ISSN 0189-3491 Volume 16, Number 2 2020

NIGERIAN JOURNAL JOURNAL OF PSYCHOLOGICAL RESEARCH

Published by
Department of Psychology,
University of Nigeria, Nsuka.
www.psychology.unn.edu.ng

Nigerian Journal of Psychological Research, 16, Number 2.

Factors affecting environmental workers' knowledge and attitudes on environmental degradation and climate change in Enugu state

Nnanna Onuoha Arukwe, Ph.D., & Chika Raphael Offor
Department of Sociology and Anthropology, University of Nigeria, Nsukka

ARTICLE INFO

Keywords:
Environment
Environmental workers
Environmental degradation
Climate change
Knowledge
Attitudes

ABSTRACT

This study examined the knowledge and attitudes on environmental degradation and climate change among environmental workers in Enugu State. The study used 507 randomly selected participants. Participants were selected via stratified random sampling procedure in order to make the sampling process more efficient given the layered nature of the target population. The findings show that age ($r = .09$, $p = .01$.) is associated with Environmental workers' knowledge and attitude to environmental degradation and climate change, while educational attainment significantly predicted knowledge of environmental degradation and climate change ($\beta = -.20$, $t(505) = -4.66$, $p = 0.00$.), However, job status was found to have no correlation with environmental workers' attitude to environmental degradation and climate change ($r = -0.06$, $p = .07$.). Implications of the findings include that environmental degradation and climate change policy formulation would benefit from this study, in the area of environmental education for environmental workers in Enugu State and Nigeria at large. Also, following the strong opinions expressed by the key informants in the qualitative (in-depth interview) part of the study, the study will be beneficial to a broad based, sustainable environmental management policy implemented at the state and national levels, which takes into cognizance several issues including comprehensive domestication of international environmental laws, incentivizing of environmentally friendly behaviours as well as massive public enlightenment on environmental degradation and climate change.

Introduction

Environmental degradation and climate change are threatening global survival and security (Owolabi, Gyimah, & Amponsah, 2012). Environmental degradation has to do with the anthropogenic destruction of the ecological system such as depletion of natural resources like air, water and soil as well as the loss of biological diversity (Uchegbu, 1998; Tyagi, Garg & Paudel, 2014). As the United Nations Research Institute for Social Development (UNRISD, 1994), has correctly pointed out, environmental degradation, including depletion of renewable and non-renewable resources and pollution of air, water and soils, can be a significant source of stress upon societies. Environmental degradation and climate change are therefore among the major threats confronting human survival and existence on planet Earth, hence deserve serious scholarly attention.

Incidentally, global warming, a major source of climate change, is largely due to man-made emissions of greenhouse gases especially CO_2 and methane; and, over the last century, atmospheric concentrations of carbon dioxide increased from a pre-industrial value of 278 parts per million to 379 parts per million in 2005, and the average global temperature rose by 0.74° C, a phenomenon which scientists referred to as the largest and fastest warming trend that has been discerned in the history of the Earth (United Nations Framework Convention on Climate Change, UNFCCC, 2007). It is evident that emissions from humans are not only harming the biosphere; they are destroying the future history of humanity and the biosphere (Collings, 2014). The major impacts and threats of global warming are numerous, ranging from increase in ocean temperatures which cause thermal expansion of the oceans together with meltwater from land-based ice that causes from sea-level-rise to frequency and intensity of extreme events, such as tropical cyclones like hurricanes and typhoons, floods, droughts and heavy precipitation events - all these are expected to keep rising even with relatively small average temperature increases (UNFCCC, 2007).

Furthermore, environmental degradation and climate change impact tremendously on human health and survival. For example, environmental degradation has a negative impact on human health in terms of lung or heart diseases especially if exposed to toxic or other specific agents (Carson, 1962; Sena, 2006). Guernier, Hochberg and Guegan (2004) posited that Africa is vulnerable to a number of climate sensitive diseases including malaria, tuberculosis and diarrhea. Similarly, Boko, et al (2007) report that rising of temperatures as a result of climate change are changing the geographical distribution of disease by vectors which are migrating to new areas with higher altitudes, for instance, migration of the malaria mosquito to higher altitudes will expose large numbers of hitherto unexposed people to infection. Moreover, billions of people in more than 100 countries are periodically exposed to climate change

Corresponding author
Nnanna Onuoha Arukwe, Ph.D., Department of Sociology and Anthropology, University of Nigeria, Nsukka.
E-mail: nnanna.arukwe@unn.edu.ng; nnannaonuohaarukwe@yahoo.com

induced extreme weather events such as earthquake, tropical cyclone, flood or drought and more than 184 deaths per day are recorded in different parts of the world, with 11 percent of the people exposed to natural hazards living in the developing countries (Sena, 2006).

