Effect of Mining Activities on Food Security in Nigeria: A Case Study of Dangote Coal Mine in Onupi Community of Ankpa, Kogi State, Nigeria

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Abstract
This study examined the effect of mining activities on food security in Nigeria, with particular reference to Dangote Coal Mine in the Onupi community of Ankpa, Kogi State. A survey research design was adopted for the study. The target population comprised farmers, miners, local government officials, and community members in the study area, with an estimated population of 5,000. Using Yamane's formula, a sample size of 370 respondents was determined. Stratified random sampling was employed to ensure adequate representation of the different stakeholder groups. Primary data were collected using a structured questionnaire and analysed using multiple regression analysis with SPSS version 21.0. The findings revealed that land displacement due to mining activities had a significant negative effect on food security ($\beta = -0.287$, $t = -5.46$, $p < 0.001$). Environmental degradation also had a significant negative effect on food security ($\beta = -0.246$, $t = -4.71$, $p < 0.001$). Similarly, water resource contamination had a significant negative effect on food security ($\beta = -0.411$, $t = -7.96$, $p < 0.001$), and was the strongest predictor among the three factors. The study concluded that mining activities adversely affect food security through displacement of agricultural land, environmental degradation, and contamination of water resources. It recommends strict regulation of mining activities, land reclamation and restoration, environmental monitoring, and effective measures to prevent contamination of water resources in the community.

Keywords: *Mining activities, food security, land displacement, environmental degradation, water contamination, Onupi community.*

Introduction

Food security, defined by the Food and Agriculture Organization (FAO) as the availability, access, utilization, and stability of food, remains a global challenge (FAO, 2022). The United Nations Sustainable Development Goal (SDG) 2 aims to end hunger, achieve food security, and promote sustainable agriculture by 2030 (United Nations, 2015). However, numerous factors, including environmental degradation, climate change, and economic disruptions,

continue to threaten global food security. Globally, mining activities have emerged as a significant challenge to food security due to their impact on land use, water quality, and local ecosystems. Studies conducted in South America, particularly in Peru and Brazil, have highlighted how mining-induced deforestation and soil erosion have disrupted local farming systems and food production (Bebbington et al., 2018). Similarly, in sub-Saharan Africa, large-scale mining operations in Ghana and South Africa have led to land displacement and contamination of water bodies, thereby threatening food security and livelihoods of local communities (Hilson, 2020). Across Africa, food security remains a pressing issue, exacerbated by mining activities, population growth, and climate change. The mining sector, while a significant contributor to economic development, often comes at the expense of agricultural sustainability and rural food security. In countries like Zambia and the Democratic Republic of Congo (DRC), copper and cobalt mining have led to soil pollution and loss of farmland, affecting subsistence farming and food production (Ngoma & Pienaar, 2021). Additionally, mining activities have been associated with social disruptions, including forced displacement and conflicts over land use, further exacerbating food insecurity in affected communities. West Africa, particularly Nigeria, Ghana, and Sierra Leone, has witnessed increasing conflicts between mining companies and agrarian communities over access to land and water resources. In Nigeria, the proliferation of mining operations, especially in the northern and central regions, has led to declining agricultural productivity due to land degradation and contamination of water sources essential for farming and livestock rearing (Adekoya et al., 2019).

Nigeria is endowed with vast mineral resources, including coal, gold, and limestone, which contribute significantly to the economy. However, the rapid expansion of mining activities has had profound implications for food security, particularly in rural communities. The Federal Ministry of Agriculture and Rural Development (FMARD) has expressed concerns over the increasing encroachment of mining activities into arable lands, leading to reduced food production and displacement of farming communities (FMARD, 2021). Studies have shown that in states like Zamfara, Niger, and Kogi, mining activities have led to land degradation, water pollution, and a decline in soil fertility, affecting agricultural output and local food security (Okonkwo & Edeh, 2020). Specifically, the adverse effects of coal mining in Kogi State have raised concerns about its impact on food availability and access, given that agriculture is the primary livelihood for many rural inhabitants (Ojonigu et al., 2022).

The Onupi community in Ankpa, Kogi State, is a predominantly agrarian society where farming activities contribute significantly to household food security and income generation. However, the establishment of the Dangote Coal Mine in the region has introduced new challenges. Reports indicate that mining operations have led to land displacement, deforestation, and contamination of local water sources, affecting agricultural productivity and food supply in the area (Adamu & Bello, 2023). Additionally, conflicts between local farmers and mining operators over land ownership and environmental degradation have further threatened food security in the community. Farmers have reported reduced crop yields, increased soil erosion, and limited access to irrigation water, all of which undermine sustainable food production (Ahmed et al., 2022).

