

# Trained Climate Change Educators: Are Secondary School Pupils Getting Quality Climate Change Education? Views from Teachers and Pupils in Lusaka, Zambia

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## ABSTRACT

Zambia like many other countries has not been spared from the destructive impacts of climate change. Climate change awareness creation is pivotal to adaptation and mitigation strategies. Effective dissemination of knowledge among the citizens during formal school years and later on in teacher training programs is crucial to that end. This paper investigates the quality of climate change education that students receive in secondary schools as well as the adequacy of the content taught from the teachers' and pupils' perspectives. It further investigated teachers' and pupils' opinions on the effects of embracing compulsory climate change education in secondary schools and teacher training colleges and universities. It is based on responses from secondary school students and teachers in Lusaka District. A descriptive survey design utilizing a structured questionnaire was administered to 152 randomly selected respondents drawn from 8 secondary schools within Lusaka. Data analysis involved chi-square tests and thematic analysis of respondents' qualitative responses. Results also show that the level of climate change knowledge among secondary school teachers in Lusaka was not significantly low ( $\chi^2 = 9.488$ ,  $n = 152$ ,  $df = 4$ ). Factors such as tertiary level qualification and teaching subject combination emerged as some of the major reasons for varying degrees of climate change knowledge among teachers and pupils respectively. It was recommended that the Ministry of Education should undertake climate change capacity building among teachers through the introduction of compulsory climate change training programs for all teachers at the college or university level, as well as comprehensive and compulsory climate change subject training at secondary school. Curriculum formulation agencies such Curriculum Development Centre and the Ministry of Education should work with teachers and university lecturers to come up with a detailed but easy-to-understand climate change curriculum content.

**Keywords:** Climate Change, Climate Change Education (CCE), Climate Change Educators, Compulsory Climate Change Training.

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## I. INTRODUCTION

Climate change is considered the most expansive global environmental, economic and political challenge facing humanity (Giddens, 2010). Consequently, it has become a vital consideration in the policy-making processes throughout the world as well as a topical discussion at various fora (Weber & Peters, 2009). Informed mass awareness of the causes, consequences, and mitigation, as well as adaptation strategies to climate change, is important to confront this largely human-induced phenomenon (Bohle *et al.*, 1994). Many aspects of the global climate are changing rapidly, and the primary drivers of that change are humans in origin. Evidence for changes in the climate system abounds, from the top of the atmosphere to the depths of the oceans (Burgman & Baer, 2012). In Zambia for instance, climate change is already exerting negative effects on the landscape. Zambians are experiencing dry spells, high temperatures, off-season rains, drought, flooding and rationed hydroelectric power generation. Zambians are currently experiencing a seasonal reduction in the amount of electricity generated annually due to drought conditions which are getting worse (USAID, 2017). This reduction has implications for industrial development in Zambia. As of 2020, water bodies such as lake Kariba and Kafue River, that the country relies on for water generation recorded the lowest water levels ever (GRZ, 2020a), leading to increased hours of power outages arising

from enhanced load shading as the power utility company had to ration power supply in order to minimize chances of total economic failure. Subsistence farming, which provides staple foods for the people, is also being threatened with Southern, Central, and western provinces the worst hit (MTENR, 2014; GRZ, 2020b).

Knowledge of climate change, perceived as a part of formal environmental education, helps the development of a sense of responsibility through the creation of informed awareness. Such awareness is necessary to guide students' behavior toward concerted mitigation actions (Kuhlemeier *et al.*, 1999; O'Connor *et al.*, 1999). Consequently, youth environmental education had already been emphasized by world policymakers (UNCED, 1992). UNCED (1992) called upon governments to advance the role of youths and actively involve them in the protection of the environment and to take measures that ensure access to education for all youths and that this education should incorporate concepts of environmental awareness and sustainable development throughout the curricula'.

