

## **Rural Community Perceptions on Land Use Change and its Effects on Their Agricultural Practices in Vulindlela Traditional Area, Kwazulu-Natal Province of South Africa**

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### **ABSTRACT**

*This study assessed the level of awareness among the Vulindlela rural community regarding land use and land cover changes occurring in their community. Additionally, this study sought to examine the effects of these land use and land cover changes on the agricultural practices of the Vulindlela rural community. The study employs a mixed-methods approach, combining qualitative and quantitative methods. Secondary data from Statistics South Africa and the Msunduzi Local Municipality were used to determine the relationship between population growth and housing unit expansion. Primary data were collected through semi-structured interviews to capture the community's perceptions of land use change and its impacts on agricultural activities. The study results indicated a strong relationship ( $r = 0.81$ ,  $t = 2.39$ ,  $df = 3$ ,  $p = 0.10$ ) between population growth and an increase in housing units. Respondents also noted that land use and cover change has occurred in Vulindlela. The driver of this change is an increase in residential housing units built on land designated for agriculture (crop and pastoral fields). Residential development on agricultural fields is a result of the de-agrarianisation by the local community. De-agrarianisation drivers in Vulindlela include a lack of agricultural equipment, high costs (time and money) associated with agriculture, inadequate government support, increased dependence on government grants and lack of interest in the younger generation in agriculture.*

**Keywords:** Rural Communities, Land Use Change, Agricultural Practices, De-Agrarianisation.

### **1. INTRODUCTION**

The global population has experienced exponential growth, rising from 1.6 billion individuals in 1900 to 7.8 billion in 2020, with projections indicating a further increase to over 9 billion by

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2050 (Cohen, 2006; Buhaug & Urdal, 2013; PRB, 2016; Worldometer, 2020). This substantial population growth necessitates additional land and resources to accommodate and sustain the expanding human populace. In the context of South Africa, the population has increased by 18 million individuals between 1996 and 2020 (Stats SA, 2020). However, the distribution of the population between rural and urban areas is uneven, with a more significant proportion (66%) residing in urban areas such as central business districts, suburbs, and townships, while the remainder lives in rural areas (Williams, 2000; Pelsar & Redelinghuys, 2008; World Bank, 2007; Statista, 2018). Concurrently, there has been a notable upsurge in peri-urban development, extending into rural landscapes (Msunduzi Municipality, 2016). This expansion has resulted in the loss of arable land, posing threats not only to the agricultural commercial sector but also to the livelihoods of rural communities, particularly those fully or partially reliant on agriculture (Turpie *et al.*, 2002).

In South Africa, the government uses town and city outskirts state land and buys commercial agricultural land to expand residential zones and build low-cost housing (Mashwama *et al.*, 2018; Malepo, 2013). South Africa also follows a trend of some Asian and African countries, where rural agricultural land is lost to residential development (Coulibaly & Li, 2020). This kind of land use change can significantly affect the food security of poverty-stricken rural areas (Shisanya, 2015; Coulibaly & Li, 2020) and cause the loss of important natural resources such as arable land and the local ecological infrastructure and services they provide (South African National Biodiversity Institute, 2014; Blair *et al.*, 2018).

In rural areas, land use and land cover change due to residential development growth are often driven by the de-agrarianisation of the rural community (Ncube *et al.*, 2014; Mohsin & Khan, 2017). Daniles *et al.* (2013) note that since 1994 there has been a gradual decline in agricultural activities in South African rural communities, which has been attributed to factors such as the decline in agrarian human capital, lack of agricultural resources, diverse income generation strategies, lack of interest in the younger generation, and the changing climate. Therefore, de-agrarianisation creates spaces where people build houses (Bhatta, 2010; Daniles *et al.*, 2013). De-agrarianisation by the rural populace and the increase in land use change is threatening rural agriculture, which in most cases is these communities' very economic and livelihood backbone (Neves & Du Toit, 2013).

