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ARTICLE

Climate Change Communication: An Analysis of Scientific Frames in Mainstream Dailies of India and USA

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ABSTRACT

The communication of climate change from scientists, policy-makers and stakeholders to the public through the mass media has been a subject of interest in the research field. It is so because of its implications for creating public understanding of climate change and related issues. India is one of the major emerging economies, and so being one of the major greenhouse gas emitters, India is a key factor in the climate change story. On the other hand, USA one of the world's most developed and technologically advanced countries, has high energy consumption needs and therefore it is also one of the world's leading greenhouse gas emitters. Being politically strong at the world forum it holds an upper hand in global policy making about climate change issues. Hence it will be important to note how these two countries perceive climate change and subsequently sensitize, inform and interpret it through their mass media. In this study we analyse how climate change has been communicated through scientific frames in four major English dailies of India and USA.

KEYWORDS: Climate change, scientific frames, newspapers, framing.

Introduction

Climate change related issues became the prime focus of the public agenda during the mid-to-late 1980s, especially in the Western parts of the world. Since then public communication regarding climate change has revolved around the question of communicating it effectively to the general audience. Much of the early communication on climate change was based on scientific findings and synthesis reports such as those published periodically by the Intergovernmental Panel on Climate Change

(IPCC). Other issues that found space in the media were weather catastrophes and high-level conferences or policy meetings (Weart, 2003). With the announcement of Millennium Development Goals by the United Nations in the year 2000, consequences of environmental degradation were more often discussed at the global level.

The way climate change was unfolding bringing forth its serious impacts, the scientific community unanimously decided that there is a need for strong consensus to be built to mitigate effects of climate change. A strong legal framework to curtail greenhouse gas emissions and reduce carbon footprint was also required to stop further deterioration of the environment.

However, many having a direct stake in the fossil fuel industry emerged as loud spokespersons countering the findings on climate change and downplaying the urgent need for implementation of mitigation policies (McCright, Dunlap, 2007). The majority from the scientific community and the civil society were convinced about the findings and evidences of climate change and its serious impacts. They took up the task of raising public awareness and increasing understanding about the issue while engaging and advocating for policy making at the same time (Cox, 2006).

Today, after more than three decades, scientific progress on climate change has taken a lead and consensus on public climate change communication is no longer limited to a clash between "experts" of contrasting opinions. Media coverage has improved; public awareness, at least in many developed countries, is reaching satisfactory levels (Oreskes, 2004; Doran, Zimmerman, 2009). This shifting of climate change communication beyond the realms of science and policy issues has opened up the annals of public discourse.

Now communicators are trying to reach a larger audience by using more diverse forums, channels, a spectrum of messengers, and a number of different framings. As a result, the issue now penetrates society more deeply than just a few years ago.

Framing of Climate Change in Media

Climate change has been defined as a "crescive phenomenon" (Beamish 2002), meaning that it occurs at an almost

indiscernible rate. Changes are gradual enough to go unnoticed by most humans. Much of the information that people seek about climate change, exists outside the ambit of their own experiences, and hence the media serves as the main source of information to the public (Gamson & Modigliani, 1989; Graber, 1984). As much of the information received through mass media outlets is second-hand, audiences are subjected to frames constructed by media outlets.

Framing, which is being used to analyse media text more frequently now than ever, has emerged as a theory and methodology from the works of Erving Goffman. Goffman (1986) writes that framing is "schemata of interpretation of a kind," that through framing users "locate, perceive, identify, and label" and that "what it does can be identified as "guided doings." In addition to framing, the affinity of news media outlets is to convey issues by using event-oriented language and descriptions, rather than using linguistic expressions which convey climate change as ongoing process. In order to analyse how climate change is framed in the media, it is necessary to understand first what the phenomenon involves, what are its causal factors, its effects, the possible solutions available to humans and also the arguments advocated by skeptics who deny climate change.

It has been seen over a period of time that a group of stakeholders have not been successful to keep climate change off the public agenda. Nonetheless, they have already started making efforts to frame climate change to suit their interests. This has created a sort of conflict with other competing stakeholders in achieving frame hegemony within news media coverage of climate change (Boykoff, 2007).

