

Measuring Pro-environmental Attitude among Women in Osun State of Nigeria

Bolatumi Oyegoke

Faculty of Education,

Ba Isago University, Gaborone, Botswana

ABSTRACT

INTRODUCTION

The first United Nations Conference on the Human Environment was held in Stockholm in June 1972 (United Nations, 1972). This conference did not mark the beginning of environmental challenges. It rather indicated the moment when global attention was, for the first time, lent to issues of environmental ill-health and degradation. Therefore, it is here implied that once upon a time, the human environment was healthy and that its ill-health ultimately began in a period in time and this ill-health might have had either one cause or a number of causes.

While the literature on the human environment is unanimous on the fact that the environment's health has been destabilised by human actions in a general sense (Akintunde, 2017; Amcamp & Bjorn, 2010), scholars have equally gone ahead to identify a few specific factors that might have been responsible for each typology of ill-health. Highlighting the phenomenal human population growth from 1 million in 1804 to 7 billion in 2004 (United Nations, 2012), Biao (2020) concluded that explosive human population is at the root of all environmental degradation. Human encroachment into the habitats of other legitimate earth species (minerals, vegetation and animals) has equally been identified as one important factor in the degradation of the environment. Stefen et al. (2015) and Rockstrom et al. (2009) argue, for instance, that there exist earth boundaries within the limit of which each earth species is ecologically allowed to operate for the sake of earth environment's stability. When human beings encroach on those boundaries either to put up their own living structures or for purposes of exploiting the contents lying within boundaries that fall outside theirs, they destabilize the environment. Additionally, the injection of harmful chemicals into the atmosphere has been demonstrated to be one other contributor to environmental degradation (Thurber et al., 2014).

The way it is, humanity currently lives within a broken environment and ways and means are frantically being sought to fix it. Among numerous plausible panaceas, the existence of Pro-environmental attitude among a critical mass of human beings sharing a space has been suggested as a possible solution to environmental degradation (Abbas & Singh, 2014; Kollmuss & Agyeman, 2002). Consequently, the current article sets out to measure the levels of pro-environmental attitude existing among women in Osun State of Nigeria with a view to determining the extent to which women may contribute in fixing the broken environment within and around the State.

CRITICAL MASS OF PERSONS POSSESSING PRO-ENVIRONMENTAL ATTITUDE

Whereas it is suggested that the possession of pro-environmental attitude may induce the enactment of environmental sustainable behaviour, it is actually the adoption of pro-environmental attitude by a critical mass of persons in a locality that ultimately tends to improve the health of the environment as a significant number of people gets to work towards environmental sustainability. A pro-environmental person is one who, in addition to possessing adequate knowledge of the working of the environment, is also ready and capable of intervening with a view to correcting that which may be going wrong within the environment. It is the critical mass of persons possessing these aforementioned qualities that can then be relied upon in environmental sustainability work where *critical mass* refers to:

... an interdisciplinary concept which explains the interrelatedness of the concept of adoption and innovation in a social system, in which there must be adequate number of adopters of an innovation, practice, ideas, and ideology in a dynamic and functional system; so that the extent of acceptance of new concepts will be highly embracing, transforming and self-sustaining to create and accelerate further development and growth (Timothy, 1987 pp.1-16).

Within social context *critical mass* relates to such social factors as size of the population, existence of easy inter-personal communication and to some extent, gender homogeneity in a society. Thus, critical mass is the small segment of a societal system that carries out operational activities to achieve a defined goal or corporate objectives (Oliver, Marwell & Teixeira, 1985). In relation to this study, *critical mass* refers to the smallest population size of women whose actions may be impactful enough to reverse the trend of environmental degradation in Osun State. In most social contexts, that smallest number of people has often been fixed at 30% of the total population of a target locality (Oliver, Marwell & Teixeira, 1985). In other words, where 30% of Osun State women could be found to be pro-environmentally disposed, then it may be concluded that the gains of environmental sustainability would be strengthened and environmental degradation would soon be stopped: "By 'pro-environmental behavior' we simply mean behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world" (Kollmuss & Agyeman, 2002 p.240).