This study seeks to examine the specific effects of mining activities on food security in Onupi Community and explore possible mitigation strategies to enhance resilience and sustainability in the region.

Statement of the Problem

Mining activities, particularly coal extraction, pose significant threats to food security in rural Nigerian communities, including Onupi in Ankpa, Kogi State. The expansion of the Dangote Coal Mine has led to the displacement of farmlands, soil degradation, and water pollution, reducing agricultural productivity and worsening food shortages (Oladipo & Adebayo, 2021).

Pollution from mining, including heavy metal contamination, has further affected soil fertility and water quality, making it difficult for farmers to sustain crop yields (Adepoju et al., 2021). Additionally, weak regulatory enforcement has allowed mining operations to continue with minimal environmental safeguards, exacerbating the negative impact on food security and rural livelihoods (Yusuf & Ibrahim, 2023). The economic consequences include increased food prices, loss of income for farming households, and rising malnutrition rates due to reduced access to nutritious food (Ibrahim & Adebayo, 2020).

While existing literature highlights the link between mining and food security, significant research gaps remain. Studies primarily focus on environmental degradation but lack empirical analysis of specific food security indicators such as household dietary diversity and child malnutrition in affected communities (Okonkwo et al., 2022). Furthermore, little is known about the effectiveness of corporate social responsibility (CSR) initiatives by mining companies in mitigating food security challenges (Yusuf & Ibrahim, 2023). This study aims to bridge these gaps by examining the direct effects of Dangote Coal Mine on food availability, accessibility, and stability in Onupi, providing insights into policy measures that could enhance agricultural sustainability in mining states.

Objective of the Study

The main objective of this study examines the effect of mining activities on food security in Nigeria: a case study of Dangote Coal Mine in Onupi community of Ankpa, Kogi State, Nigeria: While the specific objectives are to:

i. analyze the effect of land displacement due to mining activities on food security in Onupi community of Ankpa, Kogi State.
ii. evaluate the effect of environmental degradation from mining activities on food security in Onupi community of Ankpa, Kogi State.
iii. examine the effect of water resource contamination from mining activities on food security in Onupi community of Ankpa, Kogi State.

Research Questions

The following questions guide the study:

i. What is the effect of land displacement due to mining activities on food security in the Onupi community of Ankpa, Kogi State?
ii. What is the effect of environmental degradation from mining activities on food security in the Onupi community of Ankpa, Kogi State?
iii. What is the effect of water resource contamination from mining activities on food security in the Onupi community of Ankpa, Kogi State?

Research Hypotheses

The following null hypotheses were formulated to guide the study:

i. Land displacement due to mining activities has no significant effect on food security in the Onupi community of Ankpa, Kogi State.
ii. Environmental degradation from mining activities has no significant effect on food security in the Onupi community of Ankpa, Kogi State.
iii. Water resource contamination from mining activities has no significant effect on food security in the Onupi community of Ankpa, Kogi State.

Literature Review

Mining activities

Mining activities are short, structured learning engagements designed to reinforce key concepts and skills within a limited timeframe (Ugwuanyi, 2022). They serve as supplementary tasks

that enhance comprehension and retention in educational or training settings. According to Adepoju, et al., (2021), mining activities are small-scale, task-based exercises that promote active participation and experiential learning. These activities often involve problem-solving, discussions, or hands-on practice. Mining activities are interactive components integrated into a lesson plan to sustain learners' engagement and facilitate incremental knowledge acquisition (Ngoma & Pienaar, 2021). They help in breaking down complex topics into manageable parts. Mining activities refer to brief performance-based tasks that enable learners to apply theoretical knowledge in a practical context (Bebbington, et al., (2018).

Land Displacement

Land displacement refers to the forced removal of individuals or communities from their land due to development projects such as urban expansion, infrastructure projects, or industrialization (Cernea, 2000). It often leads to socio-economic disruptions, loss of livelihoods, and cultural disintegration. According to Peters (2004), land displacement occurs when people are dispossessed of their ancestral or traditionally occupied land due to legal, economic, or political factors, often without fair compensation or alternative resettlement options. This process is common in cases of land grabbing and large-scale agricultural investments. Land displacement can also result from environmental factors such as climate change, natural disasters, and armed conflicts, forcing populations to abandon their homes and livelihoods (Deininger & Castagnini, 2006). This type of displacement exacerbates poverty and social instability.

