

# What do youths of Tripura understand regarding the contributing factors of climate change and efficacy of certain mitigation behaviors

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**ABSTRACT:** A research study was undertaken to know what do the students of Tripura think are the contributory factors of climate change and what actions help in mitigation of climate change menace. The study revealed that much more information dissemination is the need of the hour. The author wants to propose that schools and colleges in the state of Tripura should do more to fill this gap by mainstreaming climate change and global warming issues into curriculum with a view to providing students with the skills to pursue adaptive strategies in order to cope with the problems that climate change when they come to pursue post graduate studies. Students in the state of Tripura may be inadequately prepared for a world that will change dramatically owing to climate change. The policy makers have a long way to go if they want to combat global climate change problem seriously. Much more has to be done to educate the student community on the issues of climate change, mitigation and adaptation. Occasional awareness creation seminars are far from adequate.

**Key Words:** : Climate Change, Awareness, Mitigation, Postgraduate Students, Behaviour Change, Tripura.

## Introduction

It is now beyond doubt that the Global North is responsible for a much larger proportion of the past anthropogenic emissions that are now causing climate change compared to the Global South (Chapman et al, 1997). Having already taken off in the industrialization process, nations of the Global North are the largest emitters of carbon dioxide than the Global South. This is the case especially since the Industrial Revolution when steam power produced by burning coal and wood, as well as other industrial practices began to become more prevalent in the late eighteenth century in the UK and the USA. Further energy-intensive developments in industry and transportation also found their beginnings in the North. For instance, constituting only 5 per cent of the world's population (Leiserowitz, 2007a), the USA is the world's largest emitter of carbon dioxide, the primary heat-trapping gas. Studies by the International Energy Agency with estimates of the year 2008 point to a disquieting fact that with its growing population and growing economy China emits 25.4 percent; Americans emit 17.8 percent or 5.40 metric tons per capita of carbon dioxide each year due to their higher standard of livelihood (IEA, 2011). By comparison, the average Japanese citizen emits 2.55 tons per capita per year, while the average Indian emits less than 0.29 tons per capita per year in this regard (IEA, 2011). However, the study by International Energy Agency (IEA) further says that India's emissions are likely to rise up in recent times which will push the country ahead of Russia to become the fourth largest emitter behind China, the US, and the EU.

These striking differences in the emission patterns by the developed and developing countries are at the bottom of the much contested North-South divide which perpetuates the dispute in terms of international efforts in climate change governance and delays in adopting the prescription of the Kyoto Protocol. Elucidating the origin of the impasse, Pandey (2014) mentions that :

*The countries that have a greater stake at UN global climate change negotiations are important in terms of fossil fuel consumption and possession of reserves that are the backbone of their economy and mode of life. Some countries such as the US and China have major challenges in maintaining their supplies of fossil fuels and in developing other forms and alternative sources of energy. Saudi Arabia has always stood against any legally binding agreement that would prevent it from exploiting its oil wells, which have long been the most important source of its national income. The US, Russia, and China are the leading producers and consumers of world energy. India and China rely on coal as their primary source of commercial energy (Pandey, 2014).*

There has been a difference of opinion between the Global North and the Global South on committing to a legally binding cut in greenhouse emissions so as to arrest climatic changes immediately. The IPCC had

stated that if global temperatures had to be prohibited from going up beyond the danger mark of an additional two degrees Celsius, then industrialized nations in the Global North would have to cut their greenhouse gas levels between 25 and 40 percent below 1990 levels by 2020. It is nearing the year 2020, but the targets are far from being achieved. On the contrary, most countries including the US and Australia are willing to pledge an emission cut of a mere 5 to 17 percent of 2005 levels (*India Today*, Dec 2009). As per the Kyoto Protocol, the industrialized countries that form the so-called Annex-I nations were also to lend money to the poor nations to help them adapt to the adverse effect of climate change. Apart from this, the developed countries in the Global North were also to impart clean technology that would have helped developing countries in the Global South to lessen their emission levels. Of late, the Annex-I countries have raised issues about intellectual property rights and now talk of only information sharing rather than technological know-how with the non-Annex-I countries.

The developed countries of the Global North seek to maintain their status quo in business - as - usual psyche. Rather they want to dissuade the developing countries of the Southern hemisphere from aping path of industrialization followed by them once upon a time as carbon intensity is linked to energy used to produce every dollar of the GDP. Hence, calling upon the developing countries to cut down their emissions when they are yet to take off industrially, is a bone of contention. The Global South believes in securing their right to development for its citizens by exploiting petroleum-based resources in industrial activity, whereas the Global North wants to impose emission reduction targets, overlooking their own contribution to the problem. Neither the Global North is ready to curtail its relative opulence and nor are the Global South ready to deviate from poverty alleviation programmes. This is why the Global South alleges it to be a political vendetta by the Global North to stop them from becoming developed by embarking on the path of industrialization riding on the scarce fossil fuel resources available to the world. For instance, the main argument of the USA is that the Kyoto Protocol does not bring China and India into the domain of Annex-I nations even if both are considered to be the largest emitters of greenhouse gases in the world. The following quote of the former Indian Prime Minister *Manmohan Singh* at Delhi Sustainable Development Summit in New Delhi on 3<sup>rd</sup> February 2011 simple illustrates this sentiment:

*Our view has been that those who have been primarily responsible for the buildup of greenhouse gases and who also have the greatest capacity to act should bear the brunt of the responsibility. Developing nations are obviously much less culpable and have a much greater need for continued growth. These countries should be helped to achieve sustainable development paths."*

But the philosophy of climate change governance requires 'combined environmental protection efforts' as global warming is a global problem and it does not matter where carbon dioxide is emitted because eventually it ends up in the sky and gets accumulated in the common atmosphere of the globe. Obviously, the Global South has an interest in improving its material situation; whereas, the Global North wants to impose emission reduction measures. The North-South divide has derailed many climate change conventions and accords adopted in several Conferences of Parties on Climate Change (CoP) held in places like Copenhagen, Cancun, Durban, and Doha and like.

### Review of Literature

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 of climate change. Employing *Ban and Hawkings'* (2000) opinion it can be said that mass media helps in the creation of perceptions of many issues around the world that cannot be seen immediately. It is needless to say that media can act as a catalyst by helping brood positive perception about climate change issues among the masses which will definitely go a long way in mitigation of the problem. Mitigation actions will follow the rhetoric only when the public perceives global warming to be an urgent issue that requires rigorous efforts by one and all to address it immediately. Unless perception is changed, individual human behavior would be detrimental to climate change. Global warming is the consequence of enhanced greenhouse gas effect caused by the everyday addition of greenhouse gases (GHG) in the upper atmosphere. Scientists hold that human activities are mainly responsible to a large extent in releasing excess carbon dioxide, another important greenhouse gas, that gets accumulated in the atmosphere and acts as a blanket to hold back radiated heat from the earth. *India Today*, the cover story of Dec 2009 mentions that "the world is now releasing 27 billion tons of carbon dioxide into the atmosphere every year". Currently, our environment is fraught with a number of serious problems and among these global warming is the most significant ones as it raises overall global

temperatures to dangerous levels, leading to melting glaciers, the rise in sea levels, weird weather and changing climate patterns (UNEP, 1997). But the question still persists -who is responsible for the given imbroglio? Scientists across the globe hold our race guilty for the same. Media holds the key to reduce global warming by creating a positive perception among the masses as it can efficiently goad them to action.

Climate change is likely to have a tremendously adverse impact on the Indians, as the country is vulnerable to the worst types of climate change induced natural disasters. The earth is getting hotter with each passing day, and weather patterns are substantially altering due to *anthropogenic* (human-caused) climate change. Notwithstanding, the general public in Tripura is unaware of what actually causes global warming. It has taken decades for climate change to enter public discourse in even the most superficial manner. Periodic surveys, researches, and assessments have proven that global warming-induced changes in the world's climate are increasing day by day and it has assumed catastrophic proportions.

The 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. The mass media has documented the risingsignificance of environmental issues over the past few decades. A great deal of what most people hear about issues such as the greenhouse effect, global warming, ozone depletion, water and air pollution, and environmental threats like global climate change is likely to come from the media (Shanahan, Morgan, and Stenbjerre, 1997).

Another significant study intended at understanding the media's role in the public perception of climate change was conducted by Fortner (2001) and his colleagues. 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, 2000). In a similar vein, Pavone, (2010) imploresthe fact that mass media was already diffusing climate change information as early as the 1930s when he mentions that the *New York Times* (15<sup>th</sup> May 1932 ) carried a story on that reported - "*The earth is steadily growing warmer...what will happen to man if climate conditions are thus changed?*" In the 1950s coverage had long-drawn-out the possibility of anthropogenic or man-made climate change decades before the issue began making inroads at the UN conferences and summits. However, climate change did not attract much political and public attention in the 1960s and 1970s until James Hansen, ascientist who worked with NASA created a media storm by his testimony of 99 percent surety of global warming before the US Senate in 1988(Leiserowitz,2003; Shao, 2012).

Mediated messages about climate change are pervasive. The media's proactive role can drive specific policy action for climate change adaptation and mitigation. If the national media is vigorously aligned with climate change, it can push for a more timely policy agenda for climate change adaptation and mitigation measures. Literature has revealed that increased coverage of climate change over the past decades has rendered the issue more salient for the public across the world. It is also worthy to mention that the media has a significant role in bringing international aid in combating climate change.