Scholars are therefore of the consensus that environmental degradation and climate change have severe impacts on the environment in terms of desertification, drought, temperature rise, low agriculture yield, drying up of water bodies, flooding, among others. In addition, climate change has obvious and direct consequences on agricultural production (Lybbert & Sumner, 2012; Nederlof, Wennink, Heemskerk, 2010; Oruonye, 2011; Simpson & Burpee, 2014). In this regard the UN Framework Convention on Climate Change (2007) declares that agricultural production that relies mainly on rainfall for irrigation will be adversely affected in many African countries, especially for subsistence farmers in Africa, south of the Sahara.

To theoretically engage with the dynamics of environmental degradation and climate change this study sought theoretical orientation in the treadmill of production model and the modern world system theory. This is because despite their flaws, these two theories explain more than other theories the causes and dynamics of environmental degradation and climate change in the contemporary period. In a society where unwise human activities for economic growth and development degrades the ecological system, climate change which poses grave threat to human existence occurs. The treadmill of production, for example, pointed out that modern capitalism and the modern state exhibit a fundamental logic of promoting economic growth and private capital accumulation, along with a parallel imperative of devoting resources to 'legitimation', and that the self-reproducing nature of these processes causes them to assume the character of a treadmill (Buttel, 2010). For the capitalist and the state, exploitation of environment is the essence of economic growth and means of surplus value derivation and accumulation of capital. The capitalists engage themselves in economic activities that are harmful to the environment in order to promote their capitalist accumulation of wealth and infrastructural growth. For Schnaiberg cited in Buttel (2010) the propensity to growth is due to the competitive nature of capitalism, such that corporations and entrepreneurs must constantly expand their productions and their profits lest they be squeezed out by other competitors. In order for the capitalists not to be phased out by competition, they exploit the environment more than is healthy and the state that is supposed to regulate human activities on natural resource use ends up encouraging the degradation of the environment for what it (or the group that controls it) stands to benefit.

Schnaiberg cited in Buttel (2010) further argues that the treadmill of production is directly linked to the ecological crisis, since the accumulation process requires resource extraction ('withdrawal') and this contributes to pollution ('addition'). In the same vein, Wallerstein (1976) sees the modern world system as a capitalist world- economy which relies on economic domination. The core nations depend on the peripheries for their raw materials and contribute 90% of the environmental degradations in the developing countries. Extraction of natural resources like fossil fuel, gold, uranium, iron ore, columbite, diamond, limestone, etc. contribute in a great measure towards degrading the ecological landscape. The core nations transform the raw material into finished goods for which they rely on the peripheries for not only their market (mostly as captive markets) but as dumping grounds in what Schnaiberg called "addition".

In Nigeria and the rest of Africa, environmental degradation and climate change have provoked some responses from academic researchers in terms of empirical fieldworks. Consequently, Ayawunyi (2013) reveals, from his study of Oyo State, that low levels of funding, change in government policy, difficult challenge in mobility and lack of access to information are the major impediments that hinder adoption of adaptation strategies to climate change.

In the same vein, Abegaz and Wims (2014) in their study on extension agents' awareness of climate change in Ethiopia and the consequences generally reveal that Extension Agents (EAs) had a good perception of climate change and were knowledgeable about climate change impact on agriculture, natural resource use and availability. Similarly, Adisa and Balogun (2012) pointed out in their study on needs of training extension agents on climate change issues in Ekiti State that the major tasks performed by the extension agents on climate change related issues were educating farmers on pest control, rendering of technical advice to farmers, establishment of SPAT to monitor climate change impacts and indigenous technology development to mitigate climate change impacts. Similarly, Ozor and Nnaji (2011) revealed in their study on the role of extension in agricultural adaptation to climate change in Enugu State that the key roles of extension in agricultural adaptation to climate change were in the re-training of extension staff to acquire new capacity in climate risk management, setting up of emergency management units in extension agencies, dissemination of innovations on best practices and building resilience capacities of vulnerable people in climate risk management.

