Perception of Higher Secondary School Teachers on the Impact of Anthropogenic Global Warming on Environment

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Abstract

Global warming, the term used to describe a gradual increase in the average temperature of the earth's atmosphere and its oceans, a change that is believed to be permanently changing the earth's climate forever. Anthropogenic global warming refers to the increase in the average temperature of the climate system in recent decades because of human induced actions. Anthropogenic global warming is a worldwide environmental problem not only affecting the nature, but it also affects the life and homes of millions of people. Anthropogenic global warming can be minimised to a great extent, if we eliminate the causes which are mostly human made. The responsibility of controlling anthropogenic global warming rests both on the individual as well as the state. The present investigation was conducted to study the perception of higher secondary school teachers on the impact of anthropogenic global warming on environment. Normative survey was conducted among 390 higher secondary school teachers of various schools of Kannur, Thrissur and Trivandrum districts. The tool used for the study was Teacher's Perception Scale on the Impact of Anthropogenic Global Warming (TPSIAGW). The findings of the study reveal that higher secondary school teachers have an average perception regarding the impact of anthropogenic global warming on environment. It was also found that there exists a significant difference in the perception of science and non-science teachers regarding the impact of anthropogenic global warming on environment and there exists no significant

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difference in their perception when analysed on the basis of sub-sample gender, locale and type of management.

Introduction

"Global Warming, the term used to describe a gradual increase in the average temperature of the earth's atmosphere and its oceans, a change that is believed to be permanently changing the earth's climate forever (Joy 2009)". It is the increase in average temperature of the earth, particularly at the lower atmosphere due to the abundant increase of greenhouse gases. This is primarily due to human intervention and lifestyle that they have adapted in the recent years. In common usage, the term refers to recent warming and implies a human influence. Anthropogenic global warming refers to the increase in the average temperature of the earth's near surface air and oceans in recent decades because of human induced actions. The increased volume of carbon dioxide and other greenhouse gases released by the burning of fossil fuels, deforestation, agriculture, land clearing and other human activities are believed to be the primary sources of global warming that has occurred over the past 50 years. Human activities have altered the chemical composition of the atmosphere through the buildup of greenhouse gases.

Anthropogenic global warming is a worldwide environmental problem due to which there is an abnormal increase in the level of temperature, particularly in a natural environment. Anthropogenic global warming is not only affecting the nature, but it affects the life and homes of millions of people (Joy 2009). Anthropogenic global warming is likely to trigger a series of events which can cause a lot of destruction on the planet. Rising global temperatures are expected to raise sea level, and change precipitation and other local climate conditions. Changing regional climate could alter forests, crop yields, and water supplies. It could also affect human health, animals, and many types of ecosystems. Deserts may expand into existing rangelands, and features of some of our National Parks may be permanently altered.

Anthropogenic global warming will alter the climatic patterns of the planet. As far as precipitation is concerned, it will increase in equatorial, polar and sub-polar regions, and decrease in subtropics. This change in precipitation pattern will trigger drought in some regions, while cause floods in other regions. Warming of the atmosphere will increase the temperature of ocean waters, which will continue being warm for a few centuries. Warm water will lead to frequent natural disasters like hurricanes. Overall, the planet will experience weather conditions, characterised by flood and droughts, heat waves and cold waves and extreme storms like cyclones and tornadoes (Maslin 2004). A rise

in global temperature will also hamper the rich biodiversity of various ecosystems. Anthropogenic global warming will result in loss of habitat for many animal species like polar bears and tropical frogs. More importantly, any change in the climate patterns will seriously affect the migration patterns of various bird species. Irregular patterns of precipitation will affect animals and humans alike.

In case of humans, anthropogenic global warming will affect our food and water supplies as well as our health conditions. Change in precipitation will affect basic necessities, such as agriculture, power production, etc. Increase in the temperature of ocean waters will hamper the fishes in the sea. The sudden change in climate patterns will have a hazardous effect on the human body which will not be able to endure the extreme conditions, a hint of which can be seen in the form of frequent heat waves and cold waves. Increase in natural calamities, such as storms, will lead to heavy human causalities. Infectious diseases will rise to a great extent as disease transmitting insects will adapt to wet and hot conditions. Many people will die of malnutrition as food production will decrease due to frequent droughts and floods.

