RESEARCH REVIEW JOURNALS
Volume-03
Issue-11
November -2018

ISSN: 2455-3085 (Online)
RESEARCH REVIEW International Journal of Multidisciplinary
www.rrjournals.com [UGC Listed Journal]

Perception of trustworthiness of the sources of information about Climate Change: A study in Tripura

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ARTICLE DETAILS

Article History
Published Online: 10 November 2018

Keywords
Perception of students, Climate Change, Heavy Users of Mass Media Occasional Users of Mass Media, Trustworthiness

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ABSTRACT

Media holds the key to reduce climate change by creating a positive perception among the people, as it can efficiently goad them to take adoptive action. This paper is a descriptive survey study among students of Tripura University who have trust upon the different sources of information about climate change and how they rate the trustworthiness of each of them with respect to their heavy and occasion use of mass media.

1. Introduction

Of late, our planet is besieged with a number of serious problems, and among these, global warming is the most significant one, as it raises the overall global temperatures to dangerous levels. The Paris agreement (2015) advocates for framing a global consensus to reduce global temperature escalation below 2 degrees Celsius above pre-industrial levels(United Nations Framework Convention on Climate Change, 2015)[1]. Any further rise would mean more of melting of glaciers, rise in sea levels, weird weather and changing climate patterns that might adversely affect flora and fauna (*UNEP,* 1997)[2]. But the question still persists -who is responsible for the given imbroglio? Scientists across the globe hold our race guilty for the same. Industrial growth, use of fossil fuel, deforestation, emissions of carbon dioxide gas, and greenhouse gases beyond limit are responsible in a collective way. However, mass media holds the key to reduce global warming by creating a positive perception among the people, as it can efficiently goad them to immediate action. Mitigation and adaptation measures will follow the rhetoric only when the public perceives global warming to be an urgent issue that requires concerted efforts by one and all to address it immediately. Unless perception about the issues of climate change among the masses is changed, individual human behaviour would be detrimental to climate change. Perception of climate change may be defined as the sum total of a person's attitude and awareness towards the issue with complete knowledge of adaption and mitigation measures aimed at addressing climate change issues.

It is also pertinent to mention that media matters a lot in any discussion of climate change communication. The reduction of individual carbon footprint and creation of a congenial international climate change policy regime largely depends upon public attitudes, and public attitudes in turn, can be influenced by the mass media intervention in several ways (*Dirikx* and *Gelders,* 2010)[3]. Climate change communication literature reveals that media can influence both public opinion and policy outcome at all levels; whether it be in national or international spheres (*Pavone,* 2010)[4]. Mass media is a mechanism of information diffusion in the society and it has been a diffuser of information regarding climate change ever since the mid twentieth century when the issue of global warming arose among scientific circles. In the year 1988, *James Hansen,* a NASA scientist created a media storm by his testimony of 99 per cent surety of global warming before the US Senate (*Leiserowitz,*2003[5]; *Shao*, 2012[6]).

There isa great deal of literature regarding the significance of environmental protection and conservation issues over the past few decades and role of mass media. A great deal of what most people hear about environmental issues such as the greenhouse gas effect, global warming, ozone layer depletion, water stress, air pollution, and environmental threats like global climate change,is likely to come from the annals of mass media like radio, TV, newspapers and new media (*Shanahan, et. al.,* 1997)[7].

However, very little research has been done in India to gauge the perceptions of the students about climate change and to examine their attitudes and behaviours on climate change issues. This gap in research exists despite the fact that India is one of the fastest growing carbon dioxide emitters in the world which is indeed the cause of anthropogenic climate change. Recently few global warming awareness studies (*Leiserowitz* and *Thaker,*2012[8];*Leiserowitz* et.al,2013[9]) have been conducted in India. However, these studies did not consider students as there sample, rather it was based on general population of metropolitan areas. Also there are not many studies documented and commission especially in the context of Tripura, a strategic geographic area of India that might be an entrance gate to millions of environmentally displaced migrants owing to climate change from the low-lying neighbouring country of Bangladesh(*Leiserowitz* and *Thaker,* 2012)[10].

