

Original Research Article

**EFFECTS OF CLIMATE VARIABILITY ON SCHOOL ATTENDANCE
IN SELECTED PUBLIC SENIOR SECONDARY SCHOOLS IN
IBADAN, NIGERIA.**

Abstract

Good classrooms, adequate security, school location, incessant strikes have been found to significantly influence school attendance and are baseline factors in determining student success. However, little is known about the influence of climate variability on school attendance in Nigeria. As a result, a total of 450 students were sampled randomly from five public senior secondary schools in Ibadan metropolis. The study revealed that the awareness of climate variability was high and not significantly different among students ($\chi^2=20.465$, $p>0.05$). High temperature and excessive rainfall were the key indicators of climate variability. Its effects on school attendance was significantly different among students ($\chi^2=19.563$, $p<0.05$). It was discovered that high temperature hinders the ability to sleep at night, and this has resulted in most students sleeping in the morning at the expense of going to school. The perceived threats that come along with excessive rain fall in the form of violent wind also affected school attendance. The reality of climate variability has made students to devise means of coping with its adverse effects such as; sleeping naked and frequent drinking of water. The study concluded that there should be adequate enlightenment on effective environmental interaction to mitigate the adverse effects of climate variability.

Keywords: Climate variability, school attendance, students, coping strategies, Nigeria.

1. Introduction

Regular school attendance has been identified as a baseline factor in determining student success, and different factors affecting school attendance have been identified in the literature. Students were found to be regular in schools with good classrooms, laboratories and with sporting facilities (Obemeta 1995; Adeboyeje 2000; and Obayan, 2003). A possible deduction from the above stated, is that schools with good physical environment encourage high school attendance. Students' turnout was also found to be high in schools and communities that provide adequate security (Patrick and Felix, 2013). Furthermore, school discipline, family background and school location are also variables determining school

attendance (Ubogu, 2004). Hunt (2008) asserted that children without any form of mobility to school, unsupportive parents and lack of professional model in the community are barriers to school attendance. Adewole (1988) reported that the breakdown of communication, student over population, shortage of teachers, incessant strikes and undue application of corporal punishment are strongly associated with whether a student would be regular in school or not.

Beyond the above stated factors affecting school attendance, climate variability has also been pivotal. For example, Shah and Steinberg (2015) found out that in rural India when rainfall is higher, children switched out of school enrollment into productive work. The evidence of climate variability on school attendance was also provided by De Janvry et al., (2006) in Mexico, Colmer (2013) in Ethiopia, Datar (2013) in China and Villalobos (2016) in Costa Rica. In a study carried out by Zivin (2015) in the United States of America, a negative correlation was found between high temperature and school attendance. This is because with extreme temperatures, the human body finds it difficult to perform tasks. In Zimbabwe, drought had adverse effects on school attendance as students who were malnourished did not find going to school interesting (Findings, 2002). Likewise in England, children living 3km from their school were excused from going to school due to high snow fall (Ellis, 1973).

From the foregoing discussion, little is known about the effects of climate variability on school attendance in Nigeria. Most studies on climate variability have been largely linked with agriculture, health, migration, economy, water resources, among others (Olaniran and Adeleke 2015; Chidi and Ominigbo 2010; Ebele and Emordi 2016; Taiwo et al., 2012). As stated concisely by Adejuwon (2016), “the problems associated with climate variability on school attendance include education retardation, dropout and child labour”. These will obviously have negative consequences on school enrolment and academic performance of students. As a result, achieving quality education which is one of the Sustainable Development Goals would be greatly hampered.

To this end, this study intends to assess how the changing climatic conditions have affected school attendance with a multiplier effect on the need for individuals, private organizations and government establishments to adopt environmental friendly approaches in their day to day interaction with the environment. Furthermore, this research would also help educational policy makers to have an understanding of the challenges posed by climate variability on students’ and the need to come up with appropriate policies in order to achieve quality

65 education in line with the United Nations Sustainable Development Goals. In order to achieve
66 the central focus of this study, the following research questions were addressed:

- 67 1. Are students aware of climate variability?
- 68 2. How do students determine climate variability?
- 69 3. Does climate variability influence school attendance?
- 70 4. In what ways does climate variability influence school attendance?
- 71 5. How do students cope with the effects of climate variability?