Both casual and general observation of the global, Nigerian and Osun State's performance on environmental sustainability issues does not suggest the possibility of finding a critical mass of persons or women engaged on the side of environmental sustainability. For instance, the severity of global environmental degradation led to the hosting of the first ever United Nations Conference on the Human Environment (the Stockholm Conference) in Sweden between 5th and 16th June 1972. To prove that the situation is yet to improve globally, a number of other world conferences have held on the environment the most prominent of which are the series of COP (Conference of the Parties) conferences including COP 1-14 (United Nations, 2019).

In Nigeria, the exploitation of earth's resources at great cost to the environment has continued with increased impetus in the wake of a pragmatic shift of commercial emphasis from science to technology and industry. Modern technology has made the extraction and processing of natural and mineral resources more effective and the resultant degradation of the environment equally more devastating. For example, millions of barrels of fossil fuels are lifted daily from Nigeria's Niger-Delta oil belt (which is south-southerly and south-easterly of Osun State) while making the setting literally unsafe and life-threatening for the inhabitants of the region. This situation has made the

Niger-Delta a hotspot of protest and violence and a socio-political thorn in Nigeria's flesh – a poet from the region, Ken Saro-Wiwa (Mapanje, 2002, p. 47) bewails the socio-geographic predicament of his people in a dirge with the title "Ogoni! Ogoni!":

*Ogoni is the land
The people, Ogoni
The agony of trees dying
In ancestral farmlands
Streams polluted weeping
Filth into murky rivers
It is the poisoned air
Coursing the luckless lungs
Of dying children
Ogoni is the dream
Breaking the looping chain
Around the drooping neck
of a shell-shocked land.*

The pun on "shell" indicates multi-national vested interest in fossil fuel extraction and shipment that is the genesis of the problem in the crude oil and natural gas deposit region which the poet laments. In the Nigerian experience, as in the global, environmental degradation is a common experience which varies mostly in the degree of incidence and the kinds of interest involved; the level of environmental damage in the Niger-Delta and crude oil and gas belt is more pronounced than that of Osun State, but the cumulative effect of degradation and damage is no less serious and should be of concern to all and sundry.

Osun State's forests were a source for the hardwood market locally and overseas export – and up until the late 1980s saw-mills, as they were described, for pre-processing felled forest trees were rife in the State: a regular reminder to the observant person then of how severe the attack was on the equatorial rain forest. The relentless incursion on the forest depleted the forest reserves so rapidly that trees for the saw-mills began to diminish to a point that a lot of the saw-mills started to fail and close down for lack of business by the 1990s. Today, the rain forest edges have receded so much that the predator saw-mills have virtually disappeared because of their unviability – a sad story of the rapacity of capitalism and a rain forest belt on the verge of extinction.

Osun State is also known for smoked game meat prepared from the carcasses of a wide variety of wild animals, reptiles (including snakes, pythons) and rodents and sold mostly by women hawkers to travelers at the roadsides of major highways and to proprietors mostly of food canteens (run by mostly women) patronised mostly by workers, artisans and labourers who are usually men. Both the fuel (wood) and the raw materials for the barbecued delicacy are predictably products of the natural forest and by-products of the lumbering activities that have virtually eaten up the natural forest reserves.

Apart from deforestation, some other major environmental problems in Osun State include soil erosion, water pollution, loss of biodiversity and flooding (Nigerian Environmental Study Team, 1991). Irregular rain patterns and excessive heat have become prevalent and there is also the sticky issue of improper or negligent disposal of domestic, and sometimes tied to the problems of bush burning and air pollution (Babalola, Babalola, & Okhale, 2010; Nigerian Environmental Study Team, 1991). As Osun state does not possess heavy industries that have been in the main blamed for great damage to the environment, this study concentrated on the manner in which women making up 61% of Osun State population carried out domestic practices which literature has found to damaging to the environment when improperly carried out and restorative to the environment when properly carried out.

