An Investigation into the Awareness, Knowledge and Attitude of Student Teachers towards Climate Change

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ABSTRACT

The purpose of the study was to understand the level of awareness, knowledge and attitude of student teachers towards climate change. Descriptive survey method was used to carry out the research study by taking sample from B.Ed. colleges of Mumbai and Navi-Mumbai region. The study revealed that though the student teachers of different stream i.e., Science, Commerce and Arts are aware of the problem of the climate change but they lack in having sufficient knowledge of climate change with regards to its causes and consequences. Also the study revealed that there is no significant difference in the knowledge of climate change of Science and Commerce student teachers. However, a significant difference was found between the student teachers of Science and Arts stream and also between Commerce and Arts stream. Further, the study reveals that there lies difference in the level of awareness, knowledge and attitude between the student teachers of Mumbai and Navi-Mumbai.

Introduction

Climate change refers to the statistically significant change in the average weather that a given region experiences. GHG (Green House Gas) are the gases present in the earth's atmosphere which warm near-surface global temperatures through the greenhouse effect. While greenhouse effect is necessary for human inhabitation, an excess of GHG can raise the temperature of our planet to a level

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which would adversely affect human habitation. This is termed as global warming which is the major cause of climate change.

The Environmental Protection Agency report dated 17th January 2009 in New York, United States had clearly warned the potential effects of sea-level rise on the Nations coast due to global warming. As per the report the sea-level rise is accelerating due to run off from melting inland glaciers and ice sheets and warmer water occupying more space. The report states that the Middle Atlantic States are particularly vulnerable because the rates of rise are "moderately high" there, the region is subject to storms, it is densely populated and much of its infrastructure is in low lying areas. The predictions of the report such as flooding of coastal cities and extreme food shortages in the years to come due to climate change has been accepted by all the countries and the climate change has become a matter of great concern for the whole Universe.

The Inter governmental panel on climate change, a United Nations climate effort estimated in its report on 17th January 2009 that sea level might rise by about as much as 2 feet by 2100. The report issued by Environmental Protection Agency, the United States geographical survey and other agencies says that in the 20th century the rates of erosion in the region of Middle Atlantic States varied from 2.4 mm to 4.4 mm a year, or about a foot over 100 years. The report states that coastal headlands, spits and barrier islands will erode faster than they have in the past.

Climate researcher Susan Solomon defines "irreversible damage from climate change" as change that would remain for 1,000 years even if humans stopped adding carbon dioxide to the atmosphere immediately. According to her, climate change is slow, but it is "unstoppable"—all the more reason to act quickly so that the long term situation does not get even worse. In her paper presented in the International panel on climate change she concludes that if carbon dioxide is allowed to peak at 450-600 ppm level the results would include persistent decreases in dry season rainfall that are comparable to the 1930's North American Dust Bowl in zones including southern Europe, Northern Africa, South Western North America, Southern Africa and Western Australia.

According to Hashem Akbari, a physicist with the Lawrence Berkeley National Laboratory in his report to California's annual Climate Change Research Conference in Sacramento on 12th September 2008, a 1,000-square foot roof—the average size on an American home—offsets 10 metric tonnes of planet heating carbon

dioxide emissions in the atmosphere if dark coloured shingles or coatings are replaced with white materials.

R.K.Pachauri, chief of the noble prize winning United Nation climate change panel in his study suggested that the best and easiest way of stemming climate change is not to eat meat at least one day each week. The emissions arise due to the way land is cleared and feed for animals are grown. He further stated that the livestock emit methane, when it belches or farts, which is 23 times stronger as a climate changing agent than carbon dioxide. He has stated that the calculation by Food and Agriculture Organisation shows that meat production accounts for nearly a fifth of global green house gas emissions.

Anne Marie Idrac, the French Minister of State for Foreign Trade said that more and more countries have joined global efforts for a low carbon economy. The initiative will not only protect the planet but will also generate growth, drive innovation and create highly skilled jobs. In the current economic down turn it could help to stimulate recovery. The global crisis is not an excuse to turn back on this vital challenge.

Aquatic ecologist Katey Walter explains the complex science of Arctic methane—released due to the thawing of permafrost—which is one of the factors accelerating climate change. This phenomenon can be termed as "METHANE TIME BOMB". The Arctic is warming faster than any area of the globe, and its average air temperature may rise as much as 10.8 degrees Faherenheit this century. As reflective ice and snow cover shrink, the ocean ice cap melts and permafrost soil thaws, releasing methane, a potent heat trapping gas which is ominous. Methane has at least 20 times the heat-trapping effect of an equivalent amount of carbon dioxide. As warmer air thaws Arctic soils, as much as 50 billion metric tonnes of methane could be released from beneath Siberian lakes alone, according to Walter's research. That would amount to 10 times the amount currently in the atmosphere.

