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Land Use Management in Tanzania: Examining Policy Approach to Mitigate Land Degradation

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Abstract

Since the mid-1990s the Tanzanian government has implemented a national land policy and corresponding laws to address various land issues, including land degradation. There have been bad practices such as bush firing, overgrazing, poor farming practices, and a lack of awareness of soil conservation measures: all of which have resulted in land degradation problems in the country, particularly in Kigoma Region. This article investigates the reasons behind this phenomena, employing a cross-sectional multiple data collection technique. A total of 750 respondents from four districts in Kigoma Region responded to a structured questionnaire. Also, the study obtained remotely sensed data for generating Kigoma Rural land use and land cover. The results show that in-migrations in the area are twice as much associated with land degradation compared to places where this phenomenon was non-existent. Also, shifting cultivation was two times more associated with land degradation than in areas without such a practice. Based on the findings, it is recommended that the current land policy be reviewed to focus more on issues that could effectively address, among other things, the mixed in-migration of refugees, farmers, and pastoralists: all of which jeopardise land resources in many rural areas.

Keywords: *land degradation; land management; land use; policy assessment*

1. Introduction

All human activities—such as agricultural production, industrial activity, transportation, and other socio-economic activities—are carried out on land (Marzelli, 2011; Niedertscheider et al., 2014; Price et al., 2015; Tudor, 2014). In Tanzania, land is divided into three categories: general land, protected land, and village land (URT, 1997). General land refers to all public land that is not reserved, village land, and land that is not owned or used by villagers. Reserved land refers to all land designated for various uses, such as forests, national parks, game reserves, conservation areas, and declared hazard land. Moreover, hazard land is any land declared as an environmentally sensitive area (URT, 2004). On the other hand, village land is any public land where the boundaries have been demarcated under any law or administrative procedures as village land (URT, 1999a; URT, 1999b; URT, 2013). It is worth noting, as it has been revealed by various scholars (Sitko & Jayne, 2014; Tsuchiya et al., 2015), that land resources are finite. Thus, as the population increases rapidly, land resources come under tremendous pressure (Bezu & Holden, 2014; Jayne et al., 2014).

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In Tanzania, the formulation of the land policy (URT, 1997) was influenced by changes in land use, an increase in wildlife and human conflicts, land competition in and around major urban centres, the demand for large land areas for investment, and the development of land markets. To implement the land policy, several local ministerial projects were initiated. These included the launching of a property and business plan project to empower the poorest in Tanzania by increasing their access to formal financial markets and other services for legalizing their property and business rights (ESRF, 2010). However, this program was unsuccessful as it relied on external donors (Benjaminsen et al., 2009). It has been reported elsewhere (Sutton, 1999) that restricting access to crucial policy implementation resources (political, financial, management, and technical) has also contributed in delaying the reform process.

Moreover, the National Land Use Planning Commission (NLUPC) was also established to ensure sustainable land use. This commission insists on land use agreements through approved land use plans or joint land use agreements (URT, 2013). This system starts with registering village land and its boundaries, after which it is protected from redistribution for other uses. In addition, these guidelines stipulate that participatory land use management (PLUM) should work closely with members of the Village Land use Management Committee (VLUM) and village councils; and should involve all land users in a village (URT, 2007; URT, 2013). Nonetheless, despite these strategic moves, land use problems in Tanzania still exist.

