JOURNAL OF AGRICULTURAL ECONOMICS, EXTENSION & SCIENCES
Official Journal of the College of Agricultural Economics and Extension
www.jaees.org
www.uam.edu.ng
Jaees Vol. 12 No.1 2025, Page 107-119
ISSN (Print) 2545-5179, ISSN (Online) 2714-5018

EFFECTS OF ENVIRONMENTAL DEGRADATION ON AGRICULTURAL PRODUCTION AMONG RURAL FARMERS IN WUKARI LOCAL GOVERNMENT AREA OF TARABA STATE, NIGERIA

Egbeadumah, M. O.[1], Abali, O.[2] and Fiyinbu, E.[1]

[1]*Department of Agricultural Economics and Extension, Faculty of Agriculture and Life Sciences, Federal University Wukari, Taraba State, Nigeria.*
[2]**National Committee for Development of Technology/Ministry of Scientific Research and Innovation, Cameroon.**

Email: odufay@yahoo.com Phone no: 08020654617

Abstract
This study investigated effects of environmental degradation on agricultural production among rural farmers in Wukari Local Government Area of Taraba State. A total of one hundred and twenty (120) copies duly validated questionnaire on Effects of Environmental Degradation on agricultural production (QEEDAP) were used for data collection. Descriptive and inferential statistics were used to analyze the data collected. The result showed that, erosion (49.1%), flooding (29.1%), air pollution (9.1%), water degradation (4.1%), land degradation (5.0%) and noise degradation (3.3%) were identified as major environmental hazards in the study area. The causes of these environmental problems were inadequate drainage pattern (38.3%), erection of building close to rivers/streams channel (2.5%), poor sanitation facilities (5.0%), low level of education (10.0%), illegal felling of economic trees (10.0%). For the regression of effects of environmental degradation, farming activity (3.311) exhibited a positive and statistically significant effect on agricultural production at 1%, The coefficient of inadequate drainage pattern (0.055) showed a positive relationship with agricultural production and statistically significant at 5%, while erection of building close to river/stream channel had a negative coefficient (-0.169), with agricultural production and was statistically significant at 5% level. The study identified some control measures in resolving effects of land degradation, such as adoption of good sanitation programme put in place by the government and dredging of river/stream channel and renovation of damage drainage. The study recommends that governments at all levels should create and implement strong policies to combat environmental degradation.
Keywords: Effects**,** Environment, degradation, Agricultural, production.

1.0 Introduction

Environmental degradation, primarily caused by fossil fuel combustion, biomass consumption, land use changes and international demand, leads to biodiversity loss,

greenhouse gas emissions and agricultural vulnerabilities (Pendrill et al., 2019; Davis & Caldeira, 2010). Deforestation exacerbates these issues, threatening biodiversity and vital ecosystem services like carbon sequestration, climate regulation, and water purification (Rehman et al., 2020; WWF, 2021).

Forests, covering 31% of the world's land, support 1.6 billion people, house 80% of terrestrial biodiversity and provide essential resources like food and medicine (Adams, 2012; WWF, 2021). However, deforestation, particularly in tropical rainforests, jeopardizes these benefits (Matthews et al., 2014). Biodiversity loss, the decline of species, genetic variability, and ecosystems, disrupts the natural cycle and disproportionately impacts poor communities reliant on these resources (Sida, 2010; Arora, 2019; Vedeld et al., 2007; Diaz et al., 2019).

Meeting the demands of a growing global population has led to increased fertilizer and pesticide use and agricultural land expansion, resulting in a 60% rise in emissions over 40 years (Hofstra & Vermeulen, 2016; Fróna et al., 2019). While agriculture faces a symbiotic relationship between emissions and productivity, high biodiversity enhances resilience, reducing risks of crop failure and supporting sustainable farming systems compared to monocultures.

Agriculture occupies over 40% of the EU-28's land, with forests covering a similar proportion (Giannakis & Bruggeman, 2015; Monteleone et al., 2018). It significantly shapes rural landscapes in Europe and Africa, driven by agricultural land use trends such as farmland marginalization, intensification, specialization, and abandonment (Monteleone et al., 2018; Paulo et al., 2016). Increasing consumption of dairy and animal products has spiked demand for feed crops, with livestock farming accounting for 66% of EU agricultural land use (Fróna et al., 2019). However, debt crises

in Mediterranean countries and land redistribution in Eastern Europe have reduced farm numbers (Giannakis & Bruggeman, 2015).