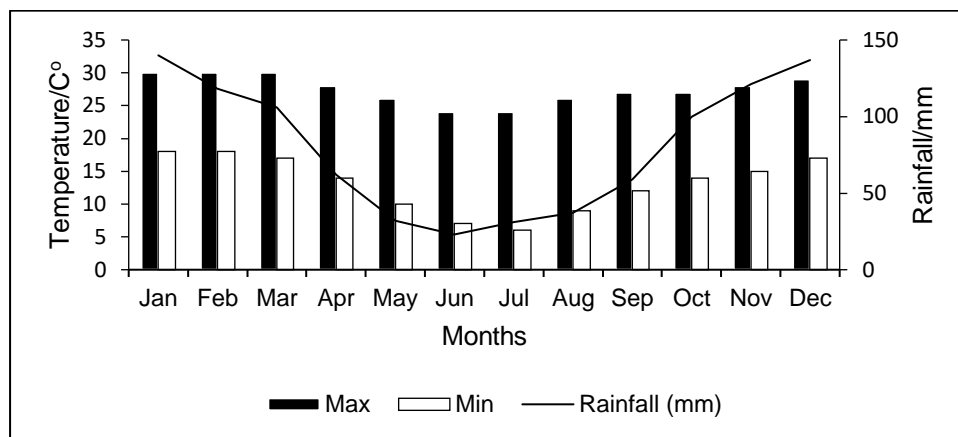
Rural communities account for the greatest number of South Africans living in poverty (May, Woodlard & Klasen, 2000; Bila & Biyase, 2022). Bila and Biyase (2022), citing STATSA (2017), state that rural areas of South Africa have a poverty headcount ratio of 81.3% which is higher than that of urban areas (40.7%). Poverty levels in rural areas are due to many factors, but de-agrarianisation has been the most prominent contributor as rural households are food insecure (Bryceson & Van der Laan, 1999; Blair *et al.*, 2018; Coulibaly & Li, 2020). When rural people used to work the land, there was little or no poverty in their communities as agriculture was their source of livelihood and economic activity was within their reach, regardless of their educational levels (Daniles *et al.*, 2013).

Considering the increasing population growth, the rapid expansion of peri-urban development, and the consequent loss of arable land in South Africa, there is a gap in the understanding of how these dynamics specifically impact the Vulindlela rural community in terms of their awareness of land use and land cover change, as well as how this landscape change their agricultural activities and well-being. Therefore, this study aims to assess the level of awareness among the Vulindlela rural community regarding land use and land cover changes occurring in their community. Additionally, this study seeks to examine the effects of these land use and land cover changes on the agricultural practices of the Vulindlela rural community.