On the global front, environmental degradation and Climate change have elicited some responses by the global community at large and the national governments in particular with the view to mitigate their effects. A number of legal frameworks have also been put in place to protect the environment, as well as adapt to and mitigate the impact of climate change. According to Ladan (2016) the Paris Agreement on Climate Change is the newest, inclusive and most ambitious international agreement to combat the complex problem of climate change. The Paris Agreement on Climate Change was adopted on 12th December, 2015 at the conference of the parties (COP21) to the UN Framework Convention on Climate Change (UNFCCC). Ladan points out that the Paris Agreement is all encompassing with legal obligations on all countries to report and account for their mitigation actions. Following from the foregoing, Ele (2016) outlines the legal policy framework for environmental protection in Nigeria to include:

- Section 20 of the 1999 Constitution of the Federal Republic of Nigeria (as amended), which states that "the state shall protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria"
- The National Environmental Standards and Regulations Enforcement Agency (NESREA)

environmental agreements on the environment and climate change to its legal and policy frameworks, as well as enacting laws and policies that border on environmental protection as cited above. However, it is not known what factors would be antecedent to the knowledge and attitudes of environmental workers in Nigeria generally and Enugu State in particular towards these environmental laws and regulations as well as responding to issues of environmental degradation and climate change. In short, it is not known what human or social demographic factors would affect environmental workers' knowledge of and attitudes to environmental degradation and climate change in Enugu State. Consequently, the major question that this study deals with is: what are the factors affecting the knowledge and attitudes of environmental workers to environmental degradation and climate change in Enugu State given the high burden of environmental degradation and climate change faced by the State? To begin to address this strategic question, this study formulated hypotheses on specific social demographic factors that may affect the knowledge and attitudes of environmental workers to environmental degradation and climate change. They were: whether age of workers would correlate with their attitude to environmental degradation and climate change; whether environmental workers educational attainment would predict their knowledge on environmental degradation and climate change; and whether environmental workers' job status would correlate with their attitude to environmental degradation and climate change.

Method

Participants

The population of this study comprised of all the staff in Enugu State ministries/parastatals, whose job description related directly to the environment and was capable therefore, by their neglect of duty or inability to carry out their work effectively, of engendering negative environmental outcomes. The ministries/parastatals were the Ministeries of: Environment, Agriculture, Housing Development Corporation, Waste Management Authority and Forestry Commission. Moreover, the incorporation of these ministries was to enable the researchers to obtain a broad spectrum of cross-sectional data on the subject matter. The sample was made up of six hundred (600) randomly selected participants, and the six hundred (600) participants were administered with the study questionnaire while three (3) key informants, who did not take part in the questionnaire study, were selected through purposive sampling. The participants were 50.5% male and 49.5% female, their age range was 20 years to 60 years and above, and they were mostly B.Sc./HND degree holders.

Instruments

Data collection was done mainly by means of self-administered questionnaire; supplemented by in-depth interview. The quantitative instrument was a 40-item questionnaire instrument designed by the researchers. The questionnaire instrument was designed to measure environmental workers knowledge on environmental degradation and climate change as well as their attitude to environmental degradation and climate change. The questionnaire instrument consisted of three segments. The first segment was the respondents' demographics, which captured the respondents' demographical data. The

Act, 2007 and numerous accompanying Regulations
- National Oil Spill Detection and Response Agency (NOSDRA) Act, 2006
- The Environmental Impact Assessment (EIA) Act
- Associated Gas Reinjection Act, 1984

In the light of the foregoing, the Nigerian government has done well in adopting the international second segment was on knowledge and it measured the respondents' level of knowledge on environmental degradation and climate change. The third and last segment was on attitudes and it measures the respondents' attitude to environmental degradation and climate change. The qualitative instrument which is the in-depth interview guide was similarly divided into three sections, covering the demographics, knowledge and attitude. The in-depth interview guide was designed by the researchers to capture in-depth the more subjective and deeper aspects of what the questionnaire instrument measures. The sections on knowledge and attitude on the in-depth interview guide both have three key questions each. These key questions were followed by several probe categories.

Face, construct and content validity for the questionnaire and in-depth interview guide were achieved through engaging three senior academics from the social sciences faculty of the University of Nigeria, who are experienced in research methodology, to validate the instrument. The reliability coefficient (Cronbach's alpha) of .81 and .85 were obtained for the instrument. The instrument had a test-retest reliability coefficient of .73.

Procedure

This study adopted an exploratory cross-sectional survey design. According to Barbie (2005, p.104) an exploratory study is often cross-sectional in nature. It combined qualitative and quantitative methods of research, which in the case of the present study were aimed at examining what human or social demographic factors would affect environmental workers' knowledge of and attitudes to environmental degradation and climate change in Enugu State.

