systems Theory (EST), as conceptualised by Bronfenbrenner in 1979. Bronfenbrenner (1979) acknowledged that human development unfolds within a complex network of interactions between the individual and the broader society. Consequently, he formulated a model delineating four layers of ecological structures, encompassing direct contacts that initiate with social agents and extend to comprehensive institutional systems. The ecological model intricately dissects the factors influencing access to health while also providing a framework for investigating associated outcomes. Rather than solely focusing on rural residents, the model delves into five potential levels of determinants: individual, interpersonal, organisational, community, and national/policy levels. These determinants operate concurrently at multiple levels.

Figure 1: *The Ecological Systems Theory* (Bronfenbrenner, 1979)

LITERATURE REVIEW

Recognising the evident disparities in the delivery of health services, a global response was triggered, leading to the formulation of the Alma-Ata Declaration in 1978 (Rifkin, 2018). This declaration transformed the landscape of public health by underscoring the significance of Primary Health Care (PHC) as a mechanism to tackle health inequities. In Zimbabwe, the initiation of the PHC program took place in 1982 in alignment with this worldwide initiative. The programme concentrated on enhancing rural healthcare infrastructure, extending immunisation initiatives, addressing diarrheal diseases, and implementing national nutrition programs (Chilunjika and Muzvidziwa-Chilunjika, 2021).

Despite a substantial decentralisation and democratisation of Zimbabwe's health sector during the initial phase of the PHC programme, persistent challenges were encountered (Ray and Masuka, 2017). Notwithstanding, the continual endorsement of the PHC approach in national health strategies, impediments such as skills migration, inadequate investment, and restricted resources impeded its complete implementation (Ray and Masuka, 2017). The economic and political dynamics in Zimbabwe significantly influence the extent and quality of healthcare delivery (Mangundu, Roets, and Janse van Rensberg, 2020). The country operates a four-tier healthcare system, ranging from rural hospitals to central hospitals in major cities, however, broader economic challenges have impacted the availability of essential medical drugs, particularly in rural health facilities (Chilunjika and Muzvidziwa-Chilunjika, 2021). It is noteworthy that only 20% of rural health facilities in Zimbabwe possessed essential drugs for treating common chronic diseases (Mangundu, Roets, and Janse van Rensberg, 2020), indicating a significant gap in health service provision.

The spatial distribution of health facilities poses challenges to accessibility in rural areas, where individuals may need to traverse substantial distances to reach the nearest health facility (Chilunjika and Muzvidziwa-Chilunjika, 2021). Poor infrastructure, exemplified by unmaintained roads, exacerbates these accessibility issues. Additionally, Zimbabwe's failure to meet the minimum 15% annual health budget allocation, as outlined in the Abuja Declaration of 2001, has repercussions for resource availability in the health sector (Chilunjika and Muzvidziwa-Chilunjika, 2021).

The identified literature gap pertains to the limited exploration of the persistent challenges hindering the full implementation of Primary Health Care (PHC) in Zimbabwe, despite the country's initiation of the PHC program in 1982. While there is acknowledgment of the transformative impact of the

Alma-Ata Declaration and the subsequent efforts to enhance rural healthcare infrastructure, extend immunisation initiatives, and address various health concerns, there is a lack of in-depth analysis regarding the sustained obstacles faced by Zimbabwe's health sector.

Specifically, the literature does not extensively delve into the ongoing impediments, such as skills migration, insufficient investment, and resource constraints that have hindered the comprehensive implementation of the PHC approach. Additionally, the economic and political dynamics in Zimbabwe, highlighted as influential factors, need further exploration to understand their nuanced impact on the extent and quality of healthcare delivery.

This research delves into the diverse difficulties encountered by rural communities in Zimbabwe when accessing healthcare services. The primary aim of the study was to examine the patterns and factors influencing health trends in rural areas of Zimbabwe, utilizing data derived from the Zimbabwe Demographic Health Surveys conducted from 1999 to 2016.

METHODOLOGY

This research utilised data from five consecutive Zimbabwe Demographic and Health Surveys (ZDHS), conducted in 1999, 2005/6, 2010/11 and 2016. In these surveys, the data were collected with a nationally representative sample of women and men of reproductive age. Key informant interviews (KII) were conducted in Mashonaland Central province. This province was purposively selected because of its proximity to the researcher. Key informant interviews (KIIs) were carried out, employing a guide specifically designed for key informants, with participants including members of the Mashonaland Central Provincial Health Executive and health centre Sister-in-Charge. These interviews aimed to gather service provider-level insights into the challenges confronting the broader rural population in Zimbabwe. Through the KIIs, essential information was obtained, shedding light on the factors influencing health-seeking behaviours. Participants in these interviews played a crucial role in delivering key insights and providing valuable information that contributes to a comprehensive understanding of the complexities surrounding healthcare in rural Zimbabwe.

RESULTS

CONTRACEPTIVE USE

The overall prevalence of contraceptive use in Zimbabwe is relatively high, standing at 66. It is pertinent to highlight a noteworthy distinction between rural and urban areas, where contraceptive usage differs. In rural settings, the

contraceptive usage rate is slightly lower, at 63%, compared to the higher rate observed in urban areas, which stands at 71%. A significant trend emerges when examining the historical data. Over the years, there has been a consistent and notable increase in contraceptive use in rural areas. In 1999, the contraceptive usage rate in rural areas was 44%, and this has steadily risen to 63% by 2016. Conversely, in urban areas, the increase has also been substantial, with contraceptive use rising from 62% in 1999 to a current rate of 71%. These trends suggest an overall positive trajectory in contraceptive adoption, reflecting changing patterns and attitudes toward family planning practices in both rural and urban contexts.

Table 1: *Percentage distribution of contraception by socio-economic variables*

Year	**1999**	**2005**	**2010**	**2015**
Urban	61.8	68.3	60.4	70.7
Rural	43.9	53.4	55.7	63.2
Total	**50.4**	**58.4**	**57.3**	**65.8**

The lag in contraceptive use in rural areas was explained by a sister-in-charge of one clinic who in a key informant interview shared the following remarks:

> *In all honesty, our educational efforts encompass the teaching and provision of diverse contraceptive methods. Nevertheless, it is crucial to acknowledge that many individuals hold strong religious beliefs that prohibit them from utilizing contraception. Despite our comprehensive education on modern contraceptive options, some individuals adhere to traditional methods due to the influence of their religious convictions. This underscores the complex interplay between cultural, religious, and personal beliefs that impact individuals' choices regarding family planning and contraception. In our efforts, we respect and navigate these diverse perspectives to ensure that our educational programs are sensitive to the cultural and religious backgrounds of the communities we serve.*

The statement was buttressed by a member of the Mashonaland Central Provincial Health Executive, who expressed the following viewpoint:

> The influence of traditional religious beliefs, especially within the Apostolic sector, plays a pivotal role in shaping the healthcare-seeking behaviours of the local population. Adherents often adhere to traditional healing practices and may harbour reservations or apprehensions toward modern medical interventions, including the use of contraceptives. The cultural and religious dynamics create a distinct challenge for public health initiatives aimed at promoting family planning and contraception. Addressing this issue requires a nuanced and culturally sensitive approach that involves engaging with local traditional leaders, religious figures, and community members. Collaborative efforts between healthcare providers and traditional influencers are essential to bridge the gap between traditional beliefs and the promotion of modern healthcare practices, including the adoption of

> contraception in rural areas. This approach should prioritize mutual understanding, respect for cultural diversity, and the integration of traditional and modern healthcare perspectives. In our province, we have a significant presence of traditional churches, particularly from the Apostolic sector, where adherents are often discouraged from seeking conventional healthcare. This factor contributes to the observed low adoption of contraception in many of our rural areas.

HIV TESTING

The overall prevalence of HIV testing in Zimbabwe is relatively low, standing at 36%. It is crucial to highlight a notable disparity between rural and urban areas, where HIV testing rates differ. In rural settings, the HIV testing rate is slightly lower, at 35%, compared to the higher rate observed in urban areas, which stands at 38%. Examining historical data reveals a noteworthy and positive trend in HIV testing rates. Over the years, there has been a consistent and substantial increase in HIV testing in rural areas. In 1999, the HIV testing rate in rural areas was only 6%, and this has progressively risen to 35% by 2016. Similarly, in urban areas, there has been a significant increase, with HIV testing rates rising from 13% in 1999 to the current rate of 38%. These trends indicate a positive shift in attitudes and behaviours related to HIV testing, reflecting an increased awareness and understanding of the importance of regular testing in both rural and urban contexts. Despite the improvements, efforts to further enhance HIV testing rates, especially in rural areas, remain crucial for comprehensive public health interventions and disease management**.**

Table 3: *Percentage distribution of HIV Testing by socio-economic variables*

Year	**1999**	**2005**	**2010**	**2015**
Urban	13.1	10.3	22.1	37.9
Rural	6.3	4.2	19.5	34.7
Total	9.2	6.6	20.4	35.9

The lag in HIV testing in rural areas was explained by a sister-in-charge of a clinic, who, during a key informant interview, shared the following remarks:

> Despite the relatively low levels of HIV testing in comparison to urban areas, there has been a noticeable improvement over the years. It's worth noting that residents in these rural areas often have to traverse considerable distances to access these services. While the current utilization levels may not meet our desired targets, there is a positive trajectory, and we are making progress in enhancing accessibility and usage of these crucial services.

This was supported by the Mashonaland Central Provincial Health Executive who made the following remark:

> The Ministry has achieved significant milestones in HIV testing across the province, encompassing both urban and rural areas. The reception and utilization of HIV testing services have been commendable thus far. Our overarching goal aligns with the National Development Strategy 1, aiming to ensure that every individual has access to these essential services. Despite persistent challenges related to long distances, we are actively addressing this issue through innovative approaches such as mobile clinics and outreach programs. These initiatives are specifically designed to reach remote and hard-to-access areas, ensuring that healthcare services, including HIV testing, are extended to every corner of the province.

HIV PREVALENCE

The overall prevalence of HIV in Zimbabwe is relatively high, standing at 14%. It is important to note a significant gender-based disparity, with higher HIV prevalence among women at 17% compared to men at 11%. Delving into the demographic specifics, HIV prevalence trends show interesting patterns. Among women, there has been a consistent decrease in HIV prevalence in both rural and urban areas. In rural areas, the prevalence among women declined from 21% in 2005 to 17% in 2016, mirroring a similar trend in urban areas. Among men, there is also a positive trajectory with consistent decreases in HIV prevalence. In rural areas, HIV prevalence among men decreased from 14% in 2005 to 10% in 2016. In urban areas, a similar decline is observed, with prevalence decreasing from 16% in 2005 to 11% in 2016. These trends indicate progress in HIV prevention and awareness efforts, particularly in reducing the prevalence rates among both women and men in both rural and urban contexts. Continued efforts in public health interventions, education, and access to healthcare services are essential to sustain and further improve these positive trends in HIV prevalence reduction.

Table 4: *Percentage distribution of HIV Prevalence by socio-economic variables*

	HIV Prevalence Women				**HIV Prevalence Men**			
Year	**1999**	**2005**	**2010**	**2015**	1999	2005	2010	2015
Urban	not available	21.6	19.6	16.8		15.7	13.1	11.3
Rural		20.8	16.8	16.6		13.8	12	10.1
Total		**21.1**	**17.7**	**16.7**		**14.5**	**12.7**	**11.3**

HIV prevalence is lower in rural areas compared to urban areas. One of Mashonaland Central Provincial Health Executive who made the following remark:

> In our province, we have undertaken the implementation of comprehensive sexuality education across all health centres. This initiative goes beyond just educating individuals; it includes comprehensive teachings on safe sexual practices and the provision of both male and female condoms. Additionally, various organisations, including churches, the private sector, and NGOs, are actively involved in implementing HIV&AIDS projects within the province. The collaborative efforts of these diverse stakeholders are geared towards maintaining a low HIV prevalence rate in our community. Through these concerted endeavours, we aim to empower individuals with knowledge and resources to make informed decisions about their sexual health, thereby contributing to the overall well-being of the population.

This was supported by a sister-in-charge of one clinic who in a key informant interview shared these remarks:

> As part of our regular practice, we engage in educating our clients on matters related to sexuality, placing particular emphasis on safe sex practices. Furthermore, we actively distribute condoms to our clients, promoting the adoption of preventive measures to ensure their sexual health and well-being. This routine approach reflects our commitment to empowering individuals with essential knowledge and resources, fostering a culture of responsibility and informed decision-making in the realm of sexual health.

SEXUAL VIOLENCE

The overall prevalence of sexual violence in Zimbabwe is relatively high, standing at 14%. It is pertinent to highlight a notable distinction between rural and urban areas, where sexual violence rates differ. In rural settings, the prevalence of sexual violence is higher, at 14%, compared to the slightly lower rate observed in urban areas, which stands at 13%. Examining historical data reveals a noteworthy and positive trend in the prevalence of sexual violence. Over the years, there has been a consistent and substantial decrease in sexual violence in both rural and urban areas. In rural areas, the prevalence of sexual violence has halved, declining from 28% in 2005 to 14% in 2016. Similarly, in urban areas, there has been a significant decrease, with the prevalence of sexual violence dropping from 21% in 2005 to 13% in 2016.

These encouraging trends suggest progress in efforts to address and combat sexual violence in Zimbabwe. The consistent reduction in prevalence rates, particularly in rural areas where the rates were initially higher, indicates positive shifts in societal attitudes, awareness, and possibly improvements in prevention and intervention measures. Continued commitment to comprehensive strategies for addressing sexual violence is crucial to maintaining and furthering these positive trends.

Table 5: *Percentage distribution of Sexual violence by socio-economic variables*

Year	1999	2005	2010	2015
Urban	not available	20.8	28.0	13.1
Rural		27.8	26.7	13.8
Total		**25.0**	**27.2**	**13.5**

Whilst the levels of sexual violence in rural areas is higher than in urban areas, there has been a significant decrease in sexual violence cases in the province as explained by a sister-in-charge of a clinic, who, during a key informant interview, shared the following remarks:

> Our collaborative efforts extend to partnering with various stakeholders, including law enforcement agencies such as the police, to conduct extensive community awareness campaigns on the perils of sexual violence. These initiatives have proven instrumental in diminishing the prevalence of sexual violence cases within our community. Although instances of such incidents persist, the notable progress witnessed underscores the positive impact of our collective endeavours in addressing and mitigating this pressing issue. Through these collaborative initiatives, we aim to foster a heightened awareness of the consequences and implications of sexual violence, encouraging a community-wide commitment to preventing and responding to such incidents. The involvement of law enforcement adds an additional layer of deterrence, emphasizing the legal consequences perpetrators may face. While challenges remain, the ongoing collaboration and awareness-building efforts contribute to creating a safer and more informed community environment.

This was supported by One of Mashonaland Central Provincial Health Executive who made the following remark:

> Our proactive collaboration involves working closely with stakeholders from other sister ministries to intensify awareness campaigns addressing sexual violence. This robust partnership has played a pivotal role in achieving a gradual reduction in the levels of sexual violence over the years. While it may be premature to declare an outright victory in the fight against sexual violence, the encouraging progress we've observed underscores the effectiveness of our joint efforts. This collaborative approach extends the reach and impact of our awareness initiatives, leveraging the resources and expertise of multiple ministries. By fostering a comprehensive and coordinated response, we aim to address the root causes of sexual violence and promote a culture of prevention and support within our community. Ongoing efforts focus on sustaining this positive trajectory, recognizing that continuous collaboration and awareness are essential components in the ongoing battle against sexual violence.

PHYSICAL VIOLENCE

The overall prevalence of physical violence in Zimbabwe is relatively high, standing at 35%. It is important to highlight a notable distinction between

rural and urban areas, where physical violence rates differ. In rural settings, the prevalence of physical violence is higher, at 35%, compared to the slightly lower rate observed in urban areas, which stands at 34%. Examining historical data reveals a nuanced trend in the prevalence of physical violence. Over the years, there has been a consistent and moderate decrease in physical violence in rural areas. From 2005 to 2016, the prevalence of physical violence in rural areas declined from 39% to 35%, indicating a positive shift in societal dynamics. Conversely, in urban areas, there was a slight increase in physical violence, rising from 32% in 2005 to 34% in 2016. These trends suggest a mixed picture regarding the prevalence of physical violence in Zimbabwe. While there has been progress in reducing physical violence, particularly in rural areas, the slight increase in urban areas indicates the need for targeted interventions and continued efforts to address this issue comprehensively. Continued commitment to awareness, education, and community-based programs can contribute to sustaining the positive trend and mitigating the challenges associated with physical violence.

Table 6: *Percentage distribution of Physical Violence by socio-economic variables*

Year	**1999**	**2005**	**2010**	**2015**
Urban	not available	31.7	28.9	34.2
Rural		39.1	30.5	35.2
Total		**36.2**	**29.9**	**34.8**

While the levels of physical violence in rural areas are higher than in urban areas, there has been a slight decrease in physical violence cases in the province, as explained by a sister-in-charge of a clinic, who, during a key informant interview, shared the following remarks:

> The statistical data highlights that high levels of physical violence persist, albeit with slight decreases over the years. This underscores the urgent need to amplify awareness campaigns, engaging key stakeholders such as traditional and religious leaders. The involvement of these influential figures is crucial in the ministry's concerted efforts to effectively address and reduce instances of physical violence within our communities.
>
> To tackle this persistent challenge, a comprehensive strategy is essential, and the collaboration with traditional and religious leaders adds a valuable dimension. By enlisting their support, we aim to enhance the impact of awareness initiatives, leveraging their influence to foster behavioural change and community-wide understanding. The statistical trends indicate the importance of sustained efforts, and through these collaborations, we endeavour to create a safer and more secure environment for all.

This was supported by One of Mashonaland Central Provincial Health Executive who made the following remark:

> The ministry collaborates with religious and traditional leaders in the province to promote peace within communities. Despite consistent efforts, the levels of physical violence have remained largely unchanged, and there are even signs of an increase in certain areas. Ongoing engagements with community leaders persist to ensure a sustained focus on fostering peace and addressing the challenges contributing to violence in our communities.

MALNUTRITION IN CHILDREN

The overall prevalence of malnutrition in children in Zimbabwe has remained constant at 27% from 1999 to 2016. It's important to highlight a significant distinction between rural and urban areas, where malnutrition rates in children differ. In rural settings, the prevalence of malnutrition in children is higher, at 29%, compared to the lower rate observed in urban areas, which stands at 22%. Examining historical data reveals a notable and concerning trend in the prevalence of malnutrition in children. In rural areas, malnutrition rates have remained consistent at 29% from 1999 to 2016, indicating a persistent challenge in addressing nutritional needs in these regions. Conversely, in urban areas, there has been a slight increase in malnutrition rates, rising from 21% in 2005 to 22% in 2016. These trends underscore the importance of targeted interventions and nutritional programs, particularly in rural areas, to address and mitigate the high prevalence of malnutrition in children. The increase observed in urban areas also signals the need for ongoing efforts to ensure access to nutritious food and healthcare services for children in both rural and urban contexts. Sustainable and comprehensive strategies are crucial to addressing malnutrition and promoting the well-being of children across Zimbabwe. The overall levels of malnutrition in children remained constant at 27% from 1999 to 2016. Worth noting is the fact that malnutrition in children in rural areas is higher, 29% compared to urban areas, 22%. Malnutrition in children have remained consistent in rural areas at 29% between 1999 to 2016, while it increased in urban areas from 21% in 2005 to 22% in 2016.

Table 7: *Percentage distribution of Malnutrition in children by socio-economic variables*

Year	**1999**	**2005**	**2010**	**2015**
Urban	20.6	23.8	27.5	22.1
Rural	29.2	31.2	33.4	28.5
Total	**26.5**	**29.4**	**32.0**	**26.8**

While the levels of malnutrition in rural areas are higher than in urban areas, there has been a slight increase in urban areas, as explained by a sister-in-charge of a clinic, who, during a key informant interview, shared the following remarks:

> Over the past decade, the levels of malnutrition experienced an increase due to the economic challenges faced by the country. However, there is a positive shift in recent times, signalling an encouraging trend of declining malnutrition rates. This improvement underscores the intensity of efforts implemented to address malnutrition effectively. Non-governmental organisations (NGOs) play a pivotal role in spearheading initiatives to combat hunger in the province, marking a welcomed and collaborative development. The concerted efforts from various stakeholders reflect a collective commitment to alleviate malnutrition and enhance the overall well-being of the population in the face of economic adversities.

This was supported by One of Mashonaland Central Provincial Health Executive who made the following remark:

> *The government is actively engaged in comprehensive initiatives aimed at* eradicating hunger and addressing malnutrition, evident in the National Development Strategy 1, which includes a dedicated pillar focused on ending poverty. This strategic approach underscores the commitment to ensuring food security and improved nutrition for the population. Notably, there has been a collaborative effort involving various partnerships, with private entities joining hands to complement government endeavours. The commendable involvement of private players enhances the breadth and depth of interventions, contributing to a more effective and sustainable impact. As the province is recognized as the breadbasket of the nation, on-going efforts persist to provide ample food resources not only for its residents but also extending support beyond its borders.

VACCINATION OF CHILDREN

The overall levels of children's vaccination in Zimbabwe are high and continue to increase, currently standing at 76%. However, it's essential to highlight a notable distinction between rural and urban areas, where vaccination rates for children differ. In rural settings, the vaccination rate is slightly lower, at 75%, compared to the higher rate observed in urban areas, which stands at 81%. Examining historical data reveals an interesting trend in children's vaccination rates. In rural areas, vaccination rates have shown fluctuation, starting at 72% in 1999, decreasing to 50% in 2005, and then experiencing a substantial increase to 75% in 2016. This indicates a positive rebound in vaccination efforts in rural regions. Conversely, in urban areas, there was an initial high vaccination rate of 81% in 1999, followed by a decrease to 58% in 2005. However, there has been a subsequent increase, reaching 81% in 2016. These trends suggest the overall success and effectiveness of vaccination programs in Zimbabwe, with concerted efforts leading to increased vaccination coverage. While rural areas have witnessed significant improvements, on-going strategies are essential to further bridge

the gap between rural and urban vaccination rates. Continued advocacy, accessibility, and education on the importance of vaccination remain crucial to sustaining and enhancing these positive trends for the overall health and well-being of children in Zimbabwe.