72 **2. Study Area**

73 Ibadan, the capital of Oyo State is located in south-western Nigeria and it lies between
74 latitude 7°3'N to 7°4' of the Equator and longitude 3°8'E to 3°9' of the Greenwich (Jackson
75 et al., 2013). It comprises eleven local government areas. Out of the eleven local government
76 areas, five are urban while six are semi urban. The urban local government areas include;
77 Ibadan North, Ibadan Northeast, Ibadan Northwest, Ibadan Southeast and Ibadan Southwest.
78 On the other hand, Akinyele, Egbeda, Ido, Lagelu, Ona Ara and Oluyole make up the semi
79 urban local government areas. With a population of about 306,795 (National Population
80 Commission, 2006), it is regarded as one of the most populous black African cities and one of
81 the oldest in Africa (Mabogunje, 1962). The Yoruba's are the dominant ethnic group,
82 however, it has a mix of other ethnic groups such as the Hausas, Igbos, Ijaws, Nupes, among
83 others.

84 The city is known for high concentration of educational institutions when compared with
85 other parts of the State with the government and private individuals providing educational
86 services. Notably, among these educational Institutions are; The University of Ibadan, The
87 Polytechnic of Ibadan, Lead City University, Loyola College, Government College Ibadan,
88 etc.

89 The area falls within the tropical wet and dry climate. The wet season runs from March
90 through October with a double maxima rainfall in June and September while the dry season
91 runs through November to February. The mean maximum and minimum temperature are
92 26.46°C and 21.42°C respectively. It also has a relative humidity of about 74.55%.

93 3. The Methods

94 This study made use of survey research design as the focus is to assess the effects of climate
 95 variability on school attendance. The study covered public senior secondary schools in the
 96 five urban local government areas of Ibadan due to the amalgam of different microclimates
 97 that are dominant and mostly modified by the influence of built up areas, auto mobile and
 98 industrial emissions when compared to the rural environment (William, 1998). Ijokodo High
 99 School in Ibadan North, Loyola College in Ibadan North East, Eleyele High School in Ibadan
 100 North West, Adelagun Memorial Grammar School in Ibadan South East and Adifase High
 101 School in Ibadan South West comprised the schools for this study, and they were selected
 102 through a simple random sampling from the five urban local government areas. Senior
 103 secondary school students formed the study population and were sampled based on the
 104 assumption that they would be better informed about climatic condition as a result of their
 105 higher age and duration of stay in environment. A total of 450 students were randomly
 106 selected from the aforementioned schools, that is; 105 students from Loyola College, 100
 107 from Eleyele High School, 85 from Adelagun Memorial Grammar School, 80 from Adifase
 108 High School and 80 from Ijokodo High School. Having secured permission from the
 109 Principals of the schools, a structured questionnaire was administered to the students. The
 110 first section elicited information about the socio economic characteristics of the students such
 111 as their age and duration of stay in environment while the second section obtained
 112 information on students' awareness of climate variability; its effects on their school
 113 attendance and their coping strategies. Both descriptive and inferential statistical techniques
 114 were adopted to address the research questions of this study. Binary logistics regression was
 115 used to identify the determinants of climate variability awareness among students while chi
 116 square was used to determine the indicators of climate variability among students, effects of
 117 climate variability on school attendance and the strategies of coping with the effects of
 118 climate variability. Graphs and tables were also used to present the findings of this study.

119 4. Results and Discussion

120 4.1. *Student's socio-economic characteristics and awareness of climate variability*