Hence, there is a need for such a study that endeavours to looking into the perceptions of students and their how their trust in information sources can motive them to adopt mitigation measures. India is indeed one of the worlds' largest democracies. But, India is also one of the world's vulnerable countries to the impact of climate change (*Gupta*, 2005[11]; *Cruz*

et.al., 2007[12]; *Unnikrishnan et al*, 2006[13]; *NAPCC*, 2008[14]; *INCAA*, 2010[15]; *Billett*, 2010[16]) and the vulnerability of Tripura cannot be ruled out under such circumstances. With an economy closely tied with its natural resource base and climate sensitive sectors such as agriculture, water and forestry; India may face a major threat because of projected changes in climate (*NAPCC*, 2008[17]; *Gosain,* 2006[18]).The State of Tripura along with the whole of the country, are already beginning to face environmental problems like artificial floods in monsoon, air and water pollution, water scarcity, erratic rainfall and reduced greenery, threats to human health with increasing number of vector borne diseases (*Cruzet. al*, 2007[19]; *TERI,* 2004[20];*Parikh* and *Parikh*, 2002[21]; *Parsuraman*and *Unnikrishnan*, 2000[22]).Climate change may alter the distribution of quality of India's natural resources and adversely affect the economic conditional of the masses and livelihood of its people (*NAPCC*, 2008)[23].

The present study would help the policy makers in understanding the problem of climate change and adopt migration measures in the right earnest (*Dasgupta*, 2007)[24], as the state of Tripura shares maximum international border with Bangladesh. In the event of any disaster due to climate change and sea level rise, environmental refugees from neighbouring Bangladesh might migrate into Tripura as the State shares linguistic, cultural and geographic proximity with Bangladesh more than any other State of the Indian Union (*Gupta*, 2005[25]; *Dasgupta,* 2007[26]). Climate change induced migration, especially from Bangladesh, may strain resources and adversely affect Indo- Bangladesh relations (*Gupta*, 2005[27]; *Dasgupta,* 2007[28]).

(Map of Tripura, bordering Bangladesh. Source: Google maps)

2. Review of Literature

Media exposure has a direct impact on the knowledge and perception of an individual. Research studies across the globe suggests that attention to news media about global warming increases public knowledge and concern about the issue (*Zhao*, 2009[29]; *Stamm et al,* 2000[30]; *Krosnick et al*, 2006[31]).The power of mass media to set a nation's agenda to focus public attention on a few key issues like climate change, is immense and well documented in literature (*Wilson*, 1995)[32]. What we know about the world is largely based on media presentation. More specifically, the result of this mediated view of the world is that the priorities of the mass media strongly influence the priorities of the public and policy makers. The role of mass media in agenda-setting the adaptation and mitigation interventions regarding climate change issues in the society is worth studying.

Individuals can also play a significant role in responding to climate change, provided they are well-informed by the mass media about the impending catastrophe (*Sampei* and *Aoyagi-Usui*, 2009)[33]. Climate change is a reality, and it has already started assuming an ugly look which warrants immediate attention by the rank and file of the country (*Shukla*, 2003[34]; *TERI*, 2004[35]).The public understanding of many issues is heavily dependent on the representation of the said issues in the media-scape of a nation. This is precisely the reason why mass media has a major influence on public perception on climate change.

Recently one pioneering pan- Indian study, entitled- "*Climate Change in the Indian Mind"* was carried out by *Leiserowitz* and *Thaker* (2012)[36]at the behest of the Yale Project on Climate Change Communication. The authors reported that a mere 7 per cent of the Indian respondents revealed that they know 'a lot' about global warming whereas, as many as 41 per cent reported either they had 'never heard of it' or 'don't know'. Among the most notable findings of the study, it was revealed that educational level was one of the strongest predictors of climate change awareness in a country like India where there are still about 35 per cent illiterate populace. Respondents with higher educational qualification were significantly more likely "to have heard of global warming" than respondents with lesser educational attainment, especially the non-literate. Regarding their support for climate change mitigation and energy policies, *Leiserowitz* and *Thaker* (2012)[37]reported that nearly 41 per cent of the Indian respondents were in favour of the "government of India doing more" to address global warming. Another sequel of the same study conducted in India by *Leiserowitz et al* (2013)[38] entitled - "*Global Warming's Six Indias",* found six distinct groups within the Indian public who respond to the threat of global warming in very different ways:

The Informed (19 per cent) are the most aware and convinced of the reality and danger of climate change and highly supportive of national actions to mitigate the threat. The Experienced (24 per cent) - the largest of the Six Indias - know less about climate change, but are convinced that it is happening and a serious problem, in part because they say they have personally experienced the impacts more than any other group. Three other Indias - the Undecided (15 per cent), the Unconcerned (15 per cent) and the Indifferent (11 per cent) - represent different stages of understanding and acceptance of the problem. The final India - the Disengaged (16 per cent) - have never heard of climate change and have no opinion about it, even when it is described.

The above study further revealed that in whichever of the six groups they were divided, one thing was common in most of the Indians - those respondents who were living in urban areas claimed to have a higher level of knowledge about global warming than those living in rural areas.

Another significant studyintended at understanding media's role in the public perception of climate change was conducted by *Fortneret al*, (2001)[39]. They have also assessed individuals' keenness to take action to reduce global warming. Their results showed a fair degree of willingness to take actions such as supporting environmental education programmes and installing energy efficient light bulbs, but low levels of willingness to take action to support increases in gasoline prices or use of public transportation (*Fortner et al*, 2001)[40].

Leiserowitz (2004)[41] mentions that the issues of climate change made its impressive entrance into the public sphere with the release of "*The Day After Tomorrow"*-a 2004 Hollywood blockbuster movie. In this context, *Leiserowitz* (2004)[42] further reports that the movie had a significant impact on climate change risk perceptions, theoretical understanding of the issue, behavioural intent, policy priorities and even voting intentions of moviegoers compared to survey respondents who did not see the film.

A similar study was conducted in the UK that found that viewing the film "*The Day After Tomorrow"* increased public concern about climate to a great extent as visual communication is a powerful tool to goad public into action (*Reusswig,* 2005[43]; *Lowe,*2006[44]). Several other studies havealso indicated that the cinemas like: "*The Day After Tomorrow", "An Inconvenient Truth"* and "*Live Earth"* can go a long way in launching issues like climate change into the public sphere(*Leiserowitz*, 2004[45];*Reusswig,* 2005[46];*Lowe,*2006[47]; *Leiserowitz*, 2007[48]). Movies can work miracles in climate change communication.

Chokker et.al, (2012)[49] reported in a study that in general Indian students exhibited "high level of concern for global warming" and expressed "considerable willingness to take action against global warming". The authors have further mentioned that as many as 90 per cent of the Indian students reported that global warming is actually happening. The respondents also exhibited high levels of apprehension about global warming; with more than 82 per cent reporting that they were either 'very worried' or 'quite worried' about the issue. The majority of the students also reported a high level of knowledge about different issues concerning global warming, with almost 82 per cent claiming to know 'a lot' or 'something' about this issue. The students in India advocated fairly strong attitude for environmental protection efforts and over 72 per cent of the students claimed to be 'very' or 'quite' environmental friendly in their attitude.

While assessing Indians' beliefs, attitudes, and policy preferences about climate change, another study by *Thaker* (2012)[50] reveal that over 40 per cent of Indians have "not heard" or "do not know" much about climate change. But, interestingly, when the respondents were provided with a short description of the term "global warming", about 72 per cent of the respondents reported that they have undergone "lived experience" matching with the explanation of the scientific phenomenon called global warming. The study further mentions that mass media happen to be the most important source of information on climate change for majority of the people in India. However, the author expresses grief because media reports on climate change were very scarce and the few reports that were there in the Indian mass media were most often portrayed as natural disasters, without reference to its inherent causes and role of human activity in that regard. The author further argues that mass media of the country seemed to be fatigued of covering climate change.