Table 8: *Percentage distribution of Vaccination of children by socio-economic variables*

Year	**1999**	**2005**	**2010**	**2015**
Urban	81.3	58.00	69.9	80.5
Rural	71.7	50.2	62.3	74.5
Total	**74.8**	**52.6**	**64.5**	**76.0**

While the levels of Vaccination in rural areas are lower than in urban areas, there has been a considerable increase in rural areas, as explained by a sister-in-charge of a clinic, who, during a key informant interview, shared the following remarks:

> Despite facing shortages in the past decade, there has been a positive resurgence in child vaccination, thanks to the concerted efforts of extensive awareness campaigns. Parents are now actively bringing their children for vaccination, marking a notable turnaround. This success is attributed to collaborative initiatives involving traditional and religious leaders who play pivotal roles in facilitating and encouraging vaccination efforts. Additionally, strong partnerships with Village Health Workers and Child Care Workers have been forged, ensuring that vaccination outreach extends to every corner of the communities. The collaborative approach and community engagement underscore the commitment to achieving widespread immunisation coverage and safeguarding the health of children across the region.

This was supported by One of Mashonaland Central Provincial Health Executive who gave the following insight:

> Significant strides have been made to enhance vaccination efforts since the country gained independence. These initiatives align with the principles of the primary health care approach, emphasizing accessibility and inclusivity. Traditional and religious leaders play crucial roles as stakeholders, collaborating closely with the ministry to boost child vaccination rates. Despite challenges posed by economic hardships and natural disasters in the past decades, recent increases in vaccination rates reflect deliberate government efforts. The commitment to achieving universal coverage, particularly in rural areas, underscores the government's dedication to the mantra of "leaving no one and no place behind." Ongoing collaboration and targeted interventions are pivotal for sustaining and expanding these positive trends in vaccination coverage.

DISCUSSION

The prevalence of contraceptive use in Zimbabwe is commendably high at 66%, with a positive trend observed in both rural and urban areas. Urban areas boast a higher rate of 71%, compared to rural areas at 63%. Notably, a

consistent increase has been witnessed from 44% in rural areas and 62% in urban areas in 1999 to the current rates in 2016. These trends suggest a positive shift in attitudes towards family planning, indicating changing perspectives in both rural and urban settings. HIV testing rates in Zimbabwe, though relatively low at 36%, display an encouraging upward trajectory. Rural areas, with a rate of 35%, have seen a considerable increase from 6% in 1999. Urban areas also exhibit positive growth, rising from 13% in 1999 to 38% in 2016. These trends signify increased awareness and understanding of the importance of regular HIV testing, emphasizing the need for sustained efforts to further enhance testing rates.

HIV prevalence in Zimbabwe is notable at 14%, with a gender-based disparity of 17% among women and 11% among men. Encouragingly, there is a consistent decrease in HIV prevalence among both women and men in rural and urban areas, indicating progress in prevention and awareness efforts. Continued commitment to public health interventions, education, and accessible healthcare services is crucial for sustaining these positive trends. Sexual violence prevalence in Zimbabwe stands at 14%, with a higher rate in rural areas (14%) compared to urban areas (13%). Despite the overall high prevalence, there has been a significant decrease from 28% in rural areas and 21% in urban areas in 2005. These trends indicate positive shifts in societal attitudes, awareness, and interventions against sexual violence. The prevalence of physical violence is relatively high at 35%, with a higher rate in rural areas (35%) compared to urban areas (34%). While rural areas show a consistent decrease from 39% in 2005, urban areas witnessed a slight increase from 32% to 34% in 2016. This mixed picture underscores the need for targeted interventions and continued efforts to comprehensively address physical violence.

Malnutrition in children has remained constant at 27% from 1999 to 2016, with a higher prevalence in rural areas (29%) compared to urban areas (22%). This persistent challenge in rural areas emphasizes the necessity for targeted nutritional programs and interventions to address the nutritional needs of children. Children's vaccination rates are high at 76%, with rural areas slightly lower at 75% compared to urban areas at 81%. The fluctuation in rural vaccination rates, decreasing to 50% in 2005 and rebounding to 75% in 2016, calls for sustained efforts to bridge the gap between rural and urban vaccination rates.

CONCLUSION

The positive trends in contraceptive use, HIV testing, and prevalence, as well as the decrease in sexual violence, highlight progress in Zimbabwe's public health landscape and the steady provision and realisation of women’s sexual

and reproductive rights. However, challenges like physical violence and persistent malnutrition in rural areas require ongoing attention and targeted interventions for a holistic improvement in health indicators across the country. The study concludes that rural populations are experiencing more challenges than their urban counterparts. Failure to address these challenges could impede Zimbabwe from attaining the Sustainable Development Goals (SDGs) established by the United Nations in 2015, similar to the difficulties faced in achieving the Millennium Development Goals. The study recommends that Zimbabwe should strive to allocate 15% of the total fiscal budget to the health sector to enhance the likelihood of success in achieving the SDGs. This financial commitment is deemed crucial for overcoming the existing healthcare disparities between rural and urban areas, ultimately contributing to the nation's progress toward meeting international development goals.

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Groundwater Depletion and its Implications for Rural Livelihoods in Zimbabwe

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Abstract

This study critically explores the adverse impacts of groundwater depletion on the livelihoods of people in the rural areas of Zimbabwe. Water is one of the most important aspects of rural livelihoods in Zimbabwe as most of these livelihoods are centred on agriculture. We proffer the argument that, owing to the adverse effects of climate change, water scarcity has become more common in most areas and its effects are being felt and adversely experienced among the livelihoods in various rural settings where the supply of clean water has always been a major problem. This study is based on primary and secondary data with primary data collected through field surveys. Many rural residents were interviewed through questionnaires on how the depletion of water is a major crisis and threat to their livelihoods. Secondary data sources including articles, journals, books, report documents and case studies from various recognised publications. The data was analysed using qualitative techniques and presented using thematic analysis. The findings claim that the depletion of groundwater is a major threat to the livelihoods of the rural population. The reduction of groundwater has led to the abandonment of agricultural livelihoods by the people in Zimbabwe's rural areas. The depletion of groundwater is a result of continued use with failure to recharge. Due to the chain of reliance on agriculture and crop cultivation in rural areas, most livelihoods are affected by the groundwater crisis. There are no more or less surplus products to trade for other goods or income and those relying on selling labour continue to suffer more and migrate to urban areas for better opportunities thus having an impact on population distribution in rural areas. Lack of other means of acquiring water and outbreak of diseases have a huge influence also on livelihoods. The study concludes that rural livelihoods need to be rethought and ways must be sought of ensuring

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robust and sustainable rural communities. It is proposed that smart technologies should be used for rural livelihoods.

Keywords: *agriculture, water table, climate change, sustainable, poverty and reservoir*

INTRODUCTION

This study aims at discussing the impacts of the depletion of groundwater towards rural livelihoods in Zimbabwe. Aromolaran *et al*. (2019) posit that groundwater is an essential commodity that affects livelihoods at a universal level.

The International Labour Office (2019) avers that water plays a vital role in ensuring equitable, productive and sustainable rural economies thus enabling employment creation through various functional rural livelihoods. It can be said that in Zimbabwe rural livelihoods revolve around farming activities hence the reason they are most likely to be affected by the level of rainfall, ground water. Rural livelihoods have proved to be lucrative for investors in rural areas through the production of cash crops (Steel and van Lindert, 2017). Archarya (2006) argues that in developing countries such as India, agriculture is the major livelihood for families residing in both farm and non-farm sectors hence there is a need for a sustainable groundwater supply for the success of these livelihood programmes. Dobricic (2013) argue that agriculture remains the main livelihood base for people in lower-income countries and it has stimulated poverty reduction and economic growth.

For the sustainability of rural livelihoods that are centred on agriculture, there is a need for investing in technological change in terms of the lowering table to limit groundwater use and use water efficiently. Other rural livelihoods include livestock production, hunting, fishing and gathering and most of these require water as a major input for their success hence the need to look into the effects of groundwater depletion on rural livelihoods. FAO (2014) argues that groundwater is the main limitation to agricultural production as most smallholder farmers have poor access to water leading to the decline of farming livelihoods that are most depended on by the rural people.

Water is scarce in Zimbabwe's rural areas and people hardly find water for domestic use. Although groundwater is very important for livelihoods in the

rural area, the lack of alternatives to source water is a major crisis as there is less planning and management of water sources as it is noted that there are few water reservoirs such as dams that can be a source for irrigation water. Besides the depletion of groundwater, rural livelihoods are threatened by the impacts of climate change, outbreaks of diseases and lack of support from the government. Boreholes can be counted in these areas that are of very old technology hence their use for rural livelihoods is an expense. It is concluded that with the depletion of groundwater, interventions are required to make water available for rural livelihoods with various technologies to draw water from beneath. The study proposes the sustainability of rural livelihoods through the installation of boreholes and taps to make life easier for rural livelihoods. It is also proposed that the diversification of livelihoods through the introduction of other forms of livelihoods for supplementation. It is recommended that clean and smart farming methods should be embraced that are water-saving and requires less water.

CONCEPTUAL FRAMEWORK

This section frames the conceptual underpinnings on which this study is grounded. Livelihood is conceptualised by Acharya (2006) as adequate stock and flow of food and cash with an individual or family to meet its basic needs. Hussain (2005) argues that a livelihood is the sum of ways in which households obtain the things necessary for life both in good years and in bad. It can be approached as a method used by a household to gain food, clothing, shelter, water and healthcare and all other important basic needs that are required for survival and improvement of living standards. Chambers and Conway (1991) assert that livelihoods comprise people, their capabilities and activities required for means of living and access to assets both material and social resources. It is argued that the acquiring of livelihoods in rural areas depends on four principles that are production-based livelihoods, labour-based livelihoods, market-based livelihoods and transfer-based livelihoods and these livelihoods have different rates of groundwater dependency that this study explores (Mpande, 2016). The availability of basic inputs for production-based livelihoods is vital and, in this case, it should be applauded that water is one of the most essential inputs for agricultural production.

There is a tendency to reliance on rural livelihoods as each one of them in some instances relies on the other and making water a reliance of all hence the effect caused by the unavailability of water tends to highly impact the chain.

Labour-based livelihoods consist of labour sales by landless households and smallholder farmers and in this case, they require job creation in the farms and fields of the producing households. Barbier and Hochard (2014) argue that the availability of land is fundamental to rural livelihoods. Mpande *et al*. (2010) argue that the choice of rural livelihood is determined by the availability of a wider range of choices. Therefore, those with limited choices end up selling their labour for survival in the farms and fields of the wealthy rural residents and looking for non-agricultural livelihoods to sustain themselves such as selling. Chambers and Conway (1991) argue that the ability of livelihoods to cope with and recover from stress and shocks, makes them sustainable to provide sustainable livelihood opportunities for the next generation. Thus, the absence of water or its shortage means no, or fewer activities being done by the producers hence the impact on those who rely on them for their income. The market-based livelihood that is mainly the sale of agricultural products is another variety of rural livelihoods practiced across the globe. Goyal and Pereira (2022) identify the transition from agricultural livelihoods to lesser dependent livelihoods as diversification rather than a lack of land and inputs for farming. This implies the sale of surplus goods produced by the farmers in exchange for money or other goods equivalent.

Lastly, transference of food and remittance is another form of rural livelihood for people with disabilities, those old age and those with no income earning asserts thus who live in extreme poverty. This group of people look forward to their next meal and income from the government through social welfare and non-governmental organisations. FAO (2019) argue that whole agriculture remains the major source of income and food security for rural households, the extreme poor diversify their sources of income in non-agricultural activities. In this case, this study intends to proffer ways in which rural livelihoods can adapt and sustain themselves from the risk of water shortage due to the depletion of groundwater. This study needs to analyse the level of groundwater depletion in Zimbabwe's rural areas, examine the various sources of groundwater used to sustain livelihoods in these rural areas and as well identify how they are coping with groundwater-related challenges. Again, it seeks to identify the implications of water depletion on the outcomes of the livelihoods and the effects on the operation of these rural livelihoods in various areas. Below is a diagram that explains the reliance of rural livelihoods on water and how rural livelihoods are intertwined for the benefit of all who reside in the rural areas.

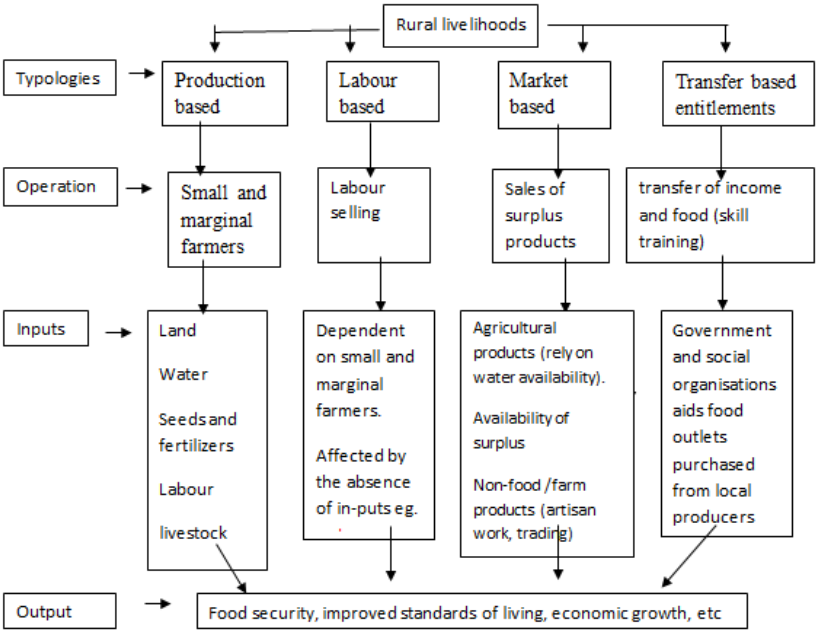

Figure 1: *Conceptual Framework: The Interconnection of Rural Livelihoods and Groundwater* (Authors, 2023)

LITERATURE REVIEW

In this section we critically explore pertinent literature with a view to ascertaining a research gap in available literature. Water is described as a life-sustaining resource that is significant to rural agricultural development and influences the livelihoods of millions of people in rural areas across the globe (Mohamed 2021). The scarcity of water is noted to imply the sustainability of rural livelihoods. Water is one of the tops that have recognised international concern as noted by its acknowledged role by the United Nations 2030 Agenda for Sustainable Development and it is noted to be vital for poverty eradication and sustainable green growth (UN, 2015). Thornton *et al*. (2019) revealed that 3.4 billion people live in rural areas with most of this population deriving its income from various livelihoods such as livestock raising, small-scale agriculture and fishing.

The International Labour Office (2019) is of the view that the sustainable management of ground water and the ability to provide for sufficient water infrastructure and its accessibility is important for the improvement of rural

livelihoods and their expansion as their sustainability results in job creation for rural people and the expansion of the economy while the failure to address water issues affect negatively the operation of these livelihoods. The United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (2018) asserts that access to natural and productive resources for instance water is increasingly becoming a challenge for rural population and their livelihoods as the depletion and scarcity of water resources is rapidly increasing. UNDP (2010) argue that the threat of climate change is the greatest challenge to rural livelihoods in most developing countries. Onyekuru and Marchant (2014) support the view that climate change is projected to have adverse impacts on rural livelihoods. ILO (2013) is of the view that rural livelihoods radiate around the agro-food sector and this relies heavily on the availability of water for irrigation that uses 70 % of the available water in the rural areas.

Dobricic (2013) argue that the problem of groundwater scarcity has increased in Palestine and has affected communities relying on agriculture who depend primarily on water as the source for irrigation. OCHA (2012a) argues that agriculture in the Jordan Valley is dependent on water for irrigation and due to the depletion of water, the livelihoods slowly diminished. Aromolaran *et al*. (2019) argue that the output of livelihoods is directly and indirectly affected by the scarcity of water leading to losses being incurred. In the Jordan Valley, farming is the livelihood for rural people and is flourishing due to the availability of the largest spring known as Auja Spring. However, the rampant decrease of the spring water and the lowering of the water table has resulted in large losses in the irrigation and the destruction of the agricultural sector in the Jordan Valley in Palestine (Dobricic, 2013). Rumman (2012) is of the view that the increased scarcity of water has affected agriculture and livelihoods of rural population in Palestine. The implications of the absence of groundwater for livelihoods are seen as the cause of the migration of people from one place to the other especially along the river basin where cultivation is at play thus leading to the siltation of these water sources (Goyal and Pereira, 2022).

Pereira (2021) also argues that the depletion of groundwater has led to the conflict between human life and wild beasts as they move closer to water sources near the river basins. The depletion of water is noted in the Jordan Valley as the spring ceased to flow all year round for two decades as it only provided water in winter thus leading to the loss of livelihoods in which the people based on irrigation for their banana plantations (Dobricic, 2013). Brooks and Trottier (2012) also noted that in 20009 the spring only flowed for

16 days thus indicating the intensity of water depletion and the effects on the local livelihoods. OCHA (2012b) argues that the depletion of water has led to the decreased amount of cattle, abandonment of irrigations and the reduction in agricultural land in the rural areas of Palestine as people opt to sell their land for other developments such as winter houses thus losing their livelihoods and land to be farm worker for the Israelites with only farmers with private wells surviving the water depletion. Besides that, a shift to more resilient crops is noted as the farming of bananas is abandoned for resilient crops such as eggplants, palm trees, dates, herbs and zucchini (Dobricic, 2013).

Castaneda et al. (2018) argue that the most extreme poor about 80 per cent reside in rural areas. The availability of rural livelihoods can be their beak-even-point from poverty and a way of generating income and developing rural economies. In Africa, it was revealed that 70 per cent of the rural population is involved in farming activities as their source of income (Davis et al. 2010). In Asia and Latin America, half of the rural population is in farming activities. (Davis et al. 2010). FAO (2019) supports this view by arguing that rural livelihoods are based on agricultural activities where most people work in their own farms or agricultural wage employment due to high reliance on agriculture, the community is highly vulnerable to climatic shocks and weather events. the impacts of climate change have a greater role to play in the depletion of groundwater due to the rising temperatures and reduced rainfall that limits groundwater recharge thus affecting the performance of rural livelihood that highly depends on water. Climate change is noted to pose a massive threat to development in developing countries at most (Dube and Phiri, 2013).

Bruce, Rosendo and Brown (2010) argue that if climate change issues remain unaddressed at local levels, the African continent is at risk of becoming a global food crisis epicentre epicentre. Dobricic (2013) is of the view that agriculture is directly dependent on climate and climatic changes are likely to have adverse impacts on agriculture and water sources. This is already noted in the failure of rural livelihoods and agricultural projects that are being affected by lack of water and the rise in temperatures. Precipitation and temperature pattern changes are noted in the SU-Saharan Africa region with rainfall becoming hard to predict (Holmgren and Oberg, 2006; Dube and Phiri, 2013). Dube and Phiri (2013) blame climate change for the increasing poverty rate in Africa and high temperatures accompanied by low precipitation. In Nigeria, it is noted that increased sunlight intensity and insufficient rainfall are the major cause of water scarcity for rural domestic

use and livelihoods as the reservoirs and rivers end up drying due to the dropping of the water table (FAO, 2012; Aromolaram *et al*., 2019). Low rainfall has led to the lowering of groundwater table due to a lack of recharge.

Agriculture production is observed to be reduced due to the decreasing precipitation levels and the increase in temperatures (Nhemachena, 2007; Biggs *et al*., 2008). Davis *et al*. (2010) asserts that 90 per cent of rural households are involved in farming as their main livelihood. Dobricic (2013) note the same in the Jordan Valley where an estimate of 50% decrease in precipitation is projected by the latter part of the 21st century. Chenoweth (2011) argues that infiltration to the groundwater has reduced due to the decrease in precipitation leading to the lowering of groundwater and the reduction of its availability thus affecting farming livelihoods on that the people depend. Henceforth, not only in Africa the problem of groundwater depletion has been experienced by also in the Middle East. Dube and Phiri (2013) assert that rural economies are dependent on agriculture and livelihoods depend on crop production that is adversely affected by the negative developments in agriculture. Simatele *et al*. (2012) are of the view that in Africa, climate change is undermining the efforts to protect livelihoods. Aromolaran *et al*. (2019) argue that in Nigeria, rural livelihoods are done using water that is fetched from far away sources thus taking much of the people's time walking long distances to find water. The scarcity of water is recorded to be one of the most pressing issues in Nigeria's rural areas and people depend on their water supply for irrigation, domestic use and livelihoods (Aromolaran et al. 2019). Costa et al. (2016) explain the difficulties associated with obtaining water in rural areas as they argue that due to a lack of piped water in rural communities, wells are being dug deeper and deeper over time to reach underground water reservoirs. The depletion of water in Nigeria's rural areas has also been noted to be because of population increase and the number of people relying on livelihoods hence the increase in demand for water that has led to its shortage (Rortter and Van Keulen, 2008). The cost of pumping water is noted to be high in Nigeria as the boreholes require maintenance and electricity to operate the pumping machines that is not always available thus resulting in water scarcity for the livelihoods of rural people including fish farming, irrigation, and other crop production (Aromolaran *et al*., 2019). Losses are incurred as people spend more money acquiring enough water to run their livelihoods activities and the reduction of products produced. It is also argued that in Nigeria, water unavailability contributes to the choice of crops and the farming system. It is revealed that rural households in Nigeria perceived a negative effect of water depletion on

their livelihoods due to the increase in expenses encountered in energy and time consumed to obtain water (Aromolaran *et al*., 2019).

Due to the depletion of groundwater, alternatives are searched by various people that tend to be costly and increase the cost of running the livelihood as they ought to drill prolific boreholes that can sustain them all year round. In the Eastern Cape in South Africa, it is noted that livelihoods are centred on agricultural production that is on its decline as most people are now concentrating and specializing in intensive home gardening due to the unavailability of water (Thronton *et al*., 2019). It is noted that there is reduced farming livelihoods in rural areas as compared to the past where it is the most common source of income and most people are turning to non-farming activities (Mphande *et al*., 2016). In Madagascar, the scarcity of water has influenced the livelihoods of the people as most rural citizens rely on agriculture, fishing and stocking as their source of income and food supply for family (FAO, 2008). Mphande (2016) addresses livelihoods as an individual's ability to obtain necessities in life such as food, shelter, clothing and water hence any activities related to the search for these can be identified as a livelihood. In Sub Saharan African countries such as Nigeria, Kenya, Malawi and Tanzania and in India an Asian country, it is recorded that farmers are opting for diversification instead of farming as their only livelihood that has proved to be unsustainable due to the challenges it is facing hence leading to their failure to support their families through it (Mphande *et al*., 2016).

