

# Effect of Environmental Sanitation on Environmental Performance of Selected Communities in Akure, Ondo State, Nigeria

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**Abstract:** This study assessed the effect of environmental sanitation on the environmental performance of Akure, Ondo State. Survey research design was adopted in which 395 questionnaires were administered to respondents from selected 15 communities in the study area using simple random sampling technique. The data collected was analysed using Statistical Package for Social Sciences and Partial Least Square Structural Equation Modelling). The findings of the study showed that with a grand mean value of 0.30, there is a moderate level of public attitudes towards environmental sanitation in Akure. The result of the regression analysis on the effect of environmental sanitation on environmental performance revealed that gaseous emission control personal hygiene, and noise regulation have significant effect on air quality dimension of environmental performance. Also, the study found that noise regulation proper waste disposal and potable water supply have significant effect on noise quality. While personal waste disposal, portable water supply, noise regulation and gaseous emission control have significant effect on the water quality performance of the environment. The study recommends, that continuous sensitization and enlightenment programme be carried out by the appropriate government institutions to educate the populace on the need to imbibe good environmental sanitation practices with a view to improving the environmental performance of the study area.

**Keywords:** Environmental Sanitation, Environmental Performance, Public Attitude

## I. INTRODUCTION

All over the world, poor environmental quality is increasingly recognized as a major threat to social and economic development and even to human survival (Acheampong, 2010). The impacts of environmental deterioration are severe on developing countries thus hindering and undermining their development (Bello, 2007). Environmental sanitation is the practice of collection, reuse and disposal of human excreta and domestic wastes with the overall objective to protect the human health (Vivienne, 2014). In an attempt to keep the environment clean, it is the human lives that are paramount. The concept of environmental sanitation entails the control of water supplies, excreta disposal, waste water disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and the safety of the working environment (Acheampong, 2010). Mmom and Mmom (2011) opined that effective environmental sanitation

in cities is a function of positive environmental behavior and availability of facilities and services. Atasoy (2005) stated that environmental problems have become globalized and have reached the stage where they present a threat to life on earth. He further stated that the situation has led to the review of people's relationship with nature, their attitudes and behaviors towards the environment, the duties and responsibilities assumed by the individual towards nature, and the redefinition of ecological culture and environmental awareness. In a simple parlance, environmental sanitation is the sum total of activities embarked upon by people to promote healthy living conditions. This view is complemented by Daramola (2012), Afon and Faniran (2013) that availability of adequate environmental sanitation facilities and enabling environmental sanitation policies positively influence the achievement of a healthy living environment.

Environmental sanitation is a major developmental issue on the agenda of Governments and development agencies worldwide. In Nigeria, adequate environmental sanitation has not been strictly adhered to. Its practices in the country are characterized by lack of basic amenities and poor sanitation behaviour thus having serious consequences for health on citizens. The living environment in the country is well polluted owing to social misdemeanour of citizens. It is also one of the identifiable sectors that keeps receiving attention from researchers, NGOs and international organisations such as the UN and the World Bank. At the UN Summit on Sustainable Development, held in New York in 2015, world leaders adopted the post-2015 development agenda to halve the proportion of the global population lacking adequate sanitation by 2030. To meet this ambitious target, the United Nations believes that coordinated action is required, not just from governments, but also from various actors and players in the sanitation sector. The need for collaboration and partnerships between communities and sanitation agencies of all kinds does not need further emphasis (Manase et al., 2004). The quality of environment is essential for the health of both adults and children. According to WHO (2013), more than 2.4 billion people in the world currently lack access to adequate environmental sanitation and are forced to dispose their excreta in unimproved and unsanitary conditions. Majority of these people are found in Africa and other developing

countries of the world. Ekong (2015) provided that environmental sanitation problems are responsible for about 30% of the burden of diseases in sub-Saharan Africa. The impacts of poor environmental sanitation situations are severe on Nigeria thus hindering and undermining its development.