Not only does the television perform a significant role of a powerful catalyst in the crusade against climate change, but it also sets an agenda among the masses in society. Equally commendable is the role of film media in this regard. Leiserowitz (2004) mentions that the issues of climate change made its impressive entrance into the public sphere with the release of "*The Day After Tomorrow*"-a Hollywood blockbuster movie released in 2004. In this context, Leiserowitz (2004) further reports that the movie had a significant impact on climate change risk perceptions, theoretical understanding of the issue, behavioral intent, policy priorities and even voting intentions of moviegoers compared to survey respondents who did not see the film. In fact, the movie had generated a kind of media tempest and debate as scientists, politicians, advocacy groups and political pundits debated the scientific accuracy and political implications of the movie on public perception of the science of global climate change. A similar study conducted in the UK found that viewing the film "*The Day After Tomorrow*" increased public concern (Reusswig, 2005; Lowe, 2006). Several studies of the movie indicate that the mass media platforms like movies "*The Day After Tomorrow*", "*An Inconvenient Truth*" and "*LiveEarth*" can go a long way in launching issues like climate change into the public sphere(Leiserowitz, 2004; Reusswig, 2005;Lowe,2006; Leiserowitz, 2007b). Commenting on the significant role of media as a launch-pad for scientific issues like global climate change among the public, Reusswig (2005) observes that:

*It is doubtful that the creators of the United Nations Framework Convention on Climate Change (UNFCCC) had Hollywood on their minds when they drafted Article 6, which asks for improved communication and education on the issue of climate change. But the*

*entertainment industry seems to have done quite a lot for the public awareness of climate change.*

Thus media coverage not only can inform the public but also stimulate public opinion in favor of policy legislation aimed at combating climate change. The media can, in fact, shape the perception of the public about climate change issues and compel individuals to action and demand policy action from their government to address the problem. In tune with the above, *Bord et al* (2000) found that an increased understanding of the climate change issue motivates people towards action. *Krosnick et al* (2006) argue that if the public has access to knowledge about climate change, it may bring increased certainty about the phenomenon which in turn increases assessments of national seriousness about climate change, which in turn increases policy support. It has been established that the public relies on the media to gain information about issues like climate change; in this process, the media also renders the role of an educator. This is why *Boykoff and Boykoff* (2004); *Boykoff and Rajan* (2007) argue that media reporting is central to the framing of climate change in the public psyche. The authors mention that when individuals are unaware of the causes of climate they are unlikely to develop effective solutions to address it. *Stamm et al* (2000) have mentioned that the problem of climate change may be less salient to individuals whom they do not understand it and these individuals value environmental problems lower than other issues. Hence, mass media's coverage of climate change issues significantly shapes people's perspectives and can impact people's behavior. The press and the public can demand a lot from the government to arrest carbon dioxide emissions globally. Climate change interventions is the need of the hour and there is no room any leeway for 'wait and watch strategy', as the *Guardian*, carried a news story (23<sup>rd</sup> October 2007) which mentions about a scientist who reported - global warming is stronger than expected and sooner than expected" (cited by *Gavin*, 2009).

The literature mentions that there are two major approaches to countering climate change: adaptation and mitigation. While adaptation approach aims at reducing the impacts of weather- and climate-related events such as floods, droughts, and storms that affect the most vulnerable countries through a capacity building that involves large financial allocations, which only solvent governments can afford. Mitigation approach, on the other hand aims at a significant reduction of the greenhouse gases (GHGs) through awareness generation. If small acts by private individuals help cut excessive carbon dioxide emissions, global warming can be arrested drastically. Herein, lies the role of mass media and other sources of information that can easily pass on the message among the public. However, both approaches are very much valuable for responding to climate change.

Literature also reveals that public perception of global warming or climate change illustrates a mass communication problem (*Stamm et al*, 2000) that requires concerted actions from all the stakeholders of the society to get the public involved in responding to climate change immediately. Global warming is a global problem and it does not matter where carbon dioxide is emitted or how much is being emitted by rich or poor countries because ultimately it ends up in the shared atmosphere of the world. Surveys of public understanding of environmental issues have exposed that although people are aware of this problem in a general sense, understanding of particular causes, possible consequences and agreed solutions to climate change are limited. Hence, the significance of the present study is of the utmost importance.

Much of the research studies on climate change issues conducted to date have been mostly done in the US, the UK, or the Western context. There is a need for Tripura based study so that the perceptions of youths can be detected and possible measures for combating climate change could be suggested or implemented in India as a whole wherein carbon dioxide emissions are on the rise as the country is on its path of development. Media exposure has a direct impact on the knowledge and perception of an individual. Research literature suggests that attention to news about global warming increases public knowledge and concern about the issue (*Zhao*, 2009; *Stamm et al*, 2000; *Krosnick et al*, 2006). The power of media to set a nation's agenda to focus public attention on a few key issues like climate change is immense and well documented (*Wilson*, 1995).

Everyone is equally responsible for adding greenhouse emissions in the atmosphere with their heavy reliance on fossil fuels. It is individual engagement and behavioral change that matter in responding to the challenge of climate change. Individual behavior change holds the key to the mitigation of climate change and global warming (*Leiserowitz*, 2007a).

Regarding their support for climate change mitigation and energy policies, *Leiserowitz and Thaker* (2012) reported that nearly 41 percent of the Indian respondents were in favor of the "government of India doing more" to address global warming. To quote the authors verbatim-

38 percent said that India should reduce its own emissions of the gases that cause global warming immediately, without waiting for other countries, 18 percent said that India should reduce its own emissions only if rich countries go first, 13 percent said that India should reduce its own emissions only if all the other countries of the world reduce their emissions at the same time, and 13 percent said India should not reduce its emissions under any circumstances.

