
TECHNOLOGICAL ADVANCEMENT AND ENVIRONMENTAL CONSERVATION IN RUKUNGIRI

DISTRICT: A CASE STUDY OF NYARUSHANJE SUB-COUNTY

1 Tumukwasibwe Gilbert, 2 Dr Arinaitwe Julius, 3 Dr Ariyo Gracious Kazaara

1, 2, 3 Metropolitan International University

ABSTRACT

*The major objective of this study lied in finding out whether there was a relationship between technological advancement and environmental conservation in Rukungiri district. Other objectives included; to find out the extent of environmental conservation in Nyarushanje sub- county and to find out the level of technological advancement in Nyarushanje sub-county. In order to generate a sample size of forty participants from a target population of 45 individuals in Nyarushanje sub-county using Solvin's formula, the study used a descriptive and observational research methodology. According to the research, there is a 0.469** link between technological development and environmental preservation. The Pearson correlation between the two variables was moderately positive, as demonstrated by the value of 0.469.*

The Pearson correlation coefficient's p-value (Sig. 2-tailed) was 0.000, which was below the 0.05 threshold for significance. This revealed that there was a statistically significant association between technical development and environmental preservation. The study came to the conclusion that in the Rukungiri district, technical development and environmental preservation are positively correlated. This was due to the fact that the degree of environmental conservation is significantly influenced by the amount of technology in the region. The investigator also advised farmers to utilize sustainable farming practices like mulching, agriculture, and reforestation in order to preserve the environment for future generations, the investigator also advised community members to take the appropriate actions.

Key words: technological advancement and environmental conservation

Background of the study

The development of information or the finding of knowledge that improves our understanding of scientific relationships or technology is referred to as technological progress (Kavanagh, 2019). According to Owen-Hill A (2017), technological development is a change in how a good or service is created or provided that lowers the number of resources needed for creation or provision. According to Chui Kamalnath (2008), technological development is the creation of information or the finding of knowledge that increases our understanding of scientific relationships or technology. The development of new and better manufacturing processes is referred to as progress in technology (Moore M, 2019). Environmental conservation is the activity that prepares people, organizations, and governments to safeguard the environment and the resources it contains (Carswell, 1997).

Innovation is seen as the key to boosting an organization's competitive advantage in a continually shifting environment. In the face of intense competition and economic integration, it can be challenging for businesses to assemble all of their available inventive resources. The focus of numerous studies has shifted to how to collaborate and cooperate with other businesses through valuable cooperative networks. In terms of open innovation, a number of top global companies, particularly those in the technology sector, have established their own innovative technological ecosystems that have developed quickly in the face of strong rivalry and created an unbeatable competitive advantage.

Uganda has experienced rapid progress during the past 35 years. It has profited from advantageous natural resources and a setting with generally stable political conditions. According to Uganda's National Vision Statement, Vision 2040, the goal is to change Uganda from a rural, impoverished nation to a modern one within 30 years.

Statement of the problem

Currently, the interaction between technical development and environmental preservation presents difficulties in Rukungiri District. To ensure sustainable development and safeguard the region's natural resources, the district's technical advancement and its effects on the preservation of the environment need to be carefully examined and addressed. The Rukungiri District's ineffective environmental conservation methods and technology improvements make it difficult to fulfill sustainable development objectives. Technological improvements may unintentionally lead to environmental degradation if environmental considerations are not properly taken into account. For example, the adoption of specific technology without the necessary environmental safeguards may lead to increasing contamination, deforestation, and depletion of resources. The district's ability to successfully handle environmental concerns is hampered by the inadequate availability and use of relevant technology for environmental protection. The district's ability to reduce environmental consequences and promote sustainable practices is hampered by a lack of knowledge, training, and resources for doing so. In Rukungiri District, attempts to safeguard ecosystems, biodiversity, and natural resources are hampered by this technological acceptance and execution gap. Therefore, the challenge was to determine whether environmental preservation and technological development were related in Nyarushanje sub-county, Rukungiri district.

Specific Objectives

- 1. To find out the level of technological advancement in Nyarushanje sub-county.*
- 2. To find out the extent of environmental conservation in Nyarushanje sub-county.*
- 3. To find out the relationship technological advancement and environmental*

conservation in Nyarushanje sub-county, Rukungiri district.