121 Two key socio economic variables were used to assess the awareness of students about
 122 climate variability. These variables are age and the duration of stay in environment. These
 123 variables are important as they help in conceptualizing the study. Majority (51.3%) of the

respondents were between 14-16 years while majority (92.8%) had lived in their environment for more than 14 years (Table 1). Based on the total number of respondents sampled, the study revealed that majority (96.3%) were aware of climate variability while just 3.7% were not aware of climate variability (Table 2). A further breakdown shows that majority (48.6%) of respondents, 17 years and above were better informed of climate variability when compared to 47.7% of respondents of age range 14-16 years (Table 3). A possible deduction from the aforementioned is that, all other things being equal, awareness of climate variability increases with age. The statistical analysis shows that age significantly determines the awareness of climate variability (odd value 3.65, $p < 0.05$). Furthermore, majority (92.8%) of those who had lived in their current location for more than 14 years had a better understanding of the changing climate compared to those (3.5%) that had lived for less than 5 years. The statistical analysis shows that duration of stay in environment significantly influences the awareness of climate variability among students (odd value 4.56, $p < 0.05$) (Table 4). On the whole, the statistical analysis showed that there was no significant difference in the awareness of climate variability among the students ($\chi^2 = 20.46$, $p > 0.05$) (Table 5).

Table 1: Respondents' socio-economic characteristics

Variables	Frequency
Age	14-16 years: 231 (51.3%)
	17 years and above: 219 (48.6%)
Duration of stay in environment	14 years and above: 418 (92.8%)
	Less than 5 years: 32 (7.1%)

Source: Field survey (2018).

144

Table 2: Awareness of climate variability

Aware of climate variability	Not aware of climate variability
96.3%	3.7%

145 Source: Field survey (2018).

146 **Table 3: Awareness of climate variability based on socio-economic characteristics of**
147 **respondents**

Variables	Frequency	Aware of climate variability	Not aware of climate variability
Age	14-16 years: 215	47.7%	3.7%
	17 years and above: 219	48.6%	0%
Duration of stay in environment	14 years and above: 418	92.8%	0%
	Less than 5 years : 16	3.5%	3.7%

148 Source: Field survey (2018).

149

Table 4: Model summary

	B	S.E	Wald	Df	Sig.	Odd Value
Age	0.018	0.164	0.012	1	0.014	3.65
Duration of stay in environment	0.427	0.164	6.784	1	0.009	4.56

150 Source: Field survey (2018)

151 **Table 5: Results of chi square analysis**

	Awareness of climate variability
X ²	20.46
Df	1
Sig	1.0764

152 Source: Field survey (2018).

153 **4.2. Indicators of climate variability**

154 Although there are scientific methodologies in measuring climate variability, students' perceptions were used in determining climate variability for this study. Six indicators of climate variability were identified by the students, and they are; flooding, high temperature, violent wind, severe erosion, excessive rainfall and intense harmattan (Figure 1). A larger percentage of the respondents about 40.4% identified climate variability through high temperature. They claimed that the level and intensity of temperature had increased at an abnormal rate over the years. This is felt in the burning effect of the sun on their skin and the increased heat at night. Furthermore, excessive rainfall representing 25% of the total distribution was the second major indicator of changing climate and weather. Flooding was identified by 19% of the respondents, and this could be due to the link that exists between excessive rainfall and flooding. Harmattan was also noticed to have been severe in recent times as this was indicated by 9.6% of the respondents. Its impact is felt in reduced visibility in the morning, intense cold and the fast rate at which washed clothes dry up.

167 Severe erosion in the form of washing away of the top spoil was identified by 4% of the respondents while violent wind that accompanies the onset of rainfall was indicated by 2% of the respondents. The result revealed an unequal distribution in the indicators of climate variability among students. The statistical analysis confirms that there was significant difference in the indicators of climate variability ($\chi^2=18.34$, $p<0.05$) (Table 6).