Among other measures suggested, *Leiserowitz and Thaker (2012)* reported that a large majority of the respondents, nearly 70 percent of them were in favor of a "countrywide programme to teach Indians about global warming in their educational institutions". Apart from this, a majority of the respondents said that policies have to be incorporated immediately so as to reduce wasteful use of energy, water and fuel even if these measures may lead to price rise.

*Vani Sarraju Rao's (2011)* study- "*Public Awareness about Global Warming in Hyderabad, India*" deserves a special mention being one of the few. The author has studied public perceptions and awareness about global warming in India by conducting a survey of 851 respondents in the city of Hyderabad in 2007. A stratified sample of nine segments of the society has been considered by the author constituting the students of eight colleges (n=167), government employees from seven organizations (n=119), corporate sector employees from five organizations (n=112), employees working in information technology sector (n=109), teachers and academicians from six schools and colleges (n=86), members and office bearers from four NGOs (n=74), educated professionals from five organizations (n=72), journalists from five media organizations (n=57), and homemakers from different regions of Hyderabad city (n=55). The study sought to understand whether the residents of Hyderabad have knowledge and understanding of global warming, its seriousness, causes and impacts, the link between energy and environment. The study also focused on what would be the level of willingness to support programmes and initiatives for the reduction of global warming.

The results of the said study revealed that the majority of the respondents were aware that global warming was a serious problem that 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 the 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". Although the study reported the presence of upright support for eco-friendly products and programmes, there was a lack of clarity among the Indians with respect to global warming mitigation measures. The majority of the respondents were in favor of increasing green cover in cities, adherence to pollution control rules and execution of a vigorous campaign to increase global warming awareness among the masses by the mass media of the country. The findings reported by *Rao (2010)* revealed the existence of significant differences in levels of awareness about global warming across age, gender, income, and occupation, as well as educational attainment of the sample.

Regarding adaptation measures, a *BBC News Survey (2007)* reports that about 37 percent Indians reported that they were in favor of taking "major steps very soon" and another 26 percent mentioned that "modest steps could be taken over the coming years". The study also revealed that about 24 per cent of the Indians were of the opinion that "less wealthy and developing countries like India" should not be bound by greenhouse gas reduction targets because they produce relatively low emission per capita, whereas, there were as many as 33 percent Indians who reported that as emissions from less industrialized countries are substantially growing up, they should also limit their greenhouse gas emissions along with the developed countries. About 47 percent Indians were in favor of "financial assistance and technology transfer" from the developed countries so as to help the developing countries in their efforts to arrest greenhouse gas emissions, whereas, 19 percent were not in favor of the proposal of technical or financial support to curb emissions.

World Public Opinion (WPO) survey of 2006, reported that Indians were "most skeptical" about the need for action against global warming among all the countries polled. Only 49 percent of the Indians were in "favor of taking immediate steps" to address the problem of climate change and of this percentage, only 19 percent reported that the problem merits immediate and costly measures. The remaining 30 percent revealed that as the effects of global warming would be gradual and hence they were in "favor of low-cost steps" to be adopted by degrees. Strangely, the study revealed that the highest percentages favoring a delay in any action, among all the nations were found among Indians. About 24 percent of respondents believed that "costly mitigation actions should not be implemented" until the veracity of the problem was established. Despite this, a large number of Indians (78 percent) reported that global warming would intimidate India's

"vital interests" within the ensuing decade. Similarly, 48 percent of the respondents were in "favor of an international agreement" that would entail the developed countries supporting the mitigation and adaptation actions in the developing countries with financial assistance to them (*WPO*, 2006).

*Shao* (2012) mentions of a study conducted among Americans that reported that young people were more willing than the elderly to pay more to reduce global warming. Income is found to have positive effects on individuals' willingness to address global warming. Further, the study revealed that people with higher levels of education and with the sound family financial condition tend to show a higher level of willingness to make financial sacrifices to reduce global warming. With respect to the mitigation behaviors of the public, the study reported that the majority of the respondents prefer "recycling", "purchasing energy efficient light bulbs regularly", and willingness to "buy products made from recycled materials". In the case of personal transport behavior, only a few respondents reported their preference to "carpool" or take a "mass transportation system" when they would like to travel. The respondents in the said study were, however, willing to make monetary sacrifices to reduce global warming, if the money was "spent on funding research activities" on production and distribution of renewable sources of energy. However, the said study reported that the majority of Americans were not in favor of "paying more taxes on gasoline". The study also revealed that local weather condition had a bearing on the perception of global warming among the Americans. The author mentioned that individuals who were exposed to "increasingly warm winters, increasingly cold springs, and increasingly cold falls" were more likely to take voluntary actions to combat global warming.

A study conducted among Thai youths by *Chokriensukchai* and *Tamang*(2010)has also reported the existence of a direct and significant relationship between awareness of global warming and lifestyle choices concerning global warming. In addition, the authors have run a 'Scheffe test' among the Thai youths, the results of which confirmed their understanding that the knowledge about global warming influenced their global warming awareness and efforts to ensure mitigation actions towards it. The authors contend that exposure to information about global warming among the Thai youths would lead to awareness about the issue. Such awareness, in turn, would lead to changes in the youths' lifestyle. On the other hand, *Truelove* (2009) mentions that participants from the US context continued to equate global warming with general environmental problems, although the respondents were more likely to recognize the importance of driving less and recycling more in mitigating global warming and less likely to associate the aerosol cans in global warming.