Poor sanitation record has prompted a number of studies in the area of environmental performance (Ayee and Crook, 2003; Awortwi, 2004; Owusu, 2010; Salifu et al., 2005; Saywell and Hunt, 1999; King et al., 2001; Obirih-Opareh and Post, 2002; Oduro-Kwarteng, 2011; Oteng-Ababio, 2010; Mansour and Esseku, 2017). According to extant literature, the dysfunctional environmental sanitation across the world and particularly in the study area, can be linked to inadequate sanitation facilities, unhygienic sanitation practices and lack of political will to deal with sanitation among others. These scenarios have in turn become a recipe for disaster in urban centres. It is on this note that this study was designed to assess the influence of environmental sanitation on the environmental performance of communities in Akure, Ondo State.

## II. LITERATURE REVIEW

### 2.1 *Environmental Sanitation*

The world Health Organization (WHO) (2008) defined environmental sanitation as the control of all those factors in man's physical environment, which exercise or may exercise a deleterious effect on his physical development, health and survival. In the view of Vivienne (2014), environmental sanitation is the practice of collection, reuse and disposal of human excreta and domestic wastes with the overall objective to protect the human health. Environmental sanitation refers to efforts or activities aimed at developing and maintaining a clean, safe and pleasant physical environment in all human settlements. It includes the control of aspects of waste that may lead to the transmission of diseases.

The concept of environmental sanitation entails the control of water supplies, excreta disposal, waste water disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and the safety of the working environment (Acheampong, 2010). Mmom and Mmom (2011) opined that effective environmental sanitation in cities is a function of positive environmental behavior and availability of facilities and services. In a simple parlance, environmental sanitation is the sum total of activities embarked upon by people to promote healthy living conditions.

### 2.2 *Environmental Performance and Performance Indicators*

Different definitions of environmental performance have been offered in relation to the business sphere. In this regard, Lober (1996) considers environmental performance as the commitment of organizations to preserve and protect their natural environment with its multi-dimensional characteristics, such as maintaining the quality of air, water, sound *etc.* Another definition states that environmental

performance refers to the effects of business activities and products on the natural environment, such as resource consumption, waste generation and emissions (Epstein, 1996). Several components of environmental performance involve the minimization of pollutants, conserving resources, waste reduction, energy conservation, marketing of safe products and reporting potential risks, among others. Environmental performance can also mean the effect, either regulated or unregulated of a facility on air, water, natural resources and human health.

In order to promote active and voluntary environmental efforts, it is necessary to precisely measure and evaluate the impacts or burden of organization's activities on the environment and the outcomes of environmental actions (environmental performance). What is required for measuring and evaluate environmental performance are environmental performance indicators. Environmental performance indicators promote environmental efforts of business organizations. It could become an important foundation of environmental information, which would promote environmental efforts in the entire society. It is thus necessary to establish a mechanism to examine whether the environmental policies being implemented at the local, regional, national and global levels actually correspond to the environmental objectives initially set. The UN identifies these three (3) major environmental performance indicators viz; Air quality, water quality and noise quality and their consequential effect on public health.

#### i. Air Quality

Air quality is a measure of how clean or polluted the air is. Monitoring air quality is important because polluted air can pose serious danger to human health and the sustainability of the environment. Air pollution results when the air is contaminated with pollutants like ground level ozone, particulate matters, carbon dioxide, Sulphur dioxide or nitrogen dioxide and render it unfit for human and animal use. (WHO, 2021) states that air pollution kills an estimated seven million people worldwide every year. Air quality is measured with a parameter called air quality index which works like a thermometer that runs from 0-500 degrees. The higher the value of AQI, the greater the level of air pollution and the greater the health concern. Five major air pollutants regulated to protect public health are; Ground level ozone, particulate matter, carbon monoxide, Sulphur dioxide and nitrogen dioxide.

#### ii. Water Quality

Water quality is the condition of the water, including chemical, physical and biological characteristics, usually with respect to its suitability for a particular purpose such as drinking, swimming, fish pond *etc.* It can also be regarded as the measure of the condition of water relative to the requirements of one or more biotic species and/or to any human need or purpose (Chapman, 1996; Chilton, 1996). Water is the second most important need for life to exist after air and as such deserve good quality for human health and the

survival of the ecosystem. Poor water quality poses a health risk for living organisms in the environment, especially the aquatic organisms. Water pollution occurs when water bodies is polluted by contaminants, usually as a result of human activities. Water quality can be classified into four types viz; potable, palatable, contaminated and Infected water

### iii. Noise quality

The human ear and lower auditory system continuously receive stimuli from the world around us. However, this does not mean that all the acoustical inputs are necessarily disturbing or have harmful effects. This is because the auditory nerves provide activating impulses to the brain that enable us to regulate the vigilance and wakefulness necessary for optimal performance. Below are some of the effects of noise pollution viz; (i) Interference with communication (ii) Noise induced hearing impairment (iii) Sleeping disturbance effects (iv) Cardiovascular and psychophysiological effects (v) Mental effects (vi) Effects on performance (vii) Annoyance responses (viii) Effects on social behavior.