Some coverage was noticed by *Thaker* (2012)[51]in this study that was between few and far and those were basically framed as a "catastrophe" or "disaster". Consequent upon such framing the author suggests that people tend to cultivate a negative perception for climate change. Common sense logic also corroborated that such portrayal in the mass media would be detrimental to public understanding of climate change, as the public would be primed to believe that climate change mitigation was beyond human efforts to deal with. In this context the *Thaker*(2012)[52] mentions that:

People with access to mass media may be exposed to higher doses of risk information about climate change impacts without equally high doses of efficacy information to adapt to those impacts. High doses of risk information about catastrophic climate change effects may raise risk perceptions about the effects of climate change, but without information about ways and means to adapt, is more likely to result in maladaptive behaviours such as denial, fatalism, or wishful thinking.

In her study*RadhikaMittal*(2012)[53]reports the existence of an event oriented ebb and flow in climate change coverage of studied in 2007 among three Indian Newspapers-*The Hindustan Times, The Indian Express* and *The Times of India.* According to the study media coverage picked up momentum when events like the release of Fourth IPCC Assessment Report in February 2007 and IPCC being awarded a Nobel Peace Prize for its efforts in October 2007 were on the forefront. *Mittal* (2012)[54]further reports that the Indian mass media was yet to set an agenda among the masses of the country on reduction of carbon footprints. On the contrary, the mainstream media of India was found to be indulging in spreading a consumerist culture which is dependent on carbon intensive life style.

Rao (2011)[55]studied public perceptions and awareness about global warming in India by conducting a survey among 851 respondents in the city of Hyderabad in 2007.The results of the said study revealed that majority of the respondents were aware that global warming was a serious problem which could impact their way of life in the future. However, their level of awareness was lower concerning the causes and impact of global warming. Consistent with many studies in the Western context, the study reported the ignorance of such terms as "fossil fuels" and "greenhouse gases" among the Indians. The study further reported that opinion of the respondents was split almost evenly amongst those who felt that global warming could be "addressed through personal actions" and those who thought that "more drastic measures were needed". The findings reported by *Rao* (2010)[56] revealed the existence of significant differences in levels of awareness about global warming across age, gender, income, and occupation, as well as education attainment of the sample.

Billett(2010) [57]can be credited to be one of the few researchers from the West who conducted a study on the representation of global warming in the Indian mass media. *Billet* (2010)[58]found that the Indian press was mostly free from any scepticism. On the contrary, media in India considers climate change as a scientific reality. Majority of the articles published in the Indian newspapers directly attributed climate change to anthropogenic causes.

Sengupta et al,(2010)[59] have reported that environmental awareness is a significant variation factor for environmentally sustainable behaviour among Indians who have exposure to mass media. Stream was also found to be very important variable where in science students scored more than their counterparts from Arts and Commerce disciplines. However, the study revealed that gender was not a significant factor. The study also indicated that the media was an important source of knowledge about environmental issues among the respondents.

Shao (2012)[60]has reported the mass media was one of the determinants of Americans' perception of global warming and individuals' environmentally sensitive behaviours aimed at mitigating global warming. The study revealed that persons who believe that "global warming is a very serious problem", perceive "global warming is causing a serious impact now", and believe "the release of greenhouse gases is the most important factor causing global warming" are willing to pay more to address the issue of global warming. Also the study revealed that age of the respondents had negative effects on the public's willingness to address the issue of global warming. The study further reported that young people were more willing than the elderly to pay more to reduce global warming.

Carvalho(2007)[61]reported that the mass media "topped" the list of trustworthy information sources indicated by the respondents of Portugal University in a study on climate change. The authors mention that the self-reported concern about climate change among the students was basically due to media coverage. Likewise, *Lorenzoni*and *Pidgeon* (2006)[62] have reported that that people who "trust in scientists" to provide them information about global warming seem to pay more attention to the findings and opinions expressed by scientists in that domain.