The study employed probability sampling. Specifically, stratified random sampling proportionate to size was adopted in selecting respondents for the study. The stratified random sampling method was adopted in order to make the sampling process more efficient given the layered nature of the target population. It was adopted also because a sampling frame exists which makes the adoption of a stratified random sampling strategy possible. The sample size for this study was selected based on the several numerical strengths of staff of the following ministries and parastatals: Enugu State Ministry of Environment and Mineral Resources, Enugu State Ministry of Agriculture and Natural Resources, Enugu State Forestry Commission, Enugu State Ministry of Transport, Enugu State Waste Management Authority, and Enugu State Housing Development Corporation. However, for the in-depth interview (IDI), purposive sampling method was used. We interviewed three (3) respondents who were unit heads or staff in the Ministries of Environment, Agriculture, and the Housing Development Corporation. These had not been captured in the questionnaire study. A total of 600 copies of questionnaires were administered to the respondents in the research area, of which 507 were duly completed while 93 were non-responses.

Data Analyses

All the completed questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS, version 20). Descriptive statistics such as percentages were used in analyzing the responses to the questionnaire items while Student t-test, Product-Moment Correlation, Regression and ANOVA were adopted to test the research hypotheses. Also, the data gathered through in-depth interview were analyzed qualitatively using on Nvivo 12 software to complement the findings derived from the quantitative data.

Results

Table 1 shows the distribution of respondents on the socio-demographic variables which include sex, age, religion, marital status, level of education, grade level, ministry/parastatal, and duration of service. The table shows that 50.5% of the respondents were males whereas 49.5% of the respondents were females.

From Table 1, the distribution of the respondents by their age indicates that 34.9% of the respondents were within the age bracket of 20-29, 33.9% of the respondents were within the age range of 30-39, 17.6% of the respondents were within age range of 40-49, 12.0% of the respondents were within the age range of 50-59, 1.6% of the respondents were within the age range of 60 and above. The distribution of the respondents by their religious affiliation shows that 8.3% of the respondents were identified as African Traditionalists, 89.5% of the respondents were Christians while 2.2% of the respondents were Muslims. The distribution of the respondents by their marital status shows that 36.7% of the respondents were single, 55.6% of the respondents were married, and 3.7% of the respondents were divorced while 3.9% of the respondents were widowed.

Also, the table shows that .8% of the respondents had no formal educational qualification, 2.6% of the respondents had FSL as their educational qualification, 10.3% of the respondents had SSCE as their highest educational qualification, 14.8% of the respondents had OND as their highest educational qualification, 55.6% of the respondents had B.Sc./HND as their highest educational attainment, 15.6% of the respondents had M.Sc. as their highest educational attainment while .4% of the respondents had PhD as their highest educational qualification.

The table similarly shows that 32.1% of the respondents were within the rank grade level range of 3-7, 53.5% of the respondents were within the rank grade level 8-13 while 14.4% of the respondents were within the rank grade level 14-16. It also shows that 8.5% of the respondents were staff of Ministry of Environment and Mineral Resources, 30.2% of the respondents were staff of Ministry of Agriculture and Natural Resources, 13.2% of the respondents were staff of ENSWAMA, 3.6% of the respondents were staff of Forestry Commission, 28.6% of the respondents were staff of Ministry of Transport, 16.0% of the respondents were staff of ESHDC.

The table further shows that 37.1% of the respondents were within the range of 1-5 years of service duration, 19.5% of the respondents were within the range of 6-10 years of service duration, 17.4% of the respondents were within the range of 11-15 years of service duration, 6.3% of the respondents were within the range of 16-20 years of service duration, 5.5% of the respondents were within the range of 21-25 years of service duration, 9.5% of the respondents were within the range of 26-30 years of service duration, 4.7% of the respondents were within the range of 31-35 years of service duration.

In testing the hypothesis on age of workers and their attitude to environmental degradation and climate change, data on distribution of participants by age were re-coded into two categories. Participants below 40 years were categorized as younger environmental workers while respondents from 40 and above were categorized as older environmental workers. Also, data on participants' attitude towards environmental degradation and climate change were re-coded into two categories positive and non-positive. Given that the middle point of the environmental degradation attitude scale is 24, respondents with environmental degradation attitude scores of 0-24 were classified as having non-positive attitude while those with environmental degradation attitude score above 24 were classified as having positive environmental attitude. The data were cross tabulated and the hypothesis tested using Pearson correlation statistic at a significance level of 0.05.

