

**Relief And Land Use In Kisoro District: A Case Study Of Nyakinama Sub County**

**Tushabomwe Rebbecca<sup>1</sup>, Tanda Moses<sup>2</sup>**

**1, 2 Metropolitan International University**

**Abstract**

The study aimed at relief and land use in kisoro district: a case study of Nyakinama sub county and it was guided by the following objectives; To find out the level of land use in Nyakinama sub county, to find out the extent to which relief influence land use in Nyakinama sub county and to find out the relationship between relief and land use in Nyakinama sub county. The study used descriptive research design because of the nature of the variables that were at hand to produce data required for qualitative and quantitative analysis to allow simultaneous description of views, perceptions and beliefs at any single point in time. Descriptive statistics such as frequency distribution and percentages were used to analyze the data. Qualitative data was analyzed using content analysis in which all the responses were categorized according to their thematic areas and analyzed according to their contents. Presentation was done on tables, and figures. From the findings, 20 (71.4%) of respondents revealed that relief influenced land use to a larger extent followed by some extent responses with 05 (18.0%), followed by smaller extent responses with 02 (7.1%) and finally some respondents were not sure of the statement with 01 (3.5%). This implied that the richness and the composition of plant communities are influenced by relief characteristics such as slope orientation, slope position, altitude, and slope. Local members should use all the resources available to achieve their goals and this would be done by using the land available effectively and appropriately. The shift of population from relatively low- productivity rural areas to higher productivity urban areas has been a major aspect if not a driver of economic progress.

**Keywords: Relief And Land Use**

**Background of the study**

According to Gupta (2005), relief is also known as topography meaning a broad term used to describe the detailed study of the earth's surface. Relief is one of the elements of physical geography, which includes topographic relief, slope, elevation, and other features, and is the basis for the survival and development of human society (Jackline et al., 2023). Thus, topographic relief greatly impacts population distribution, economic development, agricultural production, urban construction, tourism planning, and ecological effects (Allan et al., 2023). Therefore, the study of relief and spatial patterns, and the exploration of their mechanisms affecting human production and social activities, provides insight into the interrelationship between the natural environment and human society (Collins et al., 2023).

Studies will investigate the impact of relief on population, land use and economy based on different spatial scales (Okere, 2013) used topographic relief and elevation to classify mountains globally and explored the impact of different mountain types on global surface water resources and population distribution. At the country level, (Frank et al., 2023) explored the correlation between the effects of topographic relief on population distribution and economic development in China based on both raster and county unit scales and suggested that topographic relief is an important indicator of the natural suitability of China's habitat. Meanwhile, at the small and medium scale, quantitative analysis of the relationship between topographic relief and population and economy showed that topographic relief is highly accurate and

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practical in natural habitat evaluation at the small and medium scale (Ivan & Kazaara, 2023). Other studies used a geographic detector to investigate the constraints of topographic factors on the distribution and impoverishment of villages (Okere, 2013). Therefore, the study of topographic relief will provide theoretical support and reference for a rational layout of population, habitat optimization, and improvement of regional economic development policies (Ronald & Kazaara, 2023).

Land use means the utilization of the physical land and its resources human beings use for various purposes (Nancy & Benard, 2023). A good land use element considers a variety of factors including, but not limited to: land supply and demand, population and employment projections, groundwater and surface water resources, and natural limitations (such as steep slopes, flood plains, and wetlands). The idea behind good land use is to grow efficiently and in a fiscally and environmentally sound way. As communities grapple with land use issues through a planning process, those involved realize that one choice may preclude other choices (Sheleme, 2010). If one area of a community is deemed appropriate for residential development, it precludes that area from industrial development or farmland preservation (Sheleme, 2010).

Planning for land use is both an art and a science (Christopher, 2022). It's a science, because community and citizen planners gather community data, analyze it, and make proposals for how a place could grow and change in the future. It's an art to bring diverse interests to the table to build consensus around visions and ideas that make sense from both a scientific and technical perspective and from political and organizational perspectives (Christopher et al., 2022).