Small-scale businesses, including the selling second-hand clothes, scrapped material and car parts, hawking and readymade food are increasingly becoming more common sources of income in the rural areas of the above-mentioned countries (Mphande *et al*. 2016). A transition has also been noted arising from lack of rain and underground water from the farming of maize to drought-resistant crops such as sorghum, and millet among others (Thierferlder *et al*., 2015). On the other hand, Goyal and Pereira (2022) argue that due to the scarcity of water, there is a diversification from agricultural livelihoods to lesser water-dependent livelihoods in rural areas such as small businesses, tourism, mining, reliance on forest resources and livestock herding. Goyal and Pereira (2022) argue that agriculture is vulnerable to water deficit, and this arises to the emergence of various pests that reduces agricultural production and the capacity to gain income from it thus the reason why there is a shift from agriculture.

Water is at the midpoint of human life and all the livelihoods they rely on for their living but it is noted that its depletion has raised much concern regarding

rural livelihoods that are at risk due to water-related risks associated with them. Orr *et al*. (2009) assert that water-induced risks are rising with the increase in global exploitation of water resources throughout the universe that has resulted in the damage to the ecosystem leading to climate change. Climate change is in the run towards the inaccessibility of ground water that is the major source of rural livelihoods as it causes prolonged droughts that lead to reduced water supply leading to water insecurity and extreme lowering of groundwater levels. Goyal and Pereira (2022) support this view as they argue that rural communities are mostly affected and at risk of water depletion that has impacted their agricultural livelihoods and household activities that in most cases end in people dumping their water-related livelihoods and looking for other alternatives to earn income that is in some instance illegal. Garrick and Hall (2014) argue that water-induced risks can be grouped into four categories that are inadequate quality, decreased resilience systems shortage of water and excess water. Noting these categories, all have adverse implications on rural livelihoods. The focus of this study agrees with the idea that the inadequacy of water and its lack of accessibility due to the depletion of groundwater resources is a major crisis that affects not threaten the livelihoods but even human lives as water is the centre of all living things. In this case, the safeguarding of water sources and their access and availability for human livelihoods and development is essential for rural development and the growth of the economies of these marginalized environments. Garrick and Hall (2014) call for the protection of water sources against pollution and several water-related disasters that may lower the functionality of rural livelihoods.

METHODOLOGY

This study is based on a desktop review in which as number of available literature from the past studies was reviewed for the purpose of this study. Secondary data was collected from various literature, official documents and publications from recognised organisations as a way of supplying this study with vivid information that is reliable and valid as per the records. Articles, documents, reports and books among other secondary data sources were used to gather the information presented in this study. Case study analysis through the reviewing of past studies on the impacts of groundwater depletion on rural livelihoods and how various livelihoods are affected by the problem and how different communities are coping up with the situation making sure that their livelihoods continue to be functional. A qualitative research design was used for the study in dealing with qualitative data related to the study and its analysis. The research findings were presented in a thematic way so as to have clear descriptions of the results in a way that is easy to interpret by the end users.

FINDINGS

Dube and Phiri (2013) revealed that groundwater is not recharging in areas such as Matopo due to low rainfall and the change in precipitation patterns with rainfall starting late and ending earlier than the previous patterns before the crops even mature thus straining the local livelihoods. The depletion of groundwater is seen to affect livestock in rural areas due to drought and lack of enough grazing for the animals. The unavailability of fresh grazing areas is negatively affecting rural livelihoods, especially among the people relying on gardening as goats and cattle break into their gardens for fresh pasture. The change in rainfall patterns and prolonged droughts have affected the pastures leaving them with dry grass and fewer reservoirs for animal drinking water and the lowering of the water table leaves the surface dry thus resulting in poor pastures that will force domestic animals to break into fields and gardens leading to severe losses on the farmers.

Apart from that the depletion and unavailability of water for rural livelihoods is connected with conflicts among the families and the society. It is found out that the failure of livelihoods due to shortage of water results in disputes among families as most of them rely on these livelihoods as their source of income and food. Henceforth, their failure means that there is no or little food for consumption and no income to run the families thus leading to fights and in some serious cases divorce due to the failure to provide for the family. Gender-based violence is recorded to emanate from the poor operation of livelihoods that have left many rural women victims of it.

The results obtained indicated that the water table is rapidly lowering in most rural areas. The effects of groundwater depletion are noted in most rural areas as the residents' report that in the past the water table used to recharge as noted with the rising level of water in the wells but in the meantime, the water table continues to lower down as the water is used thus affecting agricultural livelihoods. This is seen through the withering of banana trees and their drying thus leading to losses on the people in most areas within the Manicaland Province. It is said that water scarcity is driven by climate change as reflecting backward, water was available in all areas hence people are now walking 2-5km to get water for their livelihoods that lowers the extent of the livelihoods as most resolve to farming on a very small portion of land. The results also argue that in Mudzi and Manicaland, livelihoods are affected among the people who used to do early farming in wetlands as these areas are now dry due to groundwater depletion caused by high temperatures thus most people have lost their livelihoods that they relied on for their income through

the sale of fresh maize and rice. The depletion of groundwater in most parts of the country led to the abandonment of livelihoods.

CASE STUDIES

GWANDA

Gwanda is located in the southern part of Matebeleland and the southern part of Zimbabwe. Zimbabwe Vulnerability Assessment Committee (ZIMVAC) (2011) argues that this area is a low-lying area and mostly known to be the hottest and driest part of the country with erratic rainfall and animal husbandry remains the major livelihood supported by rain-fed cultivation of sorghum, sweet potatoes, pulses and maize (ZIMVAC 2011; Chitongo et al, 2019). It is revealed that though maize is the main crop for most livelihoods, sorghum and millet are being cultivated to mitigate the effects of drought (Chitongo, 2019). In other words, water shortage has resulted in the shift from maize production to small grains production. Chitongo (2019) revealed that drought-resistant crops are adapted as a solution to climate change and depletion of water as they have deep, fibrous and extensive root systems that help they to produce a good yield in rainfall below 300mm. It is argued that water is a scarce commodity due to the uneven distribution of water sources and frequent and periodic droughts that lead to the drying of dams around July and August thus leaving the community in the struggles to acquire household water requirements (Chitongo, 2019).

Hove *et al.* (2022) have revealed that there is less rainfall to support agricultural activities during the major cropping seasons in Gwanda that results from unpredictable weather patterns. ZIMVAC (2011) has revealed that livelihoods in Gwanda district are highly reliant on agro-pastoral production systems due to the high temperatures and dry weather experienced in the area. Though livestock is the major livelihood that offers cash income in Gwanda, the shortage of water is the main reason for hardship in livelihood management as livestock herds migrate to as far as Botswana for pasture and water (ZIMVAC 2011). Hove *et al.* (2022) argue that the main species of livestock kept in the area are cattle, donkeys, goats and poultry. In other words, it can be said that the main livelihood system in Gwanda is the production-based livelihood though there is market-based livelihood noted by activities such as gold mining, beer brewing and local and cross border employment (ZIMVAC 2011). Of several strategies are adopted to cope with the water shortage in Gwanda to keep the livelihoods going such as increased crop spacing, conservation agriculture, livestock water and feed supplementation, intercropping and moving livestock to better grazing

(Chitongo, 2019). United States Agency for International Development (USAID) (2021) and Hove et al. (2022) argue that horticulture and irrigation schemes are noted to be another way of survival in Gwanda District through the farming of leaf vegetables, tomatoes, green mealies and onions. Hove *et al.* (2022) due to groundwater depletion, access to irrigable gardens is a struggle for the people as they must travel a distance of 5km or more to reach the gardens in Pulipeli village and use a bucket irrigation system that is labour intensive thus leading to a reduced portion of land irrigated. In short, it can be said that agricultural livelihoods in Gwanda struggle to survive due to harsh weather conditions and extreme water shortage as noted by the absence of water for domestic use. It should be applauded that the region have mitigation and resilient ways of coping with water depletion for the survival of their livelihoods that is supposed to be done for household to continue earning income for their families.

MUZARABANI

Muzarabani District is located in the northern Lowveld of Zimbabwe and experiences extreme climatic conditions (Manyani, 2017). Murwira *et al*. (2012) revealed that Muzarabani District is mostly affected by severe dry spells and seasonal droughts. Muzarabani district is made up of communal and large-scale farming as some of the livelihoods that people acquire income from. Mavhura and Manyena (2018) argue that the cultivation of crops in this district is mainly done along water courses. Unlike Gwanda and Mudzi, Muzarabani experiences floods due to the spilling off of water from the Kariba dam that affects its livelihoods (Murwira *et al*. 2012; Manyani, 2017) revealed that flood recession cultivation promotes the cultivation of crops twice a year with no irrigation as the soil will remain moist till the end of June, thus indicating the availability of groundwater and a higher water table to allow for such livelihood to progress. On the other hand, Manyani (2017) found out that water was one of the major challenges to the survival of livelihoods as detected by the depletion of groundwater and the lowering of the water table that leads people to resort to digging wells to obtain water for market gardening and for their livestock that also dries up before the rain season. Mavhura *et al*. 2013). Small-scale farming is mostly practised in the district and is mainly done in the wet season through the cultivation of maize and cotton as they rely on rain-fed agriculture (Delele *et al*. 2015). Livelihoods also continue in the dry season where small-scale bucket-irrigation is done in the gardens and vegetables and maize are planted (Mavhura and Manyena, 2018). Manyina (2017) revealed that maize, pearl millet, sorghum, cotton and finger millet are the most grown crops in the region. various forms of livelihoods are done in Muzarabani as noted by the

presence of wild fruit gathering, mining, trade and livestock rearing among others (Manyani, 2017). Manyani (2017) argue that water scarcity is one of the major challenges that affect the district's livelihoods. Sango and Godwell (2015) argues that the gathering of wild fruits in Muzarabani is affected by the change in climatic conditions and the fruits have become scarcer affecting the households relying on them. Due to water depletion, livestock owners migrate in search of water to as far as Musengezi or Zambezi River where they camp during the hot and dry seasons (Manyani 2017). Thus, like any other rural areas, Muzarabani is also a victim of groundwater depletion as noted by its livelihood operation.

MUDZI

Mutami and Chazovachii (2012) revealed that farming is one of the livelihoods that is done on Mudzi with most households growing maize for subsistence and commercial purposes. ZIMVAC (2011) argue that Mudzi is a lowveld zone associated with extensive rain-fed cultivation of maize, groundnuts and maize and cotton production and animal husbandry. Food and Nutrition Council (FNC) (2022) revealed that informal trading, carpentry, welding, gold panning and small-scale mining are some of the livelihoods that are carried out in Mudzi that fit in the third category of livelihoods that is the market-based. Landless households are noted to rely on gold panning, casual labour and petty trade (ZIMVAC 2011). Food and Nutrition Council (FNC) (2022) support this view as they argue that agriculture is the primary livelihood in the district and the poor with no livestock opt for casual labour including working in other people's fields and looking over their livestock area as a way of acquiring income. Mutami and Chazovachii (2012) argue that Mudzi is a semi-arid region that receives 40-650mm of rainfall annually, with high temperatures that affect livelihoods in this area. The change in rain seasons is identified as the cause for groundwater depletion due to insufficient water table recharge as the rain season now starts in December and ends in February, unlike in the past when the rain season expanded from October to April thus affecting the cropping seasons (Mutami and Chazovachii 2012). Due to continued crop failure because of insufficient water and moisture, the households in Mudzi have resolved to the production of small grains that are drought-resistant such as sorghum, rapoko and millet (Mutami and Chazovachii, 2012). Thus, water depletion has affected maize production in the region and livestock production as noted by the severe loss of cattle and minimal loss recorded among sheep and goats due to lack of pasture and unavailability of water in the dry seasons (De la Fuente 2008). Food and Nutrition Council (FNC) (2022) also revealed that a shortage of water for livestock is being experienced that is resulting in large trekking distances and

water stress causing the death of livestock. The depletion of groundwater can therefore be argued to be the major cause of livelihood failure in Mudzi District.

DISCUSSION

The types of livelihoods differ with regions and the ecological conditions of that area. Though water is a major input for rural livelihoods, it is noted that the failure of these projects does not only arise from the depletion of water but also the unavailability of other inputs such as capital, fertilisers and machinery to easy their work. The lack of basic inputs such as human capital where one has the knowledge, personality and social behaviour to handle a livelihood can be noted as a threat to the success of rural livelihoods (Mphande *et al*., 2016). In other words, lack of training, experience and skills on how to handle a livelihood regardless of the availability of water is a red flag for failure. Though groundwater is very important for livelihoods in the rural area, the lack of alternatives is a major crisis as there is less planning and management of water sources as it is noted that there are few water reservoirs such as dams that can be a source for irrigation water. Besides the depletion of groundwater, rural livelihoods are threatened by the impacts of climate change, an outbreak of diseases and a lack of support from the government. Boreholes can be counted in these areas that are of very old technology hence their use for rural livelihoods is an expense. The success of rural livelihoods depends on many factors and in most instances these contributors of successful and sustainable rural livelihoods are ignored and neglected. Access to credit loans is essential in facilitating the growth of rural livelihoods due to the lack of capital for most rural poor residents. Besides that, the lack of linkages with the urban areas has affected the market for rural households as they find it difficult to sell their products.

CONCLUSIONS AND RECOMMENDATIONS

It is concluded that with the depletion of groundwater, interventions are required to make water available for rural livelihoods using various technologies to draw water from beneath. The study proposes the sustainability of rural livelihoods through the installation of boreholes and taps to make life easier for rural livelihoods. The study recommends the drilling of community boreholes to help keep rural livelihoods going especially irrigation, gardening and other farming-related projects that are abandoned due to the scarcity of water. It is also proposed that the diversification of livelihoods through the introduction of other forms of livelihoods for supplementation. It is recommended that clean and smart farming methods should be embraced that are water-saving and require less

water. The study proposes a transition from basically cultivated crops such as maize to more resistant crops that can survive less water and cope with its shortage such as small grains. It is recommended that there is a need for the embracement of integrated water resources management in rural areas through community engagement and awareness where citizens are given the mandate to safeguard the available underground water sources in their communities such as boreholes and springs. The study recommends the coordination of non-governmental organisations such as Care Zimbabwe, Caritas, World Vision and many others and their aid in drilling boreholes in Zimbabwe's rural areas and helping with the supply of crop seeds that take a short time to harvest as a way of sustaining rural livelihoods. The study recommends the adoption of strategies, policies and other legal instruments to guide water use and its management in rural areas.

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Rural Towns in Zimbabwe: Urbanisation without Growth and Implications for Sustainability

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Abstract

Many towns in sub-Saharan rural terrain are struggling with accelerated urbanisation because of the country's' present economic downfall prompting an investigation of difficulties and sustainability implications associated with excessive and unsustainable urbanisation trajectories. It underscores that urbanisation without economic growth is the primary challenge in rural towns. To provide a thorough analysis, the study employed a mixed method approach in data collection. Quantitative data collection in this study encompasses the use of surveys and statistical analysis to measure changes in infrastructure, economic indicators, and demographic trends. Recommendations advocate integrated, context-specific development methods with a focus on community engagement, local economic promotion and infrastructure investment. Sustainable urban planning should be given top priority in policy interventions, considering social, economic and environmental factors. Collaboration between government, communities, and stakeholders is needed for effective implementation, fostering sustainable growth and improving well-being in rural Zimbabwean towns amid urbanisation challenges. The adaptation and resilience demonstrated by small rural towns in Zimbabwe suggest the possibility of sustainable development in rural places experiencing dynamic change, despite the obvious obstacles. For inclusive and sustainable growth, the study recommends that there should be improving infrastructure and service delivery in rural towns.

Keywords: *sub-Saharan African, Economic downfall, Urban dynamics, Rural-urban relationships, Infrastructure and Investment.*

INTRODUCTION

Africa has lately been characterised by high population growth rates and urbanisation with inadequate infrastructure in towns and cities, a feature that has exerted pressure on urban resources (Boadi *et al*., 2005, Dos Santos *et al*., 2017). Consequently, this threatens the health of urban residents and the

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sustainability of the growing urban areas, particularly the rural towns. Boadi *et al*, 2005 further argue that 95% of the population in Africa were rural at the start of the 20th century. United Nations Environment Programme (1999) note that Africa was the least urbanised continent in the 1960s with only 18.8% residing in urban areas. This doubled by 1996 and in 2010, 43% was urbanised (United Nations Population Division, 1997). Castells-Quintana, *et al*. (2020). underscores that the highest rate of urbanisation without growth is taking place in sub-Saharan Africa. This has placed a great burden on governments to develop the African continent. This is particularly witnessed with the inadequacy in the provision of facilities needed by the residents, hence putting pressure on resources and the environment (ibid.). Manuh & Yemeru (2019) emphasised on inadequate housing infrastructure, as many town residents are living in crowded areas with poor sanitation that causes serious health threats. The growth of these informal settlements has been a result of the need to find employment (Corburn and Sverdlik, 2019). That has accelerated migration from rural set ups to towns and cities where industries are concentrated.

Most of the key activities of production, consumption, trade and commerce are concentrated in towns and cities, thereby drawing a lot of population to those spalialities. Major shifts in urbanisation are taking place in the global south, presenting socio-economic challenges to the developing world. This is exacerbated by high rates of poverty with evidence showing that the quality of life in some towns of these regions is much worse than in the rural areas (United Nations Centre for Human Settlements, 2001). Additionally, poor economic growth and performance in Africa has placed hindrance for the government to provide adequate infrastructure for the growing population. Local Agenda 21 has since been promoted from 1992 Earth Summit as a basic concept to push for sustainable urban development in Africa (Boadi *et al*., 2005; Salvia et al., 2021), but implementation has been slow to now existent in countries like Zimbabwe. The rural transformation in Zimbabwe started with the Land reform program in 2000 (Moyo, 2011; Scoones and Murimbarimba, 2021).

This article assumes the following structure; initially the introduction will provide a brief background and articulates the problem statement. Subsequently, the conceptual framework section will interpret key study-defining concepts. A comprehensive literature review follows, contextualising the issue within a broader framework, highlighting major debates and identifying gaps in scholarly discourse. The Research Methodology section follows, clarifying the rationale for utilising specific data sources. The

research findings are then methodically presented through illustrative case studies, offering grounded insights into the matter under analysis. A subsequent discussion section critically evaluates the convergence, divergence or fresh contributions of the study's theory and findings, while also exploring their implications on policy and practice. The conclusions section contextualises the primary aim of the article, and actionable recommendations are provided for relevant stakeholders. Notably, the article concludes with acknowledgements, expressing gratitude to those who contributed to the research.

CONCEPTUAL FRAMEWORK

This section presents the conceptual framework that underpins the study, emphasising on the interactions among the major factors like urbanisation, rural town dynamics, economic growth and sustainability. By defining the relationships and dependencies within this framework, the study seeks to provide a comprehensive understanding of their combined influence on the overarching research objectives.

SMALL RURAL TOWN

Within Zimbabwe's complex network of rural towns, a sizeable fraction are small and medium-sized cities a phenomenon that is observed worldwide, with over 60% of all urban people living in these types of places (UN-DESA, 2018). Zimbabwe and other countries in Sub-Saharan Africa are characterised by the predominance of tiny urban centres. Approximately 196 million people, or over one-fifth of the total population, resided in small urban areas in Sub-Saharan Africa as of 2015 (Satterthwaite, 2016), which represents over half of the region's urban population. This categorisation has remarkable diversity since small towns can have anything from a few hundred to fifty thousand residents. Other classifications like the ones put forth by the UCLG (2017) place urban areas with 50,000 or fewer residents within the small town designation. These small towns are home to 26% of Africa's urban population, with differences between East and West Africa (both over 30%) and Central Africa (13%) (ibid.). Different national government definitions, however, present difficulties because the population criteria vary from a few hundred to 20,000 people (Agergaard *et al*., 2019). A more functional viewpoint emerges as a helpful analytical lens given the variation in population thresholds. The roles of small towns can be defined as the services, facilities, and infrastructure they provide to their residents and the surrounding area. This method enables a more complex comprehension. Understanding the distinct characteristics and functions of small rural towns sets the stage for exploring their role in the broader urbanisation dynamics of Zimbabwe.

URBANISATION

Urbanisation, defined as the increase in the proportion of the population residing in urban areas, is a multifaceted phenomenon propelled by various factors (Agergaard *et al*., 2019). In Zimbabwe, natural urban population growth, the reclassification of settlements as urban, and, most importantly, the movement of rural residents to cities and towns are all closely related to the process of urbanisation in rural towns (ibid.). In comparison to other countries, the United States has seen almost constant urbanisation over the past century. A crucial requirement for the definition of a territory as urban is that it must have at least 2,500 people; anything less than that is considered rural (Lichter *et al*., 2021; Ratcliffe *et al*., 2016). Rapid urbanisation in Africa is mostly caused by migration from rural to urban areas and natural population growth (Boadi *et al*., 2005; Kundu & Pandey, 2020). This procedure is an essential part of structural transformation and the foundation of a nation's social and economic advancement. (Venables, 2018). Cities, as hubs of productivity and job creation, hold the promise of transformative development. However, the challenge lies in ensuring that urban areas keep pace with population growth, delivering both liveability and productivity (Venables, 2018). It is projected that by 2050, the number of people living in cities in developing countries, especially in Africa, will have tripled, adding 800 million more residents (Jedwab *et al*., 2017). Though historically difficult, this urbanisation is considered necessary, with Africa needing to construct twice as much urban capital as it has historically accumulated. Africa is experiencing urbanisation at a unique rate, albeit at a somewhat lower income level than other regions. With a particular emphasis on natural population growth over rural-to-urban migration, urbanization has surpassed historical growth rates in Europe and Asia at comparable phases (Jedwab *et al*., 2017).

ECONOMIC GROWTH AND DEVELOPMENT

While urbanisation is a hallmark of demographic shifts, the economic landscape in many African countries, including Zimbabwe, paints a grim picture, often characterised by challenges such as slum proliferation and an informal employment sector (Venables, 2018; UN-Habitat, 2016). The combination of urbanisation and industrialisation in Zimbabwe's rural towns presents both obstacles and potential for long-term, sustainable economic growth. More than 60% of urban dwellers live in slums across Africa are typified by one-story shacks arranged in town centres or extending beyond the boundaries of cities (Venables, 2018). This percentage rises to approximately 90% in nations like South Sudan and the Central African Republic (UN-Habitat, 2016). Up to 80% of urban labourers work outside of recognised or incorporated businesses in the informal sector, reflecting the informal nature

of housing and employment (Venables, 2018). A distinctive feature of the African economic landscape is described as 'urbanisation without industrialisation' (Gollin *et al*., 2016). This idea emphasises how manufacturing production in African cities trails well behind cities in other regions at comparable development stages. The end effect is a distinct economic environment in which the manufacturing sector underperforms, and the urban population grows at an accelerated rate, creating a gap between urbanisation and industrialisation. The lack of infrastructure in Africa exacerbates the problems brought on by urbanisation and economic expansion. Significant infrastructure expenditures are required to support sustainable economic development (Foster et al., 2010; Venables, 2018). Despite these obstacles, there is growing agreement that urbanisation and economic growth are positively correlated. This consensus serves as the foundation for the global development agenda, which includes the New Urban Agenda the 11th Sustainable Development Goal (United Nations (UN), 2015).