*Lorenzoni* and *Hulme* (2009) while conducting a comparative study between England and Italy mention that information appeals to the masses only if it is consistent with the recipients' existing beliefs and attitudes about the particular event. The authors mention that, if there is no trust in the credibility of the information, then the prerequisite of information could have the opposite effect and may actually stimulate inaction for climate change mitigation endeavor. Likewise, *O'Neill* and *Nicholson-Cole* (2009) are of the opinion that "expert-led icons" have a little personal impact and invoked negative emotions such as helplessness or boredom. On the contrary, "non-expert icons" tended to impact upon the masses, and thereby invoke emotional and cognitive engagement with climate change mitigation actions. This study demonstrated that "non-expert icons" move individuals to feel more engaged with climate change without alarmism. *Lee's* (2008) study dissected the environmental behaviors of the African American college students with respect to self-reported actions of recycling behavior of five different materials like newspapers and magazines, glass bottles and jars, plastic bottles and jugs, cardboard boxes and E-waste. It was found that male students recycled more than female students. The study reported by *Lee* (2008)demonstrated a low correlation between environmental attitudes and behaviors. Students, who had pro-environmental attitudes, tend to recycle more.

A study by *Leiserowitz* (2004)reveals that personal exposure to climate change greatly increases the concern of the respondents and gives an impetus to a higher degree of willingness to adopt mitigation actions. Climate change literature also shows that persons who have experienced adverse consequences of climatic changes perceived increased concern about climate change than description-based knowledge gained due to exposure to media reports. This study brings to light the distinction between learning from experience versus learning from a description and the same information can lead to very different perceptions and actions to mitigate climate change. *Carvalho* (2007) reported that an increase in the knowledge of the causes of climate change led to greater behavioral intentions to fight climate change, but it neither affected the actual mitigations actions reported nor concern with climate change. *Boyes et al* (2007) reported a study conducted in China wherein it was found that with an increase in the age of the respondents, the various incorrect ideas were found to be decreasing. It was found that the ideas about the roles of planting trees, limiting the use of coal, more careful use of energy and reducing vehicle emissions

increased with age. A high proportion of Chinese students felt that responsibility for taking action against global warming should be shared between government, industries and the individual. This study reveals an encouraging finding that unlike their Western counterparts, the Chinese youths were willing to accept some individual responsibility and were found to be more willing to engage themselves with environmentally friendly actions. This study also found that two-thirds of the overall students (66 percent) thought that they should save money and donate it for environmental protection. However, they didn't favor taxation as a measure to alleviate the problem of global warming.

*Whitmarsh*(2005) mentions that people who are *most trusting* of climate change information seem to have accepted the key messages that climate change is 'due to human activities', and that, it is a cause for concern' and that individuals have a responsibility to 'do their bit' to tackle it. However, this group does not necessarily perceive climate change as a personal threat.

### Materials and method

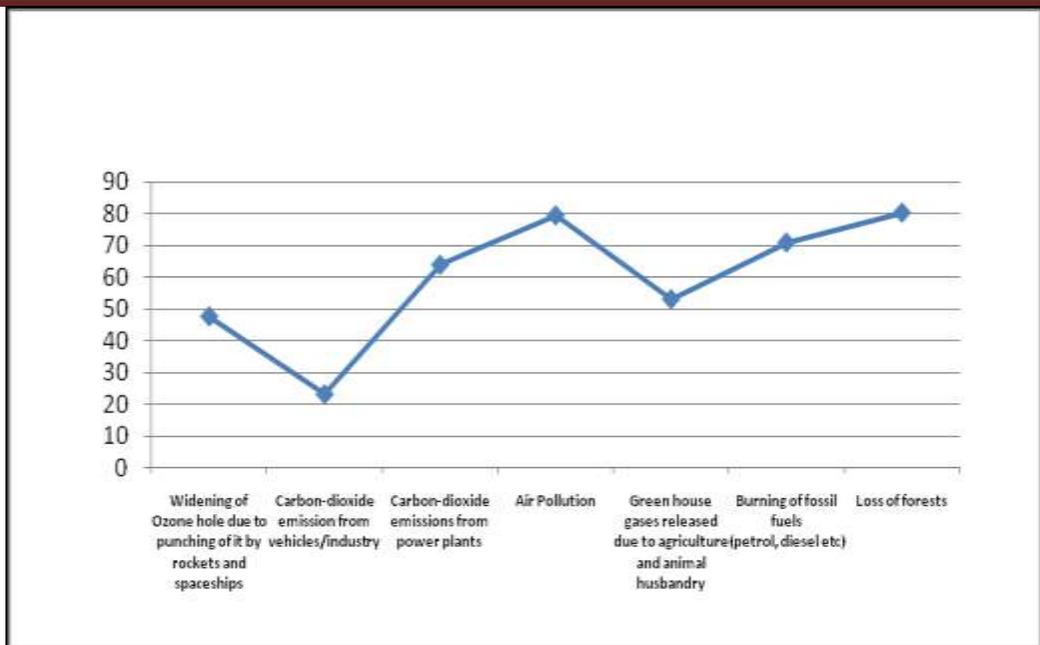
A survey research methodology was adopted for this study. For this purpose, a set of questionnaire has been prepared with close-ended questions. The questionnaire also had sections on socio-demographic profile of the respondents. The questionnaire was pretested on a small group of students in a pilot basis and depending upon the responses, and incorporating some modifications like translation into Bengali language, a final set of questionnaire was developed for execution. The primary data has been collected by administering a structured closed ended questionnaire to 657 students of Tripura University. The sample size of 657 students, consists of 55 percent (n=364) female respondents and 45 percent (n=293) male respondents which represented both the gender almost fairly. Purposive sampling technique has been adopted by the researcher for the study.