The decision to conduct this study in Kigoma Region was based on several socio-economic characteristics observed by the researcher in the region. First, it hosts thousands of refugees from neighbouring Burundi and the Democratic Republic of Congo (DRC). In the 1990s, Tanzania hosted nearly 1.3m refugees in the western part of the country from Burundi, Rwanda, and the Democratic Republic of Congo (DRC), who fled political unrest and civil wars in the Great Lakes Region. In 2006, Tanzania hosted the fourth largest refugee population globally, coming after Pakistan, Iran, and Germany (Whitaker, 2002; Berry, 2008). The number of refugees living in refugee camps in Tanzania dropped to about 300,000 due to the United Nations High Commissioner for Refugees (UNHCR) assisting in the repatriation of Congolese and Burundian refugees. Nevertheless, the overall refugee population in Tanzania has been around 600,000 since 1999 (URT, 2019). In 2017, the region registered 358,520 new arrivals: 315,073 refugees and 43,447 asylum seekers from the DRC and Burundi (Berry, 2008). As of December 2020, the total number of refugees hosted by Tanzania was 287,331; with the Kasulu and Kibondo districts of the Kigoma Region remaining the most refugee areas, hosting 136,911 and 107,718 refugees, respectively (UNHCR, 2020). Refugees in such areas are often blamed for poor environmental management (Berry, 2008).

In Kigoma Rural, land use and inappropriate land management practices have contributed to land degradation, hence it cannot support agricultural activities as it was previously. Charcoal-making and livestock-keeping—as two value chains—have been identified as the triggers of land degradation in the area. Although cattle and

sustainable charcoal-making positively affect the short- and medium-term markets, which are fundamental in promoting tangible benefits that stimulate behaviour change, they still harm the land. In addition, unregulated movements of pastoralists with their livestock have also contributed to land degradation in the study area, as has been in other parts of Tanzania. Shifting grazing has remained a custom for most Sukuma people who keep migrating with large groups of cattle from their origins to areas with low population density like Kigoma Region, causing land degradation problems to the host communities (Msuya, 2013; Mwamfupe, 2015; Walwa, 2017).

Horticulture in the region is also destructive as neighbouring farmers cultivate near water sources or hills without contour planting and soil conservation (Walwa, 2017). The area, however, suffers a critical shortage of land management officers (physical planners, land officers, valuation officers, and land surveyors) who were supposed to assist in educating citizens on the proper use of land. Relative to the population and number of villages, professional land staff allocated to the region are very few (Rubakula, 2019).

However, land degradation can either be a result of natural hazards or due to inappropriate land use and inappropriate land management practices. Natural hazards include land topography and climatic factors such as steep slopes, frequent floods, high-velocity winds, high-intensity rains, intense leaching in humid regions, and drought conditions in dry areas (Berry, 2008). This paper examines the national land policy's implementation to address land use problems, particularly land degradation. Our empirical question is whether, and to what extent, immigrants have contributed to land degradation in Kigoma region. Immigrants in this context refer to herders, farmers, and refugees. Apart from the introduction, the remaining part of the paper is divided into four sections: a brief explanation of the research methodology and the characteristics of the survey sample, the results, a discussion of the findings, and a conclusion.

2. Materials and Methods

The study was cross-sectional, using several data collection methods, including interviews with heads of household and analysis of remotely sensed data. The survey was conducted from July 2017 to February 2018. Seven hundred fifty (750) families responded to a semi-structured questionnaire from four districts of 211,057 inhabitants. In addition, remotely sensed data for generating Kigoma Rural land use and land cover were analysed to determine the extent of land degradation in the region. The researcher and four research assistants conducted the interviews. The four research assistants were recruited from the study area: one from each study district.

2.1 Sampling Procedure

The researchers used the Yamane formula to determine the household sample size for a finite population. The estimated number of households was 211,057, with 95% precession; whereas the sample size for household interviews was 399. However, considering the cluster sampling design effect, the researchers doubled

the sample size from 399 to 789. During fieldwork, we reached 94% (750/789) of the anticipated household sample size. Table 1 shows the total population of the study area, number of households, expected sample size, and the sample attained by the district after the survey. To select family heads for interviews, the researchers used the stratification technique. Four (4) of the six districts, two (2) wards from each chosen district, and two (2) villages from the corresponding wards were randomly selected. The researchers used a clustering technique to select households to be interviewed from each village.