Given that the hypothesis is a directional hypothesis, the rejection region is at one end of the tail and the Null hypothesis (H_o) will be rejected if the p-value (α) is less than 0.05. Table 2 presents the correlation analysis. It shows that the obtained correlation coefficient is .098, which implies a strong positive correlation, while the obtained p-value is 0.014. As a result of this finding, the study rejects the Null hypothesis and therefore concludes that older environmental workers are more likely to have a positive attitude to environmental degradation and climate change than younger environmental workers.

In testing the hypothesis on environmental workers educational attainment as predictor of their knowledge of environmental degradation and climate change, data on participants educational attainment was used as the predictor variable while responses were summed to obtain the respondents' knowledge of environmental degradation and climate change entered as the response variable. The data were analyzed using linear regression analysis at 0.05 level of significance.

Table 3a shows that the *r* (correlation) of environmental workers' educational attainment and their knowledge of environmental degradation and climate change is 0.0203. This indicates a very weak positive correlation between educational attainment and knowledge of environmental degradation and climate change. Also the *R* square 0.04 indicates that only 4% variation in knowledge of environmental degradation and climate change can be explained by educational attainment

Table 3c presents information on the regression model's coefficients. The unstandardised coefficient, B, shows that keeping education constant, environmental and climate change knowledge will be about 60.718. Also, a unit increase in education, that is, for example from primary to secondary education, will amount to 14% increase in knowledge of environmental degradation and climate change among Environmental Workers in Enugu State.

Given that the hypothesis above is a directional hypothesis, the rejection region is at one end of the tail and the Null hypothesis (H_o) will be rejected if the *p*-value (α) is less than 0.05. Table 3.b presents the analysis of variance result

of the respondents' educational attainment and their knowledge of environmental degradation and climate change. It shows that the p-value (0.00) is less than 0.05 which indicates that the regression model (education as a predictor of knowledge of environmental degradation and climate change) is statistically significant. Thus, the null-hypothesis is rejected and the alternative hypothesis accepted.

Table 1: Distribution of the Respondents by their Socio-Demographic Characteristics

Variable	Frequency	Percentage (%)
Sex:		
Male	256	50.50
Female	251	49.50
Total	507	100
Age:		
20-29	177	34.90
30-39	172	33.90
40-49	89	17.60
50-59	61	12.00
60+	8	1.60
Total	507	100
Religion:		
ATR	42	8.30
Christianity	454	89.50
Islam	11	2.20
Total	507	100
Marital Status:		
Single	186	36.70
Married	283	55.60
Divorced	19	3.70
Widowed	20	3.90
Total	507	100
Level of Education:		
No formal Edu.	4	.80
FSL	13	2.60
SSCE	52	10.30
OND	75	14.80
B.Sc./HND	282	55.60
M.Sc.	79	15.60
PhD	2	.40
Total	507	100
Grade Level/Rank:		
3-7	163	32.10
8-13	271	53.50
14-16	73	14.40
Total	507	100
Ministry/Parastatal:		
Environment	43	8.50
Agriculture	153	30.20
ESWAMA	67	13.20
Forestry Comm.	18	3.60
Transport	145	28.60
ESHDC	81	16.00
Total	507	100
Duration of Service:		
1-5yrs	188	37.10
6-10yrs	99	19.50
11-15yrs	88	17.40
16-20yrs	32	6.30
21-25yrs	28	5.50
26-30yrs	48	9.50
31-35yrs	24	4.70
Total	507	100

Source: Field survey, 2018

Table 2: Pearson correlation table of respondents' age and their attitude towards environmental degradation

				Attitude	Age
Attitude Towards Environmental Degradation	Pearson Correlation			1	.098*
	Sig (1-tailed)			.	.014
	N			507	507
	Bootstrap[a]	Bias		0	.000
		Std Error		0	.045
	95% Confidence Interval		Lower	1	.006
			Upper	1	.185
Age of Respondents	Correlation Coefficient			.098*	1
	Sig (1-tailed)			.014	
	N			507	507
	Bootstrap[a]	Bias		.000	0
		Std Error		.045	0
	95% Confidence Interval		Lower	.006	1
			Upper	.185	1

Educational attainment and knowledge of environmental degradation and climate change

Table 3a: Model summary of the regression analysis for educational attainment and knowledge of environmental degradation and climate change