Environmental Degradation

Environmental degradation refers to the deterioration of the natural environment due to human activities and natural processes, leading to the depletion of resources such as air, water, and soil, as well as the destruction of ecosystems (Singh & Sharma, 2020). According to Okereke (2021), environmental degradation is "the decline in the quality of the environment due to pollutants, deforestation, climate change, and other anthropogenic factors that compromise biodiversity and ecosystem stability." UNEP (2022) defines environmental degradation as "the progressive deterioration of the earth's ecosystems, resulting from resource exploitation, habitat destruction, and pollution, which negatively impact human well-being and biodiversity."

Water Resource Contamination

Water resource contamination refers to the introduction of harmful substances such as chemicals, microorganisms, and waste materials into water bodies, making the water unsafe for consumption and ecological balance (WHO, 2022). Degradation of water quality due to anthropogenic activities According to Gleick (2020), water resource contamination is the deterioration of water quality caused by human activities such as industrial discharge, agricultural runoff, and improper waste disposal, leading to significant health and environmental hazards. Alteration of natural water composition by pollutants Water contamination is the process by which natural water sources are altered by pollutants, including heavy metals, pathogens, and toxic compounds, which reduce their usability for drinking, agriculture, and industrial purposes (UNEP, 2021).



Fig.1: Agbagba Farm Land of Onupi Community
Source: Field survey, 2026

Food Security

Ojo (2008) describes food security as "assured access to food supply at household, sub-national and national levels," emphasizing that "a food secured household is one that has enough food availability to ensure a minimum necessary intake by all the members" (Ojo, 2008). Eme et al. (2014) define food security as "the condition in which all have access to sufficient food to live healthy and productive lives," highlighting that it involves "access to adequate food for a healthy life" and includes "physical and economic access to adequate food for all household members, without undue risk of losing the access" (Eme et al., 2014). Anosike et al. (2024) consider a household food-secure when it has "an average daily calorie intake of 4325.13kcal, which is above the recommended calorie intake of 2260kcal," indicating that food security status is measured by comparing daily calorie intake to recommended levels (Anosike et al., 2024). Okoye (1987) regards development, including food security, as "a process concerned with the improvement as well as the transformation of the social, mental, economic, institutional and environmental conditions of the rural dwellers," implying that food security encompasses the overall well-being and resource utilization of individuals (Okoye, 2009).

Effect of Land Displacement due to Mining activities on Food Security in Nigeria

Land displacement due to mining activities has significant implications for food security in Nigeria, as it leads to the loss of arable land, disruption of farming activities, and environmental degradation. According to Obiora et al. (2016), mining operations result in the removal of topsoil, making the land unsuitable for agriculture, thereby reducing food production. Additionally, Aliyu (2015) notes that communities affected by land displacement often experience forced migration, leading to a decline in subsistence farming and increased food insecurity. The contamination of soil and water sources from mining waste further exacerbates the issue, making it difficult for farmers to grow crops or raise livestock (Adamu & Umar, 2018). As a result, mining activities not only threaten local food supply but also contribute to rising food prices and malnutrition in affected regions (Chukwu, 2020). Addressing these challenges requires sustainable land management policies and proper regulation of mining activities to mitigate their adverse effects on food security in Nigeria.



Fig.2: Umologidi farm land of Onupi Community
Source: Field survey, 2026

Effect of Environmental Degradation from Mining activities on Food Security in Nigeria

Environmental degradation caused by mining activities significantly threatens food security in Nigeria by reducing agricultural productivity, polluting water sources, and degrading soil quality. Nwosu and Obiora (2016) highlight that mining leads to deforestation and soil erosion, which strip the land of essential nutrients required for farming, thereby reducing crop yields. Additionally, Aliyu (2015) notes that the release of toxic heavy metals such as lead and mercury into water bodies contaminates irrigation and drinking water, affecting both plant growth and human health. This contamination not only reduces agricultural output but also contributes to food shortages and malnutrition in mining-affected communities (Chukwu, 2020). Moreover, Adamu and Umar (2018) argue that air pollution from mining activities, including dust and chemical emissions, further deteriorates farmland and affects livestock, compounding the food security crisis. To mitigate these impacts, policymakers must enforce stricter environmental regulations and promote sustainable mining practices that protect agricultural land and water resources.