Despite challenges, agriculture remains economically vital, contributing €177 billion to the EU-27 GDP in 2020 and employing 9.7 million people in 2016 (Eurostat, 2020; Eurostat, 2018). Cereals account for 25% of crop production value, with the EU producing 20% of global cereals and exporting 15% (FAO, 2016). In 2017, fresh vegetables worth €34.5 billion were produced, with Spain and Italy contributing 40% (Eurostat, 2019). However, agricultural activities generate 94% of EU ammonia emissions and consume half of all fresh water, straining resources (EEA, 2019).

Environmental degradation, the gradual depletion of the environment, adversely impacts animals, farmland and agricultural productivity. A key challenge is the lack of knowledge or effective strategies to mitigate its effects on agriculture. Land degradation is the most pressing global environmental issue, exacerbated by campaigns promoting fragile ecosystems, leading to desertification and loss of genetic diversity in plant species.

Ukpong (1994) identifies causes of land degradation, including improper resource management, destructive logging, overgrazing, overcropping, flooding, wind erosion, strip mining, pesticide and fertilizer misuse, and wetland destruction for development. Indirect factors include population growth, land ownership disputes, weak enforcement measures, jurisdictional overlap, and inappropriate farming and manufacturing technologies.

2.0 Objective of the Study

i. identify level of awareness to which environmental degradation affects agricultural production.

ii. identify the factors affecting environmental degradation.

iii. ascertain Measures adopted by traditional and State institutions to proffer possible solutions to the problems.

iv. identify constraints to effective control of environmental degradation.

3.0 Methodology

3.1 The Study area

This study was conducted in Wukari Local Government Area of Taraba State, Nigeria .Wukari is within the Southern Guinea Savannah zone of Nigeria. It is at 1450 mm and average daily temperature of 24 at 33 ^{0}C during the rainy season and annual relative humidity of 78 %. It has the total population of 241,546 people, according to the 2016 census. It is located at latitude of 7,850 ^{0}C North, longitude 9,783 ^{0}C East at altitude 152m and has an area of 4.308 kilometers. The river flows through the area and Benue River from a boundary with Nasarawa State to the west (Adamu *et al,* 2020).

Sampling Procedures

The population of this study consists of all farmers in Wukari Local Government Area, Taraba State, affected by environmental hazards, impacting on agricultural production. Wukari comprises ten wards: Akwana, Avyi, Bantage, Chonku, Hospital, Jibu, Kente, Puje, Rafinkada, and Tsokundi. A sample size of 120 respondents was drawn from these wards using a multistage sampling technique. In the first stage, eight wards identified for experiencing environmental hazards were purposefully selected. In the second stage, 15 rural farmers from each of these eight wards were randomly selected based on their experiences with the environmental hazard, resulting in a total sample size of 120 respondents for the study.

Data Collection

Data were collected from primary and secondary sources. The use of structured questionnaire, personal interview, Focus Group Discussion (FGD) and telephone conversations to obtain information from the respondents as example of primary data sources, whereas journals, newspaper, biographic, were used to collect secondary data on their socioeconomic characteristics and the constraints encountered by the farmers in the study area.

Data Analysis Techniques

Data collected for the study were analyzed using descriptive statistical tools such as percentages, frequencies and mean scores, presented in tabular form. Constraints of the environmental hazards in the study area were analyzed using mean statistic. The effects of environmental degradation on agricultural production were analyzed through the use of multiple regression analysis.

Model Specification

Multiple Regression Analysis

The multiple regression models can be expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

Y = Environmental degradation

X_1 = Farming activity (year)

X_2 = the gradient or slope of the land (year)

X_3 = Inadequate drainage pattern (year)

X_4 = Erection of building closed to river/streams channel (year)

X_5 = Poor sanitation exercise (year)

X_6= dumping of toxic refuse in water bodies (year)

β_0 = Intercept (constant) term

$\beta_1 - \beta_6$ = Parameter estimates (coefficient) that is, the basic descriptive measures of population or the expected value

e = Error term

4.0 Results and discussion

4.1 Level of awareness of environmental degradation in the study area

Table 1 shows that majority (68.3%) of the respondents agreed they were aware, 23.3% were familiar with the concept, 5.0% were unsure, and 3.3% disagreed about the awareness of environmental hazards. This indicates that, most of the respondents have heard about environmental hazards, with many attesting that such hazards have negatively impacted crop production. Regarding the types of environmental hazards affecting the study area, 49.1% of the respondents identified erosion as the most significant issue, followed by 29.15 of the respondents who identified wind (9.1%) as one of the environmental hazards in Taraba State.