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.20	.04	.04	11.51	.77

Table 3b: Analysis of variance for the regression analysis

Model	Sum of Squares	*Df*	Mean Square	*F*	Sig.
Regression	2876.40	1	2876.40	21.72	.000
Residual	66876.32	505	132.43		
Total	69752.73	506			

Table 3c: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig
	B	Std. Error	Beta		
1 (Constant)	60.72	2.46		24.69	.000
Education	0.14	.51	-.20	-4.66	.000

Table 4: Pearson's correlation table of respondents' job status and their attitude towards environmental degradation

	Pearson Correlation			Attitude	Job Status
Attitude	Correlation Coefficient			1	-.06
	Sig (1-tailed)				.069
	N			507	507
	Bootstrap[a]	Bias		0	.003
		Std Error		0	.069
	95% Confidence Interval		Lower	1	-.146
			Upper	1	.023
Job Status	Correlation Coefficient			-.06	1
	Sig (1-tailed)			.069	
	N			507	507
	Bootstrap[a]	Bias		-.003	0
		Std Error		.041	0
	95% Confidence Interval		Lower	-.146	1
			Upper	.023	1

In testing the hypothesis on environmental workers' job status and their attitude to environmental degradation and climate change, the data on distribution of participants by their grade level/ rank was used alongside data from other responses which were summed to obtain the total scores of the participants on attitude towards environmental degradation. Pearson's correlation was employed in testing for association between the obtained environmental degradation attitude score and the participant's job status (grade level) at 0.05 level of significance.

The above test is a directional hypothesis that predicts a positive correlation between environmental workers job status and attitude towards environmental degradation and climate change. As a result, the rejection region is at one end of the tail and the null hypothesis (H_o) will be rejected if the p-value (α) is less than 0.05.

Table 4 presents a Pearson's correlation table of environmental workers' job status and their attitudes towards environmental degradation and climate change. The obtained correlation coefficient -0.06 indicates that there is no correlation between environmental workers' job status and their attitudes towards environmental degradation and climate change. Also given that the p-value .069 is greater than the significance level 0.05, the null hypothesis is retained. The study therefore concludes that there is no statistically significant correlation between environmental workers' job status and their attitude towards environmental degradation and climate change.

Discussion

The findings of this study reveal that older environmental workers are more likely to have a positive attitude to the environment than younger environmental workers. This finding may be in tandem with Ezeudu et al. (2016) who studied senior secondary students in Umuahia, Abia State on climate change awareness and attitude obtaining an overall climate change awareness and attitude mean score of 2.44 which is less than 2.50 mean benchmark of the study which indicates that the students possessed low climate change awareness.

Another hypothesis test indicated that environmental workers educational attainment will significantly predict their knowledge of environmental degradation and climate change. This result does not seem to agree with the related literature; for example, Ezeudu et.al (2016) whose study revealed that students (who are already exposed to a high level of education) possessed low climate change awareness. The study on this score is also not in consonance with the work of Iwuchukwu and Onyeme (2012) whose study showed that male extension workers had more access to information on climate change than the female extension workers who relied on radio and fellow extension workers, and friends/relations.

Another hypothesis concluded that there is no statistically significant correlation between environmental workers' job status and their attitude towards environmental degradation and climate change. This implies that the environmental workers' work status or rank is not necessarily antecedent to their attitude toward environmental degradation and climate change.

The findings of this study call for a few recommendations to better the condition of environmental degradation and climate change knowledge among environmental workers in Enugu State. Consequently, the following suggestions have been made based on the findings of the study.

With only a moderate level of knowledge on environmental degradation and climate change, an urgent need exists to carry out a massive environmental education for environmental workers in Enugu State and Nigeria at large. Those charged with carrying out such environmental education and enlightenment for the workers should take into take into cognizance the important differences in age and educational attainment among the workers, which have been shown to be important antecedents to the workers' knowledge and attitude to environmental degradation and climate change from this study.

Similarly, following all the strong opinions expressed by the key informants in the qualitative (in-depth interview) part of the study, there is need for a broad based and sustainable but visionary environmental management policy implemented at the state and national levels, which would take into cognizance such issues as alternative or clean energy sources, ban on indiscriminate felling of trees, comprehensive domestication of international environmental laws, incentivizing of environmentally friendly behaviours. These should happen side by side with massive public enlightenment on environmental degradation and climate change.

