

The Level of Climate Change Awareness and Perception among Primary School Teachers in Kisumu Municipality, Kenya

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Abstract

Climate change is an area that is in dire need of publicity to help the public make informed decisions in its adaptation and mitigation. This study assessed the level of climate change awareness and perception among primary school teachers in Kisumu Municipality. A structured questionnaire was used to collect data on teachers' knowledge and perception of climate change from 100 respondents distributed in 20 primary schools in the area. Findings indicate that the level of climate change awareness among primary school teachers in Kisumu Municipality is not significantly low, but there exists significant gaps in their knowledge. Results further indicate that primary school teachers in Kisumu Municipality perceive climate change as a threat. These findings necessitates capacity building to improve teachers' quality of knowledge on the subject especially if they are to be used as key actors in climate change awareness campaign in Kenya.

Keywords: Climate Change, Awareness, Perception

1.0 Background and Context

Climate change constitutes one of the 21st Century key challenges to development the world over (UNDP, 2007). As such, climate change and global warming have become issues of global concern in the recent decades. This is evidenced by the flurry of conferences, campaigns, reports and researches on this subject since the Rio Earth Summit in 1992 (Examples include the annual UNFCCC Conference of Parties, IPCC Assessment Reports and the volumes of literature published in journals such as WIREs and the International Journal of Climate Change). Holdren (2006) defined climate change as any measurable trend in global climate towards extreme, which is in addition to rising global temperatures. It is a long term measurable change in the elements of climate tending towards extreme.

Despite a few skeptical views (Frank, 2008; Lupo, 2008; Washington and Cook, 2011), there exists a widespread consensus among scientists that climate change is happening and is being driven by the unsustainable practices of mankind, especially the burning of fossil fuels, industrial pollution, deforestation, and land use changes (IPCC, 2007; Canadel et al., 2010; Weart, 2010; Cook *et al.*, 2013). Hence most authors often define climate change simply as the anthropogenic alteration of global climate system through increased concentration of greenhouse gases (GHGs) in the atmosphere leading to global warming (UNFCCC, 1992; Sexton *et al.*, 2001; Weart, 2010; Trenberth, 2011; Curry, 2011). Available scientific evidence shows that the earth experienced an average warming of approximately 0.6 °C during the 20th Century (IPCC, 2001) and is expected to warm by about 2-3 °C by the end of the 21st Century (IPCC, 2007).

Global attention on climate change was sort for the first time by the Brundtland Report, *Our Common Future*, which stated that the unsustainable development practices of humankind have pushed the world's climate to a warming trend (UNWCED, 1987). On the contrary, the public concern on climate change was not triggered by the Brundtland's report, but by the unusual northern hemisphere heat wave and drought of the summer 1988 (Christianson, 1999). Consequently, the IPCC was established in 1989 to carry out periodic assessments on the global climate system and later the *UN Framework Convention on Climate Change* was adopted in 1992 to provide a framework for global action against climate change. Nevertheless, numerous studies conducted since then reveal that the vast majority of people across the world, especially in developing countries, are unaware of climate change despite their high vulnerability to the impacts of climate change, (Bostrom *et al.*, 1994; Bord Fisher, and O'Conner, 1998; Pew Research Centre, 2006; Pugliese and Ray, 2009; Godfrey *et al.*, 2009).

Despite their awareness of changing weather patterns, people in Africa, are particularly misinformed about global climate change (Godfrey *et al.*, 2009; Taderera, 2010). The low level of awareness on climate change across sub-Saharan African countries is attributed to limited awareness campaigns on one hand and the fact that African countries have got too many problems ranging from poverty to political conflicts on the other hand (UNFCCC, 2007; UNDP, 2007) hence climate change is never a priority issue.

Just like in most African countries, the majority of Kenya's population is unaware of climate change, but are concerned about food insecurity and the recurrent droughts and floods in the country (Otieno, Pauker and Maina, 2009; Gok, 2010). However, the Kenyan government is aware of and concerned about climate change as a development issue. In this regard, the government has developed the *National Climate Change Response Strategy (NCCRS) – 2010* and its implementation plan, the *National Climate Change Action Plan (NCCAP) 2013-2017*, which outlines actions to be taken to mitigate and build resilience to the impacts of climate change.

Perception of climate change as a threat across the world has been increasing over the years thanks to the severity and increased frequency of climate change impacts (UNDP, 2007), but it is still not considered a priority environmental issue especially in the developed countries (Leiserowitz, Kates and Parris, 2005; Leiserowitz, 2006; Pew Research Centre, 2013). Various studies show that people in developing countries are more likely to perceive climate change as a threat (GlobeScan, 2006; Pew Research Centre, 2006; Godfrey *et al.*, 2009). Contrary results were, however, reported by Pugliese and Ray (2009) who states that climate change is more likely to be perceived as a serious problem in the developed world than in developing countries, despite developing countries being the most vulnerable to climate change impacts.