### Results and Discussion

The students were presented with seven items (as given in *Table -1* and *Fig-1*) and asked to rate whether each of them was a contributing factor to climate change according to their understanding. Based on the above responses, a knowledge index was constructed by adding one point for each correct answer and dividing it by the number of items. The index ranged from 0 to 1. Results pointed to an overall moderate level of knowledge of the contributing factors of climate change among the post-graduate students of Agartala (mean=0.60). Despite this moderate level of knowledge, the students continue to show some misconceptions in relation to the causes of climate change, namely concerning the role of the ozone hole. In fact, only 47.6 percent of the students gave the right answer concerning the item 'ozone hole'. As a matter of fact, the depletion of the ozone layer and climate change are dissimilar issues. This is a quite distinct problem from climate change and which experts do not consider as a cause of the latter. However, it was the item that received a significant percentage of ratings as a contributing factor to climate change. This is a finding commonly reported in the earlier studies also (e.g. *Boyes et al*, 2008). Thus it has been found that the level of misconception among the students of the study is quite low as compared to some earlier studies. Surprisingly, only 23 percent of the students correctly indicated "carbon-dioxide emissions from industry or industrial processes for that matter and "vehicle use" contribute to climate change. On the other hand, "loss of forests" was considered by almost a majority of 80 percent of the students as a contributing factor to climate change. However, 47 percent of the students considered that "agriculture and animal husbandry" do not contribute to climate change, when in fact they are significant causes of greenhouse gas emissions and consequently augment the climate change process, as it has been described in *Table-1*.

Table1: Perception of contributing factors of climate change

Perception of the factors that contribute to climate change	Percentage
Widening of the ozone hole due to the punching of it by rockets and spaceships.	47.6
Carbon-dioxide emissions from vehicles/industries.	23.1
Carbon-dioxide emissions from power plants.	63.8
Air pollution.	79.3
Greenhouse gases released due to agriculture and animal husbandry.	53.0
The burning of fossil fuels (petrol, diesel, and coal).	70.8
Loss of forests is a natural sink tank of carbon dioxide.	80.2



**Fig-1**(Perception of the factors that contribute to climate change)

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#### **Perception of personal involvement of the students to fight climate change:**

The *Table-2* presented below depicts the behavioral intentions of the post-graduate students of Agartala to mitigate climate change. The students were asked to report the mitigation actions that they have already undertaken or would be willing to adopt soon aimed at combating climate change. It was found that "to replace conventional light bulbs with low consumption bulbs" was a mitigation action that has been preferred by most of the participants (mean=2.07) who had already undertaken or intended to adopt in the short term. Most participants also reported, "Planting trees in the house so as to capture carbon dioxide and help in afforestation" (mean=2.08) and planning to "reducing energy use in the home by switching off unwanted electrical appliances" (mean=2.08) in the short run. It has been observed that many of these actions involve less costly measures and hence it was preferred by the students. Thus we can infer from the above that costly mitigation actions were not preferred by the students of Agartala. However, a majority of the respondents were willing to pay extra to avail "green products and services" (mean=2.08).

Table 2: Behavioural involvement of the students towards mitigation of climate change

Behavioral involvement	Mean	SD
Replace conventional light bulbs with low-consumption bulbs.	2.07	1.05
Acquire more energy –efficient domestic appliances even if costs more.	2.82	1.26
Take environmental aspects into account when acquiring high-budgeted items.	2.84	1.27
Reducing car journeys and using public transport and bicycles or adopt carpool so as to help cut emissions of carbon dioxide.	2.57	1.25
Planting trees in the house so as to capture carbon-dioxide and help afforestation.	2.08	1.03
Recycling some materials like glass, paper, bags can help prevent environmental waste accumulation.	2.36	1.10
Reducing energy use in the home and classrooms by switching off electrical appliances like lights and fans which are not in use.	2.08	1.13
Willing to pay more for green products, services or technology.	2.08	1.13

Note: 5-point scale (1= already did, 2= planning to do in short run, 3=planning to do in long run, 4= not sure when I am planning to do, and 5= never planning to do)

However, the students were not much in favor of "reducing car journeys or using public transport system" (mean=2.57) or "acquiring more energy - efficient domestic appliances even if cost more" (2.82) and "taking environmental aspects into account when acquiring high-budgeted items" (mean=2.84). These behaviors are comparatively less costly and the post-graduate students of Agartala were prepared to undertake them in the short span of time.