Table 1 reveals the causes of environmental degradation identified as inadequate drainage patterns (38.3%), the gradient or slope of the land (34.1%), illegal felling of trees (10.0%), low levels of education (10.0%), building close to river or stream channels (2.5%), and poor sanitation practices (5.0%). Among these, inadequate drainage patterns emerged as the dominant cause, posing significant harm to agricultural production. The evidence clearly indicates that environmental degradation, particularly inadequate drainage, has severely impacted on agricultural production in Nigeria.

Additionally, environmental degradation has led to the destruction of rural

infrastructure, with (40.8%) of the respondents citing loss of life and property as the most significant effect, followed by population density (25.6%), displacement of the people (17.5%). These findings highlight that loss of life and property is the most devastating

Table 1: Level of awareness of environmental degradation in Taraba State (n=120)

Have you heard about environmental degradation	Frequency	Percentage
Yes, I have heard about it	82	68.3
No, I have never heard of it	4	3.3
yes, I am familiar with it	28	23.3
I am not sure	6	5.0
Total	120	100.0

Types of environmental degradation that affects the study area (n=120)		
Erosion	59	49.1
Flooding	35	29.1
wind degradation	11	9.1
Water degradation	5	4.1
Land degradation	6	5.0
Noise degradation	4	3.3
Total	120	100.0

Causes of environmental degradation (n=120)		
Inadequate drainage pattern	46	38.3
The gradient or slope of the land	41	34.1
Illegal felling of vegetation[tree]	12	10.0
Low level of education	12	10.0
Erection of building closed to river/streams channel	3	2.5
Poor sanitation exercise	6	5.0
Total	120	100.0

Table 3 contd.

Rural infrastructure (n=120)		
It may reduce population density	30	25.0
Loss of life and properties	49	40.8
Displacement of people from homes and business	21	17.5
Reducing value of land and landed properties	8	6.6
Hinders transportation system in this area	6	5.0
It hinder infrastructure amenities sustainability	2	1.6
It gives unpleasant outlook in our area	4	3.3
Total	120	100.0

Source: Authors ' fieldwork (2024).

4.2 Effects of environmental degradation

The regression analysis yielded the following notable results. The $R^2 = 0.938$ shows that, 93.8% of independent variables explained the dependent variable, with the F-test confirming the explanatory power of the covariance on agricultural production, has a p-value that was significant. For the coefficients, farming activity exhibited a positive and statistically significant effect on agricultural production, with a coefficient of 3.311, indicating that increased farming activity leads to higher agricultural production. The coefficient of inadequate drainage pattern (0.055) showed a positive relationship with agricultural production and is statistically significant at 5%, implying that inadequate drainage pattern has a measurable impact on agricultural output in the study area. From a sustainability perspective, this suggests that agricultural production is influenced by the gradient or slope of the land.

Erection of building close to river/stream channel had a negative coefficient (-0.169), with agricultural production and was statistically significant at the 5% level. This implies that as the erection of buildings close to river/stream channel increases, that lead to flooding, thus causing agricultural production to reduce (Table 2).

Table 2: Effects of environmental degradation on agricultural production in the study area

Variable	Coefficient	Std. Error	T	Sig.
Farming activity	3.311	0.823	4.024	0.000***
Gradient or slope of the land	0.057	0.263	0.216	0.829
Inadequate drainage pattern	0.055	0.063	0.110	0.002**
Erection of building closed to river/stream channel	-0.169	0.140	-1.204	0.032**
Poor sanitation exercise	0.118	0.137	0.864	0.390
Dumping of toxic refuse in water bodies	0.218	0.109	1.374	0.173
C	0.016	0.135	0.121	0.004**
R^3	0.938			
Adjusted R-squared	0.760			
Durbin-Watson	0.99			

Source: author 's fieldwork (2024).