## **2. METHODS**

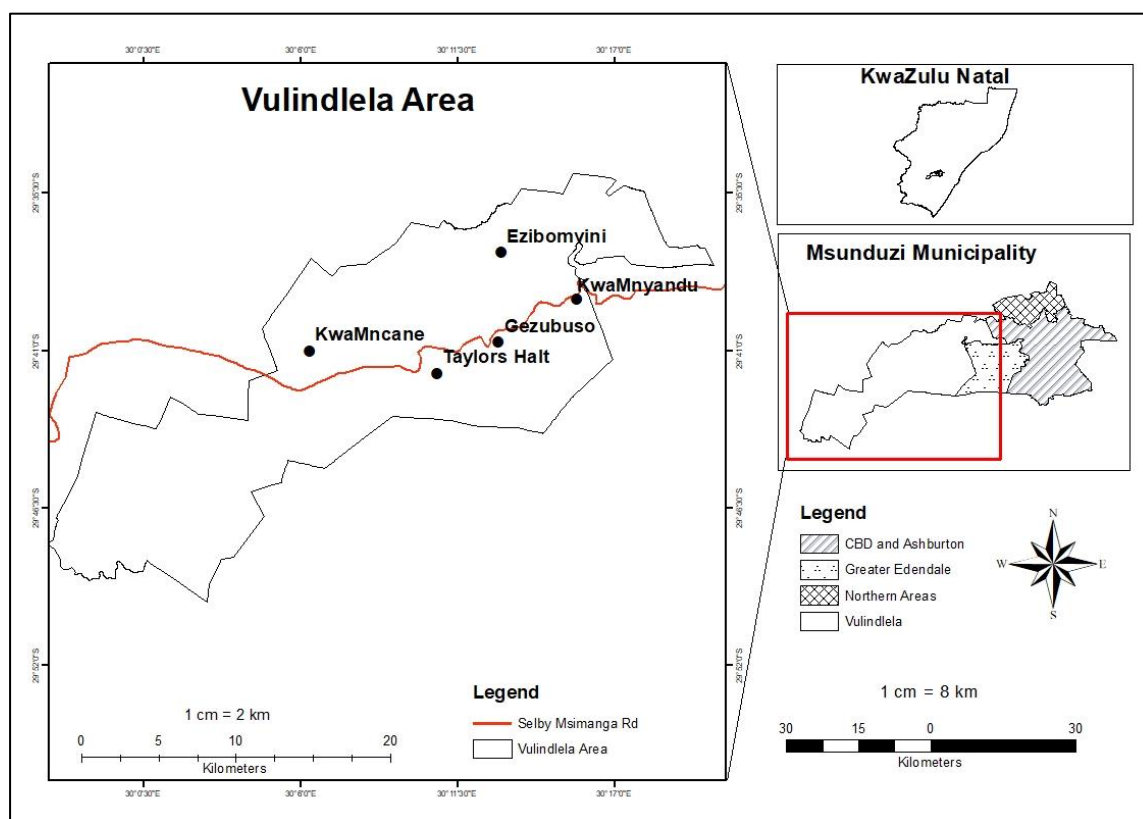
### **2.1. Study Area**

Vulindlela lies in the western part of the Msunduzi Local Municipality in the KwaZulu-Natal province of South Africa. This municipality lies in the summer rainfall region of South Africa, with a maximum and minimum temperature of 33°C and 12°C, respectively (Climate-Data, 2023). The mean annual rainfall is 966 mm, which peaks in December (Climate-Data, 2023).



**FIGURE 1: Average Temperatures and Precipitation for Colenso (Adapted from Climate-Data, 2023)**

The Msunduzi Municipality forms part of the larger uMgungundlovu District Municipality and is the largest economic contributor and has the largest population (61%) of all the local municipalities within the district. The Msunduzi Municipality covers an area of 590.6 km<sup>2</sup> and comprises 37 wards (Msunduzi IDP, 2017/22). The Msunduzi Municipality, in its land use planning, has embraced the concept of a Hierarchy of Plans with a series of Area Based Management Plans (ABM) (Msunduzi IDP, 2017/22). Four areas constitute this hierarchy of plans, namely (1) Vulindlela, (2) Greater Edendale, (3) The Northern Areas, and (4) the Pietermaritzburg Central Business District (CBD), Ashburton, and Eastern Areas (Figure 1) (Msunduzi IDP, 2017/22). The majority of land in Vulindlela is owned by the Ingonyama Trust Board (Msunduzi Municipal, 2016). The five Traditional Councils in and around Vulindlela are responsible for land allocation, while the Msunduzi Municipality is responsible for land use management (Msunduzi Municipality, 2016).



**FIGURE 2: Msunduzi Municipality and the Sampling Points in the Vulindlela Community**

## 2.2. Study Design

### 2.2.1. Research Population

The target population of this study is five rural communities of the Vulindlela area, which is situated west of Msunduzi Municipality in Pietermaritzburg, KwaZulu-Natal. Fifty households in five villages of Vulindlela were randomly selected as sample sites (Table 1). As the study required people to recall information dating back to the pre-1990s, only people whose ages ranged from 25 to 90 years participated in this study. Data collection was conducted from July 2018 to October 2018.

**TABLE 1: Vulindlela Five Villages Chosen for this Study.**

Area in Vulindlela	Total number of households interviewed
KwaMncane	10
KwaMnyandu	10
Gezubuso	10

Taylors Halt	10
Ezibomvini	10
<b>Grand Total</b>	<b>50</b>

### 2.2.2. Data Collection

The study used a mixture of qualitative and quantitative methods. Secondary data used to determine the relationship between the Vulindlela population and housing growth was obtained from Statistics South Africa and the Msunduzi Local Municipality. The primary data about the socio-demographic characteristics of respondents were gathered through close-ended questions. Open-ended questions of the semi-structured interview were utilised to gather data on Vulindlela residents' perceptions of the extent of land use and land cover change and how this landscape change affects their agricultural activities.