Even as resources are put together to mitigate climate change, there is need to educate people on what climate change really is. Increasing people's awareness on climate change through education is an important measure to persuade people at all levels in the community to play an active role in mitigating and adapting to climate change. Consequently, Kenya is considering a revision of its school curricula to include climate change knowledge at all levels as demonstrated in the *NCCAP 2013-2017*. Before, integrating climate change knowledge into school curriculum, especially at primary school level, it is paramount to assess the teachers' level of awareness and perception of climate change since this is likely to influence how teachers conduct knowledge transfer in the classroom. Whereas attempts have been made to assess the level of climate change awareness among Kenyans in general as documented in RoK (2013), GoK (2010) and Otieno, Pauker and Maina (2009), very little if any have been done to investigate the level of climate change awareness among teachers. This study was designed to fill this gap by assessing the level of climate change awareness and perception among primary school teachers in Kisumu Municipality.

2.0 Methodology

2.1 Study Area

The study was carried out in Kisumu Municipality located along the Equator within latitudes 0° 02' N and 0° 10' S and longitudes 34° 20' E and 34° 65' E in the shores of Lake Victoria (Maoulidi, 2008) as illustrated in Fig. 1 below. The area consists of both urban and peri-urban settlements with a population of 388,311 based on the 2009 census (<http://www.knbs.or.ke/census1999.php>, 2011). The Municipality is characterized by a warm to hot and wet climate all year round. The area has a total of 184 primary schools out of which 119 are public while the remaining 65 are private. Due to its location advantage, Kisumu holds high political and economic significance in the East Africa Lake region serving as a trade and communication confluence for Uganda, Tanzania, Rwanda and Burundi through its well-developed road, rail, air and water transport network (<http://www.citycouncilofkisumu.or.ke/background-and-history>, 2012).

2.2 Research Design

A descriptive survey was used in this study as it was deemed most appropriate in identification and description of people's opinion about a phenomenon (Mugenda, 2003), in this case climate change. A total of 100 respondents were selected from 20 primary schools (both public and private) located in Kisumu Municipality using a multistage stratified random sampling to ensure fair representation of schools by zone and type. At most 5 teachers were sampled from each of the 20 schools using stratified random sampling to ensure fair representation of gender in the sample. The study, however, recorded a response rate of 96% which was considered adequate as it fell above the 75% response rate recommended by Kelley *et al.* (2003).

A semi-structured questionnaire was used to collect information on teachers’ knowledge and perception of climate change. This was in congruent with UNEP (2006), which emphasizes the importance of questionnaire survey in gauging level of awareness on climate change among stakeholders and potential partners.