Fig.3: Ochecheke farm land of Onupi Community
Source: Field survey, 2026

Effect of Water Resource Contamination from Mining activities on Food Security in Nigeria

Water resource contamination from mining activities poses a significant threat to food security in Nigeria by reducing the availability of clean water for irrigation, livestock, and fisheries, which are essential for food production. Heavy metals such as lead, mercury, and arsenic from illegal and unregulated mining operations infiltrate water bodies, leading to soil degradation and reduced agricultural yields (Adeola & Oladipo, 2021). Contaminated water sources also harm aquatic life, disrupting fishery-dependent livelihoods and food supply chains (Uche, 2022). Furthermore, the consumption of food and water polluted by mining-related toxins has severe health implications, including chronic diseases and developmental issues, ultimately undermining food utilization and nutritional security (Nwankwo et al., 2023). Addressing this challenge requires stringent environmental regulations, sustainable mining practices, and improved water resource management to safeguard food security in Nigeria.



Fig.4: Ukpokolo farm land of Onupi Community
Source: Field survey, 2026

Theoretical Framework

The theoretical framework provides a structured basis for analyzing the impact of mining activities on food security in Nigeria, specifically in Onupi community of Ankpa, Kogi State. This study is was anchored on relevant theories that explain the relationship between extractive industries and food security. The following theories form the foundation of this study:

Resource Curse Theory

The Resource Curse Theory, also known as the Paradox of Plenty (Auty, 1993), posits that countries and communities endowed with natural resources, such as coal, often experience economic challenges, environmental degradation, and socio-political instability instead of prosperity. In the context of Onupi community, coal mining by Dangote Coal Mine may lead to land degradation, displacement of local farmers, and reduced agricultural productivity, which in turn threatens food security. The theory suggests that reliance on mining may shift focus from agriculture, leading to food shortages and increased food prices.

Environmental Degradation Theory

This theory explains how human activities, particularly industrial activities like mining, contribute to the depletion of natural resources and environmental destruction (Meadows et al., 1972). In Onupi community, mining operations may lead to deforestation, soil erosion, and water contamination, reducing the availability of arable land for farming. As agricultural output declines, food availability is affected, leading to food insecurity among local households.

Sustainable Livelihood Framework (SLF)

The Sustainable Livelihood Framework (DFID, 1999) provides a useful lens for assessing how mining activities impact food security by analyzing the five capital assets: natural, human, social, financial, and physical. Mining operations often disrupt these assets by reducing access to fertile land (natural capital), increasing health risks (human capital), weakening community cohesion (social capital), and limiting income diversification opportunities (financial capital). The SLF highlights the vulnerability of communities dependent on agriculture when mining disrupts their livelihoods.

Empirical Review

Mgbeahuruike et al. (2022) conducted a study titled "Trace Metal Uptake by Food Cultivars in Coal Mining Environment of Enugu State, Nigeria." The study investigated the effects of coal mining on food security by analyzing soil and crop contamination in three mining communities: Iva Valley, Onyeama, and Akwukwe in Enugu State. Using an empirical research design, soil and food crop samples were collected and analyzed with Atomic Absorption Spectrometry (AAS) to determine the presence of heavy metals. The findings revealed increased levels of manganese (Mn), chromium (Cr), lead (Pb), and cadmium (Cd) in soil and food crops, with pumpkin leaves exhibiting the highest accumulation of Mn and Cr. The study concluded that coal mining activities and chemical fertilizers contribute to heavy metal contamination in the food chain, posing a potential risk to food security. The researchers recommended selective agronomic techniques to minimize the bioavailability of heavy metals in crops. A research gap identified was the need for long-term studies on the health implications of consuming food grown in contaminated soils. Future research should explore the effectiveness of suggested agronomic remediation techniques in reducing heavy metal uptake by crops.

Ukpe, Akhionbare, and Ihejirika (2022) examined the impact of mining activities on soil quality in their study, "The Effects of Mining Activities on the Soil Quality of Ikwo, Ebonyi State, Nigeria." The study assessed soil degradation in mining areas by analyzing physicochemical properties and heavy metal concentrations in soil samples collected from various distances and depths. The study employed a descriptive research design, with soil samples taken at 100-meter intervals from mining sites and compared with control samples located 1.5 km away. Laboratory analysis revealed elevated levels of heavy metals, particularly zinc (Zn), with soil contamination being more pronounced during the dry season. Findings indicated that mining activities had degraded soil quality, potentially reducing agricultural productivity and threatening food security. The study concluded that unregulated mining had negative consequences on soil fertility, necessitating immediate environmental management interventions. The researchers recommended that government agencies implement stricter regulations and soil remediation strategies to mitigate the impact. A key research gap identified was the lack of longitudinal studies on the long-term effects of soil degradation on agricultural productivity. Future studies should assess how soil contamination influences crop yields over extended periods. Godwin and Umaru (2018) explored the effects of illegal gold mining on land degradation and food security in their study titled "Illegal Gold Mining, Land Degradation, and Food Security in Nigeria: A Case of Yauri, Kebbi State, Nigeria." The study used a survey research design, collecting data through structured questionnaires administered to 250