THEORETICAL FRAMEWORK

Environmentalists submit that the issue of environmental education can be approached from three perspectives:

1. Environmental education as behavioural change involving environmental citizenship in a way that brings about responsible environmental behaviour or environmental literacy.
2. Environmental education as personal change which is an alternative approach to increasing environmental responsibility, it focuses on developing and nurturing people's understanding of their personal motivation or attitudes that guide their decision towards environmental actions.
3. Environmental education as social change is based on critical social theory that argues that environmental problems are rooted in social, economic and political systems and the world view that support these systems in order to achieve sustainability and social systems.

This scenario portrays the domain of environmental education as a complex area. As if this is not already complex enough, ecological science which was originally the study of organisms and their environment but which has since assumed a larger dimension describing the interaction between humans and organisms and the environment of the latter (Pimm & Smith, 2019) has come to add to this complexity.

To match the complex nature of this area of study, a great variety of theories, each discussing an aspect of environmental studies or/and education, subsist within the domain of environmental research. Some of these theories include the *Behavioural Change Theory*, the *Theory of Environmental Behaviour*, the *Theory of Reasoned Action* and the *Environmental Citizenship Theory* (Akintunde, 2017). Another of these theories is known as the *Theory of Sustainability* (Ekardt, 2001).

However, the main theory employed in the current study is the environmental citizenship theory. Environmental citizenship theory approaches environmental education from the perspective of behavioural change. When compared to other existing theories within environmental science and education, the environmental citizenship theory holds itself up as the most comprehensive not only because it emphasises learning of environmental issues but also because it covers the highest number of pro-environmental dimensions that may be assessed. As stated earlier, pro-environmental behaviours are those kinds of behaviour that on the one hand, indicate awareness or knowledge of those actions that may hurt the environment and on the other hand, show avoidance of those acts that can hurt the environment.

Within the environmental citizenship theory, pro-environmental behaviours are indicated within the *ownership* and *empowerment* sections of the theory. Specifically, statements such as:

- a. In-depth knowledge about issues regarding the environment (Ownership)
- b. Personal investment in the environment (Ownership)
- c. Knowledge of the consequences of behaviour (Ownership)
- d. Knowledge of and skills in using environmental action strategies (Empowerment) and
- e. Intentions to act (Empowerment) are some of the indicators of pro-environmental behaviours and dispositions.

In addition to the above, *environmental citizenship theory* discusses three general levels (entry level, ownership level and empowerment level) and six specific dimensions (3 major and 3 minor) of engagement that are needed in the assessment of a person that may be viewed as pro-environmental or a person that is likely to take action against environmental degradation. Other theories have less number of dimensions to measure.

The entry level refers to the beginning of that period when the individual decides to show interest in environmental issues. Ownership level, to the period when the individual began to show a degree of commitment to the work that is there to be done in the environment while the empowerment variables refer to those acts that see the individual equip himself/herself with the necessary skills and psychological tools for achieving some measures of success within the area of salvaging the environment through pro-environmental activities.

At the *entry* level, there are major and minor variables to consider according to the Environmental Citizenship theory. The major variable to consider at this level is the extent of sensitivity to environment issues an individual may have entered the work of environmental activities with. The minor variables include knowledge of ecology, androgyny (readiness of the individual to work with the opposite sex on environmental matters) and attitude towards pollution, ICTs and economics.

At the level of *ownership*, major variables include deep knowledge about environmental issues and personal investment in working for the environment. Minor variables include knowledge of the consequences of environmental degradation and some amount of commitment in working pro-environmentally.

At the level of *empowerment*, major variables include deep knowledge about the application of the skills of pro-environmental work, high level of positive self-concept and the submission of a categorical statement about an individual's intention to take pro-environmental action. Minor variables include in-depth knowledge about environmental issues.