Anthropogenic global warming can be minimised to a great extent, if we eliminate the causes which are mostly human made. Today, actions are occurring at every level to reduce, to avoid, and to better understand the risks associated with anthropogenic global warming. The responsibility of preventing anthropogenic global warming rests both on individual as well as the state.

Rationale for the Study

The unprecedented increase in population and intensity of human activities, which have occurred largely in this century, has been brought about by the growing mastery of science and its application. This has produced prosperity, improved standards of life and expanded opportunities beyond what earlier generations could have imagined. But these developments have damaged and deteriorated the ecological systems and caused widespread destruction of natural resources base, on which human life and well-being depends. The uncontrolled activities of human beings are damaging the healthy environment more and more.

The pre-service teacher's perceptions of environmental issues, especially greenhouse effect and global warming, examined by Fred and Ava (1999) suggested that pre-service elementary teachers hold many misconceptions about environmental issues, especially global warming and the related greenhouse effect. Ocal et al. (2011), conducted a study on 'Turkish Prospective Teachers' Understanding and Misunderstanding on Global Warming' and the findings revealed that the prospective teachers had some misunderstandings about

global warming. Similarly a study was conducted by Emre (2011) to identify the erroneous knowledge and misconceptions of pre-service elementary teachers about global warming and it was found that the pre-service elementary teachers had knowledge gaps and certain misconceptions about the reasons underlying global warming. Keith et al., (2009) studied about students' beliefs and willingness to act in relation to some specific actions related to global warming and suggested that education could be most the effective in encouraging willingness to take pro-environmental actions to reduce global warming.

The reviews cited above shows that a majority of people have many misconceptions and misunderstandings about the actual causes, consequences and control measures related to anthropogenic global warming. It was also found that people are willing to take some actions for controlling anthropogenic global warming. But, they have some knowledge gaps about the actions to be practiced for controlling anthropogenic global warming. This problem can be solved by the teachers to some extent by increasing their level of awareness and by passing their knowledge to their students.

The potential of education as an effective instrument in preventing and solving the environmental degradation has been recognised since long. The teaching community has to be taken into consideration, for it is the teachers who are molding pupil, the future citizens. He can bear the responsibility for preserving the environment from the problems like anthropogenic global warming. He can bear the responsibility only when he himself is aware about the environment and its problems. So, it becomes necessary to study the perception of higher secondary school teachers on the impact of anthropogenic global warming on environment.

Hypotheses of the Study

H1. Higher Secondary school teachers have a low perception regarding the impact of anthropogenic global warming on environment.

H2. There will be significant difference in the mean scores of perception of Higher Secondary school teachers regarding the impact of anthropogenic global warming on environment when analysed on the basis of Subject (Science and Non-science)

(a) Gender
(b) Locale
(c) Management

Objectives of the Study

1. To study the perception of Higher Secondary school teachers regarding the impact of anthropogenic global warming on environment.
2. To find out if there is a significant difference in the mean scores of perception of Higher Secondary school teachers regarding the

impact of anthropogenic global warming on environment on the basis of Subject (Science and Non-science)
(a) Gender
(b) Locale
(c) Management

Methodology

Examining the objectives of the data, the investigator followed the normative survey method for the study. The sample selected for the study constitutes a representative group of Higher Secondary School Teachers (N=390) from various Higher Secondary Schools of Kannur, Thrissur and Thiruvananthapuram districts. The sample was selected using multistage sampling design.

The tools used for the sudy included 'Teacher's Perception Scale on the Impact of Anthropogenic Global Warming (TPSIAGW)'. TPSIAGW was prepared on the basis of an opinionnaire. The investigator covered the entire areas relating the impact of anthropogenic global warming on environment and health. The statement related to the impact of anthropogenic global warming on environment includes its impact on temperature, sea-level rise, glaciers, snow and ice, extreme weather events, water resources, ecosystems, biogeochemical cycles, biodiversity, agriculture, soil, fuel, energy, transport, infrastructure and economy. This draft form of the TPSIAGW (126 items) was pre-tried out on 100 teachers of various Higher Secondary schools. Based on the suggestions and guidance extended by the experts, items in the TPSIAGW were reduced to 31 items edited in a logical sequence.