SUSTAINABILITY OF RURAL TOWNS

The importance of sustainability for small rural towns in Zimbabwe is paramount, urging policymakers to align urban wellbeing with judicious resource utilisation (World Commission on Environment and Development, 1987). Rooted in the principles of sustainable development, the advocacy for increased human interactions across production, trade, commerce, and socio-cultural adaptations becomes pivotal for the longevity and resilience of these towns (Boadi *et al*., 2005). Comprising environmental, economic, and social dimensions, sustainability stands on three pillars, each influencing the trajectory of these evolving communities (Hansmann *et al*., 2012). The interplay between educated and uneducated inhabitants shapes the social fabric, influencing the town's vitality (Hansmann *et al*., 2012). Economic considerations are equally critical, with unemployment rates and job distribution emerging as central challenges. Identifying small towns with the highest unemployment rates and addressing the spatial disconnect between job opportunities and town locations is key for economic sustainability *(ibid.)*.

Demographic dynamics, encompassing natural development and migration patterns, further impact the sustainability landscape. The sub-urbanisation of small towns, attracting young families of reproductive age, initiates in-migration, followed by a natural population increase. Conversely, the out-migration of educated youth seeking prestigious employment in more significant regional centres can lead to a natural decrease. The demographic sustainability of small towns is involvedly linked to their distance from key regional centres, influencing whether they experience stagnation, growth, or

population decline (Hansmann *et al*., 2012). Despite their central role in population distribution and development, there is a notable gap in understanding the significance of small towns for fostering smart, sustainable, and inclusive growth (Servillo *et al*., 2014).

LITERATURE REVIEW

Literature on small towns has commented on various perspectives and neglected the context of rural towns. Some focus on spatial relations playing a central role in key economic transformations of small towns (Dorosh and Thurlow, 2013). Such transformation includes infrastructure investment that encourages backwards and forward linkages and entanglements between agriculture and industrial activities. Picard *et al*. (2017) note that this creates growth poles. Chome et al. (2020) emphasise on corridors and Hinderink and Titus (1988) nodes of economic activity. Berdegué and Proctor (2015) postulate that the growth of rural towns promotes the growth of value chains that adds value to agricultural production at the local and regional levels. More emphasis is placed on supply chains, transport networks, processing facilities and connections to retail outlets (Scoones and Murambinda, 2021).

Alonso (1973) and Meijers and Burger (2010) have identified two distinct categories of small towns that are particularly significant for the advancement of sustainability potential within the European urban system: towns situated close to larger cities, which are susceptible to the "borrowing-size" effect and should be analysed independently; and towns integrated into specialized agricultural areas, whose interaction with neighbour ring rural settlements is bidirectional. These are referred to as rural towns in Europe (Servillo *et al*., 2014). In the Netherlands (van Leeuwen, 2010) and Poland (Stanny, 2010), these towns are still heavily dependent on the agriculture and agricultural processing industries. In Spain (Santamaria, 2000), these towns also serve as service providers for the surrounding area. In Romania, the urban functions of small towns, rapid industrialization, accompanied by the modernization of public infrastructure in the socialist period (1950 1989); small towns came into the focus of this policy in the 1980s, when the idea of coordinating strong “rural towns” was dominant (Benedek, 2006).

Many have commented on the importance of multi-location and multi-activity households, as people within a household take on different roles on- and off-farm (Steel *et al.,* 2019). Major debates on urbanisation have concentrated on gendered and generational dynamics, with women and younger people engaging in trading and new businesses (Agergaard *et al*., 2019; Tacoli and Agergaard, 2017). A lot of people have been moving from rural set ups to

settle in towns with income-earning activity spread across sites is common (Ingelaere *et al*., 2017). Such movements to towns embedded in rural areas have given rise to debates on informal settlements and urban informality (Kamete, 2020), expansion of peri-urban areas raising issues of food security and poverty reduction (Djurfeldt, 2015). Haggblade *et al.* (2007) emphasise on employment creation and poverty issues highlighting that some people in rural towns can maximise on new market linkages and business opportunities. This happens through combining increasingly commercialised agricultural production with off-farm income earnings. However, this creates vicious circles of poverty for others who cannot maximise on this *(ibid.).*

Major debates have also emerged into being in the political realm, prompted by decentralisation policies, for example, or emerging because of the role of business elites in small towns linked to rural areas (Owusu, 2013; Vincent, 1974). The decentralisation policy has also been introduced in Zimbabwe. Strong foundations exist for Zimbabwe's devolution plan, which may be built upon. The country has been working toward decentralisation of services to small towns since 1883 (Dube and Chigumira, 2020). The nation's devolutionary plan is outlined in the National Development Strategy1, the Fiscal Policy, and the Presidential Policy Guidelines on Devolution. However, changing the political relations between the central government and the local government through decentralisation also raises questions on the governance of small towns as new power dynamics emerge (Satterthwaite and Tacoli, 2003).

The discussion is incomplete if we conclude without mentioning global debates on sustainability issues. The sustainability of small rural towns in the Zimbabwean case is confronted by a lot of challenges, reflecting broader global patterns. High unemployment rates, attributed to industrial restructuring, emerge as a significant threat to the economic sustainability of these towns (Birtel and Turnock, 2007). This is compounded by urban poverty, exemplified by findings in Romania, where 44% of the poorest households are concentrated in small towns (Voicu, 2005). The lack of utilities and urban infrastructure further compounds the predicament, with some towns lacking such amenities entirely, while others have seen existing infrastructure deteriorate due to insufficient investment (Bănică *et al.,* 2013). Additionally, out-migration exacerbates the strain on these towns, a common phenomenon in economically disadvantaged regions, leading residents to relocate either to traditional rural areas or seek opportunities in foreign countries (Ianoș, 2000; Sandu, 2005).

Historically, the urbanisation process involves both the concentration of population around principal cities and the outward expansion into rural areas and small towns (Fossett & Crowell, 2019). Small towns and rural areas, often overlooked, undergo spatial redefinition as they integrate into the metropolitan region's social fabric and economic life (Lichter *et al*., 2021; Cromartie, 2006). The demographic shifts in rural and small-town populations are integral dimensions of the broader urbanisation process, highlighting the interconnectedness of urban and rural dynamics. As rural areas experience demographic shifts and spatial reconfigurations, the economic landscape undergoes transformations that call for a closer examination of the relationship between urbanisation and economic growth.

Much research on urban environments in Zimbabwe concentrate on cities and large towns (Mbiba, 2017; Potts and Mutambirwa, 1990). It highlights various aspects of urban life, such as the role of urban informality (Kamete, 2020), the imposition of planning regulations (Vambe, 2008), and the livelihoods of workers (Mupedziswa and Gumbo, 2001). McGregor and Chatiza (2019) and Muchadenyika (2015) highlights the significance of party politics in the Zimbabwean urban context. The idea of establishing rural towns came with the 1982 Transitional Development Plan that supported of the need for investment in rural service centers (GoZ, 1982). The intention was to bring the rural population into close touch with markets and services to create connections with the national economy, local marketplaces with regional specialisations, and a lot of unofficial job prospects *(ibid.).*

It was insufficient to invest in infrastructure and services in the setting of an uneven economy with an ethnically defined and spatially confined populace. Growth centres during the post-colonial era included mining towns, estate towns and white farming towns; all of these had to be taken into account in the post-independence investment plan (Scoones and Murambinda, 2021). The dualistic pattern of economic development persisted in the absence of major land reform, and they were not always incorporated into local economies. Some thrived for example, Gokwe because of the cotton boom, Murewa because of horticulture marketing to Harare, but several stayed mostly in the designers' dreams rather than becoming reality (Wekwete. 1988). Except for a few notable ones (Andersson, 2002; Kamete, 1998; Pedersen, 1992), small rural towns have not been extensively discussed in the literature on Zimbabwe.

RESEARCH METHODOLOGY

This research is grounded in the interpretivist research paradigm, which emphasises the significance of exploring and understanding the complex processes of urbanisation in Zimbabwean rural towns undergoing change without simultaneous growth. This philosophical position permits a qualitative investigation, allowing for a more complex comprehension of the various elements affecting the progress of urbanisation. By using interpretivism, the study aims to clarify the fundamental dynamics of the urban landscape and to untangle the intricacies present in these phenomena.

In terms of research design, a mixed-methods approach is embraced to ensure a comprehensive analysis of urbanisation dynamics. This involves integrating qualitative and quantitative techniques to capture both depth and breadth of insights. Qualitative components encompass case studies, on-the-ground observations, and interviews, providing a contextual understanding. On the other hand, quantitative aspects involve the utilisation of data extracted from diverse sources such as academic journals, books, government documents, and policy papers. This triangulation of methods ensures a well-rounded exploration of the urbanisation process in Zimbabwean rural towns. The research methodology is distinguished by a deductive orientation, which starts the investigation with theoretical and empirical data from scholarly publications and official government records. It is possible to formulate hypotheses thanks to this deductive basis. But the study also includes an inductive component, which is especially clear in the case studies, where observations and interviews conducted on the ground help to produce fresh ideas and viewpoints.

FINDINGS

An analysis of Zimbabwe's small rural towns reveals a critical story of urbanisation devoid of traditional growth trajectories. These little rural communities' transformational journey highlights how flexible they are in the face of rapid economic change. Originally serving as support bases for large-scale commercial farmers, these towns have evolved into hubs for A1 and A2 farmers, demonstrating their ability to adjust to changing economic models. The durability of these communities is demonstrated by the observed economic diversification, which is indicated by the establishment of many industries and firms. But issues like poor service, unethical behaviour, and changes in the cotton sector highlight the precarious balance they have to maintain. On the other hand, issues like poor service delivery, unethical behaviour, and changes in the cotton sector highlight the precarious balance they uphold to support economic expansion. Land reform has had significant

socioeconomic effects, particularly after the United States (US) dollar was adopted in 2009. The economic landscapes and social structures of the towns were drastically transformed by this policy change, which also led to a building boom, the expansion of medical facilities, and the attraction of businesses.

One important aspect of these cities is the importance of local entrepreneurship, which is frequently based in the families of land reform farmers (Scoones and Murimbarimba, 2021). In addition to providing for livelihoods, the booming informal sector serves as an example of how well-adapted the communities are to deal with and benefit from economic uncertainty. The difficulties in supplying basic services, cases of land sales corruption, and susceptibility to soil gulley formations highlight the difficulties in developing infrastructure. For these communities to develop sustainably, it becomes vital to strike a balance between prospects for expansion and the need to address these issues. A major theme that touches on social, economic, and environmental aspects is sustainability. The towns have to deal with socioeconomic inequalities, maintain the general well-being of their citizens, and strike a careful balance between environmental preservation and economic growth. Strategic infrastructure investments, careful policy considerations, and sophisticated urban planning are all necessary to achieve sustainable growth.

CASE STUDIES

MVURWI - NAVIGATING URBANISATION, ECONOMIC TRANSFORMATION, AND SUSTAINABILITY

Mvurwi, a town situated in Mashonaland Central Province, Zimbabwe, has experienced significant transformation because of the dynamics of rural-urbanisation, especially in the years after the tobacco boom. It was originally built as a residential hub for farmworkers and an essential service centre for large-scale white commercial farmers. The way the town has changed over time reflects how land reform has changed society and how the agricultural economy has changed as a result.

Prior to land reform, large-scale farms were served by commercial banks and tractor rental companies, and farm suppliers catered mostly to white commercial farmers in Mvurwi's central business district. Historically a centre of government, the town saw an increase in state presence during land reform, which resulted in the opening of new government offices and a hiring boom. Following land reform, the agricultural sector experienced profound

transformation, mostly driven by the earnings from tobacco grown by A1 and A2 farmers. In contrast to previous times, when wealth was vested in a few numbers of white commercial farmers. The US dollar's adoption in 2009 encouraged the growth of tobacco production, drastically altering Mvurwi's economic terrain. The town became a beneficiary of these profits, experiencing unprecedented growth marked by a building boom, expansion of medical facilities, and the establishment of new schools.

That expansion, nevertheless, has not come without difficulties for Mvurwi. Even though the town council assigned new stands in high- and medium-density zones, it took longer to provide basic utilities like sewerage and electricity. Notwithstanding these difficulties, the town has grown to be a popular place for farmers to invest, which has led to an increase in the local population. Scoones and Murimbarimba's (2021) survey argues that 16% of A1 smallholder farmers have made rental income-generating investments in town buildings following land reform. More jobs in a variety of industries, including construction, welding, hardware store ownership, brick moulding, sawmill operations, and transportation, have become available because of the building projects.

In Mvurwi, the closure of companies that supported large-scale commercial farming led to a move toward small- and medium-scale farming, economic diversification is visible. To accommodate the expanding population, the town saw a substantial development of butchers, taverns, and bottle stores. Mobile phone credit sales, eco-cash transfers, and currency exchange all saw significant increases in growth. Local entrepreneurship is essential to the growth of new companies, especially when it comes from the families of land reform farmers. Numerous livelihoods in the community are supported by the thriving informal sector. Notably, as more farmers invest in automobiles for the transportation of people and commodities, the transportation industry has grown to be a major role, in connecting farmers to the town.

The importance of Mvurwi's urban land for housing has given rise to difficulties, such as dishonest tactics by local politicians in the plot sales. Small towns like Mvurwi profit from the local economy's continued localisation despite these problems. The complicated dynamics of rural communities in Zimbabwe experiencing urbanisation without following traditional patterns of economic growth are best illustrated by the case of Mvurwi. The tobacco boom and land reform have had a profound impact on the town's economy, bringing with them both opportunities and challenges.

For Mvurwi to continue growing and prospering as it navigates this dynamic change, it will be essential to address concerns related to service delivery, sustainability, and minimising corrupt practices.

GOKWE: RURAL URBANISATION, DEVELOPMENT, AND SUSTAINING LIVELIHOODS

Gokwe is a rural town in Zimbabwe's Midlands province, offers a unique example of urbanisation influenced by the Growth Point policy implemented by the government. Gokwe has developed into a town, despite early impressions of being backward, illustrating the difficulties and achievements involved in this change. Gokwe was once a government station that housed essential services like the police, district commissioner, hospital, and veterinary clinic. The government's growth points program expedited the town's development, leading to its official town status in July 2006, when it was placed under the Gokwe South Rural District Council's jurisdiction (Urban Councils Association of Zimbabwe, 2006).

The Gokwe Town Council has made significant infrastructural investments, building a $300 000 administration building and tackling waste collection by working with non-profits (The Sunday News, July 19, 2015). The town has different industrial landscape, with large banks and traditional industrial groups co-existing with small-scale formal and informal enterprises. With four primary and four secondary schools serving a population estimated to be below 30 000, Gokwe has achieved progress in education (Masiiwa, 2015). In 2015, the town embarked on a major streetlight renovation program and built a new primary school, Town House, as part of its attempts to solve infrastructure concerns. Healthcare services are provided by several public and private clinics in addition to the Gokwe South Hospital.

To supply water to the town, Gokwe is dependent on nine to eleven boreholes. Water supply is guaranteed by a sizable reservoir tank with a capacity of 5000 m^3, and continuous efforts under the small towns Water, Sanitation and Hygiene (WASH) program seek to renovate the water and sewage systems. A school and stadium are being built by the council to improve recreational opportunities. Gokwe's economy is broad, encompassing both huge enterprises like Cottco and an abattoir and small-scale business owners. Major stores and nightclubs are located in the town, which boosts its economy. Economic obstacles are presented by issues like gulley formations and the general shift in attention away from agriculture, especially the cotton business. Gokwe has large coal reserves in the Semwa mine, which offers a chance for

regional growth and the generation of power for the benefit of the entire country. The town also boasts the Chirisa Game Park, a significant wildlife reserve contributing to tourism.

Gokwe's soil gulley formation susceptibility is one of the main issues hindering infrastructure development. The town's traditional reliance on agriculture, especially the cotton industry, has suffered because of declining prices, which has affected the ability of the local government to provide services. The transition of Gokwe from a government station to a proclaimed town illustrates the challenges associated with Zimbabwe's rural urbanisation. Gokwe serves as a case study demonstrating the nature of urbanisation without traditional growth patterns as it overcomes obstacles and seizes possibilities. The town's adaptability and range of activities highlight the possibility for sustainable development in rural places going through change.

DISCUSSION

The results of the investigation into Mvurwi and Gokwe, when placed in the larger context of Zimbabwe's rural towns, stimulate a conversation about the urbanisation, economic development, and sustainability. Understanding the opportunities and challenges small cities face is enhanced by the literature's discussion of the junction of local realities and global debates. The literature emphasises growth poles, corridors, and centers of economic activity to highlight the significance of spatial relations in significant economic shifts. These ideas are supported by the experiences of Mvurwi and Gokwe, which demonstrate how economic diversification and infrastructure development may result in thriving hubs with connections between industry and agriculture that flow both ways. Economic diversification in Mvurwi, where agricultural earnings fuelled expansion in other industries, is consistent with the idea that household livelihoods go beyond farming. This engagement helps to create new market connections and jobs.

Zimbabwe's implementation of decentralisation strategies is in line with international discussions about the function of small towns connected to rural areas. Although the devolution plan has its roots in the history of the nation dating back to 1883, it also presents some intriguing governance dynamics issues. The difficulty is striking a balance between local autonomy and efficient governing institutions when new power relations appear. The sustainability issues that Zimbabwe's small rural towns face is a reflection of larger global trends. Inadequate infrastructure, high unemployment rates, and urban poverty are prevalent themes. Lessons learned from Romania's experience and the effects of out-migration highlight the necessity of

comprehensive, long-term development plans that take into account social, cultural and infrastructure aspects. The body of research highlights how crucial land reform was in determining small towns' economic futures. The stories of Mvurwi and Gokwe, impacted by the tobacco industry and connected to the cotton boom respectively, highlight the crucial relationship between agricultural policies and the success of small rural communities. This link emphasises how important it is to have flexible plans when dealing with changing economic conditions. There are clear gaps in the literature that highlights the necessity for more thorough discourse on small towns given how important they are to the socioeconomic fabric.

CONCLUSION AND RECOMMENDATIONS

By examining small rural towns in Zimbabwe as a whole, this study sheds light on the relationships and developmental linkages between urbanisation, economic development, and sustainability. These towns' experiences reflect both general trends and particular regional difficulties. The relationship among agricultural policies, land reform, and economic diversification becomes apparent as a crucial factor in determining the prosperity of small rural towns. The historical legacies of dualistic economic growth highlight the necessity of customised approaches that take into account the unique qualities and opportunities of every community. The adaptation and resilience demonstrated by small rural towns in Zimbabwe suggest the possibility of sustainable development in rural places experiencing dynamic change, despite the obvious obstacles. To realise this potential, there is need close the gaps in service delivery, stimulate inclusive growth, and curtail corrupt behaviour. There is also need to create an atmosphere that supports community well-being and economic vibrancy. For inclusive and sustainable growth the following recommendations are offered:

- *Improving Infrastructure and Service Delivery*: Addressing the current gaps in basic infrastructure and service supply is imperative if small rural communities are to remain sustainable. To facilitate a more rapid rate of urbanization, efforts should be undertaken to hasten the provision of amenities like power and sewerage. Investments in infrastructure should be in line with the changing economic environment to make sure that these communities' expansion is backed by stable infrastructure.
- *Community-Centred Economic Development*: Community-centric strategies are essential for promoting equitable economic growth in small rural towns. It is important to support local business, especially those that come from the families of those who have benefited from land reform. This means providing targeted assistance to a range of businesses that have been shown to be essential to the local economy, such as mobile

services, bars, and butchers. Furthermore, methods for utilising the informal sector's potential should be developed, acknowledging its significance in maintaining livelihoods in these regions.

- *Governance Reforms and Policy Adaptation*: Zimbabwe's National Development Strategy 1's effective decentralization strategy should be supported by governance reforms that provide local administrations more authority. Maintaining small rural communities requires finding a balance between strong governance systems and local autonomy. Recognising the interactions between national laws and local realities, policymakers should modify their approaches to the changing requirements and difficulties faced by small towns. Moreover, considering the various paths taken by various towns in Zimbabwe, an appropriate approach to land reform, agricultural policies, and economic diversification should be undertaken.

Achieving sustainable small rural towns in Zimbabwe will require an adaptive, all-encompassing strategy that considers social, economic, and environmental factors. Zimbabwe's small rural towns may realise their potential as dynamic, resilient, and sustainable centres of development by navigating the challenges of urbanisation by putting community wellbeing first, promoting economic variety, and improving governance systems.

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Indigenous Knowledge for Rural Resilience: Flood Control and the Green Infrastructure Agenda for Zimbabwe

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Abstract

Zimbabwe has committed itself to green infrastructure agenda to achieve resilience against recurrent challenges like flooding and sustainable growth. Nonetheless, there is still a significant gap in the application of indigenous knowledge to flood control techniques. This article contends that rural community resilience is put at risk when traditional wisdom is neglected since it reduces the efficacy of sustainable practices. This impedes the adoption of comprehensive and locally appropriate flood management measures by ignoring the priceless insights entrenched in indigenous knowledge. The main argument in this study is that, strengthening rural resilience within the Zimbabwe Green infrastructure framework requires a more thorough and culturally sensitive strategy that acknowledges and integrates indigenous knowledge systems. The study suggests that valuable indigenous knowledge, practices to support floods preparedness exist in rural Zimbabwe and they inform decision making in cushioning individual families from the impacts of floods. Cases of Muzarabani and Tsholotsho districts are used to reveal the critical role indigenous knowledge plays in promoting rural resilience. The study concludes that the country should promote the include the key component of indigenous knowledge initiatives to strengthen rural resilience. It recommends that rural communities have to deal with the dual challenge of the disappearance and preservation of indigenous knowledge system.