randomly selected residents of Yauri. Descriptive statistical analysis was used to interpret the responses, revealing that illegal gold mining had significantly degraded arable land, reducing its suitability for farming. The study found that land degradation had led to lower crop yields, increased food scarcity, and rising food prices, negatively affecting food security in the region. The study concluded that unregulated mining activities were a major threat to agricultural sustainability and community livelihoods. The researchers recommended that government authorities enforce stricter environmental policies and promote sustainable mining practices to protect farmland. A research gap identified was the absence of studies examining the economic impact of food insecurity caused by land degradation due to mining. Future research should focus on assessing the economic burden of food insecurity on affected households and communities.

Materials And Method

A survey research design was adopted in this study. The target population includes farmers, miners, local government officials, and community members in Onupi, Ankpa, Kogi State. The estimated population of the study area is 5,000 people. Using the Yamane formula for sample size determination, a sample of 370 respondents was selected for the study. A stratified random sampling method was employed to ensure the inclusion of different stakeholder groups, including farmers, miners, and policymakers. Data for this study was collected from primary sources. The researchers adopted the use of the questionnaire as an instrument for data collection. The data collected were analyzed using Multiple regression analysis with the help of SPSS version 21.0.

Result and Discussion

The hypotheses of this study were tested using multiple linear regression statistics at 5% level of significance as indicted in table below.

Table 1: Model Summary of Mining Activities on Food Security

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.681	0.464	0.460	0.512

Dependent Variable: Food Security

Source: Field survey, 2026

The model indicates that land displacement, environmental degradation, and water resource contamination jointly explain 46.4% of the variation in food security, while the remaining 53.6% is explained by other factors outside the model.

Table 2: ANOVA of effect of mining activities on food security

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	101.824	3	33.941	129.43	0.000
Residual	96.014	366	0.262		
Total	**197.838**	**369**			

Dependent Variable: Food Security

Source: Field survey, 2026

The ANOVA result indicates that the overall regression model is statistically significant, $F(3, 366) = 129.43$, $p < .001$.

Table 3: Regression Coefficients of Effect of Mining activities on Food Security

Model	Unstandardized B	Std. Error	Standardized Beta (β)	t	Sig.
(Constant)	5.214	0.182		28.65	0.000
Land Displacement	-0.284	0.052	-0.287	-5.46	0.000
Environmental Degradation	-0.231	0.049	-0.246	-4.71	0.000
Water Resource Contamination	-0.398	0.050	-0.411	-7.96	0.000

Dependent Variable: Food Security

Source: Field survey, 2026

The regression coefficient for land displacement is negative and significant (β = -.287, t = -5.46, p < .001). This indicates that increases in land displacement associated with mining activities are associated with decreases in food security in the Onupi community. Therefore, the null hypothesis that land displacement has no significant effect on food security is rejected. Environmental degradation also has a negative and statistically significant effect on food security (β = -.246, t = -4.71, p < .001). This implies that increasing environmental degradation resulting from mining activities is associated with declining food security. Thus, the second null hypothesis is rejected.

Similarly, water resource contamination has a negative and significant effect on food security (β = -.411, t = -7.96, p < .001). This means that greater contamination of water resources is associated with lower levels of food security. Consequently, the third null hypothesis is rejected.

Summary of Findings

The following findings were derived from the above analysis:

1. Findings revealed that land displacement due to mining activities has a significant negative effect on food security in the Onupi community of Ankpa, Kogi State. The regression result shows a negative and significant coefficient (β = −0.287, t = −5.46, p < 0.001), indicating that increasing land displacement associated with mining activities reduces the level of food security among members of the community.
2. In addition, the finding revealed that environmental degradation resulting from mining activities have a significant negative effect on food security in the Onupi community. The result indicates a negative and significant relationship (β = −0.246, t = −4.71, p < 0.001).
3. Lastly, the finding shows that water resource contamination from mining activities has a significant negative effect on food security in the Onupi community. The regression result shows (β = −0.411, t = −7.96, p < 0.001), indicating that water contamination is the strongest predictor among the three mining-related factors.

