

Knowledge Assessment of Science Students on Climate Change

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ABSTRACT: Knowledge regarding climate change is very vital for the society including the youth. Providing proper information regarding climate change and health to the youth is a valuable investment in reducing and delaying risk of otherwise an inevitable disaster. Youth can play a key role in tackling climate change. The present study is designed to assess the awareness regarding climate change and its implications among science undergraduates of Punjab and to recommend policy inputs to create awareness regarding climate change and its implications particularly for undergraduates and for youth of Punjab in general. The present study is based on primary data collected from 100 science undergraduates studying at Government College, Malerkotla, Punjab. A rapid survey was conducted regarding awareness about climate change and its implications. The finding of the present study of science graduates provides a clear message that today's youth is depending more on easy information reaching them through internet. Awareness on causes and impact of climate change and global warming is in doldrums. It becomes all the more important to sensitise our youth on the use and verification of easy information at hands.

INTRODUCTION

Nature is declining globally at rates unprecedented in human history and climate change is among the five direct drivers of change in nature with the largest relative global impacts so far (UN Report, 2019). Climate change is a process of changing the climatic system over a long period and over a wide area due to natural activity. According to United Nations Framework Convention on Climate Change (UNFCCC, 2011) change of climate is attributed to human activity that alters the composition of the global atmosphere and is in addition to natural climate variability observed over comparable time periods.

Climatic changes adversely affect both the environment and human health in several ways. The rising global temperature causes problems to people

who have respiratory diseases like asthma. It is evident that many future health hazards of climate change are bound to increase at an alarming rate due to heat waves, storms, floods, fires, cyclones, droughts, earthquakes and hurricanes. It is also predicted that climate changes will deteriorate agriculture and fishers and may even result in collapsing ecosystems. Change in world climate is bound to alter the functioning of ecosystems and their member species. Between 2030 and 2050, climate change is expected to result in 2,50,000 deaths per year attributed to malnutrition, malaria, diarrhoea and heat stress. Direct damage costs to health due to climate change is estimated around 2-4 billion per year by 2030. In the last 130 years, the world has warmed by approximately 0.85 degree centigrade (WHO, 2009). This has resulted in rise in sea levels, melting of glaciers and change in precipitation patterns. Extreme weather events have becoming more intense and

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frequent than ever before. Fossil fuels consumption alone causes 7 million premature deaths worldwide every year. The most vulnerable populations are badly affected by climate change with rising food and water insecurity, higher food prices, loss of income, negative health effects and forced migration.

In present times there is an urgent need to sensitize the general population regarding global warming and climate change. The importance of communicating with the general public engaging stakeholders is fully recognized by the climate change convention itself. Article 6 on education, training and public awareness urges governments to develop and implement educational and public awareness programs on climate change and its effects, to ensure public access to information and promote public participation in addressing the issue. (Pandve *et al.*, 2011)

Extreme high air temperatures contribute directly to deaths from cardiovascular and respiratory disease by exacerbation. Floods contaminate water supplies resulting in wide spread occurrence of water borne diseases and may also result in physical injuries, uprooted homes and disruption of medical and health services. Rising temperatures may increase prevalence of malnutrition and under-nutrition results in 3.1 million deaths every year. High temperature also alleviates pollen and other aeroallergens triggering asthma affecting around 300 million people (D'Amato *et al.*, 2015).

Objectives

The present study is designed to assess the awareness regarding climate change and its implications among science undergraduates of Punjab and to recommend policy inputs to create awareness regarding climate change and its implications particularly for undergraduates and for youth of Punjab in general.

MATERIAL & METHODS

The present study is based on primary data

collected from 100 science undergraduates studying at Government College, Malerkotla, Punjab. A rapid survey was conducted regarding awareness about climate change and its implications. The students had given written consent for inclusion in the study. A self-administered structured questionnaire was used to collect first-hand information. Students were asked to rank the list of top ten problems faced by the world in an order to rate the gravity of issues to our country. Each problem in the list is rated as per their understanding of the issue. Students were asked to assign 1 to the most important concern for India i.e. the most dangerous problem. The subsequent codes of 2, 3, 4, 5, 6, 7, 8, 9, 10 represent problems with relatively lower levels of concerns in terms of the intensity of danger to our country. Weighted averages of all responses are calculated on each listed item of concern to determine the severity levels. The lowest value of weighted average would reflect the most serious problem while the maximum value would represent relatively less important on the scale of severity of a problem.

FINDINGS

Background of Respondents

Majority of the students who participated in the survey are females (74 percent). Being Muslim dominated city Malerkotla, 45 per cent respondents are Muslims followed by 41 per cent Sikh, 13 per cent Hindus, and one is Jain. The age of respondents ranges between 17 to 23 years. (see Table 1)

Caste wise, 42 per cent belongs to backward class followed by 30 per cent scheduled caste, and 28 per cent general caste. The urban-rural ratio of respondents remains at 62:38. Across different income groups, 51 per cent respondents belong to less than Rs. 10000 per month and 14 per cent belongs to more than Rs 30000/- family income group while the remaining falls between per month family income of Rs. 10001-30000/-.