Climate change education entails that climate change information is relayed to responsible people who could either influence policy or influence future climate change governors (Chiedozi *et al.*, 2015). These could be policymakers, implementers, and users of climate information who could include teachers who could use the information to educate pupils who are the future climate change governors. While there are programs and opportunities in place which make climate change policymakers and implementers engage in climate change education, such programs are not available for both Zambian teachers and pupils, which makes this research relevant as it reviews the possibility of incorporating climate education into the Zambian syllabus for purposes of addressing this gap. Climate change education requires that school teachers have a good understanding of the complex interactions between global /local climate and human activities (Hansen, 2010). Education is seen as a tool of socio-economic development and a key driver of change in different spheres of life (Chiedozi *et al.*, 2015).

Widely disseminated information about environmental degradation such as climate change impacts and vulnerability has already increased the interest among young students worldwide (Pekel & Ozay, 2005). Moreover, the school students, who are the future climate change governors, should be motivated towards an environment-friendly lifestyle by inculcating informed awareness in them so that they can influence the adoption of better climate policy by choosing pro-environment leadership (Read *et al.*, 1994). In order to ensure such intensive appreciation of climate change by the young generation, there is a need to build their awareness through well-designed effective secondary school and teacher training curricula which address the issue of climate change adequately (Bangay & Blum, 2010; Kılınç *et al.*, 2011).

Given the world's limited natural resources, rising population, and the eminent challenge of climate change, sustainable development cannot be attained in the absence of an education that equips learners with the skills needed to live healthy, safe, and productive lives while also safeguarding the ability of the future generations to meet their own needs (Munang *et al.*, 2013). Since climate change poses a risk to both the current and future generations to meet their needs, equipping current and future climate change governors with the necessary knowledge and skills through climate change education will prepare them to meet their current and future needs (UNCED, 1992).

Perceptions of the impacts of climate change among different societies are likely to be shaped by geographical locations. For example, a study by GlobeScan (2006) reported that people in developing countries are more likely to perceive climate change as more of a threat as compared to people in developed countries. This could be due to the fact that developed countries have a higher adaptive capacity and are more resilient to the impacts of climate change as compared to developing countries. However, this perception was disputed by Pugliese and Ray (2009), who stated that climate change is more likely to be perceived as a serious problem in the developed world than in developing countries. The fact that people in developing countries have been living under challenging conditions for centuries could imply that they have already developed a buffer system against the impacts of climate change. As such, it would take a large perturbation to disturb their established lifestyle. Nevertheless, the perception of climate change as a threat has been increasing over the years due to the severity and increased frequency of extreme events (UNDP, 2007).

Climate variability is already affecting Zambia and projected climate change impacts include rises in temperature, shifts in precipitation, and possible increases in the frequency and intensity of weather events (Simatele & Simatele, 2015). The Government of the Republic of Zambia (GRZ) and the donor community have initiated activities to help determine priority climate impacts and vulnerabilities, adaptation strategies, and means to integrate this knowledge into development and sectoral planning. Among the adaptive strategies engaged in by communities include reducing the amount of the maize harvest sold while retaining more for household consumption as a way to prepare for potential impacts of droughts, shifting agricultural production from highlands to lower lands, early planting crops, crop residue retention in fields, switching to drought-tolerant crop varieties, crop rotations, intercropping, cover cropping, irrigation and sinking wells (Simatele & Simatele, 2015).

Research on climate change in Zambia has observed several impacts on different sectors of the Zambian economy. UNICEF (2013) reported on the impacts of climate change on the health and agricultural sectors

as well as the economy of Zambia. The report also said floods have not only destroyed houses and crops, but emergencies have also resulted in the spread of water-borne diseases such as cholera, diarrhea, and dysentery. Mubanga and Umar (2014), observed that Zambia has been experiencing an increase in temperatures and rainfall over the last four decades. The impacts have manifested themselves in increased frequency and intensity of droughts and floods (Mubanga, 2014). Droughts and irregular rain patterns have caused crop failure and largely reduced the food security of the country. The importance of climate change has increased with the realization that its impacts cuts across all sectors of the Zambian economy (Mubanga *et al.*, 2015). UNICEF (2013), noted that despite the widespread climate impacts, many people still do not know how they are contributing to climate change or how they can do something about it. Children are important in getting the message across, but the knowledge and skills they learn in schools do not prepare them for the climate change challenge (UNICEF, 2013). The Zambian syllabus does not have a stand-alone subject on climate change which highly minimizes the knowledge acquired by school-going children about climate change and its multi-faceted impacts.