Research questions

1. *What is out the level of technological advancement in Nyarushanje sub-county?*
2. *What is the extent of environmental conservation in Nyarushanje sub-county?*
3. *What is the relationship between technological advancement and environmental conservation in Nyarushanje sub-county, Rukungiri district?*

Methodology

Research design

The study involved both qualitative and quantitative approaches during data collection. Qualitative approach enabled the researcher to give a complete, detailed description of phenomenon about the study for in-depth data gathering while quantitative approach enabled the researcher to construct statistical models in an attempt to explain the findings. Quantitative approach also provided comparisons and statistical aggregation of data.

Study population

The study targets a population with in the research geographical area. The study population included 40 community members, LC1 chairperson and a district environment officer of Rukungiri district.

Sampling procedures

The procedures included simple random sampling and purposive sampling and were used to select respondents in the study.

Sample size

The study sample comprised of 40 respondents out of 45 of the total population where 40 respondents were community members, LC1 Chairperson and a district environment officer

Sampling techniques

Ahuja Ram (2010), defines sampling as the act or process of selecting a suitable sample of the population for the purpose of determining parameters of characteristics of the whole population, and these can be either probability or non- probability sampling techniques.

Simple random sampling

Community members, the LC1 Chairperson, and the district environment officer participated in this study as participants. Key responders for the study were a district environment officer and the chairperson of LC1. In order to choose responders from the group of farmers and neighborhood people, simple random sampling was used. A simple random sampling was used to choose the 40 neighborhood residents who took part in the study, and special emphasis was taken to including both male and female respondents in the study region.

Purposive sampling

The units in the sample, including LC1, were chosen using a deliberate sampling procedure.

local environment officer and the chair. This method is founded on the study's goal and the distinctive features of a population. This method was employed by the investigator because it is extremely helpful in circumstances when you must quickly achieve a specified sample and where sampling for symmetry is not the major issue.

Only those people who are pertinent to the research design are chosen through purposeful sampling, which is less expensive, more easily available, and more

comfortable. In addition, there is no way to guarantee that the sample is actually accurately representing the population, therefore the investigator's ability to evaluate the population's constituent parts is given additional weight.

Data collection methods and instruments

According to Syed Muhammad Sajjad Kabir (2016), data collection is the process of acquiring data and analyzing information on relevant variables in a predetermined systematic way that allows one to respond to specified research questions, test hypotheses, and assess results. The researcher employed both secondary and primary data methods to get information about qualitative as well as quantitative information. In order to gather data, various techniques including questionnaires and interviews were used. In Nyarushanje sub-county, Rukungiri district, these were utilized to gather information from each neighborhood member.

Data analysis

The statistical package for social science (SPSS) tool was used by the investigator to compute percentages, frequency, and tabulate responses, as well as to employ both quantitative and qualitative types of data. To find and correct mistakes made by respondents, data was modified. The answers provided to the questions were then coded into several categories. The data were analyzed using descriptive statistics like frequency distribution and ratios. The responses were all grouped accordingly to their theme categories and their contents were evaluated for qualitative data using content analysis techniques. Presentation materials included tables, charts, and figures. Data analysis was aided by the use of Microsoft Excel and the Statistical Package for Social Sciences (SPSS).

RESULTS

Response rate

Questionnaire return rate

All 40 questionnaires were given out, 40 were returned, thus representing 100%

response. The study was considered good because according to Peil (1995), questionnaire return rate above 50% is considered good for a study.

Personal information of respondents

Information regarding to the personal background of the respondents included their age, gender, marital status, education level and working experience of the respondents.

Age of the respondents

Information regarding the age of the respondents was added to questionnaires during the piloting process. The following information regarding the ages of the respondents was analyzed and

presented in form of grouped data as shown in the table 1.

Table 1: Age of the respondents

Class (Age)	Class mark (x)	frequency (f)	fx	Percentage (%)
0-10 years	5	5	25	12.5
10-20years	15	10	150	25
20-30 years	25	20	500	50
30-40years	35	2	70	5
40-50years	45	3	135	7.5
TOTAL		$\Sigma f=40$	$\Sigma fx=880$	100

Given that people in that age range (20 to 30 years) are still considered to be young and have plenty of energy to work, it can be inferred from the mean (22 years) that the majority of the participants who took part in the study were from a mature group, i.e., were within that range. This led to the conclusion that the researched adult brains were responsible for the correctness and dependability of the information that was gathered.

Additionally, the investigator learned from Table 1 that 12.5% of the participants were between the ages of 0 and 10 years.

In the Nyarushanje sub-county, 25% of the participants were between the ages of 10 and 20; 5% were among the ages of 30 and 40; and 7.5% were older.