Below is a diagram of the *environmental citizenship theory* which emphasises and promotes pro-environmental attitudes and behaviours, the last hope of the human species to regain the lost purity of the environment residing in the availability of a sufficient population of pro-environmental individuals (Akintunde, 2017).

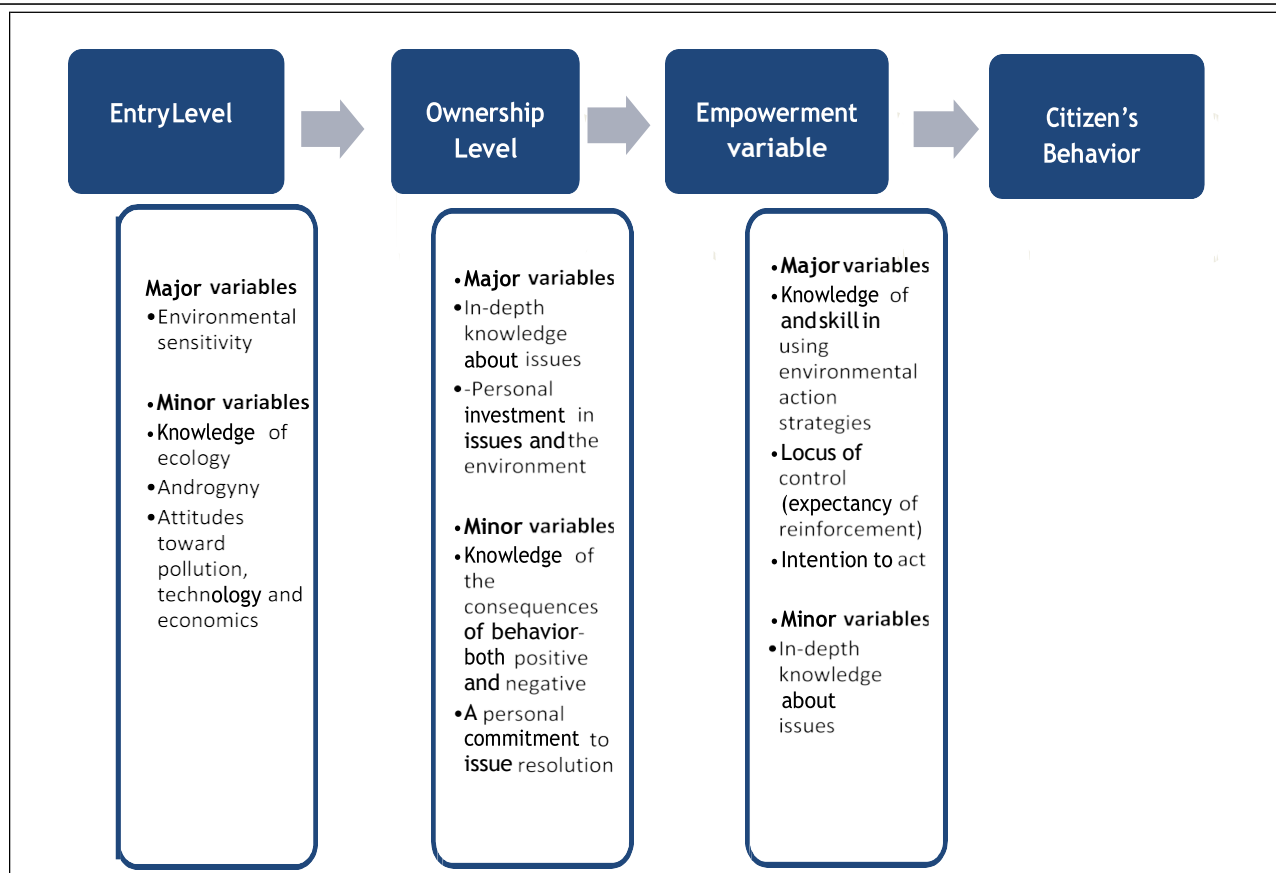


Figure 1: Diagrammatic representation of the environmental citizenship theory.