### 2.3 Public Attitudes towards Environmental Sanitation

According to Olowoporoku (2017) on his assessment of environmental sanitation situation in Nigeria, environmental sanitation should not be viewed alone from the promulgation of laws for citizens and periodic conduct of exercise only, rather it should be seen as a civic responsibility involving all levels of human activity, sound environmental sanitation management ensures that appropriate intervention are introduced and implemented to promote behaviour change and the attitude and behaviour of the stakeholders on environmental issues determine its end. In Adah's (2013) work on the attitudes of people of Nasarawa State towards environmental sanitation, a case study of Lafia Local Government Area, he asserted that the issue of environmental sanitation is nationwide, but the degree of attitude varies. The characteristic of environmental sanitation is a problem which exists by such factors as uncontrolled reuse, disposal, lack of good water supplies, well-constructed street, and pollution and

most of these problems either causes diseases, or reduce the life span of the people. Napari and Cobbinah (2014), in their research used questionnaire to collect data on environmental sanitation dilemma among the residents of Tamale metropolis in Ghana. The study found that poor attitudes of city residents towards environmental sanitation coupled with weak institutional facilities affect the development of cities.

### 2.4 Theoretical Framework

The field of environmental psychology is loaded with models developed to explain environmental behaviour. The models were developed to understand which factors promote or inhibit environmental behaviour (Steg & Vlek, 2009). However, in this study, three selected theories of environmental behaviour (Theory of Planned Behaviour, Norm Activation Model and Values-Beliefs-Norms Theory) were reviewed. The determination to reviewing the theories was based on their utility in examining the antecedents of pro-environmental behaviour. The theories are reviewed to serve as theoretical basis in understanding the antecedents (both motivational and contextual factors) of environmental sanitation behaviour. The theory of planned behaviour (TPB) holds that only specific attitudes toward the behaviour in question can be expected to predict that behaviour. The indication of TPB is that environmental performance will improve in a community where there is a good attitude of the community members towards proper environmental sanitation. This corroborated assertion of values-beliefs-norm theory which provided that the incorporation of pro-environmental attitude among community members reinforces values and beliefs that will encourage proper sanitation.

### 2.4 Conceptual Framework and Hypotheses

The conceptual framework illustrates the relationship between environmental sanitation and environmental performance. According to Mugenda and Mugenda, (2003), a conceptual framework helps to show graphically or diagrammatically a proposed relationship among various variables in a study. Environmental sanitation is the independent variable while environmental performance is the dependent variables.

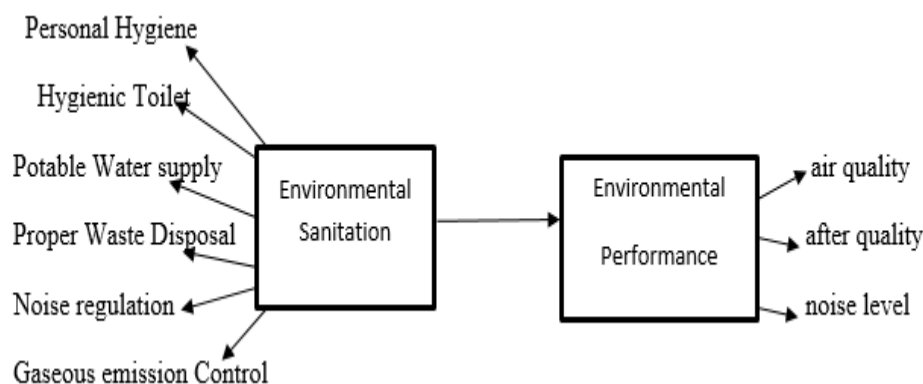


Figure 2.1: Conceptual Framework

The following hypotheses were tested in this paper:

H<sub>01a</sub>: environmental sanitation does not have significant effect on Air quality of Akure

H<sub>01b</sub>: environmental sanitation does not have significant effect on water quality of Akure

H<sub>01c</sub>: environmental sanitation does not have significant effect on noise quality of Akure

### III. METHODS

This section presents the design, population, sampling technique and method of data collection and analysis for the study. This study adopted a descriptive survey research approach to assess the effect of environmental sanitation on environmental performance of Akure, Ondo State. The choice of this research approach was based on the nature of the research problems under investigation (Creswell, 2009). It focused on the descriptive and the hypothesis testing due to the objectives of the study aimed at investigating and validating the relationships among the study variables.

The population of the study comprised 33,171 members of selected 15 communities in Akure, Ondo State, Nigeria. A total sample size of 395 was drawn from the total population using simple random sampling technique, which is a fair representation of the target population. Primary data was collected using structured questionnaires, which was self-administered to the selected respondents. The questionnaire was quantified on a 5-point rating scale starting from Strongly Disagreed (SD), Disagreed (D), Neutral (N), Agreed (A) and Strongly Agreed (SA). The questionnaire was designed in such a way that every question in the questionnaire was related to the research questions and hypotheses of the study. According to Currie (2005), questionnaire is one of the result oriented surveying techniques especially when opinions of the respondents are involved. This study employed the use of both Partial Least Squared Structural Equation Modelling (PLS-SEM) and Statistical Package for Social Sciences (SPSS) for data analysis. The SPSS was used for both the preliminary data analysis such as detection and treatment of missing data, normality, linearity and the descriptive analysis, which include the frequency, mean and standard deviation. PLS-SEM was used for the regression analysis, to estimate the measurement and structural model of the study (Rindl et al., 2005).

### IV. FINDINGS

A total of 395 copies of survey questionnaire were distributed to the respondents in the study area, 344 usable questionnaires were returned thereby representing 80.1% response rate.

#### 4.1 Demographic characteristics of respondents

The demographic result revealed that 35% of the respondents are between the age of below 21 years and 10.5% are between 31 - 40 years (10.5%) of age. The remaining age group are 21 - 30years (29.4%), 41– 50 years (13.4%) and above 51 years (11.3%). The result indicates that the respondents are within

their active age to be involved in community sanitation projects. In addition, the result revealed a fair representation of the demographic characteristics of the respondents in relation to gender with 56.7% being male and 43.3% representing females. The result also showed that the respondents are secondary school certificate holders (35.8%), and bachelor's degree holders (32.7%). Postgraduate level (Doctorate degree) (13.1%) are the least represented. 18.6% of the respondents have a different kind of educational qualification. Furthermore, the result shows that majority of the respondents have below 5 years (71.2%) work experience, followed by 21.5% respondents have between 6 - 10years, 3.5% have between 11 – 15 years' experience and 2.6% have between 16 – 20 years' work experience. However, only 1.2% of the respondents have over 21 years.

#### 4.2 Public Attitudes towards environmental sanitation

This section presents the description of public attitudes towards environmental sanitation in Akure, Ondo state. The result of the descriptive analysis as shown in Table 1 revealed a minimum value of 1 and a maximum value of 5 for all the items in the study. The mean values of 1.77 indicates that there is low level of public interest in environmental sanitation. The mean value of 2.14 indicates a low attitude towards environmental sanitation. However, the grand mean value (m = 3.03) for public attitude construct indicates a moderate public attitude to environmental sanitation in Akure, Ondo State.

Table 1: public attitude towards environmental sanitation

Cod es	Items	Mean	Std. Deviati on
PA1	I show keen interest in environmental sanitation	3.95	1.084
PA2	I participate willingly in environmental sanitation	3.88	1.03
PA3	I show carefree attitude towards environmental sanitation	2.14	1.22
PA4	I'm not interested at all in environmental sanitation	1.77	0.939
PA5	I'm coerced to participate in environmental sanitation	2.59	1.267
PA6	I consider environmental sanitation as government business	2.78	1.499
PA7	I consider environmental sanitation as joint responsibilities of both government and the public	4.14	1.24
PA		3.0341	0.46447

Low Attitude = 1 – 2.33; Moderate Attitudes = 2.34 – 3.66; High Attitude = 3.67 – 5.00

#### 4.3 Measurement Model: items loading, Average variance extracted and composite reliability

This study assessed the measurement model through the convergent validity which indicates the degree to which several items measuring a certain concept agreed. The loadings, average variance extracted (AVE), and composite reliability (CR) was assessed for the achievement of validity.