Even as resources are put together to mitigate and adapt to climate change, there is a need for a formalized system of climate change education as a mass system of outreach and dissemination of climate change awareness. Increasing people's awareness 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. Since school teachers are key in the transmission of knowledge to children, it is paramount to assess the teachers' level of awareness of climate change as this will likely affect the knowledge transfer in the classroom. The pupil's knowledge of the subject will also be assessed to determine the effectiveness of the climate change teaching and awareness approaches.

## II. METHODOLOGY

### A. Methodological Approach

This study used a survey to gather data on climate change knowledge among secondary school teachers and pupils. The data obtained was both qualitative and quantitative. The data were analyzed for frequencies, means, and patterns, and were used to assess relationships between levels of compulsory climate change education and climate change awareness among secondary school pupils and secondary school teachers. It was also used to gauge how levels of climate education affect the degree of awareness of the climate change phenomenon by secondary school teachers and pupils, as well as evaluate the amount of climate change content that the current secondary school and teacher training curricula have. This research survey was used as a cross-sectional study of the Zambian education system with regard to the amount of climate change content (knowledge) that the secondary schools and teacher training curricula prescribe, and its consequences on the degree of climate change awareness among secondary school teachers and pupils.

### B. Sample Size and Sampling Procedure

The study was carried out in public and private secondary schools located in the Lusaka District, targeting a population of pupils and secondary school teachers. Lusaka was purposively selected as the study area due to the diverse nature of the settlement, which allowed the researcher to collect data from schools of different characteristics within the Lusaka District. The decision to select Lusaka City as the study area was also informed by its high vulnerability to climate change impacts due to the influx of informal settlements which reduces Lusaka's adaptive capacity to impacts of climate change.

The education sector is cardinal in instilling climate change knowledge into generations of citizens across society. Further, the choice of school teachers as the unit of observation was guided by the vital role they would play not only in imparting knowledge of climate change but also in shaping the attitudes and behaviors of pupils. The selection of schools for sampling was done using stratified random sampling. Since the Ministry of Education has divided Lusaka schools into four zones for administration purposes, each zone was a stratum from which different schools were purposively selected. At least two schools were purposively sampled from each of the four Zones namely, A, B, C, and D. Each zone comprised more than thirty public and private schools bringing the total school population to over hundred 150 Schools. Table I shows sampled schools in the study area.

The researcher used purposive sampling to select eight (8) schools with different characteristics into the sample for this survey. Fifteen (15) pupils and 4 (four) teachers from each of the eight (8) schools were also sampled. For each school, the grades, the class, and the names of pupils to interview were sampled through simple random sampling using class registers. On the other hand, the teachers were purposively sampled targeting those who taught subjects that incorporated climate change concepts such as Geography, and Social studies. In total, the study involved 120 pupils and 32 teachers from eight (8) secondary schools. Further, 5 key informants were interviewed and these included officers from the Provincial and District Education Officers, national climate secretariat managers, and Curriculum Development Centre (CDC) who were used to validate the data that was collected.

TABLE I: SAMPLED SCHOOLS IN EACH ZONE IN LUSAKA DISTRICT

Zone A	Zone B	Zone C	Zone D
St. Monica's Secondary School	Kamwala Secondary School	Pestalozzi Secondary School	Munali Secondary School
SOS Secondary School	LICEF International School	Twin palm Secondary School	Rhodes park Secondary School

### C. Data Collection

#### 1) Questionnaire survey

Questionnaires consisting of both open-ended and closed questions were used to collect data from both pupils and teachers. Data collected included teachers' and pupils' extent of knowledge on climate change, as well as teachers' perceptions on the extent of coverage of climate change topics by the school curriculum in Zambia. A five-point Likert Scale was used to rate respondents' degree of knowledge of climate change issues. Some of the data collected included basic knowledge of climate change with respect to causes, effects, and/or mitigation actions towards climate change impacts, pupils' and teachers' views on the possible effects of a compulsory and comprehensive climate change subject on both learners and educators, and respondents' opinion on the pros and cons of compulsory climate change education in the Zambian school curriculum.