Research Questions

- Is the usage of scientific frames in each of the periodical different or the same as the other?
- Do the scientific frames change over time?
- Which is the most used scientific frame in selected newspapers?

Literature Review

Media plays a crucial role in our society. Its main purpose is to inform the public about current and past events, and it also determines what we think and worry about. Althaus and Tewksbury (2002) suggest that the news media go through a vast amount of news material and then decide what issues and events deserve more attention from the public. Their selection of the news which will finally reach the audiences paves the way for those issues gaining more prominence than others. On the contrary, however, many believe that journalists professionally produce news and try not to be swayed by factors that may bring partiality to it (Patterson and Donsbagh, 2010; Schudson, 2004). Historically the main function of news media has been to gather and disseminate news for consumption of public. Tuchman (1978) has stated that "the news aims to tell us what we want to know, need to know, and should know."

Framing is basically the act of highlighting a particular dimension of a story or event so that the audience can understand it in a better way and is able to assign a context and interpretation to it (Entman, 2004; McQuail, 2005). News frames mainly influence the selection and presentation of news stories. Every news media organization frames the world for its audience, says Hanson (1995). Framing thus can be simply described as the process by which a certain issue is defined in a certain way by the elites for public consumption, and then these definitions are disseminated through the usage of mass media (Berinsky & Kinder, 2006).

Frames form an intrinsic part of the whole news process. Tucker (1998) has written that frames are "highly ritualized symbolic structures embedded into media content." These frames form an essential part of the media structure and content and regulate the flow of information to the audience.

"Framing essentially involves selection and salience. To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described" (Entman, 1993).

Framing also permits the author to insert their individual opinions and interpretations within a written piece. Iyengar (1991) said that framing is the "subtle alteration in statement or presentation of judgment" in news stories. The repetition of a particular frame throughout a news story or series of stories retains that frame in the minds of the public and policy makers.

Dahinden (2002) has identified the four levels of framing as: 1. Media content, 2. Production, 3. Audience frames, and 4. General culture.

Media content mainly refers to the story selection process and patterns of reporting. Production refers to how content is presented, which also includes journalistic norms. Audience frames take into consideration the existing mental models and schemas enthused by media. General culture refers to the existing narratives and myths found in a modern society (Dahinden, 2002).

Researches show that the media plays a crucial role in educating and informing the public about climate change and thus influencing public opinion on the issue (Brewer and Jessica, 2015).

Research Methodology

The purpose of this study is to analyse the scientific frames used in the reporting of climate change in the mainstream dailies of India and USA. For the purpose of this study, the major English dailies of India and USA were chosen as the universe for collecting primary data. Based on the objectives a sample was drawn, and the data was gathered from selected leading newspapers – *The Hindu, The Times of India, The New York Times* and *The Washington Post*. The years selected for the study are 2007, 2012, 2017.

Three major criteria were determined for the selection of newspapers for the study. The first criterion is the number of readers for each newspaper – the circulation of the newspapers. The more readers a newspaper has the more influence it has on people's understanding of a reported issue. The second criterion is the reach of the media outlet within the country. National newspapers are chosen in this study rather than local newspapers

because of the area that they cover within the country. The third criterion is the global reach of newspapers as climate change is a global issue. Apart from the three above mentioned criteria, other important factors such as history, reputation, impact factor, total followers on social media and the total number of corresponding app downloads were also considered.

- **The Hindu** is the second most circulated English-language newspaper in India, after *The Times of India*. It has a pan Indian readership of 62, 26,000 in the Indian Readership Survey of 2019 Q1 compared to the total readership of 53, 00, 000 in 2017, up by 17%. In terms of average readership of the newspaper, it increased its numbers from 15, 68, 000 to 16, 35, 000, up by 4.27% according to Indian Readership Survey (IRS 2019). It is one of the Indian newspapers to be considered "newspaper of records." The Hindu in 1995 became the first Indian newspaper to offer an online edition. Its Facebook page and Twitter handle have 5.4 million followers. It has more than five million app downloads on Google Play store. As of March 2018, The Hindu is published from 21 locations across 11 states in India.
- **The Times of India** is the oldest English language newspaper in India which is still in circulation, since its first edition published in 1838. It was started under a different name - The Bombay Times and Journal of Commerce. Bennett, Coleman & Co. Limited owns and publishes this one of the most important Indian English-language daily newspapers. According to data provided by the Audit Bureau of Circulations (India), *The Times of India* is the largest selling English-language daily in the world. It is also the third-largest newspaper in India by circulation (IRS 2019). It is published from across forty locations across India. Its Facebook page has 11 million followers, and the Twitter account has 11.9 followers. It has more than 10 million app downloads on the Google Play store.
- **The New York Times** is a leading American newspaper based in New York City with worldwide influence and readership. Established in 1851, the paper has won 127 Pulitzer Prizes, more than any other newspaper. It ranks 18th in the world by circulation and third in the USA. It has