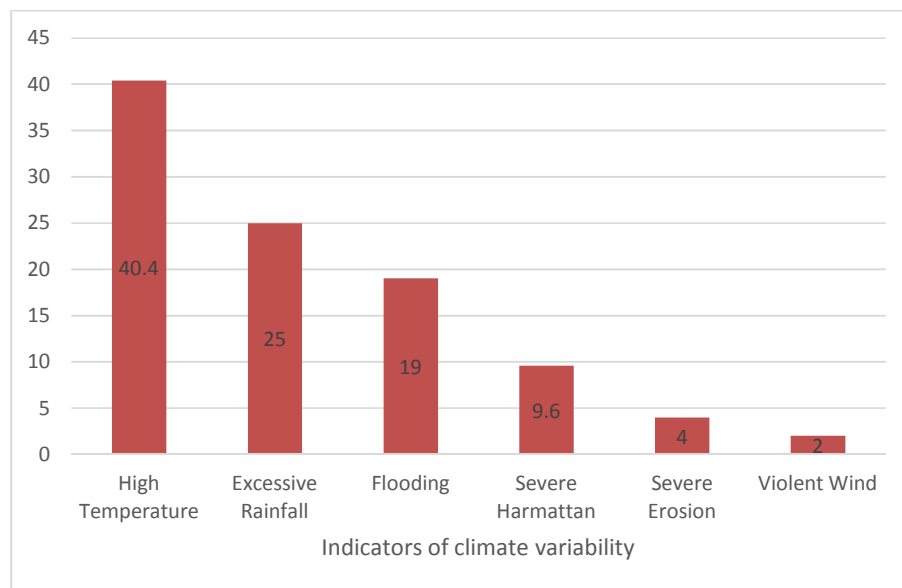


Figure 1: Indicators of climate variability

Source: Field survey (2018).

Table 6: Results of chi square analysis

	Indicators of climate variability
X ²	18.34
Df	5
Sig	0.025

Source: Field survey (2018).

4.3. Effects of climate variability on school attendance

Climate variability was found to influence school attendance as this was reported by majority (96.3%) of the respondents. High temperature led to the inability to sleep and rest at night, as this was indicated by 47% of the respondents (Table 7). In addition, it has also reduced drastically the number of sleeping hours for some students. The high heat level was also compounded by the erratic power supply which makes coping with high temperature difficult. This has resulted in most students sleeping in the morning at the expense of going to

school. Some students have also decided not to attend school owing to the possibility of sleeping in class and the loss of concentration. This is because high temperature creates a scenario whereby the brain is constantly reminding the body to do something about the condition. Due to the constant interruption, it is difficult for students to stay focused. Corroborating the findings of this study, Zivin and Neidell (2010) asserted that high temperatures cause discomfort, fatigue and even cognitive impairment which leads to absenteeism among students. Similarly, Somanathan et al (2014) argued that productivity and attendance to work decrease with high temperature.

Excessive rainfall was found to lead to ‘fear’ among 35.5% of the respondents as they reported an unpleasant emotion caused by the perceived danger or threat that comes along with heavy rainfall in the form of violent wind. According to some of the respondents, wind that accompany rainfall in recent times have been violent removing the roofs of houses, falling down electric poles and felling down trees. This can become even more dangerous when the violent wind that accompanies rainfall occurs in the morning. In such a situation, it becomes very difficult going to school and the cost of getting to school more than doubles. This situation is further made worse by poor mobility conditions.

Flooding which is a possible resultant effect of excessive rainfall was also found to affect school attendance among 17.5% of the respondents. Some students whose homes were once flooded, reported that they had to stay awake all night trying to reduce the possible damage that may be caused by the flood. This leaves them stressed out and not wanting to go to school the next day. Furthermore, some students decided to cut off schooling due to flooded roads which leads to their schools. They claimed going to school would be suicidal as they could drown in water.

Furthermore, some of the respondents absented themselves from school due to minor injury on their physical health as a result of flooding. Non-fatal injuries such as cuts and minor fracture were sustained. Flooding has also exposed them to toxic materials carried by floodwater leading to skin infections. The statistical analysis confirms that there was significant difference in the effects of climate variability on school attendance among students ($\chi^2=19.563$, $p<0.05$) (Table 8)

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Table 7: Effects of climate variability on school attendance

Climate variability indicators	Effects on respondents	Decision on school attendance	Frequency
High Temperature	Inability to sleep and rest at night	I do not go to school	204: (47%)
Excessive Rainfall	Perceived danger or threat that comes along with heavy rainfall in the form of violent wind.	I do not go to school	154: (35.5%)
Flooding	Non-fatal injuries such as cuts and minor fracture	I do not go to school	76: (17.5%)
			434: (100%)