#### **Statement of the Problem**

It is understood that relief provide one of the forms of understanding of the earth's surface, enabling the dynamics of the strands, with their variations in form, land use processes, evolution, area, altitude, inclination, orientation, among others, which would integrate and complement the learning of the spatialization of natural and human phenomena (Jackline et al., 2023). Relief has a close relationship with pedologic cover, since it determines the hydric dynamics and controls the incidence of solar radiation (Peter & Nicholas, 2023). Despite this interdependence, relief influence on the composition and structure of the vegetation is almost always clearer than that of soil attributes. In mountainous areas especially in Africa, this influence is even clearer when primary or less-disturbed forests are taken into consideration. Edaphic and topographic factors can influence not only more advanced successional stages, whose dominance of species can be related with specific soil characteristics such as water availability, but also early stages, because species at these stages are highly capable of occupying the most diverse types of terrains, such as areas of poor or shallow soil and areas with high slope or poor soils increase the fragility of the system and decrease the possibility of anthropic use (Lwanyaga, 2022)

#### **Specific Objectives**

1. To find out the level of land use in Nyakinama sub county
2. To find out the extent to which relief influence land use in Nyakinama sub county
3. To find out the relationship between relief and land use in Nyakinama sub county

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**Methodology**

The study used descriptive research design because of the nature of the variables that were at hand to produce data required for qualitative and quantitative analysis to allow simultaneous description of views, perceptions and beliefs at any single point in time (white, 2019). Geneserth (2015) defines descriptive survey as a method of collecting information by interviews or administering questionnaires to a sample of individuals. The research study was conducted in Nyakinama Sub County in Kisoro District. Nyakinama Sub County was located in Bufumbira south constituency 4km away from Kisoro Municipality Kisoro District. This was because the descriptive survey design helped to determine the frequency of occurrences of the phenomenon and discovered whether or not relationships existed between the variables. The descriptive survey design was adopted; this was because cross sectional approach was useful in obtaining an overall picture as it stood at the time of the study. Cross sectional studies are comparatively cheap to undertake and easy to analyze (Kumar, 2015). The units of analysis included the respondents (Local members, Environmental officer, and Local council III Chairperson making a total population of 30. Primary respondents was included in the study because their area was the one at the grassroot level and most involved in different activities and its associated influence on relief and land use in Nyakinama Sub County in Kisoro District. On the other hand, the Local council III Chairperson and the environmental officer helped to validate the findings from the local members. The study sample comprised of 28 respondents out of 30 of the total population. Therefore, 26 were the local Members, 01 Local council III Chairperson, and 01 environmental officer as the parent population. This was because the population more or less shared similar socio-demographic characteristics and also due to resource and time constraints. The respondents interviewed included local members, Local council chairperson and the environmental officer.

**Table 1; shows different Categories of the People in the Study sample with their Sizes.**

| S/ N | Respondents                   | Population (N) | Sample size (n) |
|------|-------------------------------|----------------|-----------------|
| 1    | Local Members                 | 28             | 26              |
| 2    | Local council III Chairperson | 01             | 01              |
| 3    | Environmental officer         | 01             | 01              |
|      | <b>Total</b>                  | <b>30</b>      | <b>28</b>       |

In this sampling method, each member of the population had an equal chance of being selected and this method was the most straightforward of all the probability sampling methods, since it only involved a single random selection and required little advance knowledge about the population (Lauren Thomas, 2020). The respondents in this study were local members as primary respondents. Simple random sampling was used to select respondents in the group of local members. A total of 26 local members from one sub county (Nyakinama) participated in the study and their selection involved simple random sampling and specific attention were paid to inclusion of both male and female members in the study area. The researcher used the questionnaire as the major primary data collection in this study. Questionnaire is referred to as a set of questions used for collecting data from respondents in order to carry out the researcher. The

researcher prepared 26 questionnaires for the local members' respondents, 01 for Local council III Chairperson and 01 for the environmental officer to supplement the interview as the key informants. All was written in English language because is the medium of instruction in most institutions. Data processing was done through editing, coding and tabulation. Data analysis was also been done using computer analysis with the help of the SPSS (Statistical Package for Social Sciences) (Nelson et al., 2022). This helped the researcher analyze the raw data and transform it into meaningful and usable information. After this process, a report was written based on the findings. Coding was then been done to translate question responses into specific categories. Descriptive statistics such as frequency distribution and percentages were used to analyze the data. Qualitative data was analyzed using content analysis in which all the responses were categorized according to their thematic areas and analyzed according to their contents. Presentation was done on tables, and figures. Statistical Package for Social Sciences (SPSS) software was used to aid in the analysis of data (Nelson et al., 2023).