Keywords: *sustainability, flood management, floods preparedness, muzarabani, tsholotsho, preservation*

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INTRODUCTION

In Zimbabwe, the historical context of flooding unveils a recurring threat that has significantly impacted rural communities over the years. The Cyclone Eline induced floods of 2000 stand out as a pivotal moment, marking one of the worst flood-related disasters in the region. These floods not only resulted in a devastating loss of life but also triggered a cascade of challenges, including shortages of food and water, and the outbreak of malaria due to stagnant floodwaters (Gwimbi, 2007). The vulnerability of rural communities to such natural disasters has been exacerbated by their socio-economic status, as evidenced by the observations of Gumbo (2006) and Gwimbi (2009) that floods tend to hit the marginalised and impoverished the hardest. Furthermore, the more recent extreme weather event, Cyclone Idai in March 2019, showcased the persistent threat posed by flooding, causing extensive damage to homes, fields, schools, and roads in various districts, particularly in Chimanimani and Chipinge (UNDP, 2019).

A proactive response to the impending threat of climate change, Zimbabwe's green infrastructure goal is deeply entwined with its commitment to sustainable development. One major obstacle to sustainable development, according to the Intergovernmental Panel on Climate Change (IPCC), is climate change (IPCC, 2014). Sustainable development, as pointed by the UN (1987), is the cornerstone of Zimbabwe's approach to environmental concerns. Defined as development that meets present needs without compromising the ability of future generations to meet their own, sustainable development forms the cornerstone of Zimbabwe's approach to environmental challenges (WCED, UN, 1987). Addressing climate change and promoting a green economy are critical components of the global sustainable development agenda that is embodied in the Sustainable Development Goals (SDGs) (United Nations, UN 2016). An essential component of Zimbabwe's dedication to socioeconomic well-being is infrastructure that is acknowledged as the engine of sustainable growth (Beeferman & Wain, 2016; Pollais,2016). Greening buildings, encouraging walkability, and funding mass transit are important factors within the green infrastructure framework, as Matamanda *et al.* (2019) pointed out. These factors address both environmental concerns and socioeconomic development. Furthermore, the Environmental Protection Agency (EPA) highlights that Green Infrastructure (GI) contributes to community resilience both now and in the future by acting as a climate-resilient infrastructure (EPA, 2013). Examining how indigenous knowledge may enhance and supplement environmentally friendly approaches particularly in the context of flood management for rural resilience becomes imperative as Zimbabwe embraces the green infrastructure agenda.

Inadequate flood management methods have a profound effect on rural residents' livelihoods in addition to causing direct human deaths. Floods are a serious threat to housing, agriculture, and the general well-being of communities because of their abrupt and unpredictable nature (Ashwajit *et al*., 2015). The devastation caused by inadequate flood control is highlighted by the aftermath of Cyclones Eline and Idai that destroyed homes, fields, and essential infrastructure, upsetting the regular course of rural life (Gwimbi, 2007; UNDP, 2019). While flood hazards are natural, Action Aid International (2006) highlights that human activity is frequently linked to the damage and losses arising from these occurrences. This highlights the significance of effective flood control measures in limiting the impact on vulnerable communities. This necessitates a holistic approach to disaster resilience that not only addresses the immediate aftermath but also considers long-term sustainable solutions.

The neglect for indigenous knowledge (IK) in Zimbabwe's green infrastructure strategy highlights a critical gap, particularly as rural regions give way to urbanisation and contemporary scientific methodologies replace traditional flood prediction methods (Joshua et al., 2017). The gap with rural people, especially those with less formal education, is highlighted by criticisms of traditional weather and climate forecasting for its lack of localised knowledge and excessively technical language (Joshua et al., 2017). Seasonal rainfall projections are particularly difficult for scientists to make because of the increased variability in rainfall patterns throughout Africa (Finucane, 2009; Joshua et al., 2017). Indigenous knowledge is underreported in urban studies despite its demonstrated ability to work in tandem with scientific methods; this highlights the necessity of conducting assessments that are specific to the area (Kalanda-Joshua, 2011; Nkomwa *et al*., 2005). To close this knowledge gap, this study will assess the applicability of indigenous knowledge to weather and climate forecasting, particularly regarding rural flood preparedness. It will also investigate the efficacy of indigenous flood early warning systems and how they might strengthen community resilience.

LITERATURE REVIEW

This section presents literature review of the whole study. It is divided into four sections which are pillars building this study that is, Indigenous Knowledge Systems, Rural Resilience, Flood Control and the Green Infrastructure Agenda.

INDIGENOUS KNOWLEDGE SYSTEMS

Challenged by the traditional dependence on scientific knowledge alone, indigenous knowledge systems (IKS) have emerged as critical assets in solving climate crises (Finucane, 2009; Joshua *et al*., 2017; Mafongoya and Ajayi, 2017a, 2017b). Based on their extensive observations of plant indicators, animal behaviour, and astronomy, local communities have long relied on IK to help them make informed decisions about managing climate risks. This has been demonstrated by numerous studies (Kalanda-Joshua *et al*., 2011; Kangalawe *et al*., 2011; Kijazi *et al*., 2013; Nkomwa *et al*., 2013; Nyong *et al*., 2007; Roncoli *et al*., 2009). There are many examples, like in Swaziland where floods are predicted by the nest heights of emahloko birds, or in rural Malawi where communities evacuate to higher ground when a dark cloud appears in the west, indicating impending flooding (Mafongoya and Ajayi, 2017b; Kalinga-Chirwa *et al*., 2011; Nkomwa *et al*., 2013). In terms of forecasts, climate change, and seasonal predictions, the research points to a convergence between IK and conventional science (Joshua et al., 2017; Kalanda-Joshua *et al*., 2011; Mafongoya *et al*., 2017).

While there has been much research on the application of IK to weather or climate predictions, especially in Africa (Chanza and Mafongoya, 2017; Joshua *et al*., 2017; Mafongoya *et al*., 2017; Mubaya *et al*., 2017), some studies suggest that some IK indicators, especially those based on flora, may be losing value due to climate change, though this may vary depending on the context (Joshua *et al*., 2017). For systematic observations of the environment and the management of natural hazards, traditional groups in Africa, especially those in hazard-prone areas, have constantly relied on their IKS (Berkes, 2012; Kalanda-Joshua *et al*., 2011; Pareek and Trivedi, 2011). This generation-to-generation transmission of collective knowledge provides social capital for marginalised groups and is a priceless resource for scientific research (Mafongoya and Ajayi, 2017a). In light of Zimbabwe's green infrastructure strategy and flood control, it is critical to comprehend the dynamic interaction between traditional practices and changing climatic patterns as we investigate the potential of indigenous knowledge for rural resilience.

RURAL RESILIENCE

As communities struggle with the many issues that floods present, the idea of resilience especially in the context of rural flood resilience—has attracted a lot of attention. Resilience is a crucial component in surviving risks like flooding. It is described by the National Research Council (NRC) as "the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events" (NRC, 2012). Community resilience, as defined by Norris et

al. (2008), is the ability of a community to withstand and recover from such dangers. They emphasise the importance of social connections in enabling community members to mobilise for effective action (Breton, 2001; Murphy, 2007). Public health and sustainable development face significant obstacles as a result of the catastrophic effects of flooding that include morbidity, death, and injuries (Rentschler and Salhab, 2020). The impact of flooding must be addressed immediately, as 1.47 billion people, or 19% of the world's population, live in low- and middle-income nations and are at significant danger of flooding (Rentschler and Salhab, 2020).

The interaction between flood risk management and community resilience becomes critical in the African environment, where more than 50% of the population lives in rural areas and depends on floodplains and rivers for subsistence activities (Lumbroso, 2020). However, there is also disagreement over how to operationalize resilience, with different perspectives on whether it should be viewed as a process or an outcome (Patel et al., 2017; Rodina *et al.*, 2017). Resilience is defined by the Resilient Africa Network (RAN) as the ability of individuals and systems to reduce vulnerability and enhance well-being by mitigating, adapting to, recovering from, and learning from shocks and stresses (RAN, 2015). Bulti *et al*. (2019) gave a hazard-specific definition of community flood resilience, emphasising a community's ability to maintain or rapidly return to desired functions in the face of flood events and highlighting the importance of adaptation efforts, including pre-flooding preparedness and mitigation (Keating et al., 2014). As global policy discourses support a transformative and resilient approach in the water governance sector to mitigate the negative effects of climate change (Salinas Rodriguez et al., 2014), the relationship between livelihoods and flood risk management becomes a central concern for improving public health, community resilience, and sustainable development objectives.

FLOOD CONTROL

Flood control strategies have changed from being traditional and focused on maintaining the stability of physical infrastructure to being more inclusive and acknowledging the complex interactions between socio-ecological factors and complex adaptive systems (White and O'Hare, 2014). But the water industry has come under fire for taking so long to adopt novel and revolutionary approaches to bolster resilience—rather, it frequently accepts some degree of flooding as the norm (White *et al*., 2016). The Intergovernmental Panel on Climate Change (IPCC) states that changes in river management have a significant impact on regional floods. Extreme weather-related occurrences, such as heavy rain, typhoons, and tidal surges, increase the risk of flood

hazards (Cooney, 2012; Zhou *et al*., 2017). Different defence lines, such as seawalls, waterlog control systems, and urban drainage systems, are used by flood control systems that are divided into engineering and non-technical categories (Liu *et al*., 2014).

Sea level rise and ground subsidence pose threats to the integrity of seawalls, crucial engineering measures, in coastal rural regions, hence diminishing their ability to protect against flooding (Tang *et al.*, 2014). Mismatches in storm water storage and drainage capacities contribute to the risk of waterlogging. The regional waterlog control system that includes pumping stations, is intended to reduce the risk of waterlogging. On the other hand, the urban drainage system is essential for controlling floods. (Shi, 2012; Shanghai Municipal Drainage Authority, 2010). The Chinese government has extensively embraced flood hazard mapping as a means of obtaining precise information about flood disasters. Other non-engineering measures include flood control command systems, regulation systems, decision support systems, and flood hazard management (Liu *et al*., 2014; Chen *et al*., 2004). One important element that expands the capability of flood hazard mapping to include real-time warning and forecasting systems is the integration of real-time monitoring and risk analysis in high-risk residential zones (Zhong *et al*., 2014). The relationship between flood control measures and the indigenous knowledge of local people becomes crucial in creating comprehensive and context-specific flood resilience solutions in rural Zimbabwe when these mechanisms change to meet the dynamic challenges given by catastrophic weather occurrences.

GREEN INFRASTRUCTURE AGENDA

Green infrastructure integration has drawn a lot of interest worldwide as a sustainable way to lessen the effects of climate change in flood control techniques. Because of their ability to sequester carbon, forest ecosystems are thought to be essential for reducing the effects of climate change (Hamilton and Friess, 2018; Shahbazi and Nasab, 2016; Patil and Kumar, 2017). Street-side swales, bioshields, buffer zones, green roofing, porous pavements, mangroves, and wetlands are just a few examples of the solutions that make up green infrastructure that is an integrated approach to flood risk control that incorporates both structural and non-structural elements. To combat the effects of climate change and ensure sustainable urban drainage, the promotion of green infrastructure, including urban agriculture, has received strong support throughout Africa (Douglas, 2018). However, some people critique the idea, citing that it increases the problem of erosion and siltation when done in flood plains there by increasing the risk of floods.

The idea of urban green infrastructure that includes environmental conservation, urban agriculture, recreational uses, and woodland, has gained traction despite municipal plans that frequently favour the evacuation of settlements from floodplains and ignore urban agriculture (Benedict and McMahon, 2002). To make the most of the restricted space, urban green infrastructure is considered crucial during planning procedures, especially in places that are prone to flooding (Ahern, 2007; Hansen and Pauleit, 2014). Arguments supporting the importance of green infrastructure, including various forms of urban agriculture, to flood relief in Africa are substantial (Connors *et al*., 2016; Lwasa *et al*., 2014). This method is consistent with soft engineering techniques that emphasise surface runoff attenuation on slopes draining towards rivers and water retention over floodplains (Hannam and Hicks, 1980; Robinson and Speiker, 1978). The implementation of grassed streams and detention ponds during the 1970s in Australia and North America further highlights the global acceptance of green infrastructure as an effective technique for flood hazard reduction (Hannam, 1979).

METHODOLOGY

DATA SOURCES

This research uses multiple data sources and a multifaceted approach to obtain comprehensive insights. The foundation is desk research that entails a thorough assessment of the body of knowledge regarding indigenous knowledge, green infrastructure, and flood management in Zimbabwe and reports and scholarly publications. A comprehensive grasp of the existing state of knowledge will be provided by this desk study, making it possible to identify any gaps that call for more investigation. Finding current and pertinent conference papers, scholarly publications, and academic articles will be made easier with the use of Google Scholar and focused web searches. These resources support the study's theoretical framework and empirical underpinnings, guaranteeing a careful analysis of the various viewpoints that are now in use.

To learn more about national policies, programmes, and tactics pertaining to green infrastructure and flood management in Zimbabwe, government publications were closely examined. By including official perspectives, this inclusion guarantees agreement with governmental viewpoints and enhances the study. The literature review synthesises existing information, theories, and frameworks by combining insights from books and peer-reviewed journal articles. This thorough literature assessment helps discover patterns and gaps for focused investigation in addition to providing information for the study's

theoretical framework. In addition, case studies from various areas with comparable problems will be examined to create a framework for comparison that will give useful insights into effective strategies and lessons discovered.

To obtain a comprehensive picture of the interactions between indigenous knowledge and green infrastructure for flood management, a variety of data sources have been purposefully used. A broad theoretical framework is provided by desk research and literature reviews that also guarantee alignment with national policies. The study's academic rigour is enhanced by the inclusion of books, journal papers, and internet searches. Case studies offer a comparative lens and practical lessons from a variety of circumstances. Interviews with important stakeholders, such as members of the local community, specialists, and public servants, provide first-hand accounts and qualitative depth. This qualitative method enables a comprehensive investigation of cultural contexts and the applicability of traditional methods through the use of topic analysis and interviews. Triangulating these methods enhances the study's robustness, promoting a more comprehensive and reliable analysis of the integration of indigenous knowledge into Zimbabwe's green infrastructure agenda for flood control in rural areas.

FINDINGS

The research article provides important new information about the inherent usefulness of indigenous knowledge as a foundational understanding for rural communities in the flood-prone districts of in rural Zimbabwe. The people who live here have an extraordinary capacity to foresee floods by shrewdly reading environmental indicators like animal behaviour and cloud patterns. With the use of this indigenous knowledge, communities are better equipped to put a variety of coping mechanisms and adaptive measures into place. These include non-structural solutions like building temporary footbridges and structural solutions like higher platforms for shelters. The study highlights the resilience and adaptation inherent in indigenous knowledge, highlighting it as a vital resource for catastrophe planning and mitigation.

The study does, however, highlight difficulties in integrating indigenous knowledge into institutional frameworks for disaster management, despite the knowledge's obvious effectiveness. It is believed that government institutions undervalue traditional knowledge in favour of Western methods. The results suggest a more comprehensive approach that integrates traditional wisdom with contemporary techniques, acknowledging the mutual benefits between both. Furthermore, the effects of flooding on man-made structures, such as homes for people and vital infrastructure, highlight the necessity of

comprehensive resilience plans. Moreover, the research proposes the integration of ecosystem-based methodologies and green infrastructure to harmonise traditional customs with modern ways for all-encompassing and enduring flood risk mitigation. To sum up, the study promotes the acknowledgement, fusion, and balancing of indigenous knowledge within more comprehensive frameworks to strengthen rural communities against the challenges posed by floods in Zimbabwe.

CASE STUDIES

The following case studies shed light on the findings from well-known flood prone Districts in Zimbabwe. The two districts are found in region 5 in the Low veld.

CASE 1: MUZARABANI, ZIMBABWE

Indigenous knowledge systems are very important in influencing the coping mechanisms that the people in Muzarabani use to protect themselves against flooding. These tactics take into account both structural and non-structural methods, taking into account the socioeconomic conditions and the particular features of the floods that occur in the area (Paul & Routray, 2010). The series of precautionary measures includes building walls around homes, building using materials resistant to flooding, and elevating kitchen and storage areas to protect valuables from flooding. Conversely, mitigation measures include changing the frequency of meals, depending on inexpensive food sources like wild fruits, and looking for alternate sources of income. Each household adopts these tactics differently based on how vulnerable they are and how well equipped they are to withstand the shocks of flooding.

In Muzarabani, communities first prioritise preserving possessions and lives when implementing coping strategies. Common customs include raising homesteads, constructing elevated platforms known as dara, and fleeing to higher land. The construction of dara, utilised to keep kitchen utensils and other properties at a height above potential floodwaters, is firmly rooted in the community's flood resilience practices. One respondent narrated that

> "Normally, we build raised platforms outside our homes called *dara* to act as shelters. Alternatively, we look for safety on relatively higher land during floods."

Residents of Muzarabani also show a good awareness of flood-resistant materials; they choose traditional huts and structures that float during floods. Farmers also use natural coping mechanisms to safeguard crops. These include choosing crop varieties appropriate for the region, adhering to agro-ecological crop calendars, and planting in riverbank flood-prone areas with minimal tillage.

Floods make it difficult to store food and water that is why stockpiling is done in specialised houses called dura and polythene bags. On the other hand, communities move to higher ground with their necessary supplies when floodwater levels drastically rise. Food shortages during and after floods force people to adopt adaptable strategies, like cutting back on meal frequency and depending more on inexpensive foods like wild fruits. One of the participants explains:

> "Our capacity to store food and water is disrupted by floods, which is why we need to employ specialised constructions like dura and polythene bags. We take our critical goods and move to higher ground when floodwater levels significantly rise. We are forced to adapt by cutting back on the frequency of our meals and depending more on affordable options like wild fruits due to the difficulties of food scarcity during and after floods."

In addition, although it is hindered by the absence of conventional fuel resources during floods, households are forced to take preventive measures due to post-flood issues including infections transmitted by contaminated water. To deal with the difficulties caused by flooding, the community uses a variety of coping strategies, such as asset disposal and borrowing money (Del Ninno & Dorosh, 2003). Overall, the intricate interplay of indigenous knowledge and adaptive strategies underscores the community's resilience in the face of recurrent floods in Muzarabani.

CASE 2: TSHOLOTSHO DISTRICT, ZIMBABWE

Residents of Tsholotsho District, who live under continual threat of flooding, have shown a strong grasp of traditional knowledge that they have used to effectively address flood-related issues. To foresee rainy seasons with the potential for floods, locals have developed a thorough understanding of domestic forecasting techniques, drawing on indigenous wisdom. This involves keeping an eye on cloud patterns, documenting changes in native trees and researching the behaviour of particular animals, such the inkanku bird that is linked to rain forecasting. A participant narrated that

> "When we hear an inkanku crying nonstop during the rainy season, we know that heavy rains and possibly flooding are on the way. Then, in case it starts to rain, we get ready to go to higher ground."

The community's cultural norms and values are reflected in the incorporation of indigenous knowledge into flood prediction, underscoring the inherent relevance of these cultural elements (Domfeh, 2007).

Although indigenous knowledge plays a significant role in flood resilience, the community feels that disaster management authorities have significantly underestimated their insights, especially when compared to Western

knowledge. It is widely believed that the integration of traditional knowledge with modern methodologies has the potential to improve the overall efficacy of flood catastrophe management. One of the participants in Tsholotsho had to say:

> "We would be more effective in disaster response and recovery if we disaster risk reduction practitioners could appropriately integrate communities' indigenous knowledge with our understanding."

Floods in Tsholotsho District have a profound effect on the built environment in addition to human experience. Roads, bridges and dams were all severely damaged, as were human shelters, the majority of which were made of poles and mud. The significant losses incurred by these structures that were essential physical capital for the affected populations, highlight the complex effects of floods on livelihoods (Dube and Chiwanga, 2014).

Tsholotsho District is prone to recurring flooding due to its location in Zimbabwe's ecological region 5 that is distinguished by low rainfall levels. Despite this susceptibility, the affected communities' rich indigenous knowledge is frequently overlooked in the government's response and intervention that is frequently informed by contemporary methods. Equipped with a wealth of indigenous wisdom, the community not only predicts flooding but also makes well-informed decisions in the lead-up to, during, and following floods. This understanding includes estimating the amount of rain that will fall and utilising post-disaster strategies, such as land zoning and utilising locally accessible resources, to lessen the effects of flooding. Community participation is also prioritised in Tsholotsho, as one of the participants narrates that,

> "Improved community engagement would result from practitioners giving careful consideration to the indigenous knowledge of the local communities. Communities would readily take ownership of development initiatives through their participation, increasing the projects' significance and sustainability for the local community."

The indigenous knowledge of the society is firmly anchored in its ability for interpreting signals found in the natural world, such as cloud patterns and animal behaviours like those of the inkanku bird. With this knowledge, the community can take preventative action, such moving animal shelters to higher ground and building makeshift footbridges (amazibuko) over flooded rivers. During floods, these methods have been successful in guaranteeing the lives of cattle and the safety of villagers. As evidenced by Tsholotsho, indigenous knowledge is an invaluable tool for practitioners of disaster risk reduction, providing insights into the planning, forecasting, and execution of successful preventative and mitigation strategies that are specific to the local environment.

DISCUSSION

The study shed light on the critical role that indigenous knowledge plays in promoting rural Zimbabwe's resilience to flooding. Local populations in the districts of Muzarabani and Tsholotsho have proven to be very adept at using traditional knowledge to predict floods by utilising subtle observations of the natural world, like animal behaviour and cloud patterns. This indigenous knowledge serves as an early warning system, enabling communities to implement preventive and mitigative measures. These adaptable techniques that range from building temporary footbridges to elevating shelters on raised platforms, highlight the adaptability of indigenous knowledge in tackling the complex problems presented by floods.

The study shows that there is a disconnect between institutional disaster management organisations and traditional practices, even if indigenous knowledge is clearly effective. The undervaluation and marginalisation of indigenous knowledge in favour of Western methods results in a gap in the comprehensive integration of community insights into official policies. To create a flood resilience framework that is more thorough and culturally aware, this barrier must be closed. The study emphasises the necessity of a paradigm change that acknowledges the intrinsic worth of indigenous knowledge and works to integrate it with contemporary practices.

Floods' effects on the built environment that includes habitations and vital infrastructure, highlight how key it is to approach resilience from a variety of angles. An approach that appears promising is the combination of ecosystem-based tactics and green infrastructure. Sustainable and situation-specific solutions can be achieved by coordinating indigenous practices with modern green infrastructure initiatives, such as land zoning and the utilisation of locally accessible resources. This example of the possibilities for a more comprehensive and all-encompassing flood risk management strategy is the synergy between indigenous knowledge and green infrastructure.

In conclusion, this study advocates for the elevation of indigenous knowledge as a cornerstone in rural resilience efforts. Recognising its significance, integrating it within formal disaster management, and aligning it with green infrastructure agendas can pave the way for a comprehensive and culturally sensitive approach to flood control in Zimbabwe. The study prompts a re-evaluation of current practices and calls for the coalescence of traditional wisdom and contemporary strategies to fortify rural communities against the growing challenges of floods.