571,500 Daily; 1,087,500 Sunday; 2,900,000 Digital-only subscriptions as of August 2018. *The New York Times* is regarded within the media industry as a "newspaper of record" and has been nicknamed "The Grey Lady." In 1996, it started publishing online. It has 16 million followers on Facebook and 43.8 million followers on Twitter and has more than ten million app downloads on Google Play store. *The New York Times* recorded 278.41 million unique visitors in June 2019, according to ComScore.

- **The Washington Post** published from Washington, D.C., is a leading American daily which emphasizes on national politics and the federal government. It has the highest daily circulation in the Washington metropolitan area. The newspaper has won a total of 47 Pulitzer Prizes. This tally includes six Pulitzers awarded in 2008 in separate categories, this stands second only to *The New York Times* which had won seven awards in 2002 for the highest number awarded to a single newspaper in one year. *The Washington Post* journalists have also received 18 Nieman Fellowships and 368 White House News Photographers Association awards. *The Washington Post* is considered as one of the leading daily American newspapers, along with *The New York Times*. It is also "considered a newspaper of records."

Through systematic random sampling technique, a sample of news stories on climate change was drawn from the population of newspapers for the study. As the international newspapers were not available in hard-copy print format in Aligarh and also in national capital New Delhi, news stories/articles for all the four newspapers were accessed through their digital archives available on their respective websites.

A representative sample of the designated years was selected from *The Hindu, The Times of India, The New York Times* and *The Washington Post* so as to have equal representation of odd-numbered and even-numbered days. In January, seven consecutive issues of newspapers published from 1st to 7th were selected. In February, 8th to 14th days were selected. In March third week was selected, in April fourth week and in May again the first week. Similarly, seven issues were drawn from each month for selected newspapers for the years 2007, 2012 and

2017. Therefore, a total of 1008 digital issues of the selected newspapers were analysed.

Keywords used to search news stories were "climate change," "global warming," "greenhouse effect," and "carbon emissions." According to search parameters, it was seen that these key terms appear at least once within the headline or lead para of newspaper story or article. The terms "climate change," "global warming," "greenhouse effect" and "carbon emissions" were chosen because of their history as commonly accepted terms used in media discourse to describe what is now most commonly referred to as climate change (Carvalho, 2005). This study used the deductive approach of framing because of the approach's suitability for a study involving a big sample size and a longer period of study (Semetko & Valkenburg, 2000). In the deductive approach, pre-defined frames are selected for analysis.

Scientific frames: In such frames articles are coded for the way in which the validity of the science of climate change is framed. The definitions used were drawn from a previous study by Antilla (2005), and the researcher added an additional framing category. Definitions for framing of the science of climate change are listed below:

1. Valid science – Articles that include scientific research on climate change. Authors of scientific research will be quoted as a source within the news story or article (Antilla, 2005).

2. Neutral – Articles that do not portray climate change as contentious, uncertain, or ambiguous. Climate change may be asserted as a fact, its cause and effect are discussed, yet no scientific sources are quoted within the news story or article.

3. Contention science – This classification includes articles that introduce scepticism about climate change, typically introduced by climate sceptics. This classification also includes a lack of consensus within the scientific community. It will deemphasize the scientific findings. The effects of climate change may be obscured (Antilla, 2005).