A look into the psyche of the students would reveal that being residents of a third world country, possessing a car or some other high budgeted-items (where the mean= 2.84, was rather high) like consumerluxury goods are much sought after by the people. The economists have mentioned that the people in these countries are bitten by a bug called "conspicuous consumption". This behavioral pattern is often adhered to by the people as they feel that it goes to enhance their status amongst their peers. This might be one of the reasons why the masses in the developing countries are not willing to adopt bicycles for local purposes which are far environment-friendly than cars that use fossil fuels and consequently adds up carbon dioxide emissions every day. On the other hand, the existence of a poor, congested public transport system might also be the reason behind the preference of having an individual means of transport in countries like ours. A general trend prevalent in the third world countries has been that there are several smaller means of public transport system coming up like two-wheelers like bikes and scooters, auto rickshaws and minibusses that no doubt fill the void, on the one hand, but add to unnecessary carbon dioxide emissions in the absence of fuel-efficient mass transit systems in these countries, with our country not being an exception. The policymakers can do well by taking a hint from the finding of the present study as to why the common people do not prefer low-cost transport system to commute.

### Conclusion

From the above analysis one can infer that the students had already undertaken some mitigation actions or were planning to pursue them in the short term, but it was not enough. The students were desirous of pursuing only those actions that involved little financial sacrifice or a small investment. Actions that involved added financial cost were relegated to the backseat, likely to adopt only in the long run. Thus it is found that the behavioral intentions of the post-graduate students of Agartala to mitigate climate change are dependent more on cost-factor rather than environmental concern. The author wants to propose that schools and colleges in the state of Tripura should do more to fill this gap by mainstreaming climate change and global warming issues into curriculum with a view to providing students with the skills to pursue adaptive strategies in order to cope with the problems that climate change when they come to pursue post graduate studies.

### References:

1. Chapman, G., Kumar, K., Fraser, C. & Gaver, I. (1997). Environmentalism and the Mass Media: The North-South Divide. London: Routledge.
2. Leiserowitz, A. (2007a). "Communicating the risks of global warming: American risk perceptions, affective images, and interpretative communities". Pp.44-63 in S.C. Moser and L. Dilling (eds.), Creating a climate for change. Communicating climate change and Facilitating Social Change. Cambridge: Cambridge University Press.