CONCLUSION AND RECOMMENDATIONS

This study concludes that the country should promote the inclusion of indigenous knowledge as a fundamental component of initiatives to strengthen rural resilience. Acknowledging its importance, including it into official disaster management, and coordinating it with green infrastructure initiatives can open the door to a thorough and culturally aware flood control strategy in Zimbabwe. The study demands that present methods be re-evaluated, and that traditional knowledge and modern tactics be combined to strengthen rural communities' defences against the escalating threat of flooding. The study suggests that valuable indigenous knowledge, practices to support flood preparedness exist in rural Zimbabwe and they inform decision making in cushioning individual families from the impacts of floods. Despites the existence and the relevance of indigenous knowledge system for flood management, rural communities have to deal with the dual challenge of the disappearance of this vital knowledge system and its preservation. The study therefore suggests the following recommendations:

1. ***Integration of Indigenous Knowledge into Formal Disaster Management:*** Recognising the crucial role traditional practices play in flood resilience; modern disaster management systems must incorporate indigenous knowledge. Early warning systems, catastrophe preparedness plans, and community-based adaptation methods should all actively involve local populations and incorporate indigenous knowledge, according to government agencies, non-governmental organisations, and humanitarian partners. This partnership has the potential to improve the efficacy of flood prevention efforts and promote a more inclusive, culturally aware approach to rural resilience.
2. ***Community Empowerment and Knowledge Sharing:*** Encouraging community empowerment is crucial for flood resilience initiatives to be sustained. The creation of knowledge-sharing and community engagement platforms can promote the exchange of traditional wisdom and contemporary techniques. It is important to plan workshops, seminars, and community-led projects to foster a dynamic learning atmosphere where traditional and scientific knowledge can coexist. In addition to enhancing communities' ability to adapt, this strategy promotes a feeling of shared accountability and ownership in the face of flooding difficulties.
3. ***Incorporation of Green Infrastructure Strategies*:** The study highlights the potential of green infrastructure in enhancing flood resilience. Policymakers and urban planners should consider integrating green infrastructure solutions, such as wetlands, bioshields, and sustainable land-use planning, into flood risk management strategies. This approach

aligns with indigenous practices, harmonizing traditional ecological knowledge with contemporary green infrastructure agendas. Pilot projects and community-based initiatives can be implemented to assess the feasibility and effectiveness of these strategies within the Zimbabwean context.

4. ***Capacity Building and Knowledge Transfer:*** Capacity-building programmes are crucial for bridging the knowledge gap between indigenous peoples and institutional disaster management systems. It is important to provide training programmes that can help local disaster management organisations better identify, honour, and use indigenous knowledge. To guarantee that indigenous knowledge is passed down to future generations, efforts should be made to both document and conserve it at the same time. A more inclusive and flexible framework for disaster management is promoted by this dual strategy that makes use of the advantages of both conventional and contemporary knowledge systems.

By implementing these recommendations, Zimbabwe can develop a comprehensive and culturally sensitive approach to flood control, leveraging the strengths of indigenous knowledge and green infrastructure for enhanced rural resilience.

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Small Livestock Rearing as A Mitigation Against the Vagaries of Climate Change Impacts in Rural Zimbabwe

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Abstract

This chapter critically examines the adoption of livestock rearing in Zimbabwe as mitigation measure against the adverse impacts of climate change in the rural areas. Climate change has proved to be a major challenge to the sustainability of rural livelihoods in Zimbabwe which are more dependent on agriculture hence the production of small livestock is a mitigation measure for sustaining rural households in the countryside where the effects of climate change are severe. This study is centred on how small livestock rearing can be a panacea to the impacts of climate change in the rural areas of Zimbabwe. Document and literature review was used to collect and gather information presented in this study. Various existing documents were reviewed for the purpose of this study and both qualitative and quantitative data was generated, presented and critically analysed. The results indicates that the adaptation of small livestock rearing has already began in the country as noted by their production in most parts of Matebeleland and Masvingo Province respectively. It can be argued that in as much small livestock rearing is a hedge against climate change effects in rural areas there is still limited information on how these are kept and their various breeds as well as the diseases that attack them and their treatment. Farmers still lack enough knowledge with regards to small livestock which is limiting its production and adaptation in the country. The study recommends the education of farmers on various diseases and the availability of medicines for treatment close to farmers. The study proposes coordination of the government, rural farmers and non-governmental organisation in raising awareness and fostering the adaptation of small livestock farming.

Keywords: *rural, resilience, livelihood, adaptation, sustainable and agriculture*

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INTRODUCTION

The rearing of small livestock is one of the most significant strategy used in the rural areas to meet various needs as well as the sustainability of rural livelihoods in most countries in the global south. Abbas, Ribeiro and Santos (2023) argue that developing countries are extremely susceptible to climate change due to their high dependency of their livelihoods on natural resources. It can be argued that in this time of crisis caused by climate change, the production of small livestock can be achieved as the main dominant livelihood for the socioeconomic upkeep of rural lives in the emerging countries like Zimbabwe. Animal husbandry is considered to be an important activity done in most developing countries within the agricultural industry as a way of reducing poverty and promoting rural livelihoods (Conteh, Sesay, Sheriff and Sesay, 2020). It is argued that the rearing of small ruminants have gained popularity and great attention in the developing world due to the continued and increased social, traditional and religious demand as they are used to fulfill various needs in these different dynamics (Conteh *et al*. 2020). Small ruminants are argued to contribute and play a critical role in the agricultural livelihoods among the poor and marginalised regions (FAO, 2022). Von Grebmer *et al* (2022) note that the global climate change crisis has exposed weaknesses of food and farming systems at local and universal scales which has contributed to the worsening of hunger crisis in emerging countries. This has proved true in Zimbabwe which is suffering severe crop failure as a result of climate change hence the need to foster alternatives such as the rearing of small livestock to reduce the huger risks imposed by climate change. Kontgis *et al*. (2019) affirms that climate change has affected rural livelihoods and food security due to the variation in cropping system and yields. It is in this regard that the rearing of small livestock is considered to be the solution in mitigating the problems imposed by climate change in the rural areas of Zimbabwe.

This study is based on a desktop review of scholarly literature where a number of secondary literature articles and documents were reviewed for the purpose of this study. Both qualitative and quantitative techniques were both used to present the descriptive and numerical data as analysed from the research. The study discovered that the rearing of small livestock is on an increase in Zimbabwe mainly in semi and arid regions such as Matobo, Gwanda and Bikita among others. In conclusion it can be argued that small livestock rearing has proved to be an effective and viable strategy for the rural areas as a measure towards climate change adaptation. It is argued that though small livestock keeping is been adopted there is still lack of knowledge on different breeds of sheep and goats to keep in various areas among the rural households.

Besides that the medicines are found far from their areas making it difficult for them to treat their livestock which they also struggle to identify the diseases attack. The study recommends water harvesting as a solution for water depletion for the livestock. The study proposed the investment in rainwater harvesting technologies as a way of collecting, storing and conserving water for the use in dry seasons. The study propose that farmers needs to be educated on various goats breeds and other breeds of poultry for them to know and choice the correct breeds that easily adapt in their areas.

LITERATURE REVIEW

This section critically reviews pertinent literature on small livestock farming as a potential mitigation measure against the adverse effects of climate which constitutes one aspect of the triple planetary crisis. On a global scale, the livestock sector is argued to have drawn international attention in the past decades sue to the rising concern about the environment and safety (Vermeulen *et al*., 2012). Conteh *et al*. (2020) argue that goats and sheep are fundamental to keep and can perform well even if they are poorly managed due to their unique adaptive characteristics that are natural. IFAD (2020) note that small livestock sector has huge adaptation potential to climate change. Climate change is argued to have given rise to various problem including the intensity of poverty on rural lives who rely on agriculture for their income. International Fund for Agriculture Development (IFAD, 2020) argue that small livestock sector has the potential to play a critical role in addressing direct and indirect challenges created by climate change. Small livestock are believed to adapt to a range of environments, and this makes them valuable to farmers who seek to optimize production and profit (et al. 2020). Bennett *et al*. (2018) argue that broiler chicken has become the most intensely cultivated animals across the globe. Among Asian countries, poultry is regarded as the most significant livelihood for rural households (Birhanu *et al*., 2023). IFAD (2015) argue that rural poultry is a solution towards poverty exerted by the effects of climate change on rural lives in most Asian and African countries. Chantalakhana (2000) asserts that the production of indigenous poultry is vital for climate change adaptation as they produce low carbon and water footprints due to their less requirement for land clearance and their manure nourishes the soil's health. Wong *et al*. (2017) support this view as they argue that village poultry have greater disease resistance and strong ability to scavenge and avoid predators which improves their rate of survival. It can be argued that poultry is a year round activity that can be used to meet food security among the people and these can adapt to various environments and have the potential to survive harsh conditions hence it should be taken more seriously in

Zimbabwe as a measure against climate change and a solution to food insecurity it is causing in rural areas.

IFAD (2020) mention that small livestock has the potential to provide adequate and reliable supplies of healthy and nutritious food, empowering rural women and young people and strengthening development through financial benefits and employment creation. It is argued that small livestock contribute to food accessibility and as well the income of smallholder farmers in the rural areas due to the sale of produce such as milk, eggs and meat among others (Wong *et al*., 2017; IFAD 2020). It is mentioned that small livestock contribute to human society through the provision of food, fiber and the necessities (Adams *et al*., 2021).

Gowane *et al*. (2017) note that small ruminants are climate resilient and possess unique characteristics which grounds their adaptation capacity and tolerance against rising temperatures. This fact is borne by the fact that around 50% of the world's goats and sheep are found in the arid regions of the world. This is a clear indication that with the changing climate in developing countries and the whole universe, the production of small livestock in Zimbabwe can be a well thought idea that can lead to the substance of rural livelihoods and the development of rural areas without the fear of distractive manner of climate change. Joy *et al.* (2020) argue that with regards to climate change adaptation, small livestock production have a great adaptive capacity as they can overcome both direct and indirect effects of heat stress due to their wide range of adaptive responses including rumination time, reduced feed intake and ability to maintain thermal equilibrium.

With regards to exerting stress on the environment, small livestock are argued to emit less greenhouse gases as compared to large livestock such as cattle (Opio *et al*., 2013). In this case it can be argued that besides their adaptive mechanism, small ruminants are advantageous to keep as they results in the reduced carbon emission which limit the concentration of greenhouse gases in the sky. Marino *et al*. (2016) argue that small livestock have the capacity to adapt well to water limited areas because of the increasing threats to water sustainability and availability imposed by climate change. It can be argued that with this argument and observation of the survival of small ruminant in low water supply areas, goats and sheep are a great investment among rural areas of Zimbabwe which are suffering from low rainfall and droughts caused by the change in rainfall patterns and seasons. Akinmoladun *et al*. (2019) posit that small ruminant have an increasingly vital role in enhancing the resilience of rural households to the effects of climate change due to their ability to tolerate

intermittent watering without heavily compromising production. Marino et al. (2016) assert that more than 56% of the world's small livestock production is dome in water-limited and dry locations in developing countries with approximately 27% and 21% temperature and humidity capacity. This indicate that with the raising temperatures and lowering rainfall in Zimbabwe, rearing of small livestock will bring preferred outcomes as they are recognized for their strength on adaptation. It can be argued that their capacity to withstand climatic shock indicate that they can be essential in reinforcing the resilience of rural agricultural systems and manage the risk of crop failure as well as a diversification strategy.

It is argued that animal production uses about 30% of the land area available and support 600 million livelihoods through employment creation (Thomton, 2010). It has been observed that in Asian and African regions, there are 59, 7% and 33.8% of goat population and 42% and 26.7% of sheep population respectively which could have increase by now due to the adoption of animal rearing as a mitigation measure towards climate change in these areas (Abdle, 2010). Small livestock production have been noted in Afghanistan with farmers in the rural areas rearing sheep, goats and over 12 million poultry (FAO, 2023). Henning *et al*. (2007) argue that poultry raising is more popular in rural areas in the developing countries as these can be quickly sold for income. In Afghanistan, the livestock sector is argued to contribute to the livelihoods of most rural population and a source of food and income (FAO, 2023). In as much as small livestock production is considered to be a way of mitigating climate change effects on rural livelihoods, in Afghanistan, the death of 98% of the goats and sheep have been recorded to be due to cold weather waves between 2022 and 2023, thus a numerous loss for the farmers (FAO, 2023). In other words, climate change has contributed to the reduction in small livelihood production in Afghanistan. Leal Filho *et al*. (2020) argue that climate change threatens small ruminant production due to changes in weather patterns and increased frequency of extreme events that increase the risk of the outbreak of diseases and limit production. In Southern Africa, it has been discovered that there is a shift in rural livelihoods from mixed crop livestock to pure rangeland systems. IFAD (2020) is of the view that small livestock strengthen rural people's resilience to climate change as it is a way of diversifying smallholders' assets and source of income in a way that reduces the emission of greenhouse gasses.

Climate change has impacted rural lives in various way which are direct and indirect as noted by many challenges being faced in these areas. Apraku *et al*. (2018) are of the view that climate change has made developing countries

more vulnerable and has worsened their rain-fed agricultural and free range pasture-fed livestock which they strongly depend on. Assan (2014) argue that livestock production in the face of rapidly changing climate can be the most sustainable livelihood for the rural people especially in arid regions in Zimbabwe. Phiri *et al*. (2020) assert that small livestock have the highest chances of surviving under climate change conditions such as the reduced land of grazing, droughts prevalence and the depletion of water and pastures. In southern parts of Madagascar, small ruminants are described as a support system for the households during the drought episodes due to their capacity to sustain while they quickly reproduce due to their resilience to harsh conditions compared to other livestock (World Bank 2018). Though the production of small livestock is applauded for its adaptation to climate change, in Ghana the production of sheep and goats is decreasing due to farmers opting to reduce the losses incurred from high maintenance cost of rearing them as the drugs are more expensive (United States Department of Agriculture (USDA) 2023). IFAD (2020) note that the small livestock sector is facing challenges such as transboundary diseases and emerging infectious diseases which are a threat to the rise of this sector for sustainable rural development and livelihood sustenance. On the other hand, IFAD (2020) argue that small livestock are the proper animals for rural farmers as they require few inputs and they are more prolific and offer faster returns on investment.

Besides livestock production being an important relief during droughts, it can also be regarded as an important function which meets the basic livelihood requirements of the people especially the vulnerable groups. Waters-Bayer and Letty (2010) is of the view that the rearing of goats and sheep is fundamental for poverty alleviation and food security which is a pillar to the achievement of sustainable goals. Nandini and Suganthi (2018) argue that livestock is the central due to its multiple benefits including nutrition, food security and organic fertilizer within the rural areas. Previous studies have shown interest in the examining the efficacy of small livestock rearing in Zimbabwe through studies in areas such as Matobo, Gwanda and Binga among others (Phiri *et al*. 2020). ZIMSTAT (2013) note that the effects of climate change are experienced in the rural areas where 60% of the people residing there depend on agriculture-based livelihoods. Makuvaro *et al*. (2014) argue that communal farmers in Zimbabwe have started to take action towards climate change adaptation as noted by the change in planting times, conservation farming, mixed crop livestock systems and crop diversification. Nyathi (2008) argue that Zimbabwe's communal famers are faced by numerous challenges that differ with agro-ecological region thus posing problems on cattle production thus the reason for the adoption of small livestock rearing. Masikati (2010)

assert that the major constraint to communal livestock production is the seasonal deficiency in quality of feed and its quantity and this call for alternatives such as the rearing of small livestock which are less demanding to keep.

METHODOLOGY

This study is based on literature and document reviews where secondary data sources were used to gather the information presented in this paper. A desktop review was done for this study and a number of case studies were reviewed from various regions to analyse how the rearing of small livestock is a solution towards the disastrous effects of climate change on rural livelihoods and their socioeconomic lifestyle. Various research articles, report documents, book chapters and news articles among others were used to collect the data scientifically presented in this study. A mixed approach to data gathering was done and both qualitative and quantitative research techniques were applied in this research as noted in the presentation of information. A thematic analysis to data presentation was used to present the findings of this study. This technique was used so as to present clear findings that are well documented with in-depth information on how the rearing of small livestock turns to be a relief on rural livelihoods and a coping mechanism against climate change in rural areas around Zimbabwe.

FINDINGS

Phiri *et al*. (2020) argue that livestock rearing is a most popular climate change adaptation strategy that is being employed in Zimbabwe in the district of Matobo and some parts of Matebeleland among others. It is discovered that districts including Beitbridge, Gwanda, Binga, Matobo, NKayi and Tsholotsho are most associated with small livestock farming especially goats due to their natural regions which are arid (Homman *et al.,* 2007). Gukurume (2013) discovered that small livestock production is on an increase in Bikita and other dry regions as an adaptation strategy towards the impacts of climate change and sustainable rural livelihoods. Homman *et* al. (2007) argue that goats are kept in most semi-arid regions in Zimbabwe due to their comparative advantage as compared to cattle as they are more drought resistant and feed from a wider variety of plants. Dube *et al*. (2018) note that rural citizens in Zimbabwe have not been passive victims of climate change as they portrayed to be action oriented in the adaptation of climate change variability. Due to the reduction in rain-fed crop farming in arid regions as a result of climate change, it has been observed that livestock production has become the most suitable strategy that protect food security and reduce poverty in rural areas in Zimbabwe. Homman *et al.* (2007) discovered that goats are increasingly used

to augment cash income and enhance food security for rural households in drought prone regions.

Phiri *et al* (2020) discovered that although livestock production in arid regions in Zimbabwe is yet to be endorsed by the government as an agricultural policy, the Livestock Production Department has increased its support for the uptake of livestock rearing. Gukurume (2013) argues that small stock such as goats, indigenous poultry and sheep have become more dominant in rural areas as people are merging the consequences of drought in areas receiving little rainfall. For instance it is evident that goats can survive in drier areas with various terrains as they have varied diet due to their eating habits as grazers and browsers as well as water scarce areas as they can survive for 2 days without drinking water (Phiri et al. 2020). It is noted that goats are more productive as compared to cattle hence they have a high rate of recovery hence the reason they are being adopted to curb the effects of climate change in the rural areas in zimbabwe (Homman *et al*., 2007)

Zimbabwe's National Climate Change Response Strategy (2014) observes that rearing of small drought resistant livestock such as goat has been adapted by vulnerable communities due to the adverse effects of climate change on rural livelihoods. It is argued that the government has influenced the investment in livestock in areas prone to increased dry spells as a measure against harsh weather conditions induced by climate change (Phiri *et al*., 2020). Gukurume (2013) discovered that various adaptation strategies are being taken in the rural areas of Zimbabwe by smallholder farmers as a way of coping against the effects of climate change on their livelihoods. In Matobo District, the rearing of sheep is practiced due to the belief that they protect the homestead against lightning which is another effect of climate change that comes about with lightning and terrifying thunder (Phiri *et al*., 2020).

The rearing of small livestock have been noted to have a couple of benefits to the community. Since rural citizens rely on the agricultural livelihoods as the source of income through the sale of surplus, the availability of small livestock is beneficial especially through the time of drought as they can easily sale or exchange for grain their goats, poultry and sheep for income and slaughter them for food (Phiri *et al*., 2020). Phiri *et al*. (2020) observed in Matobo District that small livestock rearing is taken as an alternative and a good insurance against crop failure for the rural residents as they are resistant to high temperatures and drought as compared to cattle. It is therefore discovered that small livestock rearing is an effective strategy for adapting to climate change and its effect on rural livelihoods.

CASE STUDIES

1. MATOBO DISTRICT

Matobo District is one of the districts in Zimbabwe that has adopted the rearing of small livestock as a measure to mitigate against the effects of climate change. Phiri *et al*. (2020) observes that the rearing of small livestock is a popular climate change adaptation strategy among farmers in Matobo District in Zimbabwe. Goats and sheep rearing has become the center of rural livelihoods in the Matobo District. Farmers in Matobo argue that small livestock are not affected by high temperatures and drought as compared to cattle which collapse and die (Phiri *et al*., 2020). World Vision (2015) discovered that the rearing of small livestock in Matobo District as a measure towards climate change is being pioneered by Khulasizwe (Non-Governmental Organisation) which has already distributed goats to 380 households. Households in this district have embraced goat keeping as their core livelihood with many people with herds over 50 goats (Kwulasizwe File Report 2018). The rearing of goats in the area has been applauded for its output which is said to be two to three times as compared to cattle as goats reproduce a multiple time in a year (Phiri *et al*., 2023). In a study carried out in the district, one of the respondents announced that they started with 5 goats which have Goat farming has been described as a viable livelihood during drought and disaster as they can be easily sold for cash and other food commodities hence the reason why most people opt for goats in Matobo District. Phiri *et al*. (2020) note that small livestock rearing in Matobo is viewed as a good insurance against crop failure as it becomes an alternative for the families with multiple benefits such as meat, milk and manure for gardening. The Matebele goat is commonly reared in the area and is described as a large framed animal weighing between 35 and 50 kg depending on their gender and can give birth to twins and triplets thus making it more economic and sustainable to keep in drought and heat prone areas (Khulasizwe File Report 2018).

Challenges have been noted in rearing other small livestock such as pig whose market and consumption are slim due to religious reasons (Phiri *et al*., 2020). It has been discovered that only 20 percent of the total households in the district rear sheep as an alternative livelihood. It is argued that though sheep are resilience to the impacts of climate change they require more labour and attention as the easily get lost because they can hardly re-track their way back home hence they require someone to look after them throughout the day (Phiri *et al*., 2020). Besides they are easily stolen or attacked by predators as they do not make noise as compared to goats thus the reason why goats have gained more popularity in the district.

2. GWANDA DISTRICT

The effects of climate change have been noted to affect Zimbabwe's rural livelihood production with some areas such as Gwanda being noted among other areas due to the poor rainfall patterns that already exist in the area. Gwanda District is claimed to be one of the hottest and driest regions in Zimbabwe with low and erratic rainfall (Mujaya and Mereki, 2006). It is claimed that rainfall patterns in the district of Gwanda are not adequate to support agricultural activities during the major cropping seasons due to the unpredictable weather patterns (Hove *et al*., 2022). The failure of rainfall has been noted to affect livestock production leading to droughts and the death of animals. Due to long dry spells in the area, people around Pulipeli Village argue that they travel a distance of 5km or even more in search of water for their livestock. It has been discovered that 90 percent of the people in Gwanda practice goat breeding which is their source of meat and milk (Hove *et al*., 2022). Besides the rearing of goats, poultry is another form of small livestock farming done in the district for the purpose of meat, eggs and income. Hove *et al*. (2022) argue that the rearing of goats in Gwanda is much preferred as compared to cattle as their grazing is seasonal and scarcity of feed is experienced in summer and winter thus leading to a higher cost of rearing cattle which needs expensive feed. It is argued that the purchase of feed is unaffordable to most farmers due to its high prices and as well unavailable at local markets. Chitongo (2019) argue that most households in Gwanda South have livelihoods which are heavily dependent on rain fed agriculture making them vulnerable to food insecurity due to the prevailing and anticipated climatic conditions.