Source: Akintunde (2017 p.127)

As stated earlier, the *environmental citizenship theory* suggests how awareness of environmental issues may be supplied through learning and assessment processes that emphasize the environmental knowledge of the individual at the *Entry Level* wherein the individual demonstrates initial interest in environmental issues; *Ownership Level* wherein the individual concerned shows enough commitment to own all efforts and knowledge being acquired in the area of environmental issues; and finally *Empowerment Level* wherein the individual through equipping himself/herself with sufficient enough skills and knowledge to contribute to practices aimed at sustaining the virtues of the environment is able to demonstrate concrete actions aimed at protecting or salvaging the environment.

Within the theoretical framework of the *environmental citizenship theory* therefore, we see the prescriptions of three factors that women must uphold in order to contribute their own to environmental sustainability, namely, knowledge of environmental issues, practice of environmentally non-threatening domestic practices and the development of environmentally friendly economic activities (a number of which are linked to domestic practices), since women must sustain themselves with some income generating activities albeit within the constraints of the world's globalized economy and extreme form of patriarchy at home.

Criticism of the environmental citizenship theory

The environmental citizenship theory as part of the environmental literacy framework is traceable to the 1970s and became dominant in the 1980s and 1990s. Quoting Disinger and Roth (1992) Johnson and Mappin (2005) explain that: "The environmental literacy framework focused on building a 'capacity to perceive and interpret the relative health of environmental systems and to take appropriate action to maintain, restore, or improve the health of those systems" (p.11). The model has, however, been criticized for the following:

- Not giving sufficient attention to the aesthetic or spiritual aspects of environmental education.
- Being unable to help a person learn how they think, feel, or how to extract meaning from the environment.
- It is fixated on individual behavioural change to the exclusion of political and collective dimensions of environmental issues.
- There is also the difficulty that may come from conflict between action as an outcome of the model and the knowledge or skill that brings about the action.

The highlighted weaknesses of the environmental citizenship theory to produce a critical mass of pro-environmental women that will engage in positive environmental activities notwithstanding, this theory remains the most promising in advancing the cause of environmental sustainability.

CONCEPTUAL FRAMEWORK

From the theoretical framework of this study was consequently drawn a scientific conceptual framework as a scientific conceptual framework is the specific frame of thinking through which a researcher chooses to conduct a study. The environmental citizenship theory having outlined three domains of performance (natural sensitivity to environmental issues, deep knowledge of environmental issues and intrinsic motivation to engage in environmental sustainable actions), this study's conceptual framework retained that two categories of women would be viewed as pro-environmentalists while one category of women would be viewed as women who are not pro-environmentalist thus,

1. Women who possess natural sensitivity to environmental issues and had deep knowledge of environmental issues and equally demonstrate intrinsic motivation to engage in environmentally sustainable actions in the practice of their domestic chores (*major variables*), would be declared pro-environmentalist.
2. Women who state that they did not know themselves as being naturally sensitive to environmental issues but who end up displaying deep knowledge of environmental matters and show that they are intrinsically motivated to act environmentally sustainably in the practice of their domestic chores (*middle variables*), would be said to be pro-environmentalist.
3. Women not naturally inclined to react to environmental issues who possess general knowledge about the environment and are not intrinsically committed to taking environmentally sustainable actions in the practice of their domestic chores (*minor variables*), would be classified as women that are not pro-environmentalist.

METHODOLOGY

A mixed research design (quantitative and qualitative) was adopted for this study. Using a stratified sampling technique, a sample of 400 women was drawn from among the 61% of the women population making up Osun State who lives within the three geographical regions of the state. Data was collected using a questionnaire designed to measure both the levels and criteria making up the environmental citizenship framework. Only one research question was tested

Research Question Tested

Does a critical mass of pro-environmental women exist in Osun State of Nigeria?