Gender of Respondents

The study investigated the gender of the respondents and the findings were as shown in the table 2

Gender	Frequency (No. of Respondents)	Percentage (%)
Males	15	37.5
Females	25	62.5
TOTAL	40	100

Table 2: Gender of respondents (primary, data 2022)

From table 2, it was found out that, majority of the respondents were females with 62.5% compared to males with 37.5%. This shows that females produce a lot of girl children than the boy babies. The simple random sampling technique offered each member of the population an equal and non-zero chance of participation in the study.

Occupation of the respondents

Information regarding the occupation of the respondents in Nyarushanje sub-county was collected and presented in table 3

Occupation	Frequency (No. of Respondents)	Percentage (%)
Farmer	20	50
Civil servant	15	37.5
Trader	5	12.5

<i>Total</i>	<i>40</i>	<i>100</i>
--------------	-----------	------------

Table 3: Occupation of respondents

The bigger percentage of the respondents lied in farming (50%), 37.5% were civil servants and followed by traders (12.5%).

Marital status

<i>Marital status</i>	<i>Number of respondents (f)</i>	<i>Percentage (%)</i>
<i>Single</i>	<i>22</i>	<i>55</i>
<i>Married</i>	<i>10</i>	<i>25</i>
<i>Divorced</i>	<i>8</i>	<i>20</i>
<i>Total</i>	<i>40</i>	<i>100</i>

Table 4: Marital status of respondents

The major percentage of the respondents in the study was single. This was because the mean average age was 22years and people in this age range are still young to get into serious marriage and these were 22 (55%). Only 25% of the sampled population were married and 8(20%) were divorced.

Educational level of the respondents

Information regarding the academic background of respondents in Nyarushanje sub-county was obtained and tabulated as shown in table 5

<i>Educational level</i>	<i>Number of Respondents</i>	<i>Percentage (%)</i>
<i>Primary and below</i>	<i>5</i>	<i>12.5</i>
<i>O' Level</i>	<i>15</i>	<i>37.5</i>
<i>A' Level</i>	<i>8</i>	<i>20</i>
<i>Certificate</i>	<i>7</i>	<i>17.5</i>
<i>Diploma</i>	<i>4</i>	<i>10</i>

None	1	2.5
TOTAL	40	100.0

Table 5: Educational background of the respondents (Primary data, 2022)

According to table 5, a majority of the people who responded only graduated from their ordinary level of education (37.5%) and had never attended any higher education; 12.5% had only answered primary school; 20% had completed their A' Levels; 17.5% had finished their certificate levels; 10% had finished their diploma levels; and 2.5% had never attended any level of education. According to statistics, Rukungiri District's education is deficient and urgently needed.

The level of technological advancement in Nyarushanje sub-county, Rukungiri district This

Level	Frequency (No. of Respondents)	Percentage (%)
Low	25	62.5
Medium	10	25.0
High	5	12.5
Total	40	100.0

Table 6: Level of technological advancement

The responses were interpreted as follows, 62.5% of the respondents agreed that the level of technological advancement in Nyarushanje sub-county, Rukungiri district is at a low level, 25% argued that the level of technological advancement in Nyarushanje sub-county, Rukungiri district is at medium level and 12.5% revealed that technological advancement in Nyarushanje sub-county, Rukungiri district is at a high level.

The extent of environmental conservation in Nyarushanje sub-county

This Section describes the dependent variable (Environmental conservation). The

independent variable was addressed in Section C of the questionnaire for respondents.

Extent	Frequency (No. of Respondents)	Percentage (%)
<i>Small</i>	20	50.5
<i>Medium</i>	15	37.5
<i>Large (high)</i>	5	12.5
<i>Total</i>	40	100

Table 7: The extent of environmental conservation (Primary data, 2021)

According to the research, just a limited amount of environmental conservation has been done in Nyarushanje sub-county, Rukungiri district. Because of increased deforestation, swamp restoration, and inadequate sewage disposal in the area, 50% of the study's total population agreed that the extent of environmental conservation was to a small extent. Only 37.5% agreed that the extent of environmental conservation is at a medium extent, and only 12.5% argued that the extent of environmental conservation is a large extent.