#### 2) Key Informant Interviews

A semi-structured key informant interview schedule guided the researcher's discussions with the key informants. The key informant interviews helped the researcher to get further primary data. The key informants were asked to give their views on the extent of coverage of climate change content in the school curriculum. The researcher also sought the informants' views on whether teacher training colleges and universities should offer compulsory climate change education to all school teachers during their years of training at college or university.

#### 3) Desk Research

Desk research was about collecting secondary data. Existing data was summarized and collated to increase the overall effectiveness of the research. The role of desk research was to review the literature on climate change education so as to gain insights into previous but related research findings. Sources of secondary information included the internet, published and journal articles, books, and magazines.

### D. Data Analysis

Statistical Package for Social Sciences (SPSS 23) and Microsoft Excel 13 were used as data analysis tools for the study. Data from interviews were first examined for completeness and consistency. This was then followed by numerical coding of the qualitative responses for ease of storage and analysis. The responses were then entered into SPSS creating a data set of climate change awareness, perceptions of both teachers and pupils as regards climate change, as well as teachers' opinions on how much the curriculum embraces climate change topics and/or subjects. Quantitative data analysis involved both simple descriptive statistics and inferential statistics. Data from the Likert Scale involving climate change knowledge among pupils was analyzed using the Chi-Square test. All statistical tests were conducted at a probability level,  $P \leq 0.05$ . Qualitative data were analyzed using thematic analysis where responses were grouped into themes in order to determine the most frequently recurring themes. Data coding and data reduction were also conducted in order to assist in drawing verified conclusions.

## III. RESULTS AND DISCUSSION

### A. General and Demographic Characteristics of the Sampled Population

A total number of 120 pupils were randomly selected into the sample from both private and public schools. Out of the 120 pupils interviewed 72 were female while the rest (48) were males. The sample population for this study included both public and private schools. From the eight (8) schools sampled, 15 pupil respondents and 4 teacher respondents were interviewed from each. Of the 120 pupils interviewed 50 % (60 pupils) were from public schools while another 50 % (60 pupils) were from private schools. Four (4) teacher respondents were interviewed from each of the eight schools. This amounted to 32 secondary school teachers in the interview sample. Of the 32 teachers interviewed 43.8 % were males whereas females accounted for 56.2 % of the sample. Out of the 32, secondary school teachers interviewed 16 were from public schools and another 16 from private schools. For their highest level of tertiary qualification of the 32 teachers interviewed 53.1 % were bachelor's degree holders, 43.8 % Diploma, and 3.1 % Certificate holders. Table II below shows the general and demographic characteristics of the respondents, such as gender, grade, school name, and school type.

TABLE II: INFORMATION PERTAINING TO RESPONDENTS' DEMOGRAPHIC CHARACTERISTICS

Gender	Frequency	Percent	Number of Respondents from Sampled Schools	Frequency	Percent
Male	66	43.4	Kamwala secondary	19	12.5
Female	86	56.6	LICEF	19	12.5
Total	152	100.0	Munali secondary	19	12.5
Level of education of teachers	Frequency	Percent	Pestalozzi education Centre	19	12.5
Certificate	1	3.1	Rhodes park school	19	12.5
Diploma	14	43.8	SOS	19	12.5
Bachelors' degree	17	53.1	St. Monica's	19	12.5
Total	32	100.0	Twin palm secondary	19	12.5
Pupils' grade distribution	Frequency	Percent	Total	152	100.0
8	14	11.7	School type	Frequency	Percent
9	42	35	Public	76	50.0
10	11	9.2	Private	76	50.0
11	16	13.3	Total	152	100.0
12	37	30.8	—	—	—
Total	120	100	—	—	—

### B. Degree of climate change knowledge among pupils and teachers

Table III shows that 53.1 % of the subjects offered by the teachers contained elements of climate change and required some degree of climate knowledge to teach. However, 75 % of the teachers who taught subjects that contained elements of climate change did not receive any form of climate change training during their tertiary training. Only 25 % of the educators had received some form of climate change training through workshops and seminars and not whilst in college or university. Despite the majority of these teachers not receiving training in climate change education in tertiary schools, they were still required to teach elements of the subject as long they were taking subjects that included climate change knowledge.