Table 1: Distribution of Household Survey Samples in the Kigoma Region

Districts	District Population	Households (HH)	Proportion to Size	Expected Sample Size of HH	Actual Sample Size
Buhigwe District	245,342	40,890	19%	145	160
Kigoma Rural District	211,566	35,261	17%	125	192
Kasulu District	425,794	70,966	34%	252	215
Uvinza District	383,640	63,940	30%	227	183
Total	1,266,342	211,057	100%	749	750

Source: Field survey data, 2017.

The method of data collection used was a face-to-face survey. Since the target sample was land village owners in Kigoma rural, non-probability sampling (convenience sampling) was used to reach the participants, where respondents from a population close to hand filled in a survey.

2.2 Questionnaire Design

The researchers used a structured questionnaire to interview the heads of household. The questionnaire was designed in English and later translated and administered in Kiswahili, the language spoken by the majority in the study area. Moreover, the questionnaire was divided into three sections. The first section gathered the demographic characteristics of the participants. The second section assessed respondents' attitudes towards land use management: this was done by presenting statements relating to land management (availability of land use plans, ownership of surveyed land, and ownership of title deeds). The third section examined participants' most prevalent reasons for land degradation by using a multiple-choice question carrying several alternatives, such as shifting cultivation, overgrazing, and the presence of immigrants in the area. To ensure the validity of the questionnaire, we conducted a pilot test on 20 respondents in one village in Kasulu District. The exercise enabled us to adjust the questions to suit all respondents. The questionnaires were face-to-face, as not all participants could read; but also it enabled one to clarify issues that needed amplification for some respondents.

2.3 Data Analysis

2.3.1 Sample Profile

This section presents three demographic characteristics. First, 62.3% of the respondents were men, and 37.7% were female. Second, 54.9% were between the

ages of 31 and 50, 28.0% were between 20 and 30, and 16.1% were above 50 years. Third, 16.4% of the respondents had not received any formal education; while 53.2%, 26.5%, and 3.9% had completed elementary school education, went to high school, and received university education, respectively.

2.3.2 Kigoma Rural-Remotely Sensed Data

Remotely sensed data were used to assess land use and land cover (LULC) change in the study area. Three Landsat imageries were acquired for 2006, 2012, and 2018 from the USGS Global Visualization Viewer (https://glovis.usgs.gov) using Path/Row 172/67 for Kigoma Rural (see Table 3). During the analysis, these images were used to generate LULC maps into a GIS technology using Arc GIS 10.5 and ENVI 5.3. The images used had the exact spatial resolution of 30m. The images were processed to produce LULC classes such as built-up areas, vegetation, and grassland. For each of the determined LULC classes, training sample data were created by delimiting polygons around representative sites. An appropriate representative sample was created to ensure minimal mix-up or error among the land covers. About 70 spectral signatures for each LULC type generated from the satellite images were recorded. The years 2006, 2012, and 2018 were selected because the Kigoma region received more immigrants, especially refugees, during this period.

3. Results and Discussion

3.1. Factors of Land Degradation

This study determined factors associated with land degradation, including shifting cultivation and immigrants' presence in the area. In this context, immigrants refer to herders, farmers, and refugees. The interviewed respondents reported that the presence of immigrants in the area is twice as much associated with land degradation [(AOR 2.018, 95% CI 1.395–2.919, p-value 0.000)] compared to the places where this phenomenon was non-existent. Also, shifting cultivation was two times more associated with land degradation compared to areas without such a practice [(AOR 23.441, 95% CI 9.917–55.406, p-value 0.000)]. Moreover, out of 750, only 91 respondents had land titles, of which 68 said that despite having a title deed, the land is still plagued by land degradation caused by human activities similar to those owning surveyed land, and where land use planning has taken place (Table 2).