## **RESULTS**

**Table 2; showing the level of land use in Nyakinama Sub County**

| <b>Response</b> | <b>Frequency</b> | <b>percent</b> | <b>Valid percent</b> | <b>Cumulative percent</b> |
|-----------------|------------------|----------------|----------------------|---------------------------|
| High            | 21               | 75.0           | 75.0                 | 75.0                      |
| Medium          | 04               | 14.2           | 14.2                 | 89.2                      |
| Low             | 02               | 7.1            | 7.1                  | 96.3                      |
| Very low        | 01               | 3.5            | 3.5                  | 100                       |
| Total           | 28               | 100            | 100                  |                           |

**Source: primary data; 2023**

According to table 2 above, most 21 (75.0%) of respondents revealed that level of land use was high due to a variety of different crops, followed by medium responses with 04 (14.2%), followed by low responses with 02 (7.1%), and finally very low responses representing 01(3.5%). This implied that land was used for growing of crops like beans, Irish potatoes, Maize, vegetables and cash crops like coffee. This also indicated that parent materials determine certain soil properties e.g., soil particle-size and pore- space distribution, which are among the factors that determine ratio by which the rainfall was partitioned into run-off or infiltration (Grace et al., 2023). Land use can be enhanced with some forethought about how the reclaimed topography will look and how it will function with the proposed post-mining land use.

**Table 3; showing the extent to which relief influence land use in Nyakinama Sub County**

| <b>Response</b>    | <b>Frequency</b> | <b>Valid percentage</b> | <b>Cumulative percentage</b> |
|--------------------|------------------|-------------------------|------------------------------|
| To a larger extent | 20               | 71.4                    | 71.4                         |
| To some extent     | 05               | 18.0                    | 89.4                         |

|                     |    |     |      |
|---------------------|----|-----|------|
| To a smaller extent | 02 | 7.1 | 96.5 |
| Not sure            | 01 | 3.5 | 100  |
| Total               | 28 | 100 |      |

Source: primary data; 2023

Table 3 shows that most 20 (71.4%) of respondents revealed that relief influenced land use to a larger extent followed by some extent responses with 05 (18.0%), followed by smaller extent responses with 02 (7.1%) and finally some respondents were not sure of the statement with 01 (3.5%). This implied that the richness and the composition of plant communities are influenced by relief characteristics such as slope orientation, slope position, altitude, and slope. The heterogeneity of the topographic conditions can also affect the floristic composition as well as the richness and diversity of tree species and the study findings were in line with .

**Table 4 showing responses on the relationship between relief and land use in Nyakinama sub county**

| Responses | Frequency (f) | Valid percentage | Cumulative percentage |
|-----------|---------------|------------------|-----------------------|
| Yes       | 26            | 93.0             | 93.0                  |
| No        | 02            | 7.0              | 100                   |
| Total     | 28            | 100              |                       |

The table 4; above shows that most 26(93.0%) of the respondents agreed that there was a significant relationship between relief and land use. While 02(7.0%) disagreed with the statement. This implied that understanding the dynamics and distribution of the soil characteristics as influenced by landscape features is critical for assessing the effect of future land use changes on soil use and management and the findings were in line with (Emmanuel et al., 2023).

### Conclusion

Conclusively, the research study indicated that there was a significant relationship between relief and land use in Nyakinama Sub County in Kisoro District. Relief plays a vital role on the utilization of land use. The shape of the Earth's surface, its topography and is a fundamental dimension of the environment, shaping, mediating many other environmental flows or functions. But there is a major divergence in the way that topography is conceptualized in different domains.

### Recommendations

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**To the local members**

Local members should use all the resources available to achieve their goals and this would be done by using the land available effectively and appropriately. The shift of population from relatively low- productivity rural areas to higher productivity urban areas has been a major aspect if not a driver of economic progress.

**To the government**

The government should always sensitize its own people to effectively use land that is always available for their economic gains other than remaining blank

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