As regards the question of how much climate change content the curriculum contained, 47 % of the teachers felt that climate change content was significantly inadequate in the current Zambian school curriculum, and 44 % felt that at present the curriculum provided inadequate climate change knowledge content, while only 9 % of the teachers felt that existing school curriculum has adequate climate change knowledge (Fig. 1). This entailed that there was room to improve the quantity and quality of the climate change content taught to learners at all levels of the Zambian school curricula.

There was a relationship between the subject taught and the extent of climate change knowledge possessed by teachers ( $X^2 = 7.342; p = 0.001$ ). Teachers who offered subjects such as geography, integrated science, and biology exhibited more knowledge of climate change concepts than teachers who taught other subjects. This was supported by the fact that most of the teachers that agreed to have received some kind of climate change training in secondary school were those that had either geography, integrated science, agricultural science, and /or biology in their different areas of specialization (Fig. 2). None of the teachers with English, Social Studies, Religious Education, History, Mathematics, Civic Education, Literature, Physics, and Computer Studies had undergone any training in elements of climate change.

TABLE III: PERCENTAGE OF TEACHERS TRAINED TO TEACH CLIMATE CHANGE IN SCHOOLS

Does the subject taught contain climate change information?	Frequency	Percent
Yes	17	53.1
No	15	46.9
Total	32	100.0
Did you receive climate change training during your teacher training?	Frequency	Percent
Yes	8	25.0
No	24	75.0
Total	32	100.0

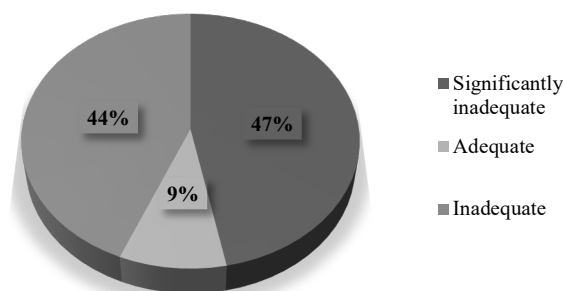


Fig. 1. Teachers' perceptions on the degree of adequacy of the climate change content covered in the Zambian school curricula.



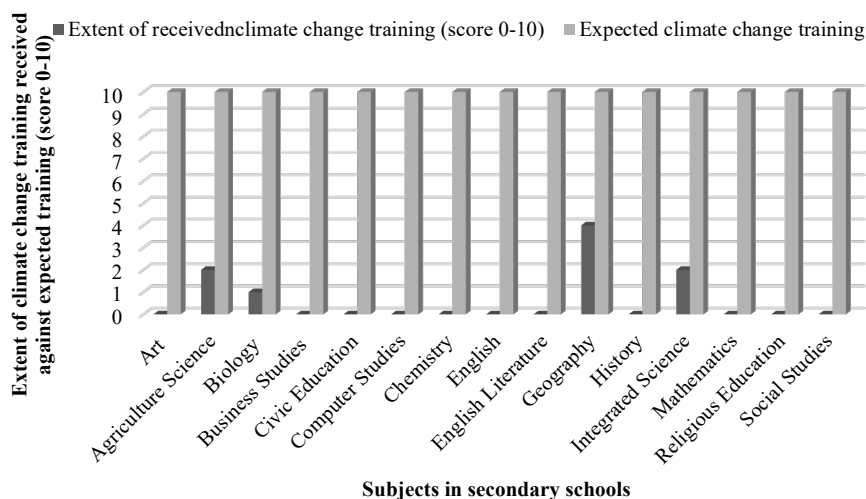


Fig. 2. Extent of climate change education training received by teachers in tertiary schools against their expected climate change training on a rating of 0-10 with 0 representing no climate change education received in tertiary schools and 10 representing their expected training received in tertiary school.

### C. Respondents' Level of Knowledge on Causes of Climate Change

This section intended to assess the respondents' level of climate change knowledge. As such, the following two-tailed hypotheses were formulated:

- $H_0$ : the degree of climate change knowledge among teachers and /or pupils is significantly low.
- $H_1$ : the degree of climate change knowledge among teachers and pupils is not significantly low.

Table IV presents the chi-square results on respondents' levels of knowledge of the causes of climate change.