The degree of possession of the opinions concerned can be measured by making people respond to statements on a five point scale — these being strongly agree (very true), agree (true), undecided (not sure), disagree (not true), and strongly disagree (not at all true). Then these responses are weighed by assigning numerical value to them. If an item is considered positive, the weightage will be 5, 4, 3, 2, 1 and if it is a negative item, the weighting will be in the reverse order, that is 1 for strongly agree, 2 for agree and so on. The response of a person for all the items in a tool will thus be weighted and the total score obtained will be considered as an index of his opinion towards the issue.

Statistical Techniques used in the Study was Percentage analysis, Critical Ratio and Analysis of Variance (ANOVA).

Result and Discussion

Based on the scores, obtained on the teachers perception scale on the impact of anthropogenic global warming on environment, the total group was classified into High (above M+ σ), Average (between M+ σ & M- σ) and Low (M- σ) perception groups. The distribution of the subjects into different levels is presented in Table 1.

Table 1

Classification of total groups into High, Average and Low perception groups based on the perception of Higher Secondary school teachers regarding the impact of anthropogenic global warming on environment

S. No.	Teachers Perception Group	Subject	
		N	%
1.	High perception group regarding the impact of anthropogenic global warming on environment (above M+ σ)	61	16
2.	Average perception group regarding the impact of anthropogenic global warming on environment (between M+ σ & M- σ)	289	74
3.	Low perception group regarding the impact of anthropogenic global warming on environment (below M- σ)	40	10
Total		**390**	**100**

Table 1 shows that only 16% of the Higher Secondary school teachers under the study possess a high perception regarding the impact of anthropogenic global warming on environment. Based on the perception of Higher Secondary school teachers, majority of them fall in the average category (74%) and a small proportion (10%) in the low group. This shows that majority of the teachers, with an exception of a few; do not have high perception regarding the impact of anthropogenic global warming on environment.

Since global warming is a global issue, majority of the people are familiar with this term. But, many of them do not have the proper understanding about its actual causes and impacts. Therefore, awareness of education on environment should be paramount concern of all the citizens of society. The key for achieving this goal lies in Environmental Education and its related programmes.

Table 2

Comparison of mean scores of perception of Higher Secondary School Teachers regarding the impact of anthropogenic global warming on environment based on the sub-sample – Subject (Science and Non-science), Gender and Locale

Sub-sample		No. of teachers	Mean	Standard deviation	C.R	Level of significance
Subject	Science	172	128	16.13	3.16	0.01 level
	Non-science	218	122.74	16.54		
Gender	Male	150	124.73	15.03	0.18	NS
	Female	240	124.42	17.54		
Locale	Rural	256	124.42	15.38	0.99	NS
	Urban	134	126.25	18.22		

Analysis and interpretation of results obtained from Table 1.2

By comparing of mean scores of perception of science and non-science teachers regarding the impact of anthropogenic global warming on environment, it was found that the obtained critical ratio 3.16 is significant at 0.01 levels ($P<0.01$). This shows that there is a significant difference between the mean scores of perception of science and non-science teachers regarding the environmental hazards caused by the impact of anthropogenic global warming.

Compared to non-science teachers, science teachers are more familiar with environment. They get more opportunities to know more about the current environmental issues, their causes and impacts. So equal opportunities should be given to non-science teachers by conducting programmes and activities which will help them to enhance their awareness about environment and its related issues.

In the case of sub-sample gender, the obtained value of the critical ratio is 0.18 ($P>0.05$), which is not significant. This indicates that there is no significant difference between the mean scores of male and female teachers regarding the impact of anthropogenic global warming on environment.