3. IEA. (2011). CO2 Emission from Fuel Combustion Highlights. Report of the International Energy Agency (IEA) titled – World Energy Outlook. IEA 2011: Paris. Accessed from the net on 15/05/13-<http://www.iea.org/co2highlights/co2highlights.pdf>; See for detail, see IEA 2011.
4. Pandey, C.L. (2014). International Climate Change Governance: Issues of Democracy, Institutions and the Media. Unpublished Doctoral dissertation submitted to the Department of Political Science and Public Policy, The University of Waikato, New Zealand. Retrieved from <http://researchcommons.waikato.ac.nz/>. On 20/06/14.
5. Ban, A.W. V.D. and Hawkins H.S. (2000). Agricultural Extension. Second Edition, Blackwell Science, UK.
6. UNEP (1997). "Climate Change fact sheets". Accessed from the official web site of the United Nations Environment Programme on 12/5/12 from <http://www.unep.ch/iuc/submenu/infokit/factcont.htm>.
7. Shanahan, J., Morgan, M. & Stenbjerre (1997). "Green or brown? Television and the cultivation of environmental concern". *Journal of Broadcasting and Electronic Media*, 41 (3): 305-323.
8. Fortner, R.W. (2001). Climate Change in school: Where does it fit and how ready are we? *Canadian Journal of Environmental Education*, 6:18-31.
9. Fortner, R.W., Young-Lee, J., Jeffrey, R.C., Romanello, S., Bonnel, J., Luthy, B. Figuerido, C & Ntsiko, N. (2000). "Public understanding of Climate Change: Certainty and willingness to act," *Environmental Education Research*, 6(2):127-141.
10. Pavone, T. (2010). "Hot off the Press: Climate Change and the Mass Media." Dissertation submitted to the Gerald R. Ford School of Public Policy at the University of Michigan. Accessed from the Internet. <http://www-personal.umich.edu/~tpavone/Hot%20off%20the%20Press-20T.%20Pavone%20PP%20495%20Paper-revised2.pdf>
11. Leiserowitz, A. (2003). "Global warming in the American mind: Roles of affect, imagery, and worldviews on risk perception, policy preferences and behaviour." Unpublished doctoral dissertation submitted to the University of Oregon.
12. Shao, W. (2012). Understanding public perception of global warming. Unpublished doctoral dissertation submitted to the Department of Geography and Anthropology, the graduate Faculty of Louisiana State University.
13. Leiserowitz, A. (2004). "Before and after The Day After Tomorrow: A U.S. Study of Climate Change Risk Perception." *Environment*, 46(9).
14. Reusswig, F. (2005). International impact of The Day After Tomorrow. *Environment*, 47(3):41-44.
15. Lowe, Thomas. (2006a). "Vicarious Experiences vs. Scientific Information in Climate Change Risk Perception and Behaviour: A case Study of Undergraduate Students in Norwich, U.K." Technical Report no- 43. Tyndall Centre for Climate Change Research. Norwich: UK.
16. Leiserowitz, A. (2007b). Assessing the public impact: The Day After Tomorrow, An Inconvenient Truth, and LiveEarth. Presentation at the Behaviour, Energy and Climate Change Conference, Sacramento, CA.
17. Bord, R.J., O'Connor, R.E., & Fisher, A. (2000). "In what sense does the public need to understand global climate change?" *Public Understanding of Science*, 9:205-218.
18. Krosnick, J.A., Holbrook, A.L., Lowe, L., & Visser, P.S. (2006). "The Origins and Consequences of Democratic Citizens' Policy Agenda: A study of Popular Concern about Global Warming". *Climate Change*. 77 (2006): 36-45.
19. Boykoff, M.T., & Boykoff, J.M. (2004). "Balance as bias: Global Warming and US prestige press". *Global Environmental Change*. 14(2):5-136.
20. Boykoff, M.T., & Rajan, S.R. (2007). "Signals and Noise: Mass media coverage of climate change in the USA and the UK." *EMBO Reports*, 8(3):207-210.
21. Stamm, K.R., Clark, F., and Eblacas, P.R. (2000). "Mass Communication and public understanding of environmental problems: The case of global warming". *Public Understanding of Science*. 9(1):219-237.
22. Gavin, N.T. (2009). "Addressing climate change: a media perspective". *Environmental Politics*, 18(5):765-780.
23. Zhao, X. (2009). "Media use and Global Warming Perceptions: A Snapshot of the Reinforcing Spirals". *Communication Research*, 36 (5):698-723.
24. Wilson, K.M. (1995). "Mass Media as Sources of Global Warming Knowledge". *Mass Communication Review*, 22:1-12.
25. Leiserowitz, A. & Thaker, J. (2012). Climate Change in the Indian Mind. Published by the Yale Project on Climate Change Communication in collaboration with GlobeScan Incorporated. Yale University. New Haven, CT: Yale Project on Climate Change Communication. Accessed from the internet on 2/09/13-<http://environment.yale.edu/uploads/climate-change-in-the-Indian-mind.pdf>.
26. Rao, V.S. (2011). Public Awareness about Global Warming in Hyderabad, India. Unpublished Master's theses submitted to the Department of Environmental Studies, San Jose State University: USA. Paper no – 4072. Accessed from the net [http://www.scholarsworks.sjsu.edu/etd\\_theses/4072](http://www.scholarsworks.sjsu.edu/etd_theses/4072) on 15 Sept 2012.
27. BBC News Survey. (2007). World service global poll on climate change. Retrieved from <http://www.news.bbc.co.uk/2/hi/7010522.stm>.
28. Shao, W. (2012). Understanding public perception of global warming. Unpublished doctoral dissertation submitted to the Department of Geography and Anthropology, the graduate Faculty of Louisiana State University.

29. Chokriensukchai, K. & Tamang, R. (2010). "Thai Youths and Global warming: Media Information, Awareness, and Lifestyle Activities". *Applied Environmental Education and Communication*, 9(3):198-208, DOI. 10.1080/1533015X.2010.510028.
30. Truelove, H.B. (2009). "An Investigation of the psychology of global warming: perceptions, predictors of behaviour and the persuasiveness of ecological footprints calculator". Unpublished doctoral dissertation submitted to the Department of Psychology, Washington State University: USA. Retrieved from the net on 20/5/13 [http://www.dissertations.wsu.edu/Dissertations/Summer2009/H\\_Truelove\\_082209.pdf](http://www.dissertations.wsu.edu/Dissertations/Summer2009/H_Truelove_082209.pdf)
31. Lorenzoni, I., & Hulme, M. (2009). "Believing is seeing: Laypeople's views of Future Socio-Economic and Climate Change in England and Italy". *Public Understanding of Science*, 18:383-400.
32. O'Neill, S., & Nicholson-Cole, S. (2009). "Fear won't do it: Promoting positive engagement with climate change through visual and iconic representations". *Science Communication*, 30 (3):355-379.
33. Lee, B.E. (2008). "Environmental Attitudes and Information Sources among African- American College Students". *The Journal of Environmental Education*, 40(1):29-42.
34. Carvalho, A. (2007). "Ideological cultures and media discourses on scientific knowledge: Re-reading news on climate change." *Public Understanding of Science*, 16(2):223-243.
35. Boyes, E., Stanisstreet, M. & Yongling, Z. (2007). "Combating global warming: the ideas of high school students in the growing economy of South East China". *International Journal of Environmental Studies*, 4:39-45.
36. Whitmarsh, L. (2005). "A study of public understanding of and response to climate change in the South of England." Unpublished doctoral dissertation submitted to the Department of Psychology, University of Bath, England.
37. Boyes, E., Skamp, K. & Stanisstreet, M. (2008). "Australian Secondary Students' Views about Global Warming: Beliefs About Actions, and Willingness to Act". *Research in Science Education*, published online 29 August 2008.