The result of the statistical analysis as shown in Table 2 indicates a good item loading above the threshold of 0.4 recommended by Hair et al., (2013). The result of internal consistency revealed that the values for composite reliability are all above the threshold values of 0.7 indicating a good internal consistency among the constructs. In addition, the result of the AVE shows that the values of all the construct are well above the threshold value of 0.5 indicating that the amount of extracted variance by the latent variables are above 0.5. These results indicate that the values of the item loading, composite reliability and AVE all exceed the threshold values and hence, achievement of convergent validity.

Table 2: Confirmatory factor analysis result

Constructs	Items	Loadings	Cronbach's Alpha	Average Variance Extracted (AVE)
Air Quality	AQ4	0.838	0.7640	0.6780
	AQ5	0.848		
	AQ6	0.782		
Gaseous Emission Control	GEC1	0.796	0.8080	0.6310
	GEC2	0.73		
	GEC3	0.873		
	GEC6	0.774		
Hygienic Toilet Facility	HTF1	0.932	0.8330	0.8570
	HTF5	0.92		
Noise Quality	NQ1	0.663	0.8190	0.5290
	NQ2	0.851		
	NQ3	0.799		
	NQ4	0.698		
Noise Regulation	NR1	0.657	0.8190	0.5290
	NR2	0.437		
	NR3	0.773		

	NR4	0.825		
	NR5	0.845		
	NR6	0.75		
Public Attitude	PA1	0.935	0.8860	0.8160
	PA2	0.929		
	PA7	0.843		
Personal Hygiene	PH1	0.827	0.8560	0.6980
	PH2	0.889		
	PH5	0.826		
	PH6	0.798		
Proper Waste Disposal	PWD3	0.757	0.7300	0.5950
	PWD4	0.928		
	PWD6	0.591		
	PWS1	0.889		
	PWS2	0.805		
	PWS7	0.837		
Water Quality	WQ1	0.814	0.8530	0.5850
	WQ2	0.839		
	WQ3	0.877		
	WQ4	0.831		
	WQ5	0.608		
	WQ6	0.56		

### 4.3 Assessment of structural model and hypotheses testing

This section presents the results of the hypothesized relationships between environmental sanitation and environmental performance in Akure. Table 3 presents the relationship among the variables and their respective t-value, p-values and decision made on each hypothesis.

Table 3: Effect of environmental sanitation on environmental performance of Akure

Hypotheses	Relationship	Original Sample (O)	Std Dev	T-Value	P Values	Decision
H <sub>01a</sub>	GEC -> AQ	0.211	0.073	2.865	0.004	Significant
	HTF -> AQ	0.122	0.128	0.953	0.341	Not Significant
	PH -> AQ	0.187	0.083	2.245	0.025	Significant
	NR -> AQ	0.120	0.051	2.356	0.019	Significant
	PWD -> AQ	0.115	0.085	1.348	0.178	Not Significant
	PWS -> AQ	0.165	0.108	1.527	0.127	Not Significant
H <sub>01b</sub>	NR -> NQ	0.442	0.044	10.078	0.000	Significant
	GEC -> NQ	-0.034	0.061	0.550	0.582	Not Significant
	HTF -> NQ	0.087	0.104	0.836	0.403	Not Significant
	PH -> NQ	-0.029	0.060	0.472	0.637	Not Significant
	PWD -> NQ	0.122	0.067	1.816	0.069	Significant
	PWS -> NQ	0.420	0.102	4.113	0.000	Significant

<b>H<sub>01c</sub></b>	<b>PH -&gt; WQ</b>	-0.050	0.057	0.875	0.381	Not Significant
	<b>HTF -&gt; WQ</b>	-0.017	0.095	0.177	0.860	Not Significant
	<b>PWD -&gt; WQ</b>	0.183	0.055	3.317	0.001	Significant
	<b>PWS -&gt; WQ</b>	-0.353	0.086	4.107	0.000	Significant
	<b>NR -&gt; WQ</b>	0.220	0.040	5.442	0.000	Significant
	<b>GEC -&gt; WQ</b>	-0.165	0.058	2.860	0.004	Significant