A two-dimensional questionnaire modelled on the environmental citizenship theory was developed which sought to assess the natural sensitivity of participants to environmental issues, their knowledge levels on both environmental issues and best practices in environmental sustainability especially as it regards the execution of domestic activities. The environment dimension of the questionnaire was made up of six (6) criteria (environmental sensibility, attitudes towards pollution and related matters, indepth knowledge about environmental issues, personal investment in environmental issues, skill on environmental strategies and locus of control). The dimension on the domestic practices was made up of two (2) dimensions (knowledge of ecology and knowledge of the consequences of environmentally related behaviours).

Each of the criteria making up the two dimensions of the questionnaire was further made up of at least five (5) items. The scoring of participants' responses to the items of the questionnaire was structured along a four (4)-Likert Scale wherein the lowest score (poorest response) attracted 1mark and the highest score (best response) attracted 4marks. Within this frame of reasoning, the lowest score on any particular 5-item criterion came to 5 marks (1mark x 5items) and the highest score on any particular 5-item criterion was 20 marks (4 marks x 5 items).

In line with the scoring format which posits that participants who can be declared adequately knowledgeable in both environmental issues and domestic practices were those that can be placed on the *major* and *middle* rungs of the environmental citizenship theory, it was determined that only those who scored between 15 and 20 marks on each 5-item criterion of the questionnaire were pro-environmental and/or knowledgeable in best domestic practices. Fifteen (15) marks were obtained whenever a participant consistently chose five (5) answers that fell within the lower arm of the upper bracket of the 4-Likert Scale (3 marks each) and a participant obtained twenty (20) marks when she consistently selected answers five (5) answers that fell within the upper arm of the upper bracket of the 4-Likert Scale (4 marks each).

Participants who were knowledgeable in best domestic practices or who were declared as pro-environmental were those that selected answers that attracted either 3 marks or 4 marks or those who scored a minimum of 15 marks on each 5-item criterion.

Table 1: Mean scores obtained by all participants on the criteria measuring knowledge on both environmental issues and best domestic practices.

		Total score for Environmental sensitivity	Score for Knowledge of ecology	Score for attitudes towards pollution /ICTs/Economics	Score for In-depth Knowledge about environ. issues	Score for personal invest in environ. Issues	Score for Knowledge of the consequences of behaviour	Score for skill in using environ Action strategies	Score for locus of control	Mean Score on all Criteria
N		400	400	400	400	400	400	400	400	
Mean		12.22	13.16	15.04	15.18	15.02	16.08	14.54	14.61	14.481
Std Deviat.		2.482	1.310	1.067	2.607	3.122	-1.987	1.666	0.184	
Percentage of N	25	12.10	15.10	15.01	15.13	17.00	15.95	15.51	14.28	15.01
	50	12.11	15.20	15.09	15.00	17.11	12.20	15.60	14.30	14.576

Table 1 highlights the scores obtained by participants on the eight (8) criteria assessing knowledge on both environmental issues and domestic practices. Table 1 shows that all 400 participants obtained a total mean score of 14.481 on all the 8 criteria assessing knowledge on both environmental issues and domestic practices. Table 1 equally shows that only when the total mean score of 25% of all participants was computed that a mean score of 15.01 was obtained. This implies that only 25% of the 400 participants were found to be adequately knowledgeable in both environmental issues and best domestic practices.

However, the Research Question Tested specifically asked for the purpose of determining the size of pro-environmental women in Osun State of Nigeria. As such, the findings on Table 1 were re-plotted on Table 2 below with a view to directly answering the Research Question Tested.