Further, it is suggested that a replication of this study be done to cover all the states in southern Nigeria and ultimately the whole of the country. The reason for this suggestion is because southern Nigeria appears to have a disproportionate burden of environmental degradation in the Nigerian context.

Conclusion

Environmental workers in Enugu State, as revealed by the study, have a good knowledge of climate change and its implications on the environment. The factors that influence environmental workers' knowledge and attitude to environmental degradation and climate change in Enugu State (and by extension Nigeria) are but not limited to: age and educational attainment, while job status appears not to have any influence on their attitude. This study provides data which contributes to knowledge in the areas of environmental degradation and climate change knowledge and attitudes among environmental workers. Also, those interested in the designing of replication of this study to for other states in southern Nigeria as well as the rest of the country and Africa would find the work useful. In the light of all the foregoing, environments degradation and climate change policy formulation would benefit from this study, especially in the area of environmental education for environmental workers in Enugu State, Nigeria and Africa at large. This is because environmental workers severally and collectively are capable, by their neglect of duty or inability to carry out their work effectively, of engendering negative environmental outcomes.

References

Abegaz, D. M., & Wims, P. (2014). Extension agents' awareness of climate change in Ethiopia. *Journal of Agricultural Education and Extension*. doi:10.1080/1389224X.2014.946936

Adisa, R. S., & Balogun, K. S. (2012). Analysis of training needs of extension agents on climate change issues in Ekiti state agricultural development project (EKSADP), Nigeria. *Journal of Agricultural Extension, 16*(2), 24-33. Retrieved from: doi: 10.4314/jae.v16i2.3

Ayanwuyi, E. (2013). Extension services strategies in adaptation to climate change in Oyo State, Nigeria. *Civil and Environmental Research, 3*(7), 115-120. Retrieved via ww.iiste.org

Barbbie, E. (2005). *The basics of social research.* Toronto: Thomson Wadsworth

Boko, M., Niang, I., Nyong, A., Vogel, C., Githeko, A., Medany, M., B. …, & Yanda, P. (2007). Climate Change: Impacts, Adaptation and Vulnerability. In M. Parry, O. Canziani, J. Palutikof, P. Van Der Linden, and C. Hanson (Eds.), *Working group II contribution to the fourth assessment report of the intergovernmental panel on climate change* (pp. 433–467*)*. Cambridge: Cambridge University Press.

Buttel, F. H. (2010). Social institutions and environmental change. In M. R. Redclift and G. Woodgate (Eds.), *The international handbook of environmental sociology* (pp. 33-46). Cheltenham: Edward Elgar Publishing Limited.

Collings, D. A. (2014). *Stolen future, broken present: the human significance of climate change.* Michigan: Open Humanities Press.

Dunlap, R. E. (2010). The maturation and diversification of environmental sociology: from constructivitism and realism to agnosticism and pragmatism. In M. R. Redclift and G. Woodgate (Eds.), *The international handbook of environmental sociology* (pp.33-46). Cheltenham: Edward Elgar Publishing Limited.

Ele, M. (2016). *Legal and policy framework for climate change adaptation and environmental protection*. Paper presented at the Joint International Seminar on Human Rights, Environmental Law and Children's Rights and Climate Change in a post 2015 world: global call, local action, held at University of Nigeria, Nsukka, Enugu, Nigeria, November 2-3.

Eurobarometer (2009). *Europeans' attitudes towards climate change report*. A survey sponsored by the European Commission and the European Parliament and coordinated by the Directorate-General for Communication of the European Commission. Retrieved from ec.europa.eu/public opinion/archives/ebs/ebs_300_full_en.pdf

Ezeudu, S. A., Ezeudu, F. O., & Sampson, M. (2016). Climate change awareness and attitude of senior secondary students in Umuahia Education Zone of Abia State. *International Journal of Research in Humanities and Social Studies, 3*(3), 7-17.

Guernier, V., Hochberg, M. E., & Guegan, J. F. (2004). Ecology drives the worldwide distribution of human diseases. *PLOS Biology*, *2*(6), 740–746.

Hannigan, J (2006). *Environmental Sociology*. New York: Routledge.

International Panel on Climate Change (2007). *Climate change 2007: Impacts, adaptation and vulnerability*. Contribution of Working Group II to the Fourth Assessment report of the IPCC. London: Cambridge University Press.