Table 2: Factors Associated with Land Degradation in the Kigoma Region

Factors	Land degradation Yes, N (%)	Land degradation No, N (%)	Total N (%)	AOR	p–value	95% CI
Holding land title	68(74.7)	23(25.2)	91(100)	0.988	0.969	0.547–1.786
Owning surveyed land	242(74.5)	83(25.5)	325(100)	0.992	0.970	0.654–1.506
Availability of land–use plan	184(69)	83(31.1)	267(100)	0.561	0.004	0.380–0.829
Presence of immigrants	337(81.2)	74(18)	411(100)	2.018	0.000	1.395–2.919
Shifting cultivation	557(79.2)	146(20.8)	703(100)	23.441	0.000	9.917–55.406

Source: Field survey data, 2017.

For instance, it has been revealed elsewhere (Barrow, 2016) that for land use planning to be more effective, it can be hinged with traditional ways of managing land such as '*ngitili*' – or 'enclosures' or 'fodder reserves'. These are farmer-led initiatives adapted from traditional grazing and food security (Kamwenda, 1999).

Moreover, the findings generated from remotely sensed data match what respondents reported in the region: that there is a problem of land degradation caused by, among other things, human activities such as nomadic farming, pastoralism, and the presence of refugees in some areas. The results show the trend of LULC changed from 2006 to 2018 based on three classes extracted from Kigoma Rural, with an appropriate proportion of coverage area for each district (Figure 1). The spatial representation of LULC types from 2006 shows that the pattern of LULC was dominated by grassland covering 58.53% of the total area, followed by vegetation (33.63%), and built-up area (8.06%).

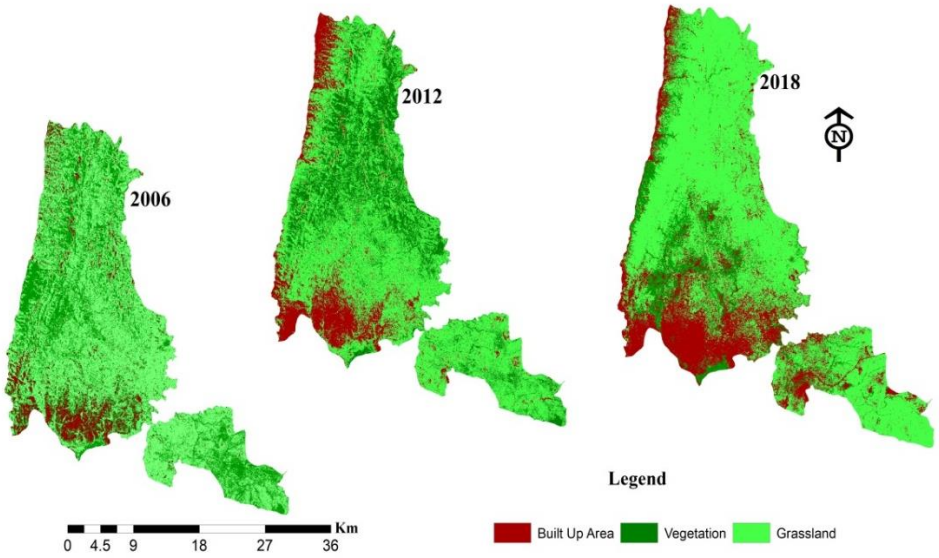

Figure 1: Land Use and Land Cover Map of Kigoma Rural in 2006, 2012 and 2018

The LULC trend changes continued for all LULC types in years from 2012, whereby results show an abrupt increase in built-up land from 8.06% in 2006 to 15.52% in 2012 and 23.53% in 2018; while grassland increased from 58.5% to 59% and 65.7% in the same period (Table 3). The region also suffered a decrease in vegetation from 33.63% in 2006 to 25.37% in 2012, and 10.72% in 2018 (Table 3). However, there is a notable increase in grassland over the entire period of 2006 to 2018. This situation could result from efforts to replace dense vegetation with grasses in areas affected by climate change impacts, shifting cultivation, overgrazing, and over-exploitation of forest resources by the community for different related needs in the studied area.