Now a days, mass media are handling environmental issues in a astonishing way. They are giving prime importance to various environmental issues like environmental pollution, deforestation, global warming, etc. One may see an article or report in the newspaper or television channels regarding any of the current environmental issues almost every day. Along with these, there are reports about environmental activists who are talking about environmental issues. All these can help people know about various environmental issues and its causes and impacts up to a certain level. This may be the reason behind similar awareness of male and female teachers regarding the impact of anthropogenic global warming.

Comparison of mean scores of rural and urban teachers shows that the obtained value of critical ratio is 0.99 ($P>0.05$) which is not significant. This means there is no significant difference between the mean scores of teachers coming from rural areas and those coming from urban areas regarding the impact of anthropogenic global warming on environment.

During earlier times, urban people were suffering more from the adverse effects of environmental pollution than rural people. But now, due to globalisation and urbanisation, villages or rural areas are moving to metropolitan cities. This has caused the villages, which are the store house of natural resources and beauty, to change to lands with many large buildings and uncontrolled population and pollution. Hence, like that of urban people, rural people also facing environmental problems due to rapid modernisation, urbanisation, industrialisation and land use

changes. Such type of environmental issues have made rural and urban teachers understand about the impact of environmental problems like anthropogenic global warming to some extent.

Table 3
Comparison of mean scores of perception of government, aided and unaided Higher Secondary school teachers regarding the impact of anthropogenic global warming on environment

Source of variation	Some of squares	df	Mean square variance	F- value
Between groups	Sb2 = 557.84	2	278.92	1.1
Within groups	Sw2 = 97961.4	387	253.13	

The F-value table is referred for 2 degrees of freedom for smaller mean square variance on the left-hand side, and 387 degrees of freedom for greater mean square variance across the top. The critical values of F obtained by interpretation are as follows.

Critical ratio of F = 3.03 at 0.05 level

Critical ratio of F = 4.68 at 0.01 level

The computed value of F is 1.1 is lower than both the critical values of F at 0.05 and 0.01 level of significance. Hence, it should be taken as 'not significant'. Therefore, no significant difference exists among government, aided and unaided Higher Secondary school teachers regarding the environmental impact of anthropogenic global warming.

This is an era of competition. There are competitions in all the fields including the educational field. There are so many self-financing and aided educational institutions which are competing with each other to provide better facilities and thereby better results. For this purpose, all the educational institutions are competing with each other to select the most qualified teachers with a high academic performance. So irrespective of the type of management, all the teachers have more or less similar awareness levels.

Tenability of hypothesis

The hypothesis formulated in this context, viz., that there will be a significant difference in the mean scores of perception of science and non-science teachers on the impact of anthropogenic global warming on environment was accepted and in the case of gender, locale and type of management it was rejected.

Conclusion

The main objective of the study was to study the perception of Higher Secondary school teachers on the impact of anthropogenic global warming on environment and to find out whether there is a significant difference in the mean scores of

perception of Higher Secondary school teachers regarding the impact of anthropogenic global warming on environment on the basis of Subject (science and non-science), Gender, Locale and type of Management. After analysing the results of teachers' perception, it was found that only a few teachers had high awareness about the impact of anthropogenic global warming on environment. Majority of the teachers had an average awareness. It was also found that there is a significant difference between the mean scores of perception of Higher Secondary school teachers on the basis of subject and there is no significant difference between the mean scores of perception of Higher Secondary school teachers on the basis of gender, locale and type of management.

The human population is rising day by day. The uncontrolled human activities are damaging the healthy environment more and more. Anthropogenic global warming can be minimised to a great extent if the causes, which are mostly human made are eliminated. Today, actions are occurring at every level to reduce, avoid, and better understand the risks associated with anthropogenic global warming. It is high time that we take actions for controlling anthropogenic global warming. As good citizens, we can play a vital role in creating a better environment for the future. It could be a small step like planting trees in more areas or keeping our vehicle exhaust smoke to the minimum or practicing 3Rs — Reduce, Reuse, Recycle, etc. So let us do our bit to control anthropogenic global warming and to create a clear environment. That is the best thing we can leave behind for our future generation.

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