Iwuchukwu J C & Onyeme F. N (2012). Awareness and perceptions of climate change among extension workers of Agricultural Development Programme (ADP) in Anambra State, Nigeria. *Journal of Agricultural Extension, 16*(2), 104-118. doi: 10.4314/jae.v16i2.9

Ladan, M. T. (2016). *Achieving sustainable development goals (SDGS) through effective domestic laws and policies on environment and climate change.* Paper presented at the Joint International Seminar on Environmental Law, Human Rights and Climate Change in a post 2015 world: global call, local action, held at University of Nigeria, Nsukka, Enugu, Nigeria, November, 2-3.

Lybbert, T. J., & Sumner. D.A. (2012). Agricultural technologies for climate change in developing countries: Policy options for innovation and technology diffusion. *Food Policy, 37*(1), 114–123. doi: 10.1016/j.foodpol.2011.11.001.

Nederlof, E. S., Wennink, B., & Heemskerk, W. (2010). *Access to agricultural services. Background paper for the IFAD rural poverty report.* Amsterdam: Royal Tropical Institute. KIT Development Policies.

Oruonye, E. D. (2011). An assessment of the level of awareness of the effects of climate change among students of tertiary institutions in Jalingo Metropolis, Taraba State Nigeria. *Journal of Geography and Regional Planning, 4*(9), 513-517.

Owolabi, H. O., Gyimah, E. K. & Amponsah, M.O. (2012). Assessment of junior high school students' awareness of climate change and sustainable development in central region, Ghana. *Educational Research Journal, 2*(9), 308-317.

Ozor, N. & Nnaji, C. (2011). The role of extension in agricultural adaptation to climate change in Enugu State. Nigeria. *Journal of Agricultural Extension and Rural Development*, *3*(3), 42-50.

Sah, J. K., Bellad, A. A., & Angolkar, M. (2015). Assessment of the knowledge and attitude regarding global warming among high school students of Ramnagar, Belagavi city: A cross-sectional study. *Journal of Dental and Medical Sciences, 14*(4), 74-78. doi: 10.9790/0853-14467478

Schnaiberg, A. (1980). *The environment: From surplus to scarcity.* New York: Oxford University Press.

Schnaiberg, A., Pellow, D., & Weinberg, A. (2002). The treadmill of production and the environmental state. In A. P. J. Mol and F. H. Buttel (Eds.), *The environmental state under pressure* (pp. 15-32). London: Elsevier North-Holland.

Sena, L. (2006). *Disaster prevention and preparedness*. Lecture notes for health science students. Ethiopia Public Health Training Initiative, The Carter Center, the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education.

Skalík, J. (2015). Climate change awareness and the attitudes of adolescents in the Czech

Republic. *Envigogika, 10*(4), 1-19. doi: 10.14712/18023061.472

Simpson, B. M., & Burpee, C. G. (2014). *Adaptation under the new normal of climate change: the future of agricultural extension and advisory services*. A discussion paper produced as part of the United States Agency for International Development (USAID) project "Modernizing Extension and Advisory Services" (MEAS). Retrieved from www.meas-extension.org.

Tyagi, S. Garg, N., & Paudel, R. (2014). Environmental degradation: causes and consequences. *European Researcher, 8*(8), 1492- 1498. doi: 10.13187/er.2014.81.1491.

Uchegbu S.N. (1998) *Environmental management and protection*. Nigeria: Spotlite Publishers.

United Nations Environmental Programme ((2007). *Global environmental outlook. Environment for Development.* Retrieved from https:// na.unep.net/atlas/datlas/sites/default/files/ GEO-4_Report_Full_en.pdf

United Nations Development Programme (2008). *Gender and climate change: impact and adaptation. UNDP. Asia- Pacific gender community practice annual learning workshop.* Retrieved from www.undpcc. org/undpcc/…/look%20at%20forword%20 for%20summary%20UNDP.

United Nations Development Programme (2009). *Resource guide on gender and climate change*. http://content.undp.org/go/cmsservice/ download/asset/?asset_id=1854911

United Nations Framework Convention on Climate Change,UNFCCC, (2007). *Climate change: impacts, vulnerabilities and adaptation in developing countries.* Retrieved from https://unfccc.int/resource/docs/publications/ impacts.pdf

United Nations Research Institute for Social Development (1994). *Environmental degradation and social integration.* UNRISD Briefing Paper No. 3 World Summit for Social Development. Retrieved from http:// www.unrisd.org/80256B3C005BCCF9/ (httpAuxPages)52B8B9CA219784/$file.pdf

Wallerstein, I. (1976). The modern world-system: Capitalist agriculture and the orgins of the European world-economy in the sixteenth century. New: Academic Press