216 Source: Field survey (2018).

217

Table 8: Results of chi square analysis

	Effects of climate variability on school attendance
X ²	19.56
Df	2
Sig	0.031

218 Source: Field survey (2018).

4.4. *Coping with the effects of climate variability*

In coping with the effects of climate variability, various measures have been adopted by students which include; a change in the time of study, putting on light clothing, sleeping naked, frequent drinking of water, bathing at least twice in a day, the use of electric fan powered by generator and sleeping on the floor (Table 9). The study revealed that majority of the respondents (30.9%) adopted a change in their time of study as a way of coping with the effects of climate variability. According to the respondents, they had to change their period of study to a time that is more conducive in terms of less heat to fast track their level of assimilation. For those who initially studied in the afternoon, there has been a shift to evening which they claimed is cooler when compared to afternoon which is now extremely hot unlike in time past. This is buttressed by the radiation and insolation concept, of which there is great heating in the day and cooling at night.

Putting on light clothing accounted for 22.8% of the coping strategy. Based on the responses, it is no longer convenient wearing thick clothes in time of intensive heat. It is believed that this will only worsen the situation leading to more perspiration, a situation which makes them very uncomfortable. The male students in particular, have resorted to not wearing singlet which is a common form of dressing for men in order to have a better feel of the air which helps reduce the impact of high temperature. Also, 18.4% of the respondents sleep naked in order to adjust to the effects of climate variability. The respondents asserted that it makes no sense wearing clothes to sleep in the face of intensive heat, as this will only aggravate the situation. Furthermore, it was found that the water intake level of the students had greatly increased. Some of the respondents (15.4%) now drink between 5-10 glasses of water per day as against the initial average of 5 glasses of water per day. The water intake was, however, higher for those who engage in sport, drinking between 8-13 glasses of water per day.

The rate of bathing was also found to be more frequent in the face of climate variability. About 8.3% of the respondents reported bathing at least twice in a day in order to keep themselves cooler and more refreshed. Another coping strategy was the use of electric fan powered by generator. This was adopted by 4.1% of the respondents. According to the respondents, the impact of heat would have been minimal if there had been constant electricity supply to power their fans. Since this is not the situation, they had to persuade their parents to buy generator. In some cases, the respondents did not have to persuade their parents to buy a generator, as their parents bought it based on their own discretion as the

impact of heat is generally felt. Finally, 2.1% of the respondents slept on bare floor which they claim is cooler and can help mitigate the adverse effects of climate variability. On the whole, the coping strategies adopted by the respondents were largely determined by the increase in temperature. The statistical analysis shows that there was a significant difference in the strategies of coping with climate variability among respondents ($\chi^2=21.365$, $p<0.05$) (Table 10).

Table 9: Coping strategies

Coping strategies	Frequency
Change in the time of study	134(30.9%)
Putting on light clothing	99(22.8%)
Sleeping naked	80(18.4%)
Frequent drinking of water	67(15.4%)
Bathing at least twice in a day	36(8.3%)
Use of electric fan powered by generator	9(2.1%)
Sleeping on bare floor	9(2.1%)

Source: Field survey (2018).

Table 10: Results of chi square analysis

	Coping with the effects of climate variability
χ^2	21.365
Df	6
Sig	0.012

Source: Field survey (2018).

5. Conclusion

The study identified the effects of climate variability on school attendance among students, awareness of climate variability, indicators of climate variability and the coping strategies adopted by the students. Based on the findings, a number of conclusions were arrived at. First, the awareness of climate variability was high and largely determined by age and duration of stay in environment. Second, high temperature, severe erosion, excessive rainfall, flooding, severe harmattan and violent wind were key indicators of climate variability. Third, climate variability was found to negatively affect school attendance. Thus, it poses a great danger to the achievement of quality education for sustainable development. Finally, a change in the time of study, wearing light clothing, sleeping naked, frequent drinking of water, bathing at least twice in a day, the use of electric fan powered by generator and sleeping on the floor were some of the coping strategies against the adverse effects of climate variability adopted by students. Based on the aforementioned findings, educational policy makers and the government need to come up with appropriate policies to ameliorate the negative consequences of climate variability in the form of; intensive awareness on the causes and negative consequences of climate variability and optima environmental interaction.

Disclosure Statement

No potential conflict of interests.

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