4.3 Measures adopted by traditional and State institutions in resolving effects of environmental degradation on agricultural production in the study area

Table 3 shows the measures adopted by traditional and State institutions in resolving effects of environmental degradation on agricultural production, About 37.5% of the respondents adopted good sanitation programme put in place by the government, 21.6% the respondents practiced dredging of river/stream channels and renovation of damage drainage, 20.8% of the respondents show that they only thing is an awareness programme to re-awaken peoples' commitment on environmental management, 10.0% of the respondents said that environmental offenders in their area should be prosecuted, 3.3% of the respondents said that law enforcement is necessary for the adoption of sanitation programme, while 6.6% of the respondents said there should be provision of waste bins/inclinator for refuse disposal.

Table 3: Measures adopted by traditional and state institutions

	Frequency	Percentage
Adoption of good sanitation programme put in place by government	45	37.5
Dredging of river/stream channel and renovation of damage drainage is necessary	26	21.6
There must be an awareness programme to re-awaken people commitment on environmental management	25	20.8
Environmental offender in my area need to be prosecuted	12	10.0
Law enforcement is necessary for the adoption of sanitation programme	4	3.3
There must be provision of waste bins/inclinator for refuse disposal	8	6.6
Total	120	100.0

Source: Authors ' fieldwork (2022)

4.4 Constraints to effective control of effects of environmental degradation on agricultural production

Table 4 shows the constraints to effective control of effects of environmental degradation on agricultural production Table 4 revealed that (21.8%) of the respondents said that lack of government policy is a constraints to environmental degradation, about 27.7% of the respondents have personal interest, 28.6% of the respondents said that poor drainage system is a constraint to effective contest, 11.8% of the respondents agreed to lack of environmental management system, 5.0% of the respondents had bad government experience, 1.7% of the respondents said that the rate of illiteracy of the people was a constraint, and so forth.

Table 4: Constraints to effective control of effects

	Frequency	Percent
Lack of government policy	26	21.8
Personal Interest	33	27.7
Poor drainage system	34	28.6
Lack of environmental management system	14	11.8
Bad government	6	5.0
Illiteracy of people	3	1.8
Weak Law enforcement system	2	1.7
Total	120	100.0

Source: Authors ' fieldwork (2022) .

5.0 Conclusion and recommendations

5.1 Conclusion

The study concluded that the Level of awareness of environmental degradation is high in the study area. Farming activity, inadequate drainage pattern and Erection of building close to river/stream channel have impact on agricultural production. Interestingly, inadequate drainage patterns positively affect productivity, underscoring the need for infrastructure improvement. Traditional and State measures, like sanitation programs and environmental law enforcement, vary in effectiveness against environmental

degradation, but issues like poor drainage systems and weak law enforcement hinder their success.

5.2 Recommendations

Based on the findings of this study, it was recommended that:

1. Invest in better drainage systems and ensure regular maintenance, given their positive effect on agricultural production.
2. Increase efforts to educate farmers and community members about the significance of environmental management and its influence on agricultural output and
3. Governments at all levels should create and implement strong policies to combat environmental degradation.

References

Adams, E. A. (2012). World forest area still on the decline. *Europe*, 989(998), 1–5.

Adamu, A. J. (2020). Climate change and agriculture: The competition for limited resources. *Journal of Cleaner Production*, 276, 123–134.

Aher, S., Lakaria, B., Kaleshananda, S., Singh, A. B., Ramana, S., Ramesh, K., & Thakur, J. K. (2015). Agroecology and the design of climate change-resilient farming systems. *Agronomy for Sustainable Development*, 35(3), 869–890.

Ahsan, F., Chandio, A. A., & Fang, W. (2020). Climate change impacts on cereal crops production in Pakistan: Evidence from ARDL and Johansen cointegration approach. *International Journal of Climate Change Strategies and Management*, 12(2), 205–219.

Arora, N. K. (2019). Impact of climate change on agriculture production and its sustainable solutions. *Environmental Sustainability*, 2, 95–96.

Crosti, R., Arcangeli, A., Campagnuolo, S., Castriota, L., Falautano, M., Maggio, T., & Andaloro, F. (2020). Assessing worth of marine protected areas for the protection of threatened biodiversity using IUCN Red List and Red List Index. *Ecological Indicators*, 116, 106489.