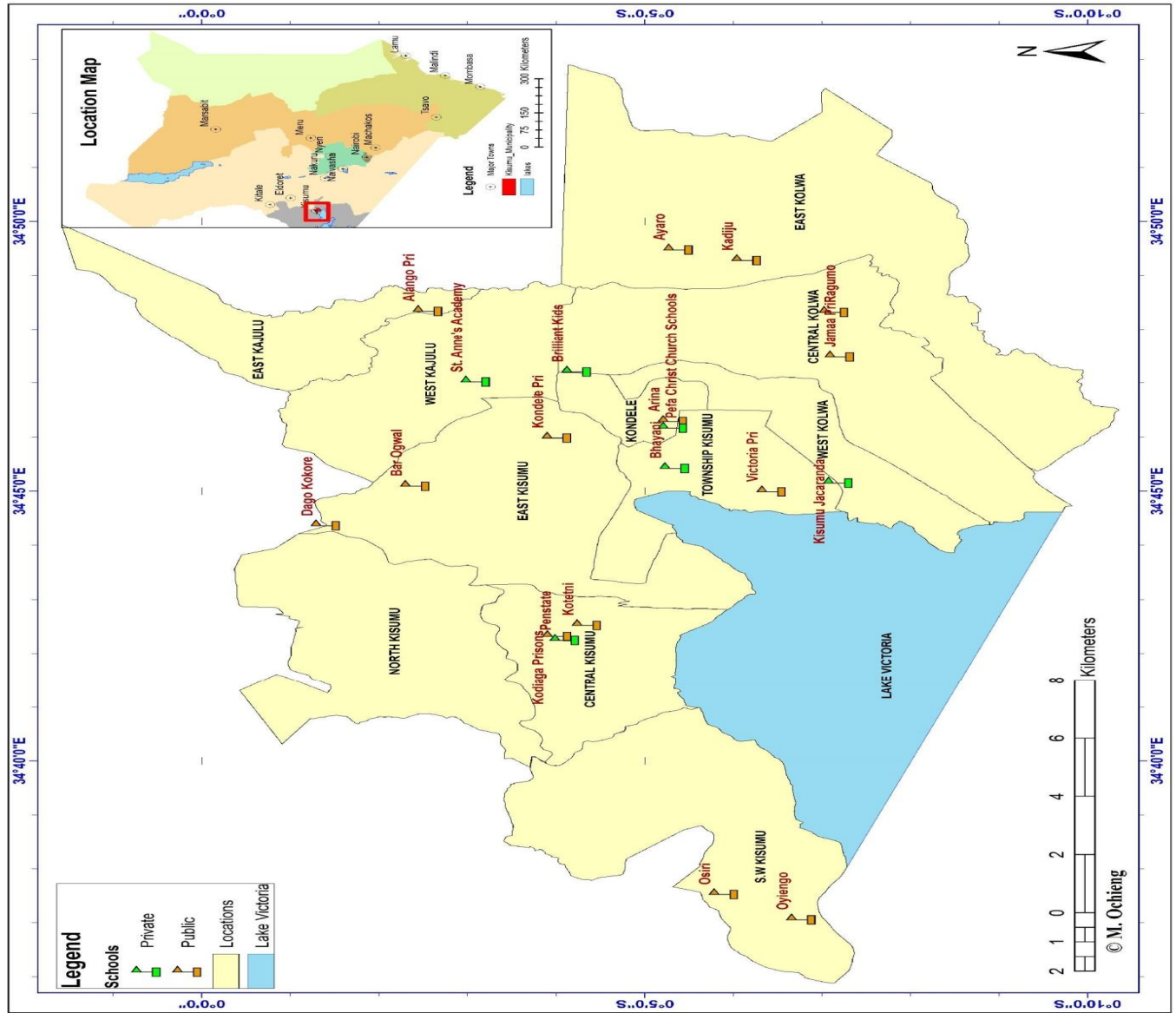


Figure 1: Map of the study area showing the main administrative areas and the sampled schools

2.3 Construction of Climate Change Awareness Scale

The level of awareness on climate change was assessed based on responses to 20 paired Likert Scale statements which returned a Cronbach’s Alpha of 0.816 considered good according to George and Mallery’s (2003) rule of thumb. The items were weighted 1-5 in which case 1 = Strongly Disagree and 5 = Strongly Agree for the positive statements while the reversed scale was used for the negative items. The “Don’t Know” responses, rated 3 in the Likert scale, were rerated zero during analysis to omit their effect as they had a tendency of increasing the final score despite their reflection of a lack of awareness. A summative approach was used in which case a respondent who scored 5 in all the 20 items would have a total score of 100 while one who scored 1 in all the 20 items would have a total score of 20. The final score for every respondent was divided by 20 (the number of items) resulting into an interval awareness scale ranging from 1 to 5 as described below:

Low level of awareness (1 – 2): Respondents in this category remained negative (i.e. either disagreed or strongly disagreed) to the positive statements and positive (i.e. either agreed or strongly agreed) to the negative statements hence could only score a maximum of 40 points (2*20 items) and hence considered unaware of climate change.

Medium level of awareness (2.01 – 3.99): Respondents in this category had mixed responses in either direction of the statements hence their composite score could only range from 41 to 79 and were thus considered aware of climate change, but with significant gaps in their knowledge.

High level of awareness (4 – 5): Respondents remained positive (i.e. agreed or strongly agreed) to the positive statements and negative (i.e. disagree or strongly disagreed) to the negative statements and hence could only score a minimum of 80 points (4*20 items). Respondents who fell in this category were considered highly aware of climate change.

3.0 Results and Discussion

3.1 Teachers' Level of Climate Change Awareness

The level of awareness on climate change among teachers in Kisumu Municipality can be categorized into three as already described in 2.3 above. Using level of climate change awareness as the only variable, a univariate chi-square test was used to test the hypothesis that the level of climate change awareness among primary school teachers in Kisumu Municipality is not significantly low. Results of the study shows that the level of climate change awareness among primary school teachers in Kisumu Municipality is not significantly low ($\chi^2 = 62.818$, $df = 2$, $n = 89$, $p = 0.000$) (Table 1). The respondents recorded a medium level of climate change awareness (score of 3.61 in the awareness scale) showing that primary school teachers in Kisumu Municipality are relatively aware of climate change, but there exist gaps in their knowledge and understanding of the same.

Even when teachers were asked to state how much they think they know about climate change, only 6 respondents claimed to have not heard about climate change while another 29 respondents claimed to know a great about it and the remaining 61 knew a little about it. By comparison, studies based on teacher population such as Akinnubi *et al.* (2012) and Ekpoh and Ekpoh (2011) revealed a low level of awareness among secondary school teachers in Ondo West Government Local Area, Ondo State and Calabar Municipality, Nigeria respectively. Studies on the general population of Kenya have also revealed a general low level of climate change awareness among Kenyans (Otieno, Pauker and Maina, 2009; GoK, 2010; RoK, 2013). The relatively high level of awareness among primary school teachers in Kisumu revealed in this study was not surprising as it was reported during data collection that NGOs operating in the area have been working with schools to create awareness on environmental changes (including climate change and global warming) along Lake Victoria¹.