TABLE 1
Respondents profile

Class	Frequency	Age	Frequency	Religion	Frequency	Caste	Frequency
B Sc 1	11	17	1	Hindu	13	General	28
B Sc 2	63	18	11			BC	42
B Sc 3	26	19	42	Sikh	41	SC	30
Total	100	20	28			Total	100
Gender	Frequency			Muslim		Area	Frequency
Male	26	22	7			Urban	62
Female	74	23	3	Jain	1	Rural	38
Total	100	Total	100	Total	100	Total	100

Source: Field Work

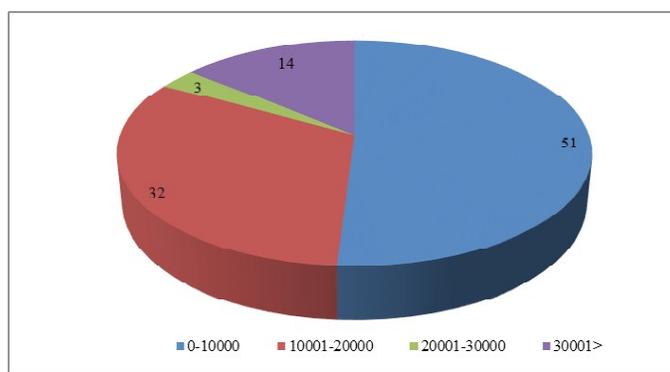


Fig. 1: Level of family income of the respondents

PERCEPTION ON CLIMATE CHANGE AND ITS IMPLICATIONS

In our attempt to understand the general perception among students regarding major problems afflicting our country, students were asked to number various problems on 1 to 10 scale considering the most serious problem at number 1. List of ten main areas of problems faced by the world was given to the students with an instruction that the list is not arranged in any way. Students were asked to give preferences as per their understanding to the list of worldwide social problems that are increasingly affecting our country. The Table 2 provides detail of preferences across various listed problems ranks ranging from 1 (most dangerous) to 10 (least dangerous). The weighted scores to the listed problems range from 1.9 to 7.6. Weighted averages display that given the situation at international level, poverty is the daunting challenge faced by our country at present. This finding coincides with the findings of a study conducted in Yogyakarta, Indonesia which also indicates poverty to be the prime concern among adolescents (Sulistyawati *et al.*, 2018).

The weighted scores of the three problems indicating high severity lie on below average score scale. These include poverty, global economic crisis / unemployment and global population growth. These three problems are ranked as the biggest challenges face by the country today with high level of severity in danger.

The next category of problems at relatively lower scale of severity in India includes problems with weighted scores more than average but less than 7. Four problems are categorised in this group with medium level of severity in danger. These problems include international terrorism followed by infectious diseases, food and water scarcity, and global warming & climate change. The last group of problems with low level of severity identified by the students include three listed problems. These include increase of dependent population followed by nuclear wars & armed conflicts and non-communicable spread of diseases. Strangely, impact of global warming and climate change on India is ranked after issues related to poverty, diseases, unemployment, population growth, and terrorism.

TABLE 2
Ranked Perceptions of Science Students

Listed problems	1	2	3	4	5	6	7	8	9	10 average	Weighted Severity in danger
International terrorism Medium	7	10	22	9	2	14	7	7	15	7	5.3
High poverty High	51	23	15	7	3	0	0	1	0	0	1.9
Increase of the dependent population Low	5	3	7	1	5	19	4	18	11	27	7.2
Infectious disease Medium	4	6	6	15	21	10	18	12	4	4	5.6
Global economic crisis/ Unemployment High	10	42	10	8	9	4	5	2	9	1	3.7
Global population growth High	14	7	20	22	9	6	8	9	3	2	4.3
Global warming and climate change Medium	3	8	2	11	21	9	18	8	14	6	6.0
Nuclear wars and armed conflicts Low	0	0	2	7	12	15	16	20	4	24	7.3
Non-communicable disease spread Low	0	0	1	10	7	11	12	18	20	21	7.6
Food and water scarcity Medium	6	1	15	10	11	12	12	5	20	8	6.0

Source: Field Work

This depicts perception of college students on problems afflicting mother earth. In terms of percentage of responses, only three percent respondents reckon global warming and climate change as the worst problem afflicting our country whereas eight percent respondents ranked global warming as the second biggest calamity. Overall, 45 percent respondents considered it amongst the top five major problems affecting our country.

To further comprehend the level of their knowledge on issues related to global warming and climate change, a series of questions were raised. On the issue of their awareness on what causes climate change, an overwhelming majority (99 percent) of students claimed that they are aware about the causes of climate change while 96 percent also affirmed their awareness on consequences of climate change (Table 3). 97 percent of the students felt assured that they

are aware of few attempts that have been made to tackle climate change.