From the statistics in Table IV, it can be concluded that most pupils and teachers had some basic understanding of the causes of climate change ( $X^2 = 9.488$ ;  $p = 0.001$ ). Most of the teachers and pupils had an understanding of what was contributing to increased temperatures and changes in patterns of rainfall. Fig. 3 highlights the common causes of climate change as cited by respondents.

Many of the respondents were aware that air pollution (35.14), greenhouse gas emissions (13.51), and unsustainable methods of agriculture (13.51 %) were among the major causes of climate change. A few were also aware that bush fires (8.11 %) and open-air burning of waste (8.11 %) also contributed to climate change. However, based on these results, it could be seen that even though the respondents had a basic understanding of climate change, that understanding was generally very low. The fact that teachers who were responsible for educating pupils in knowledge and skills in climate change were also deficient in understanding of the subject could have been the contributing factor to the reduced understanding by the pupils.

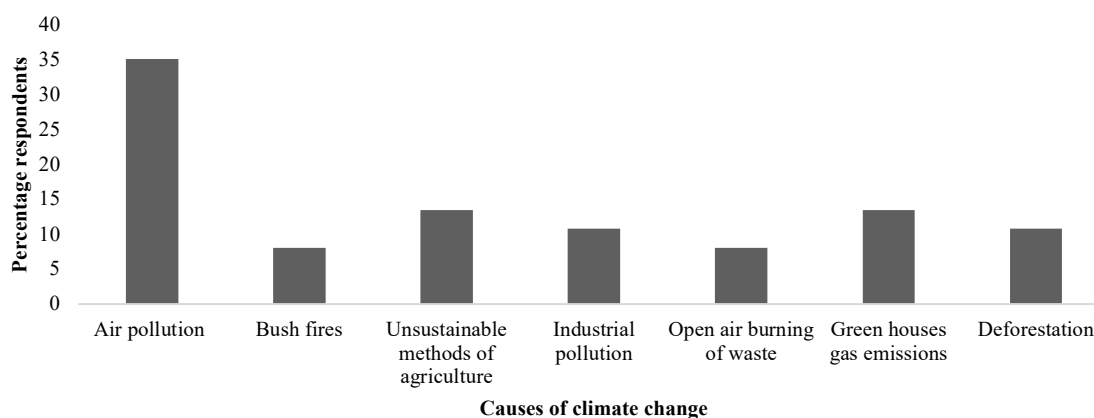


Fig. 3. Respondents' understanding of causes of climate change.

TABLE IV: CHI- SQUARE STATISTICAL CALCULATION FOR DEGREE OF CLIMATE CHANGE KNOWLEDGE FOR RESPONDENTS

Total N	152
Chi- square calculated value	88
Degree of freedom	4
Critical value $\alpha$	9.488
Significance level	0.05
Confidence level	95 %
Decision rule	Reject $H_0$ if $X^2$ is greater than 9.488

#### D. Effects of Compulsory Climate Change Education

This section intended to establish the possible effects of introducing compulsory climate change education into the Zambian education curricula at secondary and teacher training levels. In order to achieve this, the following hypotheses were generated:

- $H_0$ : Compulsory climate change education will not affect secondary school teachers, secondary school pupils, and tertiary training for the teachers.
- $H_1$ : Compulsory climate change education will affect secondary school teachers, secondary school pupils, and tertiary training for the teachers.

Since the chi-square critical value ( $X^2 = 9.488$ ;  $p = 0.001$ ) is less than any of the calculated Chi-square value (35.46) statistics for this group, the null hypothesis is rejected and  $H_1$  is accepted. Therefore, we conclude that compulsory climate change education will affect secondary school teachers, pupils, and tertiary training for teachers. Since it has already been established that few teachers were grounded in the climate change education subject, compulsory climate change education will make them more knowledgeable, and this will have a counter effect on the pupils that are trained by these teachers (Fig. 4).

Most of the respondents felt that compulsory climate change education would have positive effects on pupils (Fig. 4). About 31 % of the respondents felt that climate education would help pupils to take care of the environment while another 23 % were of the notion that climate education would help learners to be ready for climate change impacts.