3. MUDZI DISTRICT

The rearing of small livestock have become more common in the Mudzi District as recent statistics indicates that small livestock prodution have surpassed the production of cattle (Food and Nutrion Council 2022). Farmers in Mudzi have adopted small livestock production as a strategy to adapt from the effects of climate change whih affect crop prodution and large livestock such as cattle. Food and Nutrion Council (FNC) (2022) note that sheep, goats, pigs and poultry are the most common forms of small livestock prodution being done in Mudzi Distrit and an increase in production is noted as compared to the 2016 statistics. Due to the effects of climate change, water shortages is one of the most common challenge faced by livestock producers in Mudzi District that leads to large trekking distance which leads to water stress and death of livestok especcially attle hence the reson for shifting to small livestock which require less water as compared to cattle (FNC 2022).

Table 22: Livestock Populations

Ward	Cattle	Sheep	Goats	Pigs	Donkeys	Poultry
2016 data	75953	7767	36213	3950	740	104967
2021						
1	2253	143	2503		0	6509
2	7921	1720	10728		407	10637
3	11990	1567	16927		0	27506
4	9538	6064	11370		0	14654
5	8488	1367	15225		164	11336
6	5338	0	8541		0	10677
7	5980	0	6990		0	10407
8	4542	522	6271		0	15034
9	5750	392	12372		87	11545
10	6614	779	8528		0	9676
11	6238	480	6628		0	10972
12	8266	209	8906		0	16053
13	4711	44	4432		104	8201
14	6720	0	8467		403	8870
15	10921	84	13633		0	13413
16	3561	0	9200		0	8479
17	3597	0	5555		0	8273
18	7493	126	6669		52	12127
Totals	**119 921**	**13497**	**162 945**	**5221**	**1217**	**203692**

Figure 1: *Livestock distribution in Mudzi District* (Food and Nutrition Council, 2022)

DISCUSSION

Phiri *et al*. (2020) assert that despite the comparative advantage of small livestock in adapting to climate change over cattle, their production is beset by subtle challenges that threaten its viability and effectiveness. It is argued that though small livestock rearing has become the main strategy to curb the effects of climate change in rural areas, extreme temperatures, severe water scarcity and reduced fodder for the livestock resulting in poor production (Munhande *et al*., 2013).

Phiri *et al.* (2020) argue that though the adaptation of small livestock is significant for the mitigation against climate change effects, the farmers in Zimbabwe are not aware of the various breed of goats for instance which has an implication on the effectives of their adaptation as various breeds respond differently to different locations. Despite the adaptation ability of small livestock, farmer are finding challenges in keeping them as they get affected by various diseases that they fail to predict what they are due to lack of knowledge on various diseases and their symptoms in goats, sheep and chicks. This is supported by Phiri *et al*. (2020) who argue that though the farmers received training from the Veterinary Department, they still fail to identify and

state the diseases affecting their animals making it difficult for them to treat them with the right medicine due to their lack of disease knowledge. Besides the medicine are not available locally hence the farmers need to travel to towns to acquire them which are far distanced from their rural places thus the inaccessibility of the medicine is a great challenge in the rearing of small livestock in rural areas of Zimbabwe.

Though goats and sheep have been discovered to adapt and rely in dry regions, it can be argued that the scarcity of water is a major challenge that affect production. Phiri *et al*. (2020) is of the view that high mortality rates are being experienced in sheep and goats due to the drinking of stagnant water. Although small livestock rearing has proved to be an effective strategy for rural livelihoods to be sustainable, it can be argued that there are challenges faced by rural households in rearing these stocks. Phiri *et al*. (2020) argue that small livestock like sheep are hard to rear as they can easily get lost due to their inability to re-track their way thus requiring more labour and exposing them to predictors and as well, they cannot make noise hence they are easily devoured without the owner noticing. Phiri *et al*. (2020) further posit that goats are destructive animals with the capacity of causing reduced or loss of tree regeneration thus leading to deforestation. There is less support from various institutions to farmers thus leading to the unsustainable livelihoods. Phiri et al. (2020) note that the Veterinary are incapacitated and do not have enough resources to educate and supervise the rearing of small livestock in various rural areas hence leading to several challenges being faced by farmers which they are unable to solve themselves causing the loss of their livestock.

CONCLUSION AND RECOMMENDATIONS

In conclusion it can be argued that small livestock rearing has proved to be an effective and viable strategy for the rural areas as a measure towards climate change adaptation. The study recommends water harvesting as a solution for water depletion for the livestock. The study proposed the investment in rainwater harvesting technologies as a way of collecting, storing and conserving water for the use in dry seasons.

The study proposes that farmers need to be educated on various goats breeds and other breeds of poultry for them to know and choice the correct breeds that easily adapt in their areas.

The study also proposes the education and training of farmers on different diseases affecting their livestock and how to treat each of them for the sustainability of their livelihoods.

The study recommends that the government should give support to rural farmers through various parastatals and ministries that deals with livestock such as the Ministry of Agriculture and Veterinary departments. Government support should be in terms of financial aid, policies, training and medications required for these livelihoods. Government should ensure that the required resources are available for the farmers and are accessible in their respective rural areas to curb the loss of livestock due to unavailability of various resources such as information pertaining diseases and the required medicines.

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Psycho-social Factors Influencing Effective Collaboration of Stakeholders in Community-based Projects: Lessons from Scope-Zimbabwe

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Abstract

Community-based projects are instrumental in achieving desirable economic changes in communities. To ensure effectiveness of community-based projects, a trans-disciplinary (TD) approach is preferred since it promotes active engagement that produces collaborative knowledge generation and engenders multiple lens of interpretation and analysis. One area where community-based projects are plausible is in projects for sustainable use of the environment. Considering the consequences of global warming and climate change, Scope-Zimbabwe, a local Non-Governmental Organisation (NGO) in Zimbabwe, embarked on a project called Seeding Local Cultures (SLC). The project was aimed at generating knowledge on how to effectively implement community involvement and inclusive participation in the implementation of permaculture through their local schools and colleges. This study focuses on a writer's workshop that was held to design a facilitator's manual and student handbook to be used to implement SLC. The motivation of this study was identifying the psycho-social dynamics that were at play in the workshop that affected collaboration of the various stakeholders. A case study approach was utilised in this study since it affords an in-depth insight of a phenomena of interest. A TD approach informed the type of collaboration expected where engagements needed to transcend disciplinary boundaries in the creation of knowledge. Observations and focus group discussions were used for data collection. Braun and Clarke's (2006) thematic analysis framework was utilised for data analysis. Themes identified included; community engagement impact processes and methods to be used; attitudes, knowledge, beliefs and motivation; attitudes, motivation and resource mobilisation and use; and skills needs for effective community project management The study concluded that a systems analysis of the processes involved with permaculture projects to ensure deep understanding of various stakeholders' needs, values and roles and knowledge and awareness of technical guidelines to be used for

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permaculture and indigenous knowledge systems Community engagement was found to be crucial in effective management of the SLC project. Effective resource mobilisation to eliminate the donor syndrome that threatens the longevity of community projects was also identified. Effective communication among the various stakeholders was found to be key in effective resolution of conflicts.

Keywords: *trans-disciplinary research, resilience, sustainability, community engagement, systems design, innovation.*

INTRODUCTION

Community-based projects involving NGOs are effective in tackling social and developmental problems in communities. Their effectiveness is partly defined by their durability and sustainability, yet their continued existence is threatened after the NGOs withdraw their aid (Banda et al., 2023). Projects are viewed as an ecological system comprising complex and multiple interlinking subsystems (Naderpajouh *et al*., 2020). This makes them a complex entity to understand. Matunhu *et al*. (2022) explain that community-based projects usually involve various stakeholders from different disciplines with varying needs, motivations and values, to the extent of threatening viability of the projects. The continued collaboration of these various stakeholders is one factor that governs sustainability and durability of the projects.

In the face of drastic climatic change, arid and semi-arid regions may face prolonged droughts and floods that threaten the livelihoods and sustainability of community members. Zimbabwe has been no exception. The majority of Zimbabweans live in the communal lands, and they depend on agriculture for survival (Phiri et al., 2019). Seventy percent of Zimbabwe's communal lands are located in the dry climatic spatialities constitutive of regions four and five (Mukarumbwa and Mushunje, 2010) thus making the majority of Zimbabweans vulnerable to the risks associated with climatic change. With this in mind, Scope-Zimbabwe, a local NGO that promotes the use of permaculture came up with a project (SLC) involving schools in various climatic regions in Zimbabwe, including the low-veld, to promote community involvement in sustainable use of their environment. The schools were to serve as centres for knowledge and resources to sustain and promote the use of permaculture by the communities that surround them.

How individuals that represent the various interests of the stakeholders interact may be the lifeline of the projects. One area of interaction involves generation of knowledge and systems that are used in the community projects. Various

methods of generating knowledge that govern how community-based projects have been identified as interdisciplinary approaches, participatory research and trans-disciplinary approaches underpins this study (Andrén, 2010). All these methods involve collaboration of various stakeholders and are unique in conceptual frameworks that govern them.

This paper will focus on the trans-disciplinary approach and the psycho-social factors that affect effective collaboration, particularly in a workshop that was carried out as part of a community-based project by Scope-Zimbabwe. Individuals although they represent organisations or institutions that are unfeeling, they themselves possess cognitions and emotions that may inform their behaviour and perceptions of proceedings. A trans-disciplinary approach was preferred because it is found to be a promising approach generating social knowledge involving sustainable land-use and addressing complex and multifaceted "real-world problems", involving not only academics, but also knowledgeable communities (Zscheischler *et al*., 2017).

The Government of Zimbabwe has introduced a paradigm shift in the education sector where emphasis is on heritage-based education, innovation and participation of the student actively, in knowledge generation, rather than being a passive recipient of knowledge in the classroom (Zimbabwe Institute of Permaculture (Scope-Zimbabwe), 2021). This is part of the National Development Goals informed by the strategic development blueprint encapsulated in Vision 2030 whose end is to foster an Empowered and Prosperous Middle Income Economy Society by 2030 (NATIONAL DEVELOPMENT STRATEGY 1 16 NOVEMBER 2020 "Towards a Prosperous & Empowered Upper Middle Income Society by 2030" January 2021 – December 2025). The blueprint is in tandem with the international Sustainable Development Goals 14 (life on land) and 4 (quality education) (Ministry of Finance and Economic Development, 2020).

Given that community-based projects involve various stakeholders, community active participation informs projects of the values and the needs of the communities thus ensuring that disruptive and unnecessary competitions that may arise among various stakeholders are eliminated (Manyena, 2006). Ensuring communities have resilience amplifies adaptive capabilities since an adaptive buffer is created that allows individuals to deal with immediate shocks that present as threats to instant survival of communities (Twomlow *et al*., 2008). Building resilience in communities must ensure sufficient access to food supplies thus ensuring food security (Mwangi and Ostrom, 2009). In this

light, crop production was identified as an important feature of ensuring community resilience (Mukarumbwa and Mushunje, 2010).

Traditional methods of relating to the environment have been found to be more efficient, accessible and sustainable in preserving the environment as compared to the modern ways (Lepofsky, 2009). Previous studies propose that indigenous technical knowledge (ITK) remains key in accumulation of information that is useful in the maintenance and development of sustainable socio-ecological systems (Sow and Ranjan, 2021). ITK is a component of the indigenous knowledge systems (IKS) that are instrumental in informing communities of their role in the holistic complex system of sustainable coexistence with the natural environment (Reitsma *et al*., 2019).

Many now attempt to harness these indigenous knowledge systems in implementing community-based projects including Scope-Zimbabwe. Since there is a need to harness the gains from collaboration, evidence shows a trans-disciplinary approach has the potential to increase stakeholder decision making contributions, since they have implementable knowledge; the capacity to accommodate complex demands of the various stakeholders and conflict resolution (Zscheischler *et al*., 2017). Effective collaboration has been identified as key determinant in successful implementation of projects. The purpose of this treatise is horn in on the important writers' workshop, a key process in the SLC project, to identify psycho-social determinants of effective collaboration.

CONCEPTUAL FRAMEWORK

Sustainability is broadly defined as whether or not an object or concept or approach continues working overtime (Ceptureanu *et al*., 2018). For a sustainable socio-ecological system to develop, the issue of resilience must be addressed. Resilience is a complex concept that has been found to be closely related to the sustainability. Resilience entails individuals, communities or the nation are endowed with the capabilities to survive short- and medium-term shocks as people are planning for their long-term adjustments that give rise to sustainability (Boyd *et al*., 2013). It is important to have the communities participate to have measures that are acceptable and suitable for different contexts from individual levels. Trans-disciplinarity research principles inform the conceptual framework of this paper. Given community-based project thrive due to being informed by the communities that need and use them, trans-disciplinarity informs that knowledge is generated from various academic and non-academic disciplines and stakeholders (Andrén, 2010). This serves as a bridge that connects science and the real world. Andrén (2010) clarifies that

trans-disciplinary research involves three types of knowledge namely systems, target and transformation knowledge.

Systems knowledge comprises knowledge on the origins and development of the research problem and how the "life-world" interprets it. Target knowledge informs of the knowledge of the needs for change, what goals are desired and how they can be achieved. Transformation knowledge is a type of technical, social, legal, cultural and other methods of hanging existing pathways of action to conform to the desired directions. In the production of knowledge in the writers' workshop that this paper focuses on, understanding how the participants interact to inform these three types of knowledge, elucidate the importance of understanding psycho-social factors that buffer or encourage continued engagement and harmony in the various needs, values and goals of the different entities that the individuals represent.

LITERATURE REVIEW

Community-based programmes are social intercessions that lead to social practices targeted at changing the behaviours of individuals and the social and institutional structures (Ceptureanu *et al*., 2018). There are different stages that community-based projects go through. These stages comprise, *inter alia*, situational analysis, stakeholder analysis, participatory assessment and planning (United Nations High Commissioner for Refugees (UNHCR), 2008). Involving adequately trained personnel assist in ensuring the longevity of the program (Ceptureanu *et al*., 2018). Communities and cultures are constantly changing meaning problems are created while also creating opportunities to learn new things.

Fours aspects are essential in community development namely knowing and understanding the needs of the community members, control of the members of the community that become active participants in the projects, fostering and nurturing self-help and having a holistic view of communities and how members relate (Federal Reserve Bank of St. Louis, n.d). Projects for the community must be informed by the community members from the onset. Having a community project implies the acceptance and involvement of the community members and the success of the projects depends on the community members (Ceptureanu *et al*., 2018).

Ceptureanu *et al*. (2018) also found that community involvement determines how quickly or easily the project can be established and how easily it may consolidate resources needed for its success. The community-based approach to conservation aims to include communities in the decision-making processes,

management and use of resources followed by equitable sharing of the benefits that result from the resource use (Zyambo, 2018).

Milupi *et al*. (2017) propose the use of various principles that include meeting basic needs of the community, giving control of resources to the local communities, ensuring communities benefit from their local resources, and obtaining commitment from local institutions in how the resources are managed. This means priorities of the project need to match those of the community (UNHCR, 2008). The goals of the project need to align with goals of the community (Malupi *et al*., 2017; UNHCR, 2008). It must be noted however, that the environment, the communities and their demands are not static. Responding to the changing environment improves the adaptability of the project to the changing circumstances thereby improving the chances of having a sustainable project with lasting results (Ceptureanu *et al*., 2018).

Successful community projects are sustainable because they are participatory and inclusive in orientation. Five core principles that guide the success of community development projects are; community engagement, leadership, collaboration, evaluation and adaptability (Federal Reserve Bank of St. Louis, n.d). For projects to be successful, management capabilities are required, and these include securing local resources and making sure communities are familiar with the project (Ceptureanu *et al*., 2018). Projects need to have inherent mechanisms that manage change across time. With the elements of empowerment of communities and public participation, conflicts arise and the need to have clear paths of conflict resolution will ensure continued existence of the project (Malupi *et al*., 2017). A competent leader brings consistency to the processes of the program, improves networking, and partnerships, while reducing duplication of efforts.

Formal and informal leaders need to be identified before the onset of the project (UNHCR, 2008). Ownership of the project improves if project champions are identified and the project is embedded in the program in the existing community structure (Ceptureanu *et al*., 2018) Selecting these leaders may help develop an acceptable level of trust between the program implementers and the communities. Proper rules and boundaries then need to be set and clear engagement and communication to foster a transparent relationship.

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Needs of the community members from individual level need to be considered to ensure there is adequate motivation to participate in long term sustainable measures. Communities are diverse thus a need to understand, acknowledge

and incorporate community members' norms beliefs and values (Ceptureanu *et al*., 2018). Ceptureanu *et al*. (2018) explain that failure to adequately consider socio-cultural identity as informed by the norms, beliefs and values of the community may hinder development of trust that may result in ultimate rejection of the project. Community-based interventions usually do not have immediate and quick impact thus are usually viewed as time consuming (UNHCR, 2008). Immediate needs of individuals within the communities must be identified and addressed to ensure members stay resolute in attaining the sustainable goals (Manyena, 2006; Mwangi and Ostrom, 2009).

In addition to ensuring community-based resources are adequately harnessed and used, specialists also provide technical knowledge based on scientific research that could inform efficient use of resources. For Scope-Zimbabwe, the integrated Land-Use Design (ILUD) is an effective tool they depend on in their permaculture projects. As a tool used in Scope-Zimbabwe projects, ILUD ensures successful and uniform implementation of their projects, addresses these five principles (Nyika, 1998). ILUD process comprises five steps namely grounding, situational analysis, visioning, integral design and implementation and monitoring.

Grounding connects the school and the community to nature, the community culture and their past. Any community-based project uses the community's cultural identity for it to be sustainable (Ceptureanu *et al*., 2018). Situational analysis identifies resources and limitations in the community to give a better understanding of the current situation. Visioning maps the current way of thinking to the future thinking process allowing the stakeholders to come up with future goals that cover four dimensions that are ecology, social aspects, culture and economy. Integral design informs on the design skills necessary to redesign the environment to meet stakeholder needs. Implementation and evaluation helps develop work plans needed to monitor and evaluate the new designs implemented.

The TD approach creates various pathways that allow for the provision of various factors that ensure continued and effective existence of the community-based projects. Effective communication, creativity and innovation are key aspects that inform a TD approach (Andrén, 2010). To enable the stakeholders to reach high levels of intellectual integration, 'cognitive flexibility' is required. This involves an open-minded approach and the courage to embrace varied opinions of other stakeholders. It involves tolerance and respect for diverging perspectives and a continued commitment to learn despite contrasting values and differences in opinion. Community

context is described as knowledge of the contextual factors that affect the community including the relationships with other institutions like the governments, their social statues and inequalities and community problems (Ceptureanu *et al*., 2018). Improved communication between the communities and various stakeholders were found to benefit farming communities (Boyd *et al*., 2013). Collaborations with specialists in climate, social scientists, communities and various stakeholders remains key in bringing about food security (Matunhu *et al*., 2022).

Community-based projects are effective in that they enable the deliverance of effective and sustainable solutions instead of supplying quick fixes that are marred with future problems (UNHCR, 2008). Community-based natural resource management (CBNRM) for instance aimed to provide conditions where the community members benefit from how wildlife resources are used and managed through a bottom-up participatory approach (Milupi et al., 2017). This is contrasted to the scenario where resource management is centralized and decisions are made top down, giving limited to no consideration of the community needs (Gruber, 2010).

Four challenges were identified as the main hindrances that limit the success of community-based conservation programmes. These are the inability to sustain livelihood, poor land and resources tenure, weak institutions in the community and poor governance. The challenges were found to weaken the decision-making processes that have a barrier on equitable benefit to the members (Zyambo, 2018). Zyambo (2018) explains that projects must have the objective of conservation and enhancing local community livelihood.

BACKGROUND INFORMATION AND OVERVIEW OF THE WORKSHOP

Scope-Zimbabwe is an organisation established in 1994 that helps schools redesign their land use to achieve sustainable resource use. Scope carries out various projects with schools and their communities aimed at improving nutrition, creating a learning environment for children that fosters innovation and exploration through experience. Scope methods work to improve the connection of schools with their local communities through participatory action projects. The schools are intended to be models of sustainable living practices.

Scope works closely with the Ministry of Primary and Secondary Education as it aims to influence the implementation and development of syllabi that are used in primary and secondary schools and in colleges. The workshop that was

help from 27 to 29 September was part of the Seeding local cultures project. The project is based on the idea that indigenous knowledge systems need to be reintroduced as effective methods of managing the environment while incorporating modern technology. Pilot schools and various stakeholders including the University of Zimbabwe, Great Zimbabwe University, AGRITEX and the Ministry of Primary and Secondary Education participated.

Three of the pilot study schools presented their projects to the workshop participants. All were from natural farming region four. The schools outlined their successes and challenges in implementing and sustaining their permaculture community-based projects. Various presentations were made in the first day of the workshop to provide information on the purpose of the workshop as part of the SLC project. Focus groups were then carried out on the second day with the aim of formulating information to include in the instructors manuals and the student workbooks.

RESEARCH METHODOLOGY

A qualitative methodology in the form of a case study was adopted for this study since the SLC project provided an opportunity to gain insight on a TD approach in knowledge creating for a community-based initiative. The involvement of various individuals from different disciplines at the writers' workshop provide a unique opportunity to learn about psychosocial factors influencing collaboration both based on the participants' experiences in their various community projects and at the workshop as their shared knowledge and experiences to inform the creation of the manual and workbooks for the SLC project (Adams et al., 2007). This study was done in its naturalistic setting and was a unique process in the project's proceedings making a case study approach suitable (Leavy, 2017).

Case studies can incorporate principles of TD and also allow the researcher to be a participant in the production of knowledge, not as an expert. TD informs that research must be problem and solution oriented research in the real world, not necessarily methodology oriented (Andrén, 2010). Andrén (2010) clarifies the researcher's need to be reflexive and have deep understanding that they are not in a position of privileged knowledge. A qualitative approach is ideal because the need is to understand and describe a particular phenomenon, not to manipulate, control or predict it, or even for the purpose of generalizing the data (Bryman, 2012).