Causes and consequences of climate change

Climate always varies due to natural processes. However, human activities are constantly increasing from manual to mechanised mode. As a result of this they release some gases such as chlorofluro carbon, halons, methane, nitrous oxide, carbon dioxide etc. (majority is CO_2) in to the atmosphere. These gases tend to warm the earth surface. It is quite evident that both natural and human systems are vulnerable

to climate change because of their limited adaptive capacity. This vulnerability varies with geographic location, time and social, economic and environmental conditions. The earth's climate has changed over the last century. There is new and stronger evidence that most of the warming observed in the last 50 years is attributable to human activities. Evolving computer models predicts that, as a result of greenhouse gas emissions, temperatures will continue to rise over the twenty first century, impacting nature and mankind both positively and negatively.

Human activities include, (i) burning of fossil fuels (coal, oil and gas) and deforestation leading to higher carbon dioxide concentrations. Land use change (mainly deforestation in the tropics) account for up to one third of total anthropogenic CO_2 emissions, (ii) livestock enteric fermentation and manure management, paddy rice farming, land use and wetland changes, pipeline losses, and covered vented landfill emissions leading to higher methane atmospheric concentrations. Many of the newer style fully vented septic systems that enhance and target the fermentation process also are sources of atmospheric methane, iii) use of CFCs in refrigeration systems, and halons in fire suppression systems iv) agricultural activities, including the use of fertilisers, that lead to higher nitrous oxide concentrations, etc.

Need of the study

Most people in our society are still unconcerned and ignorant about the issue of climate change. The student and the teachers are the guardian of our future generations and they are going to be the architects of our society. There is a need to bring out awareness among the future teachers on what is climate change? How it affects our life, our economic prosperity and health and other welfare. How all of us together can save the environment for the benefit of present and future generations and achieve the ultimate objective of stabilising the atmosphere by way of bringing awareness among the children.

The International community is in serious discussion to tackle the most complex issue of the process of climate change and to take necessary action due to its threat to the fate of human race. The fact is that, unless timely measures are taken by the countries to put in place an effective mechanism for limiting emission of CO_2 and check its level of concentration in the atmosphere; it would be difficult to protect the mankind and wildlife.

Domestically, India has blazed a trail by drawing up an ambitious National Action Plan (NAP) for mitigation. Key elements of the plan

are to boost solar energy, promote research and development into renewable energies and enhance energy efficiency. The plan foresees effective adaptation measures, such as helping farmers by boosting the development of drought and pest-resistance crop varieties. Now, the road ahead is for an effective and efficient implementation of the ambitious plan.

It is everyone's responsibility to educate, sensitise and train the future citizens of the world on the issue of global warming and climate change. Possibility of advancing in the right direction in the controlling of climate change is possible if the endurable and responsible effort of the student teachers and teachers are channelled sensibly by providing the knowledge of climate change to pupils. The teachers and the student teachers can do so if they themselves are aware of the problem and consequences of climate change and global warming.

In the present study an attempt is made to find out the extent of awareness, knowledge and attitude of student teachers towards climate change.

Objectives of the study

1. To study the level of awareness, knowledge and attitude of student teachers (B.Ed.) towards climate change.
2. To study the awareness of climate change among student teachers possessing Science, Arts and Commerce as major subjects in graduation.
3. To study the knowledge of climate change among student teachers possessing Science, Arts and Commerce as major subjects in graduation.
4. To study the attitude of student-teachers possessing Science, Arts and Commerce as major subjects in their graduation towards climate change.
5. To study the awareness, knowledge and attitude of students and teachers of Mumbai and Navi Mumbai region.

Hypotheses

1. There is no difference among the students and the teachers in the level of awareness, level of knowledge and level of attitude towards climate change.

2. There is no significant difference in the awareness of climate change among the student and teachers possessing Science, Arts and Commerce as major subjects in graduation.
3. There is no significant difference in the knowledge of climate change among the student and teachers possessing Science, Arts and Commerce as major subjects in graduation.
4. There is no significant difference in the attitude of student teachers possessing Science, Arts and Commerce as major subjects in graduation towards climate change.
5. There is no significant difference between the student teachers of Mumbai and Navi Mumbai in the awareness, knowledge and attitude towards climate change.

Methodology

The descriptive survey method has been used in this study.

Sample

A sample of 180 student teachers was selected from various B.Ed. colleges located in Mumbai and Navi Mumbai.

Tool Used

A questionnaire was prepared by the researcher to find out the awareness, knowledge and attitude of student and teachers towards climate change. The questionnaire consists of a list of statements related to the awareness, knowledge and attitude of prospective teachers towards climate change. The tool consists of 50 items under three dimensions- awareness, knowledge and attitude. The reliability and validity of the questionnaire were established. The content validity of the questionnaire was ensured through consultation with experts from Mumbai University. The table-1, shows the no of questions and its reliability under the dimensions of awareness, knowledge and attitude of student and teachers towards climate change.