TABLE V: CHI- SQUARE STATISTICAL CALCULATION FOR EFFECTS OF COMPULSORY CLIMATE CHANGE EDUCATION

Total N	152
–Chi-square ( $X^2$ ) calculated value	35.46
Degree of freedom	4
Critical value $\alpha$	9.488
Significance level	0.05
Confidence level	95 %
Decision rule	Reject $H_0$ if $X^2$ is greater than 9.488

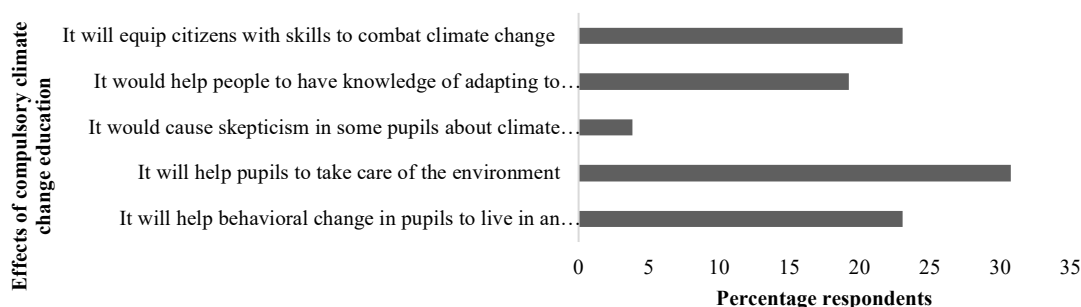


Fig. 4. Respondents' perceptions of the effects of compulsory climate change education on pupils.

TABLE VI: CHI-SQUARE STATISTICAL CALCULATION FOR THE SIGNIFICANCE OF PERCEIVED PROS AND CONS OF INTRODUCING COMPULSORY CLIMATE CHANGE EDUCATION IN SCHOOLS

Total N	152
Chi- square calculated value	33.75
Degree of freedom	4
Critical value $\alpha$	9.488
Significance level	0.05
Confidence level	95 %
Decision rule	Reject $H_0$ if $X^2$ is greater than 9.488

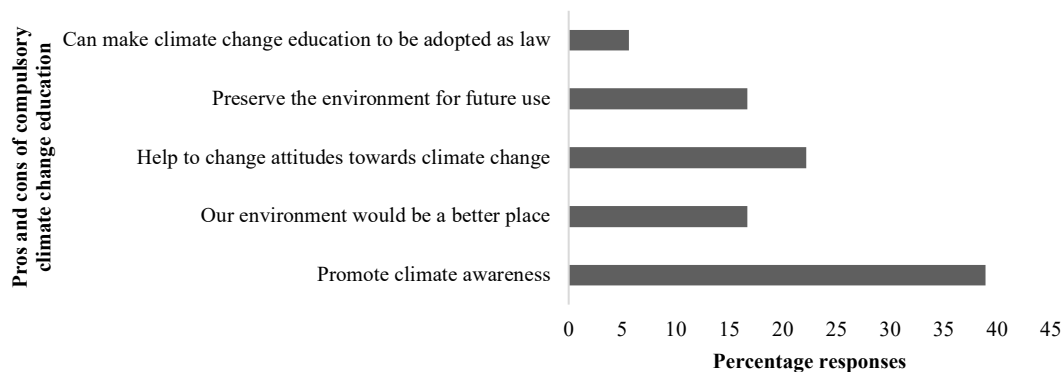


Fig. 5. Respondents' perceptions of the pros and cons of compulsory climate change education.

#### E. Pros and Cons of Introducing Compulsory Climate Change Education

This section was intended to find out the pros and cons of introducing compulsory climate change education into the Zambian education system.

The hypotheses below were thus generated:

- H<sub>0</sub>: There are no pros and cons of introducing compulsory climate change education into the Zambian education system
- H<sub>1</sub>: There are more pros than cons to introducing compulsory climate change education into the Zambian education system.

The calculated Chi-square values are greater than 9.488 standing at an average value of 33.75. Since the calculated Chi-square value of 33.75 is greater than the critical value (9.488), the null hypothesis is rejected. Therefore, it was concluded that there were more pros than cons to introducing compulsory climate change education into the Zambian education system. From Fig. 5 respondents had more pros to say about compulsory climate change education. In fact, there were no cons expressed by the respondents interviewed.