Participants in this study included various stakeholders, utilising a trans-disciplinary approach in selecting various members from different relevant

sectors including the government as policy makers, researchers, community leaders in the form of community school facilitators, specialists in Permaculture and the NGO members.

Discussions in the workshop took on the form of a focused group discussions where participants of the workshop discussed the Scope projects under the minimal guidance of the facilitator (Leavy, 2017). Three focus group discussions were done. Participants in the focus groups were assigned to accommodate some representation of each stakeholder. Each group was given a topic of discussion. The three topics were

1. processes and methods to be used
2. resources mobilisation and use
3. productivity management

The participants were to review progress of the projects in their various communities and to draw lessons from there and the current workshop. This knowledge was to guide the construction of the facilitator's guide and the students' handbooks. The groups then provided feedback to all the whole workshop delegates.

The sessions were recorded and later transcribed. Participants were asked to state their pseudonyms before they contributed anything to enable participant identification. Thematic analysis was used to analyse the data. Braun and Clarke (2006) thematic analysis framework was utilised for data analysis (Maguire and Delahunt, 2017) since it flexible and not tied to any particular epistemological or theoretical perspectives. Braun and Clarke's (2006) framework comprises six steps (familiarity with data, initial code generation, theme searched, theme reviews and finally doing write up. Analysis is done manually using Microsoft word by utilising the copy and paste and colour functions for coding of data and eventual development of these (Leavy, 2017).

RESULTS

Participants in this study included all 28 members that attended the writers' workshop. A trans-disciplinary approach was utilised in selecting various members from different relevant sectors. In terms of demographics, there were 9 females and 19 males. Representatives from the government included 4 from the Ministry of Primary and Secondary Education, curriculum development department and 1 from Agriculture Research and Extension Services (AGRITEX); 6 research participants for the project were from the University of Zimbabwe and Great Zimbabwe University; 5 Secondary and High school and 5 Primary School facilitators represented the schools from Harare,

Masvingo and Matabeleland provinces; 1 participant from a technical college; 1 participant was a Permaculture consultant and 5 member of Scope Zimbabwe (NGO).

The participants clarified first, the aims and objectives of the SLC project before proceeding to form focus groups. Themes identified included; community engagement, knowledge and awareness among stakeholders combining indigenous knowledge systems and modern technology, attitudes, knowledge and beliefs fostering internal motivation and complex relationship of needs values and roles. Various themes arose from the discussions as indicated in the forthcoming paragraphs.

COMMUNITY ENGAGEMENT IMPACT PROCESSES AND METHODS TO BE USED

In focus group 1, the participants focused on growing of fruit trees and vegetables that were demanded in the community. Disagreements mainly arose as different individuals suggested what they believed the most viable fruit option would be. One participant then pointed out the possibility that a consensus would not be arrived at since people were from different climatic regions and areas. Some fruits may be viable in one area and not the other. Bananas were being successful in natural farming regions 2 and 3, yet not performing well in the drier region, region 4. One school in region 4 attempted to grow bananas but did not succeed due to water supply problems.

Participants identified involvement of teachers, learners, and community members and other critical stakeholders as a source of labour and resources. The process of recruitment could not be agreed on by the participants as various barriers were suggested. Participants highlighted that each individual needed to gain knowledge on permaculture processes hence the need for training. No agreements could be reached on methods on how indigenous knowledge systems could be harnessed as participants noted involvement of the community members proved difficult most of the time since they believed they needed to benefit from donor funding. The community members came in numbers to initial meetings, but after learning that they were required to provide some resources, they withdrew from participation. Others argued that prescribing a process was equivalent to dictating what communities needed to do and this reduced a sense of ownership of the project from the communities.

ATTITUDES, KNOWLEDGE, BELIEFS AND MOTIVATION

Attitudes, awareness, in-depth knowledge of processes and procedures, and individual motivation were found as key determinants in the stakeholders that affected acceptance and usefulness of recommended processes. These

variables were found to be interlinked in a complex manner. Effective and assertive communication was found to be the most instrumental factor that could elucidate these individual attributes to inform running of the projects.

ATTITUDES, MOTIVATION AND RESOURCE MOBILISATION AND USE

Focus group 2 aimed to discuss resource mobilisation and optimal use of resources. They reviewed one project from a participant school that was producing guava and baobab juice as trained by Scope-Zimbabwe in previous projects. The guavas were sourced from a schoolteacher's rural areas (Scope-Zimbabwe focal person). The same teacher donated USD 10 to buy the baobab fruit to make the juice. Effective stakeholder engagement was seen as crucial in fruitful resource management. The focus group lamented limited support from the NGO for resources. Communities engaged dropped out of the project after realizing there was not much donor funding coming, and that they would be expected to contribute resources.

One participant agreed with the sentiments of the community citing that the donor of the USD 10 was unique since most in Zimbabwe are struggling and they would rather partake in projects that add value to their way of living and livelihood. They highlighted the need to understand the context that every prospective participant of the project is operating in since Zimbabwe's economy is not stable.

Student mobilisation was also a challenge since the students also needed to have products that they could take home after hard work. The students were also seen to view manual work as punishment following observations that most schools in Zimbabwe use manual labour as a form of punishment. The lesson plans also did not accommodate students that wanted to participate in the projects due to class times and at times hot sitting arrangements. Some teachers resisted releasing the students since there was no benefit for them. One participant lamented poor relations with the school administration who discouraged project participation both in students and the teachers since they did not understand the project or even the value of the project. Children were also unavailable for the option to come during the holiday or over weekends, resulting in long dry spells that killed plants in the garden. Teachers were using these weekends and holidays to make extra income to subsidy their low salaries.

Resource mobilisation problems identified included the inability to raise adequate funds, water supply and the lack of cohesion between school administrations and project committees. One participant highlighted the need

to seek alternative sources of funds rather than depend on schools' authorities. Resource mobilisation depended on effective stakeholder engagement. Waste management was a topical issue of discussion as participants debated on how to manage and reuse the waste materials from their farming projects in a manner that was sustainable to the environment.

Generally, there were good relations between the host schools and Scope. Field officers usually visited the schools to evaluate the projects and to offer technical advice. Scope also provided some material assistance to the schools in the form of seedlings and fences among others. Participants also reported a fruitful relationship with the AGRITEX officers, especially in region 4 schools. One school reported having good relations between the school administration and the project committee since they sent 2 members, a teacher and a community member to a fellow school that was doing the Scope project to learn from them and to also get seedlings for bananas.

Some schools testified of successes in engaging additional sources for resources that were not the school, the teachers, the students or the NGO. One school also reported the forestry commission donated 50 fruit trees that were successfully planted and were being maintained. One school reported having planted 16 banana trees to make use of the runoff water from the classroom roofs and these were sourced from the community at no cost. The school also grew, and harvested beans donated by AGRITEX officer got 5 5l gallons in harvest. This increased the interest of the local communities when they saw the development close to our administration area. The same school indicated that 5 ladies from the community are doing gardening using Scope guidelines. These same ladies can serve as a source of labour for the school whenever required.

AWARENESS CAMPAIGNS

Two schools exhibited innovation in methods of increasing community engagement and awareness of the projects. One used workshops at the school. The community members also attend workshops including nutrition workshops. They are currently preparing to go to Victoria Falls and packing their herbs to sell and exhibit there. These successes in community engagement were a result of the school managing to align the non-formal area of education into the Scope project.

One school, on 20 June 2022, hosted the World Environmental Day that saw the attendance of 1181 people. They also hosted visitors from other schools that wanted to learn about the permaculture project. Community shows like

this were suggested to be one effective way to give feedback to the communities on the projects and their successes.

SKILLS NEEDS FOR EFFECTIVE COMMUNITY PROJECT MANAGEMENT

Focus group 3 focused on ascertaining what was happening in the various project communities in terms of project management, monitoring and evaluation. All schools indicated a failure to have proper record keeping. It was found that school administrations handled the finances but the authorities did not reveal how much money was spent buying the inputs and how much was then received as proceed from the project since the school administration is responsible for selling the produce from the project.

The participants decided to prescribe production processes that may result in success. The participants agreed it was prudent for the projects to start small. This followed testimonies of projects that started off with many beds and products that ended up wilting from limited water supply and could not be tended to due to scarcity in labour.

Technical knowledge of what to grow, how to grow it and where to obtain the resources needed to grow the stuff at reasonable prices were noted as basics that individuals needed to be aware of. Members and the communities in which the projects were done were not fully aware of the recommended ILUD process designed by Scope Zimbabwe. This was because people trained in it earlier had left the communities and the projects, leaving new members that were naive of permaculture processes. Brain drain was noted as a major threat to productivity.

Schools got assistance from the schools in the form of start-up money and some schools partook in broiler projects. All schools had limited mortality rates in broiler projects. The group explored the possible cause and found that it may be because almost all stakeholders in the project agreed at the viability of the broiler project in that it gave a quick turnaround of funds and everyone benefited from the income.

Poor yields were found to be a result of the limited water supplies that most schools were facing. Schools also lamented lack of a viable and stable markets for their produce. One school testified of failing to find a market for their lettuce at harvest time. The focus group interjected to propose a prior process of planning for production and marketing. A market survey was suggested before production to ensure produce is the preferred product. A test run may be advisable to gauge the market response to the products.

Documentation of lessons learnt from the projects was encouraged as part of institutional memory. One school reported they planted crops that did not perform well in the winter seasons as they were more of summer crops. The school also reported they had a daily output of about 5 20l buckets from their water source that needed to sustain their 35 beds of vegetables. Power outages that affect the pumping of water. Financial constraints most students are on beam and some children for teachers' payment delays from government. One participant echoed the sentiment that problems are opportunities if viewed from a productive angle, and failures serve as viable lessons that strengthen sustainability and viability of the projects. The participant informed that problems were inevitable in a project implementation, but solutions needed to come from the same problems.

One school gave an example of how their committee made an annual plan for their projects. The committee laid down plans of what needed to be done. Committee decided to have seeds for vegetables, buy broilers for quick cash to then buy the runners. Thought of planting bananas in the school yard and fruit trees in the orchard and school yard. Planned to have a fowl run that was independent from the one for agriculture fowl run that was there.

The participants agreed the project implementers must not isolate the project by calling it a scope project that requires separate provisions and resources from already existing structures in the school for instance Agriculture. This labelling may hinder community ownership of the project as the label brands it a Scope project. Scope committee must be all inclusive to include school administration and community members. In addition, Communication with the administration is key to outlay the boundaries and roles that each part plays. There is need to device ways on how to engage new heads and new member of the community and how to get them on board.

Other areas of agreement included the need to have community involvement in the projects from planning stage to implementation in order to foster ownership of the project. Engaging peer leaders has an impact in getting other children involved in the project. However, one participant wondered how open schools are to community participation. Issues mentioned included the fact that schools were a protected area and opening the schools to community members may open the schools to unruly members of the community. Security measures needed re-evaluation to accommodate this community inclusion.

Water management was another crucial area that was mentioned. It was highlighted that effective water management did not only involve how to

efficiently take out and use water, but there was also a need to focus on the need to put water back into the ground. So far, all participants were focused on water extraction.

INDIGENOUS KNOWLEDGE SYSTEMS AND MODERN PROCESSES

Participants also noted individuals had a way that they normally carried out their farming processes yet Scope had a set of guidelines that they needed the participants trained on. A decision could not be readily made as candidates identified readily available resources in the communities and barriers available to ensure efficient use of available resources and possible generation of mitigatory factors. These projects were aimed at improving schools and community nutrition and revenue generation. Participants highlighted the manual may not be effectively used as its use may be viewed as a creation of extra work for the teachers that already feel swamped. One participant then indicated how on the contrary the manual could lighten the burden of work since there is the concept of continuous academic learner's assessments. Training may serve as a necessity on how the manual can be used in lesson planning for the teachers.

The ILUD process was suggested but it was discovered that most participants were not fully aware nor were they trained on the technical process. There was a need for training for the communities to effectively use permaculture in their regions. One participant highlighted the need to tap into the indigenous knowledge from the communities where the projects were being done so that this knowledge informs the ILUD process.

One school testified on the effective utility of the Zunde raMambo style in their project. The project involved students bringing in tree seedlings from home for different fruits and vegetables. The children also brought some water from home to water the gardens in 2l or 5l containers. After produce was ready, the students harvested and took the produce home. The school also distributed to the students avocados that they were already growing at the school. Another school ensured the community benefited by buying the output produced in the programmes from the community project heads. Another school testified to reducing input costs in improving nutrition of the soil. They professed they managed to create different permaculture zones, that carried various plants that were benefiting from their ecosystem. They also got manure from the chickens and rabbits they were keeping. The school enjoyed harvests in a variety of vegetables and have a fish pond construction that is half way through. The school also has a beehive project had its first harvest in 2022.

DISCUSSION

The trans-disciplinary approach informs of how effectively various stakeholders can collaborate in an inclusive and participatory manner for effective knowledge generation and management of projects. Scope-Zimbabwe's SLC project gives an illustration that various stakeholders need to be engaged, to interact and to effectively communicate to foster sustainability of community-based projects. Transformation knowledge, as a principle of TD research informs on the type of technical, social, legal, cultural and other methods' interaction to provide a viable existing pathway of action that satisfies the various stakeholders to ensure trans-disciplinary interaction. The writers' workshop involved policy makers, technical support teams, researchers and community leaders that were to spearhead the SLC project.

The workshop provided an opportunity to share ideas from these various expects to elucidate the contextual concerns and how each stakeholder's needs and concerns could be effectively addressed. All participants were equal and each voice was important as it informed the creation of a technical manual that would be used in implementing the SLC project. Identifying community leaders and project champions is necessary to prolong the life of a project (Ceptureanu *et al*., 2018). One school out of the three boasted of continued community engagement and consented efforts in resource mobilisation because the project team managed to identify community members that were dedicated and motivated to see the projects succeed.

Understanding how the principle of systems knowledge informs this study clarifies factors that affect effective engagement in community-based projects. Systems knowledge clarifies whether or not individuals understand the root problems that give rise to a need to generate knowledge (Andrén, 2010). In this case, all stakeholder were aware of the need to foster the acceptance and use of SLC as a community-based project that promoted permaculture in communities using schools and colleges as the hub of production and knowledge generation. Community involvement was found to be key at all processes from planning of the project to the monitoring and evaluation stage (Ceptureanu *et al*., 2018). Participants noted however, that lack of knowledge and awareness of technical processes would hinder the project. And technical processes to be accepted and used needed the stakeholders to consider contextual impact of processes and the community knowledge that would be informed by the indigenous knowledge systems. This in line with previous studies that inform that ITK remains key in accumulation of information that is useful in the maintenance and development of sustainable socio-ecological systems (Sow and Ranjan, 2021). Blending of ITK and modern technologies is

therefore instrumental through training and effective community engagement. Here the ILUD process helps in identifying and collaborating community values and norms with those of the project.

Systems knowledge also comprises knowledge on the origins and development of the research problem and how the "life-world" interprets it (Andrén, 2010). The study indicated that all systems are interlinked in a complex manner and effective community engagement would help clarify the various needs from the various stakeholders, hence the need for collaborative knowledge production. In the grounding process of ILUD, the individuals in the community are supposed to be made aware of who they are and what they stand for as members of the ecosystem. This grounding concept may not have been fully implemented by some of the schools that testified where communities and other stakeholders within the schools were not willing to be active participants of the projects. Community project leaders and implementers need to explore the values of the community and understand them. Values of stakeholders determine norms and attitudes that then influence behaviours and thinking processes of individuals. The aim may therefore be mutually coming up with values of the communities, individuals and the project that are not in conflict to ensure by-in of the projects. The long-term goal remains sustainable use of the environment, however, the immediate needs of the individuals who then drive towards attaining sustainability need to be catered for.

Interpretation of community-based projects clarifies how the real world interprets the projects and the research problem, thus requiring the need for effective community engagement. Community engagement as a key process was essential in increasing awareness of the projects in the communities and in the schools (Nyika, 1998). Needs of the communities and the projects were aligned in some schools that achieved voluntary participation in community members. Hindrances to successful community-based programmes include the inability of projects from sustaining immediate livelihood (Zyambo, 2018). One school testified that the salient needs of the community members were identified where they as the school provided the land and the technical knowledge while allowing the community to sell their produce without demanding anything in return (Federal Reserve Bank of St. Louis, n.d).

Self-help was fostered in two schools that gave testimony and self-help was identified as a key component in the success of community development projects (Federal Reserve Bank of St. Louis, n.d). One facilitator testified that he donated some money to buy inputs for making the baobab juice, the same facilitator at times donated his vehicle to ferry goods to the market and

sourced guavas to make guava juice at the school. This stakeholder may have interpreted the resource mobilisation problem from a self-help perspective. However, most participants indicated community-based projects in their areas faced a challenge after the community member realised they needed to contribute resources and not much donor funding was available. This informs community-based projects of the dangers of the donor syndrome that arises in community-based projects, which serves as a huge threat to sustainability of such projects ((Banda *et al*., 2023).

Andrén (2010) posits that target knowledge clarifies the knowledge of the needs for change, what goals are desired and how they can be achieved. From this perspective, projects must be informed from the onset by the community members for success to be achieved (Zyambo, 2018). A variation in this sentiment was found in how the schools were carrying out their permaculture projects. Committees are set up and these are the main drivers of the activities that are done. The participants at the workshop felt this may be a hindrance as it creates passengers in the community projects instead of active participants. Basic needs for communities for instance must be met, and these include food security and income.

Another aspect that clarified the need for the TD principle of target knowledge is how 1 school proved community engagement continued due to autonomy given to the community in deciding what to plant and how to use the produce. These participants managed to experience the principle of cycling of resources as they realised how resources they put in could be converted to beneficial output in the forms of their harvest. Another school showed that community members appeared in their numbers at the initial meeting only, possibly because they thought donations would come. When the community learned there was need to give in labour and possibly put in some inputs, participation faded away. This could be a basic indicator that the basic needs of the community members were not being met (Milupi *et al*., 2017). The workshop participants also commented on the need for the project leaders to implement water harvesting methods as the idea in permaculture is not only to extract but to assist in putting water back into the ground. Project leaders and the communities must clearly understand the cycle of resources. Projects need to realise that the community members have to benefit directly from the projects in a manner that satisfies their basic needs, and this fosters collaborative efforts.

Participants at the workshop proposed the need for good leadership, community engagement, collaboration with stakeholders and a robust evaluation process that is a product of good record keeping for the projects and

these characteristics are key in fostering project adaptability. These findings are in tandem with the five core principles suggested by the Federal Reserve Bank of St. Louis. To this end, Scope provided the ILUD process to guide these proceedings across the lifespan of the project. Although the tool provides a uniform process that can be monitored and evaluated, it appeared that some of the schools that presented were not succeeding in following through with the establishment of this process. A systems design and analysis of projects is thus necessary to ensure its endurance.

For projects to be successful, management capabilities are required and these include resource mobilisation, adequate resource needs analysis, careful documentation and a clear mapping of the program's life cycle (Ceptureanu *et al*., 2018). Ceptureanu *et al*. (2018) further clarifies that community projects must be self-sustaining and considerations that determine self-sustaining projects vary at three different levels namely individual, organisational and community level. Conflict management is one necessary skill that the project leadership must possess in community projects management (Malupi *et al*., 2017). All the schools that presented proved that conflicts occur frequently in managing community development projects. Conflicts threaten the very existence of the project if they are not effectively managed. Conflicts in the schools that presented arose mainly from competing for the limited proceeds from the projects. There appeared to lack proper clarity in duties and responsibilities among the stakeholders.

Community involvement that results in community awareness of the project determines how quickly the project establishes and develops (Ceptureanu *et al*., 2018). One school that presented testified they managed to keep participation of the community from the beginning of the project. This inclusion gave the community ownership of the project that served as motivation for efforts put. This is contrary to the other schools that invited the schools to their meetings to inform them of the projects.

Understanding community context is important for effective community-based management (Ceptureanu *et al*., 2018). Some schools showed they did not adequately investigate their resources to establish their strengths and weaknesses. For instance, one school professed a water production capacity of less than a 100l per day, yet they had planted 35 beds of vegetables. The region that the schools are located are mainly dry regions that are suitable for small grains. The same school ordered seeds that were not ideal for the season they were in. the other school planted and harvested lettuce that had no ready market. Consultations with AGRITEX and Scope project officers may have

provided the project managers with sound advice on what they could have tried to minimise the losses. Other scholars add that effective resource mobilisation entails an adequate resource needs analysis and a clear mapping of the program's life cycle (Ceptureanu *et al*., 2018). These are a product of effective communication with various stakeholders and effective documentation. Resource mobilisation cannot be effective if the program leaders fail to understand and identify their strengths and weaknesses.

CONCLUSION AND RECOMMENDATIONS

A systems analysis of the processes involved with permaculture projects is necessary to ensure their continued existence. A trans-disciplinary approach informs of how knowledge can be produced to inform effective collaboration among stakeholders. Scope-Zimbabwe managed to provide a platform for engagement of the various stakeholders involved in the SLC project, in the writers' workshop to ensure each stakeholder's concerns are aired and considered in the creation of the instructor's manual. Scope also provided comprehensive processes that ensures effective and uniform management of projects in the ILUD process, though a training need was identified. ILUD process if correctly implemented would help the project implementers understand their communities' socio cultural and socio ecological relations. Values and goals of the project may then be more effectively aligned with those of the communities and its members to ensure a mutually beneficial coexistence that provides for the short-term needs of the communities and term goals achievement for the projects. However, schools seem to apply the ILUD process haphazardly and less effectively as expected. There may be a need to evaluate where the problem arises.

Community engagement is central to effective management of the Scope projects in schools and communities because it would foster collaborations from the various stakeholders. Schools need to be able to embark on effective resource mobilisation to eliminate the donor syndrome that threatens the longevity of community projects. Effective communication among the various stakeholders may aid in resolving conflicts that arise from the lack of clear boundaries, roles and expectations that is inherent among the various stakeholders. Increased awareness of sustainable ways of doing agriculture can be achieved by schools as demonstration centres, having children go out to the communities as advocates for permaculture and occasionally holding exhibitions like fairs for the produce.

Scope needs to invest more in workshops for both project leaders and communities to ensure the application of systematic principles and methods in carrying out projects. These project leaders also need to identify ways to ensure community ownership of the projects so that the projects cater for the

needs of the members in their context. Involvement of technical advisors and the communities ensures the bridge between indigenous knowledge and technological advancements informed by the experts. A cyclical exchange of information ensures concerns for all stakeholders are considered in all processes from planning to monitoring and evaluation to engender sustainable, participatory development.

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