Table 1: Reliability coefficient of questionnaire under various dimensions

Dimension	*No. of Questions*	*Reliability coefficient*
Awareness	20	0.77
Knowledge	16	0.94
Attitude	14	0.71

Results and Discussion

Table 2 : The means and standard deviations of the level of awareness, knowledge and attitude of student teachers towards climate change

Dimensions	*Mean*	*SD*
Level of awareness	14.933	2.63
Level of knowledge	11.111	2.38
Level of attitude	12.289	1.57

TABLE-2 depicts that the mean of the level of knowledge is lower than the mean of the level of awareness and the level of attitude. The standard deviations of the level of awareness, knowledge and attitude are 2.63, 2.38 and 1.57 respectively.

Table 3 : Result of ANOVA on the Awareness, Knowledge and Attitude of student teachers towards climate change possessing Science, Commerce and Arts as major subjects in graduation

Dimensions	*Sources of Variance*	*Sum of Squares*	*df*	*Mean of Squares*	*F Value*	*Result at 0.05 level*
Awareness	Between	13.6	2	6.8	0.34	NS
	Within		1726.4	87	19.8	
Knowledge	Between	57.86	2	28.93	5.26	Sig.
	Within		478.74	87	5.5	
Attitude	Between	10.69	2	5.345	2.507	NS
	Within		185.54	87	2.132	

From Table 3, it is evident that there is no significant difference in the awareness and attitude on climate change among the student teachers possessing Science, Commerce and Arts as major subjects in graduation. Hence, the second and fourth hypotheses are to be accepted. Whereas, there is significant difference in the knowledge of climate change among the student teachers possessing Science, Commerce and Arts as major subjects in graduation, hence the third hypothesis is to be rejected.

Table 4 : Differences in the knowledge of climate change among student teachers possessing Science, Commerce and Arts as major subjects in graduation

Sr. No.	*Categories*	*N*	*Mean*	*SD*	*t*	*Significance at 0.05 level*
1.	Science	30	11.46	2.012	3.19	Sig.
	Arts	30	9.8	2.018		
2.	Science	30	11.46	2.012	0.127	NS
	Commerce	30	11.53	2.236		
3.	Arts	30	9.8	2.018	3.145	Sig.
	Commerce	30	11.53	2.236		

Table 4 indicates that there lies significant difference in the knowledge of climate change between student and teachers having Science and Arts as major subjects in graduation, whereas there is no significant difference in the knowledge of climate change between student and teachers having Science and Commerce as major subjects in graduation. It is also evident that there lies significant difference in the knowledge of climate change between student and teachers having Arts and Commerce as major subjects in the graduation.

Table 5 : Differences in the awareness, knowledge and attitude towards climate change between the student teachers of Mumbai and Navi Mumbai

Dimensions	*Mumbai*		*Navi Mumbai*		*t*	*Significance at 0.05 level*
	Mean	*SD*	*Mean*	*SD*		
Awareness	15.53	2.33	14.33	2.79	3.13	Sig.
Knowledge	11.87	1.97	10.36	2.52	4.48	Sig.
Attitude	12.64	1.49	11.94	1.58	3.06	Sig.

Table 5 shows that the differences between the student teachers of Mumbai and Navi Mumbai in their levels of awareness, knowledge and attitude towards climate change are significant. Therefore, the hypothesis no. 5 is to be rejected.

Conclusion

Climate change is the most serious threat facing mankind in the twenty first century. It has been linked to human activities and the impacts of the global climate change will persevere for the years to come. No one can deny the measures required to be taken for the improvement of climate for peaceful survival of mankind on this earth. In the day-to-day activities people ignore the changes of the weather and in the event of any natural calamities only; they realise the problem and its consequences. The study revealed that though the student teachers are aware of the problem of climate change, they lack in having sufficient knowledge of climate change with regard to its causes and consequences. Further, the study revealed that, although the student teachers are aware of the problem of climate change their level of knowledge and attitude towards climate change are inadequate.

It is desirable for the future teachers of the society are imparted with adequate knowledge to address the problems associated with climate change. In order to increase public awareness and knowledge of climate change our future teachers need to be re-focused on encouraging people to act voluntarily on their attitudes, values and beliefs.

Recommendations

(i) Subjects related to protection of the Environment, Global climate change are to be made compulsory in the teacher training syllabus. The syllabus should be designed in such a way that the student teachers will be well equipped with the knowledge of climate change, they become aware of its causes and consequences and develop a positive attitude to mitigate the climate change.

(ii) Student teachers should be encouraged to undertake various research projects to find out solutions of the climate change problems.

(iii) Various co-curricular programmes on climate change should be arranged and organised by the student teachers.

(iv) Incentives in the form of awarding extra marks to those student teachers who undertake project work on climate change may also be considered.

(v) Climate change campaigning could be conducted by the student teachers in association with environment protection agencies in various schools and public places.

(vi) Further study can be undertaken to determine awareness, knowledge and attitude of rural and urban people towards climate change.

(vii) Further study can also be undertaken to find out the significant difference in awareness, knowledge and attitude of male and female student teachers towards climate change.

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