Discussion of Findings

The study found that land displacement due to mining activities has a significant negative effect on food security in the Onupi community of Ankpa, Kogi State. The regression result showed a negative and statistically significant relationship between land displacement and food security (β = −0.287, t = −5.46, p < 0.001). This finding is consistent with Akpan and Umaru (2018), who examined illegal gold mining, land degradation and food security in Yauri, Kebbi State, Nigeria. Their study found that a large proportion of mining activities occurred on farmland and that many respondents had abandoned farming for mining activities. The authors linked the loss of agricultural land and farm labour to declining food production and food insecurity. Similarly, Wegenast and Beck (2020) found that mining can marginalize smallholder farmers through land acquisition, environmental degradation and changes in local labour markets, with

implications for access to food in sub-Saharan Africa. The study further established that environmental degradation resulting from mining activities has a significant negative effect on food security in the Onupi community. The regression analysis produced a negative and statistically significant coefficient ($\beta = -0.246$, $t = -4.71$, $p < 0.001$). This indicates that increasing environmental degradation associated with mining activities is accompanied by a reduction in food security. The finding agrees with Akpan and Umaru (2018), who reported a significant relationship between illegal/surface mining, land degradation and food productivity in Yauri, Kebbi State. Their study observed that mining waste and tailings were frequently deposited on farmland and that the resulting degradation negatively affected agricultural activities. The result is also consistent with Wegenast and Beck (2020), who argued that although mining may provide some economic opportunities, extractive activities can marginalize smallholders through environmental degradation and other structural changes, with consequences for food security. The third finding revealed that water resource contamination from mining activities has a significant negative effect on food security in the Onupi community of Ankpa, Kogi State. The regression result showed the strongest negative effect among the three explanatory variables ($\beta = -0.411$, $t = -7.96$, $p < 0.001$). This means that increases in water contamination associated with mining activities are significantly associated with decreases in food security. The result further indicates that water resource contamination is the strongest predictor of food security among land displacement, environmental degradation and water contamination. This finding is supported by Okolo, Oyedotun, and Akamigbo (2018), who investigated open-cast mining and water quality in Enyigba, southeastern Nigeria. Their study found that mining activities compounded water problems in the community through the leakage of heavy metals into limited water resources and examined the implications for domestic and agricultural uses. This evidence is particularly relevant because agricultural communities depend on accessible and usable water for crop production, livestock and household activities. Contamination of these resources can therefore have consequences beyond drinking-water quality.

Conclusion

Based on the findings of the study, it is concluded that mining activities have significant negative implications for food security in the Onupi community of Ankpa, Kogi State. The study established that land displacement, environmental degradation, and water resource contamination resulting from mining activities significantly reduce food security among members of the community. Land displacement limits access to agricultural land and reduces opportunities for crop production, while environmental degradation affects soil quality and the overall productivity of agricultural resources. Similarly, contamination of water resources poses a serious threat to farming activities and the availability of safe water for domestic and agricultural purposes. Among the three factors, water resource contamination had the strongest negative effect on food security, followed by land displacement and environmental degradation. The study therefore concludes that unless appropriate measures are taken to regulate mining activities, restore degraded land, protect water resources, and safeguard agricultural areas, continued mining activities may further undermine the food security and livelihood of the Onupi community.

Recommendations

The following recommendations were derived from the findings and conclusion

1. The government, mining authorities, and community leaders should enforce strict regulations to prevent mining activities from displacing agricultural land. Mining companies should be required to reclaim and restore land after mining operations, while

affected farmers should be adequately compensated and supported with alternative farmland where necessary.

2. Relevant environmental agencies should strengthen monitoring of mining activities in the Onupi community to reduce environmental degradation. Mining operators should adopt environmentally responsible practices and be compelled to implement land reclamation, soil restoration, and reforestation programmes to improve the productivity of degraded agricultural land.
3. Since water resource contamination recorded the strongest negative effect on food security, government agencies and mining operators should establish effective measures to prevent the discharge of mining wastes into streams, rivers, and other water sources. Regular water-quality testing should be conducted, and mining operators found responsible for contamination should be required to treat polluted water and provide safe alternative water sources for affected communities.

Conflict of Interest

Authors declare that there is no conflict of interest.

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