Table 1: Teachers' level of climate change awareness

Level of Awareness	n	%	χ^2	df	p
Low	2	2.2	62.818	2	0.000
Medium	63	70.8			
High	24	27.0			

3.1.1 Identified Gaps in Teachers Knowledge of Climate Change

Primary school teachers in Kisumu Municipality expressed a general awareness of the causes, effects and mitigations of climate change registering an aggregate awareness mean score of 3.97, but also expressed limited understanding of the role of fossil fuels ($\bar{x} = 3.59$, $s = 1.198$) and poor management of waste ($\bar{x} = 3.75$, $s = 1.153$) in climate change, as well as the likely impact of climate change on sea level ($\bar{x} = 3.33$, $s = 1.290$) and on lakes and rivers ($\bar{x} = 3.67$, $s = 1.112$)². While teachers expressed some understanding of the fact that the present climate change is anthropogenic (88.37% supported the notion), they also expressed some level of confusion as 58.14% of the same respondents still supported the notion that the current climate change has been caused by natural factors. It is thus not guaranteed that teachers who agree to the theory that the current climate change is anthropogenic will disagree with the theory that natural factors are to blame for the current climate change.

¹Probing during data collection revealed that NGOs such as UNICEF and OSIENALAHave been active in working with schools' administration to address problems resulting from environmental changes and have thus created awareness on climate change and global warming.

²Scores reported here are based on the Likert Scale weights of 1-5 and not the designed awareness scale described in section 2.3

The results point out the existence of a gap in teachers' understanding of the anthropogenic nature of the current climate change as they fail to conform to the scientific consensus on anthropogenic global warming.

Teachers also appeared unaware of the Kyoto Protocol and IPCC with only 46% and 27% being aware respectively compared to 61% of the same respondents who claimed to know a little about the UNFCCC. This shows an inherent lack of awareness on the important climate change institutions and instruments among teachers in Kisumu Municipality.

3.2 Primary School Teachers General Perception of Climate Change

Just like in the case of awareness, teachers' perception of climate change was assessed through a series of six paired Likert Scale statements which returned a Cronbach's Alpha of 0.809 considered good according to George and Mallery's (2003) rule of thumb. Based on the summative scores, respondents were grouped into two namely:

Climate change is a threat: respondents in this group registered a summative perception score of at least 19 out of the 30 possible score

Climate change is not a threat: respondents in this group registered a summative perception score of at most 18 out of the 30 possible score.

Results of the study shows that primary school teachers in Kisumu Municipality perceive climate change as a major threat ($\chi^2 = 63.202$, $df = 1$, $n = 89$, $p = 0.000$) (Table 2). Similar results emerged when the Likert items were analyzed as individual items. An overwhelming 93.3% of all respondents accounting for 84 responses either agreed or strongly agreed with the statement that climate change is an issue of global concern. This was also reflected in the negative version of this statement in which only 12.2% of the respondents agreed with the statement that we should not be worried about climate change. Respondents also overwhelmingly agreed with the statement that climate change poses a serious threat to Kenya (91.1% supported the statement) as well as the statement that Kisumu is warming just like the rest of the world returning a mean of 4.00 (83.3%) and 4.35 (93.3%) respectively. These results confirm findings of earlier studies by GlobeScan (2006) and Pew Research (2006) both of which stated that climate change is more likely to be perceived as a threat in developing countries. The results, however, contradict the results of Pugliese and Ray (2009) who pointed out that perception of climate change as a threat is low among people in sub-Saharan countries as well as other developing countries in the world.

Table 2: Perception of climate change as a threat among primary school teachers in Kisumu Municipality

Perception of climate change	n	χ^2	df	p
Climate change is a threat	82	63.202	1	0.000
Climate change is not a threat	7			

4.0 Conclusion

Based on the findings of this study, the conclusion drawn was that the level of climate change awareness among primary school teachers in Kisumu Municipality is not significantly low but there are significant gaps in their knowledge which needs to be addressed. Teachers' perception of climate change as a threat shows that they would be willing to support any policy geared towards adaptation and mitigation of climate change including educating pupils on climate change and related issues. Climate change is, however, a relatively new and complex subject usually surrounded with a lot of misinformation. For this reason, awareness creation is unavoidable in the fight against climate change. This, therefore, necessitates the need for a national climate change awareness policy that focuses on teachers as key stakeholders in the education sector.

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