Thus, we see that the public's perception of the world affairs is a selective business and in matters concerning climate change, one may end up perceiving what mass media wants us to perceive. Relevant literature in these lines reveal that respondents who perceive climate change as a threat were more likely to be graduates in non-science subjects, supporters of a particular political party and people belonging to high income group families and were heavy users of mass media and held mass media in high trust.

3. Materials and Methods

This survey study was basically undertaken to find out answers to questions, like, what are sources of information do the students seek to acquaint themselves about climate change issues, which are most trusted or reliable among the information sources that the students under study try to seek information from on climate change issues and what kind of media users –heavy or occasional, are most likely to be motivated to take adoptive measures to combat climate change.

To guide the study, above research questions were formulated. The survey instrument adopted for the said purpose was a close-ended questionnaire, adapted from different studies. The researcher's universe of study constituted of all the post-graduate students enrolled in the various courses of Tripura University, Agartala in the year 2013.Both male and female students participated in the survey.This sample consisted 45% male and 55% female students whose age group was in between 21 to 35 years. Atotal sample sizeof 567 (around 30 per cent of the universe) wastaken purposively as it was felt that it would suffice the purpose and would be representative of the total population. The questionnaires were distributed to the students in all the 34 departments under the University who agreed to participate in the survey. The survey was conducted in the period between September and October, 2013. The respondents were divided into the categories-1) Occasional Users of Mass Media are those who spend less than 15 minutes in (a) reading newspapers, (b)watching TV and (c) surfing Internet daily; And 2) Heavy Users of Mass Media are those who spend more than 15 minutes in (a) reading newspapers, (b) watching TV and (c) surfing Internet daily.The "Trust" in different sources of information on climate change was calculated on a 5-point scale; where 1 signified "strongly distrust", and 5 signified "strongly trust". This calculated in reverse order.

4. Results and Discussion

To investigate whether there was a significant difference among the post-graduate students with regard to having heard/seen/ read about climate change based on time spent on different mass media and between the variables such as faculty of study, place of residence, medium of instruction in school days, logistic regression analysis was performed by using SPSS software.

4.1. Determinants of those who have heard/ seen/ read about climate change:

Table1: Distribution of students who have head/read/seen about climate change and a Logistic regression analysis with background characteristics

Background Characteristics		e^{β}	95% CI	
Faculty of Study	Science Stream			
	Arts and Commerce Stream	0.347*	0.200	0.602
Present class of study	Master Degree			
	PhD	1.140	0.380	3.418
Age	<=25 years			

	> 25 years	0.840	0.381	1.849
Caste of the respondent	ST			
	SC	1.356	0.573	3.212
	OBC	0.835	0.388	1.795
	GENERAL	0.999	0.476	2.098
Income	< Rs. 1,80,000			
	>= Rs. 1,80,000	0.969	0.550	1.706
Place of residence/birth	Urban			
	Rural	0.623***	0.366	1.059
Medium of instruction in school days	Vernacular			
	English	1.771***	0.930	3.372
Environmental studies in school	No			
	Yes	1.162	0.483	2.797
Spending time on Internet daily	Less than 15 minutes			
	More than 15 minutes	1.673	0.765	3.658
Spending time on watching TV daily	Less than 15 minutes			
	More than 15 minutes	0.815	0.266	2.498
Spending time on reading newspapers daily	Less than15 minutes			
	More than 15 minutes	2.746*	1.605	4.697
Sex of the respondent	Men			
	Women	1.022	0.630	1.659

** p<0.01, ** p<0.05,***p<0.10*

It was found that amount of time spent time on reading newspapers has a significant impact in this regard. Regression analysis of the data described in *Table-1,* indicated that a student without science stream background has almost 66per cent less chances of having heard/seen/read anything about climate change as compared to students of science stream background. Students from rural areas have about 38 per cent less chances to be familiar with the topics of climate change than respondents' form urban areas. The chances of having heard/seen/read something about climate change is 1.8 times more among the English medium students than vernacular students. Hence, it is revealed from the above data that there exist significant differences in climate change awareness among the post-graduate students based on their academic stream, medium of instruction and place of birth with respect to the amount of time spent on different mass media.