Table 3: Tabular Representation of the Area and Percentage Coverage of Each Class in a Given Period

	2006 (ha)	%	2012 (ha)	%	2018 (ha)	%
Built-up	78281100.00	8.06	150494400.00	15.52	228038400.00	23.53
Vegetation	322290900.00	33.63	245910600.00	25.37	103874400.00	10.72
Grassland	568887300.00	58.63	572042700.00	59.02	636533100.00	65.67

Source: Remote sensed data, 2017.

Planning and managing scarce land is essential for a country to realize sustainable development (Jayne et al., 2014). However, the study findings reveal that a substantial demand for land increased pressure on land; and, as a result, the availability and quality of the land decreased. Overexploitation of land resources has resulted in continuous deforestation and land degradation, as shown in the study.

For instance, the imagery pictures of Kigoma Rural show deforestation and increased built-up land. This observation is mainly similar to the responses of the interviewed households regarding land degradation and its associated factors, which are human activities: primarily nomadic farming and pastoralism. Some studies (Kim & Arnhold, 2018; Mehdi, Ludwig, & Lehner, 2015; Raum & Potter, 2015; Verburg et al., 2015) have also reported similar impacts of population movement and cultivation techniques on the environment.

Moreover, it was established that land use management strategies stipulated in the National Land Policy and corresponding laws could stop major human activities contributing to land degradation in rural areas. For example, the Land Act and Village Land Act (URT, 1999a; URT, 1999b), in particular, explicitly advocate for land use planning and titling to address the land use problem, including land degradation. Contrary to this provision, most respondents with title deeds in the study revealed their land being plagued by land degradation caused by human activities. This situation indicates that land use planning and titling alone do not warrant effective land use management and productivity in rural areas. More efforts are needed—apart from issuing land titles—to address the region's land degradation problem.

In addition, land titling in rural areas has been slow, as indicated in this study. The slowness in land legalization is blamed on the sluggishness of tapping on the potential of customary right of occupancy to accelerate titling. It has been revealed that customary land laws and informal land tenures have successfully been implemented in Africa, Asia, and Latin America (Chimhowu, 2019). This study shows that the beneficiaries are uncertain of the government's motives in demarcating the land they have owned for centuries. If it is a matter of cost, the government could use the traditional discourse enshrined in the Certificate of Customary Right of Occupancy (CCRO) that involves local leaders (Knight, 2010). Involving local leaders—such as chiefs and/or headmen—to decentralize land management is feasible given the limited resources setting and cost-effectiveness (Juknelienė et al., 2017).

The study further revealed that many villages do not have land use plans or traditional land management methods. As previously mentioned, such methods include the '*ngitili*' ('enclosures'/'fodder reserves'). The system involves retaining standing vegetation (grasses, trees, shrubs, and forbs) from the onset to the end of the rainy season (Barrow, 2016). These traditional strategies are still essential in contemporary natural resource management. They have contributed to the booming land management in rural areas, particularly in adapting to the increase in herd size, which has grown above subsistence level (Kangalawe et al., 2014; Reyes, Quiroz, & Msikula, 2005). Unfortunately, as revealed in our study, the validity of many traditional ways has remained unknown as the best practice for broader adaptation in the study area.

4. Conclusion

Looking at the land degradation problem the study area faces, there is a need to revisit specific legal and administrative arrangements, including by-laws and land use policies that govern land matters in the study area. The new approach should address various issues, including rapid socio-economic and ecological dynamics and land degradation. In this process, the emphasis should be on active and sound public consultation for the new policies to effectively address, among other things, mixed migration patterns and varied land uses of refugees, farmers, and herders that tend to degrade land resources in many rural areas. A mixed migration of refugees, farmers, and herders makes land management complex, thus, requiring more complex solutions that cannot be provided within the existing policies. This study also recommends the adoption of traditional methods of natural resource management that are cost-effective, and have shown tremendous success in other rural areas.

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Conflicts of Interest

There is no conflict of interest to declare. The funder did not influence the results of the study.

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