Table 2

	Entry Level		Ownership Level		Empowerment Level		Mean score	%
Major Variables	Existence of Sensitivity Criterion (15-20)	Attitudes towards Pollution, ICTs & Econ (15-20)	Indepth knowledge about environmental issues (15-20)	Personal investment in environmental issues (15-20)	Skill in environmental action strategies (15-20)	Proof of intrinsic motivation for action (15-20)		
	Mean	12.10	15.01	15.13	17.00	15.51	14.28	14.84
Middle Variables	Absence of Sensitivity Criterion (1-14)	Attitudes towards Pollution, ICTs & Econ	Indepth knowledge about environmental issues (15-20)	Personal investment in environmental issues (15-20)	Skill in environmental action strategies (15-20)	Proof of intrinsic motivation for action (15-20)		
	Mean	12.10	15.01	15.13	17.00	15.51	14.28	14.84

Percentage of pro-environmental women in Osun State

Table 2 presents five types of important information. First, it highlights the 6 sets of criteria that assessed participants on knowledge concerning environmental issues only. Second, the table highlights the individual mean scores on each of the six (6) sets of criteria belonging to the 25% of the participants who pooled a total mean score of 15.01 on both knowledge of environmental issues and best domestic practices. Third, the table shows that when the 6 criteria assessing

environmental knowledge alone of the 25% of participants were isolated and considered separately, the 25% of participants that earlier on scored a total mean of 15.01 on both domestic practices and environmental knowledge, scored only a total mean of 14.84.

This suggests that while it was possible to submit that 25% of all participants were adequately knowledgeable in best domestic practices and environmental issues (having pooled at least a mean of 15.01 which falls within the brackets 15-20), a little less than 25% of all participants can be said to be proenvironmental because of a total mean score of 14.84 which is a little lower than the 15.00 mean score threshold.

Fourth, the table displays one unexpected result wherein the 25% of participants who failed to pool a total mean score of 15.00 on the environmental sensitivity and who could not also obtain 15.00 total mean score on locus of control (intrinsic motivation to act proenvironmentally) managed to obtain a mean score of 17.00 on personal investment (ability to act proenvironmentally). This particular finding was taken up with participants that took part in the FGD.

Fifth, contrary to the conceptual framework assumption to the effect that there existed the possibility of attaining the status of pro-environmental using two different routes (e.g. high environmental sensitivity or low environmental sensitivity) Table 2 shows that such a possibility did not exist in this study. According to the conceptual framework, the status of proenvironmental could be attained by those who pooled a mean score of at least 15.00 on environmental sensitivity as well as those who pooled less than 15.00 mean score on environmental sensitivity. Table 2 shows that all pro-environmental women had low environmental sensitivity before they began showing interest in environmental issues (as they all pooled a mean score less than 15.00 on the sensitivity criteria). Consequently, all participants that attained the status of proenvironmental fell within the group that satisfied the *middle variables* of the conceptual framework. No woman in this study attained the status of pro-environmental through the *major variables* of the conceptual framework.

ANALYSIS OF FINDINGS

Even practices such as domestic practices (cooking, washing at home, disposing of domestic waste, etc.) have been found to impact the environment negatively depending on the way they are carried on. In Osun State, less than 30% of women who make up 61% of the State's population were found to be equipped with the right skills and competences to contribute their own to environmental sustainability. While a statistically significant number of women did not pass the pro-environmental mark, it should however be said that there is great promise for Osun State women to eventually contribute significantly to environmental sustainability as 25% (but not the 30% critical mass) of them were able to pool the near mean required.

CONCLUSION

There is an ontogeny of development in Africa which favours the respect and near reverence towards natural entities such as special bodies of water, sacred trees, shrines and all items and places that may be deemed natural phenomena (Biao, 2016). In the absence of systematic environmental education to Osun State women, this African ontogeny may have been responsible for obtaining not the expected result of 30% of critical mass of pro-environmental women, but equally not negligible 25% pro-environmental women. With a bit of tweaking, Osun State may soon

count among the States that may produce a critical mass of pro-environmental women and citizens within the federation of Nigeria.

RECOMMENDATIONS

The tweaking referred to in the *Conclusion* has to do with the introduction of a minimum of environmental education and learning to Osun State women so that, combined with their respect for natural places and phenomena, their consciousness may be raised to that high level of environmental sensitivity and performance where at least 30% or even higher percentage of pro-environmental women may be enthroned.