### 2.2.3. Data Analysis

The collected information was properly arranged and dealt with for analysis. IBM SPSS Statistics 26 was used to conduct the regression analysis between population and housing unit growth. MS Excel was used to examine the socio-economic characteristics of respondents. In contrast, the thematic content analysis was to analyse the open-ended question data on the perception of land use and land cover change and the impacts on their agricultural activities.

## 3. RESULTS

### 3.1. Socio-Demographic Results

The respondent's socio-economic background information is summarised in Table 2.

**TABLE 2: Respondents' Socio-Economic Characteristics**

<b>Respondents' socio-economic characteristics (n = 50)</b>	<b>Percentage</b>
<b>Family head</b>	
Male	42
Female	58
<b>Family Head</b>	
Male	60

Female	40
<b>Educational level</b>	
No education	10
Primary school	16
High school	58
Higher education	14
Other	2
<b>Livelihood strategies</b>	
Agriculture	15
Trade/business	4
Labour	14
Pension	8
Social grant	10
Remittance	2
<b>Vulindlela as a place of origin (birth)</b>	
Yes	74
No	26
<b>Land ownership acquisition</b>	
Inherited	48
Purchased	44
Gifted	8

### **3.2. Land Use and Land Cover Change and its Effects on Agricultural Practices of Vulindlela Rural Community**

Respondents had different views on land use and land cover change in the study area. Some thought land use and cover have changed, some thought it has not changed, while others have not noticed whether it has changed. Those who believed land use and land cover had changed stated that there were now more houses in their area than in pre-1990. Other respondents mentioned that residential development growth has been coupled with increased infrastructure such as roads, other activities such as forestry activities, and more crop fields.

The land use and land cover change process that is currently taking place has had many effects on the local landscapes. Respondents stated that open spaces and pastoral fields had been

greatly reduced due to land use and land cover change. However, some of the respondents stated that there is no change in their area, and some have not noted whether the change has happened. Those who stated that land use and land cover change have and is taking place in their areas noted that the loss of open spaces, pastoral fields and crop fields does not bother or affect them and their agricultural activities as they no longer practice large-scale crop farming or own livestock.

Respondents who own livestock stated they no longer hold large livestock such as cattle and goats since they prefer chicken. This preference has been driven by various factors, such as livestock theft, a lack of interest in the younger generation in herding and safeguarding animals, a lack of or shrinking of pastoral fields, and the low cost of maintaining chickens. Respondents who own large livestock stated that the reduced open spaces and pastoral fields affect them as their animals have reduced food availability. These respondents further mentioned that the reduced open areas are causing conflict, especially now as the livestock damages crop fields and fences of their community members seeking food.

While respondents who used to own crop fields no longer practice large-scale agricultural activities. They now prefer to have gardens within their properties as it is less intensive and do not cost much money. As a result, some respondents gave the crop fields to other people to build houses on, and others either sold or abandoned their crop fields.

### 3.3. Growth of Vulindlela Population and Number of Housing Units

The linear regression results for the relationship between the increase in housing units and population growth in Vulindlela show a strong positive correlation (Table 3).

**TABLE 3: Regression Analysis Results**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.810 <sup>a</sup>	.656	.542	9223.372036 854777000	.656	5.732	1	3	.096



#### 4. DISCUSSIONS

There has been an increase in the number of housing units in the study area, and the statistical analysis shows that this increase is strongly correlated with an increase in population. These results support the assertion of Ramankutty *et al.* (2002) that population growth is the force that drives land use and land cover change. Vulindlela's population, in addition to natural growth, is experiencing something that is not common in rural communities, namely inward migration (Msunduzi Municipality, 2016).