From Fig. 5, about 39 % of the respondents felt that one of the key advantages of compulsory climate change education was that it would raise the level of awareness about climate change, 16 % thought that it would help to preserve the environment. Some respondents were even willing to see compulsory climate change education adopted as law (Fig. 5). Further, there was a general understanding that increased climate change education would help change people's attitude towards the environment and climate change practically turning the world into a better place.

#### F. Climate Change Education and Its Contribution to Adaptation

This section intended to find out the respondents' views on the contribution of climate change education to climate change adaptation.

Pursuant to this, the following hypotheses were generated.

- H<sub>0</sub>: Compulsory climate change education at secondary and tertiary (teacher training) levels would not contribute to climate change adaptation.
- H<sub>1</sub>: Compulsory climate change education at secondary and tertiary (teacher training) levels would contribute to climate change adaptation.

Since the Chi-square calculated value is greater than the critical value the null hypothesis is rejected, hence we accept the alternative hypothesis. Therefore, compulsory climate change education at secondary and tertiary levels would contribute to climate change adaptation. Table VIII presents respondents' views of the nature of the contribution climate change education will have on climate change adaptation.

TABLE VII: CHI-SQUARE STATISTICAL CALCULATION FOR THE CONTRIBUTION OF COMPULSORY CLIMATE CHANGE EDUCATION TO CLIMATE CHANGE ADAPTATION

Total N	152
Chi-square calculated value	51.31
Degree of freedom	4
Critical value $\alpha$	9.488
Significance level	0.05
Confidence level	95 %
Decision rule	Reject $h_0$ if $\chi^2$ is greater than 9.488



TABLE VIII: RESPONDENTS PERCEIVED CONTRIBUTIONS OF CLIMATE CHANGE EDUCATION TO CLIMATE CHANGE ADAPTATION

Contributions of compulsory climate change education to climate change adaptation	Percentage
Help pupils to know more about climate change	16.67
Would help pupils to come up with solutions to protect the environment	41.66
would help change lifestyles to protect the earth	25.00
Would help people in times of climate change	16.67
Total	100

Table VIII shows that about 42 % of the respondent felt that compulsory climate change education in its contribution to adaptation would encourage pupils to develop innovative solutions on how to protect the environment. Further, another 25 % thought it would assist in changing lifestyles so as to save planet earth. The call for an introduction of compulsory climate change subjects was further reinforced by one of the key interview informants who remarked that there is not enough content on key issues concerning the likely future effects of climate change in the current curriculum, hence the need to broaden this knowledge in the curriculum in the near future.

#### IV. CONCLUSION

The study has shown that there exists some degree of knowledge of climate change among secondary school pupils and teachers in the Lusaka district. However, the climate change knowledge that learners have is rather disjointed and incoherent. This form of disorganized and sparse knowledge does not help school pupils develop skills to adapt to the negative impacts of climate change. The climate change content in the curricula is sparsely found in some subjects such as integrated science, and geography. However, even these subjects only contain scanty information about climate change, and they do not give comprehensive details on the causes, effects, mitigation, and adaptation to climate change, leaving pupils with inadequate knowledge of the subject. This study has shown that about 75 % did not have any training in the climate change subject they were supposed to teach. As such, 80 % of the teachers thought that the climate change knowledge prescribed under the current curriculum is not adequate to equip the learners with the requisite survival knowledge amidst the impacts of climate change. Further, more than 80% of the educators supported the idea of introducing compulsory climate change subjects at the primary or elementary level of formal school. It was recommended that policy should consider introducing compulsory climate change education at different levels of Zambian formal education, from primary level to tertiary level. Further, only teachers trained in climate change education should be able to teach the subject so as to effectively impart the skills to pupils at different levels. The Ministry of Education should undertake climate change capacity building among teachers through the introduction of compulsory climate change training programs for all teachers at the college or university level as well as a comprehensive and compulsory climate change subject at secondary school.

#### CONFLICT OF INTEREST

We declare that we do not have any conflict of interest.

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