The cohort of students who reported that they have heard/seen/read something about climate change increases with an increase in the amount of time spent on reading newspapers daily. Thus "heavy users" of newspapers significantly differ in terms of their awareness of climate change in comparison with their counterparts who spent less time in reading newspapers. But this proposition is not found to be applicable in the case of other mass media like radio or TV or magazines as such.

4.2. Perception of trustworthiness or reliability regarding the different sources of information on climate change:

Table2: Distribution of students with their perception of trust in different sources of information on climate change

Sources of Information (Trust in sources of information on climate change (5-point scale: 1 =strongly distrust, to 5= strongly trust) calculated in Reverse order.)	**Mean**	**SD**
Mass Media	3.88	1.446
Government Reports	3.51	1.355
Business and industry reports	3.07	1.152
Publications from environmental NGOs	3.61	1.380
Publications from scientists	4.06	1.405
Teachers/ Family/ Neighbours/Friends/ Colleagues	3.60	1.283

The students were asked to rate the trustworthiness of the sources of information they would use to access information on climate change as given in *Table-2* about climate change in a reverse order. The above analysis reveals that by and large the respondents expressed a high degree of trust in information coming from "publications from scientists". "Mass media's cored second most trustworthy source of information regarding climate change by the students. On the contrary, the respondents expressed mistrust on the reports by "friends and family members/neighbours/teachers/colleagues. Printed materials of environmental NGOs were rated next to scientific publications.

4.3. Level of use of mass media and perception of different issues of climate change:

Table 3: Distribution of students "not at all informed about different issues" of climate change with different levels of mass media users

	Percentage of 'not at all informed' about different issues of climate change		
Level of use of mass media	Causes*	Consequences*	Preventive ways
Occasional users	34.0%	29.8%	27.8%
Heavy users	23.6%	23.6%	23.0%

**p<0.01, ** p<0.05, *** p<0.1*

To determine the level of use of mass media, the students were divided according to their self-reported degree of use of sources of information as "heavy users" and "occasional users". It was found through factor analysis that 'mass media' comes out as a factor. Television and newspaper are included in the factor-1. Then a composite score was prepared and the students who scored above the median value of the composite score were recognized as "heavy users" and those who scored below the median were referred to as "occasional users". This distinction is being used in other analyses as well in this study. It becomes clear from the data analyzed that "heavy users of mass media" are more concerned about different issues of climate change, in terms of "causes", "consequences" of and "preventive ways of mitigating climate change" than the "occasional users of mass media".

5. Conclusion and suggestion

It was found from the data analysed above that there exists a significant association between level of use of mass media and being "not at all informed" about different issues of climate change. The proportion of students who reported that they are "not at all informed" decreases with a shifting from occasional to heavy users of mass media as described in the analysis. Thus we can infer that as a student becomes a "heavy user of mass media", his or her chances of becoming well informed of climate change issues increases accordingly.

It was found that word of mouth information on climate change was discredited by the respondents under study. Likewise "government reports" were also mistrusted by most of the students and were not considered to be a reliable source on climate change. This phenomenon is obvious in the case of developing countries for reasons very well known to scholars. The administration in most of the third world countries is affected by rampant corruption at every level of the government and hence official reports are taken with a pinch of salt. Scientific publications are considered most trustworthy by the respondents. This is an encouraging picture of students' understanding of climate change along with positive contributions from mass media, even though a number of misconceptions exist. There is an urgent requirement of a proactive mass media in the country that can spread messages with more info graphics on climate change. In conformity with *Cabecinhas et al,* (2008)[63], the present study has found that heavy users of mass media reported higher levels of actions and more behavioural intentions than occasional users. It can be suggested that future researchers can do well by dissecting whether private media outlets or government media outlets, are considered more trustworthy by the masses as a source of information on climate change.

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