TABLE 3
Incidence of awareness on issues of global warming and climate change

Aware about	Number of affirm responses
Causes of climate change	99
Consequences of climate change	96
Attempts to tackle climate change	97

Source: Field Work

In an enquiry on student's perception on continuity of the problems related to climate change, 57 percent agreed that climate change is an unbreakable phenomenon and problems related to global warming and climate change will persist. However, 18 percent feel that these adverse effects will be controlled with government interventions and people's participation while another 25 percent are

not sure of the future dynamics of climate change. (Table 4)

TABLE 4

Perception of students on continuity of problems related to climate change

Perception about	Frequency
Believe that it will be controlled	18
Believe that it will not be controlled	57
Not Sure	25
Total	100

Source: Field Work

Literature provides that increasing levels of CO₂ contributes to increase in warming on earth. Students were asked if they agree with increasing levels of CO₂ having low impact on climate change. Responses reveal that 57 percent students do not agree with CO₂ having low impact on climate change. Instead they were aware of the fact that high CO₂ levels contribute to increase in global warming. Again one-fourth of respondents were not sure of the concept (see Table 5).

TABLE 5

Perception about CO₂ has a low impact on climate change

Opinion	Frequency
Agree	18
Do not agree	57
Not sure	25
Total	100

Source: Field Work

In an attempt to draw on students understanding of the concept of climate change it is found that 42 per cent respondents felt that climate change is caused by natural processes and 46 per cent opined that industrial sector is the only cause of climate change (see Table 6).

TABLE 6

Students views on causes of climate change

Opinion	Natural processes	Only industrial activities
Agree	42	46
Do not agree	38	40
Not Sure	20	14
Total	100	100

Source: Field Work

Further, to understand student's views on the impact of climate change, it is found that 85 percent of students understand that increase in temperature is one of the climate change impact whereas 64 percent students believed that rise of sea level is another climate change impact. Further 72 percent of the students are aware that natural hazards are one of the

climate change impacts. (Table 7)

TABLE 7

Students views on impacts of climate change

Opinion	Impacts of climate change		
	Increase in temperature	Increase in sea level	Increase in natural hazards
Agree	42	46	72
Do not agree	38	40	7
Not Sure	20	14	21
Total	100	100	100

Source: Field Work

It became all the more pertinent to understand the kind of exposure students get to build their perception on the listed issues of concern. Accordingly, students were asked about the sources from where they have gathered information on these issues. Students mentioned various sources such as discussion with friends and family, media etc and the multiple sources mentioned are also incorporated in the analysis. It is due to multiple responses that the total of all responses would exceed more than number of respondents. Table 8 accounts for different sources tapped by students for information on the listed problems. In all, six main sources are reflected in responses. All except one referred source are categorised under 'public media' including internet/social media, radio, television, articles and newspapers and magazines. A quick glance at the number of responses in Table 8 provides that discussion with friends and family on important issues of societal concern and information from scientific articles are least preferred options by the students. Only 20 percent of the respondents considered family and friends as a vital source of information on climate change.

The most preferred dependence of students for information and building their opinion is internet and social media. 65 percent students reported internet to be the primary source revealing the influence and popularity of smart phones in dispensing information and role of digital media as a promising tool for imparting climate change awareness. However, material on internet should be used with a caution and verification as reliability and authenticity of information in forwarded messages is questionable. The responses indicate gradual isolation from family and friends and more reliance on internet for obtaining any information.

TABLE 8

Source of information about climate change

Source of information	Number of responses
Television	55
Family and friends	20
Internet / social media	65
Radio	48
Scientific article	23
Newspaper and magazine	55

Source: Field Work, Multiple Responses

Findings of the present study relates to few other studies conducted elsewhere such as adolescents considered poverty as an inevitable and natural process, smart phones are the most promising tool for spreading information on all social issues including climate change (Sulistiyawati *et al.*, 2018). Television is found to be the most common source of information on climate change (Pandve *et al.*, 2011). Climate change is not found to be the most threatening issue amongst science students of Government College, Malerkotla, Punjab.

CONCLUSION

Knowledge regarding climate change is very vital for the society including the youth. Providing proper information regarding climate change and health to the youth is a valuable investment in reducing and delaying risk of otherwise an inevitable disaster. Youth can play a key role in tackling climate change. There is ample need to focus on this crucial problem which is fast culminating into a predicament of the present times. Youth should be engaged in climate change projects within different national and international organisations.

Although stopping climate change altogether is a daunting task, yet massive attempts should be undertaken to slow it down and stop it from worsening further by encouraging youth to become an active part of decision and law making policies. In this light,

the finding of the present study of science graduates provides a clear message that today's youth is depending more on easy information reaching them through internet. Awareness on causes and impact of climate change and global warming is in doldrums. It becomes all the more important to sensitise our youth on the use and verification of easy information at hands. Education institutions should take up in organising more awareness camps at schools, colleges and universities on the pertinent issues of climate change and global warming and also training youth to filter the internet material for proper use.

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