The result of the regression analysis on the effect of environmental sanitation on environmental performance of Akureas shown in Table 3 revealed that three (3) out of the six hypothesized relationship between environmental sanitation and environmental performance showed evidences of significant effect. Specifically, the result revealed that gaseous emission control (GEC) ( $\beta = 0.211$ ;  $t = 2.865$ ;  $P < 0.05$ ), personal hygiene (PH) ( $\beta = 0.187$ ;  $t = 2.245$ ;  $P < 0.05$ ), and noise regulation (NR) ( $\beta = 0.120$ ;  $t = 2.356$ ;  $P < 0.05$ ) showed significant positive effect on air quality dimension of environmental performance. These findings imply that increase in gaseous emission control (GEC), personal hygiene and noise regulation will improve the air quality of the environment in Akure, Ondo State. This finding is in-line with the study of Alabi (2010) and Robinson (2002) who identified that the implementation of appropriate health and hygiene practices improves the quality of air by reducing the rate of communicable diseases outbreaks. Also, Alabi (2010) posited that hygienic environment promotes the quality of air in the environment. However, the remaining relationship between hygienic toilet facilities (HTF), proper waste disposal (PWD) and potable water supply (PWS) do not have significant effect on air quality of environmental performance.

Furthermore, the result of the regression analysis of the effect of environmental sanitation on noise quality of environmental performance indicated that only the hypothesized relationships between noise regulation (NR) ( $\beta = 0.442$ ;  $t = 10.078$ ;  $P < 0.05$ ), proper waste disposal (PWD) ( $\beta = 0.122$ ;  $t = 1.816$ ;  $P < 0.05$ ) and potable water supply (PWS) ( $\beta = 0.420$ ;  $t = 4.113$ ;  $P < 0.05$ ) have significant effect on noise quality. The remaining hypotheses between gaseous emission control (GEC), hygienic toilet facilities (HTF) and personal hygiene (PH) do not significantly influence noise quality of the environment. These findings imply that increase in the noise regulation, proper waste disposal and potable water supply will improve the noise quality of the environment. The findings of this study of Dwivedi and Sharma (2007) and Acheampong (2010) who identified among others that pleasant physical environment through water supply, waste water disposal, solid waste disposal, ensures the promotions of physical well-being of all sections of the population.

## V. DISCUSSION

The significant effect of GEC, PH and NR on AQ of environmental performance indicated positive values which implies that the more communities implement these dimensions of environmental sanitation, the higher their environmental

performance, except for HTF, PWD and PWS which implies that increase in these dimensions will lower the environmental performance. Also, if NR, PWD and PWS increase in their dimensions, it will affect the NQ of environmental performance positively, except the dimensions of GEC, HFT and PH whose effect is not significant because of the negative values. Lastly. The significant positive effects of PWD, PWS, NR and GEC on the WQ of environmental performance shows that the more communities implement those dimensions of environmental sanitation practices, the more it enhances its environmental performance. However, the negative values of PH and HTF implies that more of its dimensional increase will lead to decrease in the WQ of environmental performance in the area. The findings are in line with the result of Wakule et, al (2016). This therefore agrees with Larri (2016) that improved environmental sanitation practices improves the environmental performance of communities and its overall effect on human health and survival.

## VI. CONCLUSION AND RECOMMENDATION

The study concludes that there is a moderate level of public attitudes towards environmental sanitation in the communities, showing that majority of the people implement improved environmental sanitation practices in the area. The study also established that gaseous emission control, personal hygiene and noise regulation significantly predict air quality; noise regulation, portable water supply and proper waste disposal significantly influence noise quality while proper waste disposal, portable water supply, noise regulation and gaseous emission control influence water quality in Akure, Ondo State. Based on the findings of the study, it is recommended that there is need for continuous sensitization and enlightenment of the public on the need to maintain good environmental sanitation attitudes that can engender positive environmental performance outcomes.

## VII. SUGGESTION FOR FURTHER STUDIES

The study collected data from only a selected portion of the study area which may limit the ability to generalize the result of the study across other population of similar. Hence, future studies should increase the scope of the research to cover other major communities in the study area.

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