References

- Abbas, M.Y. & Singh, R. (2014). A survey of environmental awareness, attitude, and participation amongst university students: A case study. *International Journal of Science and Research (IJSR)* (3) 5. www.ijsr.net.
- Akintunde, E. A. (2017). Theories and concepts for human behavior in environmental preservation. *Journal of Environmental Science and Public Health*, 1(2), 1-121-133.
- Amcamp, P. J., & Bjorn, L. O. (2010). Environmental Effects Assessment Panel: United Nations Environmental Programmes. UNESCO.
- Babalola Y., Babalola, A., & Okhale F. (2010). Awareness and accessibility of environmental information in Nigeria: Evidence from Delta State. *Library Philosophy and Practice* <http://digitalcommons.unl.edu/libphilprac>.
- Biao, I. (2020). An alternate theory of climate change. *Pascal International Members Association (PIMA)* 30, 12-14.
- Biao, I. (2016). The place of ontogeny in the process of socio-economic development. *Advances in Social Sciences Research Journal* 3(3), 57-68. DoI:10.14738/assrj.33.1844.-ISSN2055-0286--Society for Science and Education—UK.
- Disinger, J. F. & Roth, C. E. (1992). Environmental literacy. ERIC: CSMEEDigest. ED351201.html
- Ekdardt, F. (2001). Sustainability and climate policy. *Journal of Research in Environmental Sustainability*. Retrieved <http://www.sustainability-justice-climate.eu/en/nachhaltigkeit.html>
- Gonzalez de Molina, M. & Toledo, P. (2014). Environmental history as sustainability. Retrieved <http://www.springer.com/978-3-319-06357-7>.
- Goodland, R. (1995). The concept of environmental sustainability. *Annual Review of Ecology and Systematics*, 26, 1-24.
- Johnson and Mappin (2005) *Environmental education and advocacy: Changing perspectives of ecology and education*. Cambridge: Cambridge University Press.
- Kollmuss, A. & Agyeman, J., (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research* 8(3), 239-260.
- Nigerian Environmental Study Team. (1991). *Nigeria's threatened environment: A national profile*, Ibadan, Nigeria. www.nestinteractive.org
- Newbold, T. et al. (2016). Has land use pushed terrestrial biodiversity beyond the planetary boundary? A global assessment. *353*(6296), 288-291.
- Oliver, P., Marwell, G., & Teixeira, R. (1985). A theory of the critical mass: I. Interdependence, group heterogeneity, and the production of collective action. *American Journal of Sociology*, 91(3), 522-556. <https://doi.org/10.1086/228313>
- Pimm, S. L. & Smith, R. L. (2019). *Ecology*. Retrieved from <https://www.britannica.com/science/ecology>
- Rockstrom, J. et al. (2009). Planetary boundaries: Exploring the safe operating space for humanity. *Ecology and Society* 14(2): 32 <https://www.ecologyandsociety.org/vol14/>
- Saro-Wiwa, K. (2002). Ogoni! Ogoni! In J. Mapanje (Ed.), *Gathering seaweed: African prison writing* (p.47). Harlow, Essex: Heinemann.

Stefen, W. et al. (2015). Planetary boundaries: Guiding human development on a changing planet. Retrieved from <http://dx.doi.org/10.1126/science.1259855>

Thurber, A. R. et al. (2014). Ecosystem function and services provided by the deep sea. *Biogeosciences*, 11(14), 3941-3963.

Timothy, S. (1987). The concept known as 'critical mass'. Retrieved from <http://www.concepts&terminologies/reiterate/ooo/>.

United Nations (2019). COP14: Combatting desertification. Retrieved from <https://www.unccd.int/conventionconference-parties-cop/cop>

United Nations (1972). Report of the United Nations Conference on Human Environment. Retrieved from https://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.48/14 United Nations (2012). World population prospects. New York: UN