Davis, S. J., & Caldeira, K. (2010). Future CO_2 emissions and climate change from existing energy infrastructure. *Science*, 329(5997), 1330–1333.

Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Guèze, M., Agard, J., ... & Zayas, C. N. (2019). Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science*, 366(6471), eaax3100.

European Environment Agency (EEA). (2019). *Consolidated annual activity report 2019*. European Environment Agency.

Eurostat. (2018). *Agriculture, forestry and fishery statistics—2018 edition*.

European Commission.
Eurostat. (2019). *Agriculture, forestry and fishery statistics—2019 edition*. European Commission.
Eurostat. (2020). *Agriculture, forestry and fishery statistics—2020 edition*. European Commission.
Food and Agriculture Organization (FAO). (2016). *The state of food and agriculture 2016: Climate change, agriculture and food security*. FAO.
Fróna, D., Szenderák, J., & Harangi-Rákos, M. (2019). Food security measures and their impact on the agricultural sector. *Sustainability*, 11(5), 1508.
Giannakis, E., & Bruggeman, A. (2015). The highly variable economic performance of European agriculture. *Land Use Policy*, 45, 26–35.
Hofstra, N., & Vermeulen, L. C. (2016). Impacts of climate change on the water cycle and water quality: A global perspective. *Global Water Pathogens Project*.
Kanemoto, K., Lenzen, M., Peters, G. P., Moran, D. D., & Geschke, A. (2014). Frameworks for comparing emissions associated with production, consumption, and international trade. *Environmental Science & Technology*, 48(3), 1410–1418.
Liu, J., Hull, V., Batistella, M., DeFries, R., Dietz, T., Fu, F., ... & Zhu, C. (2015). Telecoupling: A new frontier for global sustainability. *Ecology and Society*, 20(3).
Matthews, H. D., Gillett, N. P., Stott, P. A., & Zickfeld, K. (2014). The proportionality of global warming to cumulative carbon emissions. *Nature*, 459(7248), 829–832.
Meemken, E. M., & Qaim, M. (2018). Organic agriculture, food security, and the environment. *Annual Review of Resource Economics*, 10, 39–63.
Monteleone, M., Ronga, D., & Parisi, D. (2018). Sustainable agriculture and climate change: The role of agroecology. *Agronomy*, 8(11), 243.
Orsenigo, S., Mondoni, A., Rossi, G., & Abeli, T. (2018). Climate change and future effectiveness of European protected areas for plant conservation. *Conservation Biology*, 32(4), 929–939.
Paulo, A. A., Pereira, L. S., & Matias, P. (2016). Analysis of droughts in the Iberian Peninsula using the standardized precipitation index. *Natural Hazards and Earth System Sciences*, 12(9), 2923–2931.
Pendrill, F., Persson, U. M., Godar, J., & Kastner, T. (2019). Deforestation displaced: Trade in forest-risk commodities and the prospects for a global forest transition. *Environmental Research Letters*, 14(5), 055003.
Rehman, A., Jingdong, L., Chandio, A. A., & Hussain, I. (2020). The nexus between climate change, energy consumption, and agricultural productivity in Pakistan. *Environmental Science and Pollution Research*, 27(24), 29580–29588.
Swedish International Development Cooperation Agency (Sida). (2010). *Sida's environmental policy: Contribution to sustainable development*. Sida.
Ukpong, S. J. (1994). Global and Nigerian environment problem analysis. *SIRF*, Calabar, 3rd November.
Ullah, R., Shivakoti, G. P., & Zulfiqar, F. (2008). Determinants of farmers' willingness to pay for improved irrigation water. *Water Policy*, 10(4),

273–284.
Vedeld, P., Angelsen, A., Bojö, J., Sjaastad, E., & Berg, G. K. (2007). Forest environmental incomes and the rural poor. *Forest Policy and Economics*, 9(7), 869–879.
World Wide Fund for Nature (WWF). (2021). *Living Planet Report 2020: Bending the curve of biodiversity loss*. WWF.
Zanen, M., van der Werf, W., & van der Putten, W. H. (2008). Plant-soil feedbacks and the persistence of exotic plant species in the Netherlands. *Journal of Ecology*, 96(5), 877–885.