Human activities that destroy the environment

Human activity	No. of respondents	Percentage (%)
<i>Bush burning</i>	5	12.5
<i>Over grazing</i>	8	20
<i>Over cultivation</i>	7	17.5
<i>Deforestation</i>	20	50
<i>Total</i>	40	100

Table 8: Human activities that destroy environment

According to table 8, the majority of people in the Rukungiri district's Nyarushanje sub-county degrade the environment by engaging in reforestation (50%). 17.5% of those who

responded excessively cultivate their land, which is detrimental to soil fertility and soil structure because the majority of people in this region are producers and there is a limited amount of land available for farming. 20% of those who responded say they degrade the ecosystem through overgrazing, and 12.5% say they do it by burning the fertile lands in the bush.

Components of environment that are destroyed in Rukungiri district

<i>Component</i>	<i>No. of respondents</i>	<i>Percentage (%)</i>
<i>Atmosphere</i>	25	62.5
<i>Hydrosphere</i>	10	25.0
<i>Lithosphere</i>	5	12.5
<i>Total</i>	40	100

Table 9 Components of environment

From table 9, it was found out that majority of the residents in Rukungiri district destroy the atmosphere (62.5%), 25% destroy the hydrosphere and only 12.5% destroy the lithosphere.

The findings were in line with the study conducted by Olawale (2005) in Nigeria where the conservation of biodiversity is very much fundamental to life and positive business performance especially in the oil and gas sector.

Relationship between technological advancement and environmental conservation

The data collected from the respondents on the relationship between technological advancement and environmental conservation in Rukungiri district were presented as seen from table 10

Table 10 Relationship between technological advancement and environmental Conservation

		<i>technological advancement</i>	<i>environmental Conservation</i>
<i>technological advancement</i>	<i>Pearson Correlation</i>	1	.469**
	<i>Sig. (2-tailed)</i>		.000
	<i>N</i>	39	39
<i>environmental Conservation</i>	<i>Pearson Correlation</i>	.469**	1
	<i>Sig. (2-tailed)</i>	.000	
	<i>N</i>	39	39
**. Correlation is significant at the 0.05 level (2-tailed).			

Technology development and environmental preservation have a 0.469** correlation coefficient (across both rows and columns). The correlation between the two variables was moderately positive, as demonstrated by the value of 0.469.

The correlation coefficient's p-value (Sig. 2-tailed) was 0.000, which was below the 0.05 threshold for importance. This revealed that there was a statistically significant association between technical development and environmental preservation.

Conclusion of the findings

The study came to the conclusion that there has been little technological improvement, and this is because there have been few breakthroughs in the field and little financial support.

The study came to the conclusion that in the Rukungiri district, technical development and conserving the environment are positively correlated. This was due to the fact that the degree of environmental conservation is significantly influenced by the level of technical development in the region.

Recommendations of the study

The researcher recommended the government to carry out enough sensitization of people about the importance of environmental conservation.

The researcher also recommended farmers to use good methods of farming like afforestation, agro-forestry and mulching.

References

Air quality Monitoring Report, 2005, Environmental Information and Monitory Program Environment Quality Sector.

Kelvin, T.P. and Levis A.O. (1994). An Introduction to Global environmental issues. London Butter Tanner Ltd.

Aghede and Duitiah (2004). Causes and prevention of erosion in urban centers A case of

Okettunu/Sango Area of Ibadan city, Nigeria. International Journal of Environmental Issues Vol. 2. No. 1 & 2, 60 -65pp.

Adebayo, R. A. and Uyi, N.O. 2010. Biological control of invasive weed species: Nigerian experience. International Journal of Agricultural Research 5: 1100-1106

Akpabio, K (2016). "Keynote Address" Biodiversity Conservation and Challenges of Climate Change Workshop held at the University of Uyo, Nigeria.

Atsegbua, L. Akpotaire and Dinmowe (2003). Environmental Law in Nigeria Theory and

Practice Ababa Press Ltd. Lagos., 78pp.

Bioresearches Development Conservation Program (2015). Ogbogolo Community Biodiversity Action Plan (A GEF-UNDP Pilot Project in Rivers State), GEF-UNDP Niger Delta Biodiversity Conservation Project. Final Report by Bioresearches Development and Conservation Programme

Bioresearches Development Conservation Program (l 2015) BDCP 2012. Restoration and the Conjunctive Sustainable Management of Native Mangroves and Nypa Palms in the Cross-river Estuary of Nigeria

Daura A. S. (2000). "Keynote address Nigeria Conservation Foundation (NCF) 20th

Anniversary Public Lecture Series No.: 2. NCF.

Gastron, K. J. (2010). Biodiversity in Sodhin, Enrich -PR Editors. Conservation Biology for All, Oxford University Press.