The findings from interviews indicate that land use and land cover change have occurred, as reported by the respondents. They mentioned that the population in the area has increased, leading to a rise in housing units. Approximately 26% of respondents indicated that they were not initially from Vulindlela. People are attracted to this area due to the availability of affordable, sizable parcels of land, exemption from municipal taxes, the opportunity for crop cultivation and livestock rearing, and the freedom to perform burials within their properties.

According to the respondents, some areas have witnessed a shrinkage or loss of crop and pastoral fields, primarily due to the expansion of residential areas. This finding aligns with the Msunduzi Municipality (2016) report, which highlights the unmanaged exponential growth of people in Vulindlela, resulting in the loss of highly fertile and arable land, primarily agricultural land used for crops and pastoral activities. Deng *et al.* (2015), Blair *et al.* (2018), and Coulibaly and Li (2020) affirm that the decline of agricultural land due to land use change is a common phenomenon in countries of the Global South. The loss of fertile land affects the natural environment and threatens rural food security (Jiang *et al.*, 2013; Ncube *et al.*, 2014; Blair *et al.*, 2018).

Respondents cited several factors that have led them to discontinue agricultural activities, including the lack of government support in providing necessary infrastructure, limited access to cutting-edge agricultural information and technologies, and the absence of drought-resistant crops. Some indicated that the government provides agricultural assistance through extension services and other resources, although political interference and favouritism sometimes hinder equitable distribution. Respondents noted that the distribution of resources, such as seedlings and irrigation equipment, and the use of tractors tend to be biased toward specific wards or sections of the community affiliated with a particular political party.

In the past, people in Vulindlela plough the land using cattle, with a collective effort by males from various households in the area. This method facilitated faster ploughing and assisted families who did not have enough or no cattle for land cultivation. However, respondents mentioned a decline in cattle numbers due to livestock theft and the younger generation's disinterest in agricultural activities such as cattle herding and working the land. As a result, families who own crop fields must now hire tractors for ploughing and pay others to work on their fields. Unfortunately, some families cannot afford the associated costs.

Employment emerged as another driver that has reduced people's interest in agricultural activities, as formal jobs are preferred over agricultural engagement. Despite this, Vulindlela is considered one of the poorest communities in the Msunduzi Municipality (2016). During data collection, most respondents indicated that the community heavily relies on old age pensions, child support grants, and family remittances. This finding aligns with the studies by Clara and Du Toit (2007), Chitonge (2013), Ncube, Tanga, and Bhumira (2014) and Sinyolo *et al.* (2017), which highlight the high dependency on grants among rural communities, leading to de-agrarianisation and diminishing importance of land, particularly in agriculture. The distancing of the Vulindlela community from agricultural activities, as noted by Bryceson and Van der Laan (1999), Koch (2011) and Blair *et al.* (2018), contributes to increasing socio-economic disparities and poverty levels.

## 5. CONCLUSIONS

Land use and land cover change has, and is, taking place in Vulindlela as residential areas are expanding and replacing open, pastoral, and crop fields. The growth of residential areas has been facilitated by the de-agrarianisation of the Vulindlela community and the lack of measures preventing the transformation of crop and pastoral fields into residential areas. De-agrarianisation is a major problem in Vulindlela, even though this area has the highest number of impoverished people. The study also reveals various factors contributing to the decline in agricultural activities among the Vulindlela community. These include limited government support, inadequate infrastructure, lack of access to agricultural information and technologies, and shifting preferences towards formal employment. As a result, the community heavily relies on social grants and remittances, further distancing themselves from agricultural practices and exacerbating socio-economic disparities and poverty levels.

This study recommends that the governing structures (Traditional Councils, Local Municipality, and the relevant government departments) of Vulindlela should halt residential development on crop- and pastoral fields using relevant policies. The government should also assist these communities with cutting-edge agricultural information through agricultural extension services. Furthermore, the government should help these communities by linking them with markets where they sell their products. Commercialising agricultural products will create interest in the younger generation and the community at large in agriculture and the preservation of agricultural landscapes. The Vulindlela community should organise itself and revitalise agricultural activities. This collaboration will enhance efficiency and reduce costs for families who may be struggling.

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