Findings of the Study

Table 1 and Table 2 show the distribution of scientific frames in the selected newspapers. The valid science frame constitutes

36.33% of the total scientific frames, while neutral scientific frames constitute 48.34% and contention science frame is 15.3%. When we look individually at each frame we see that percentage of neutral frame is highest in all the four newspapers. So an inference can be drawn that usage of neutral scientific frame is same in all the newspapers. Chi-square test was applied between the Indian and US newspapers and the value of p was 0.092 showing that statistically there is no significant difference between the groups.

Table 1: Total Scientific frames for the selected time period

	The Hindu	The Times of India	The New York Times	The Washington Post
Valid Science	34	20	44	23
Neutral	42	27	54	38
Contention Science	10	17	09	15

Table 2: Distribution of Scientific Frames over the time period of study

	2007	2012	2017
Valid Science	35	42	44
Neutral	48	51	62
Contention Science	17	23	11

A chi-square test revealed that there was a statistically significant difference of 0.007 for the frames used within the three time periods. The framing trend indicates that the neutral frame is statistically the most frequently used scientific frame in the portrayal of climate change. From 2007-2017 there is constant rise in its usage meaning that newspapers are more inclined towards depicting climate change as a hard fact or event. Quoting scientific sources and outlining scientific findings makes the story appear technical so the newspapers want their general readers to read climate change stories as hard news rather than some technical story on climate change. Statistically valid science frame is also increasing over a period of time but is less than neutral. So newspapers are quoting more scientific

sources in their stories but still preference is given to neutral frame.

Contention science frame increased from 2007-2012, reached a peak in 2012 but then went downwards and recorded lowest in 2017. Over the period of time if more people were speaking about climate change as a threat, there were sceptics too. But constant engagement of climate change activists with the public, more discussions and policy meetings on the issue at the global level especially at UN led to the decline of people who deny climate change. So a downward trend in contention science frame can be observed.

Statistically neutral science frame is the most used frame in all the four newspapers over the three year time period.

Discussion

Examining the scientific frames used to portray climate change demonstrated that climate change has continually been covered in neutral frame in the selected newspapers and increasingly in valid science frame as well. Qualitatively, headlines and lead para of randomly selected news stories from each frame in each newspaper were also analyzed. Some of them are mentioned here.

- "Knowledge Ignorance and Climate Change" published in *The New York Times*. In this news story contention science frame has been used and the climate sceptic in it is a philosopher. Using theories of wisdom and knowledge and quoting Socrates, the sceptic says we shouldn't believe blindly whatever scientific findings says.
- "Five myths about Climate Change" published in *The Washington Post* quotes a former senator how the stakeholders of renewable energy resources are using fake findings to increase their share in the market. It further says that climate change has always been a part of the natural cycle. In billions of years of Earth's history, climate has changed from extremes to present life supporting temperatures.
- "Climate Hysteria" in the *Times of India* quotes a sceptic that climate change may be real but the hysteria and panic around

is unwanted. Earth's surface is still cooler and the time period stated by findings to mitigate effects of climate change is quoted too short. We have much more time.

- "Climate Change Scepticism" in *The Hindu* quotes different sources that describe climate change as hoax to derail economic progress. It says the methods to mitigate climate change will affect the manufacturing and industrial sectors thus bringing more poverty and economic crisis.
- "Climate Change is not World War" in *The New York Times* uses neutral scientific frame stating that we are underestimating the trauma of climate change. The way we ignored deep trauma of World War II it is being repeated for climate change as well.
- "Global warming is already here. Denying it is unforgivable" in *The Washington Post* uses valid scientific frames. The newspaper did an exhaustive research where four researchers studied decades of local temperature records and identified hot spots where warming of climate is more rapid.
- "20 C: Beyond the Limit" in *The Washington Post* uses neutral frame and discusses how hot zones are rapidly spreading around the world. It states climate change is a global threat and everyone needs to come together.
- "Climate Change Threatens World Food Supply UN warns" in *The New York Times* uses valid scientific frames and quotes findings on relation between climate and agriculture. It discusses how climate change is altering the growth of food crops and developing resistant strains in crop damaging pests.

Conclusion

Having a dominant frame requires control over the content of media. In order for the public to accept or internalize a particular way of looking at an issue, the media must emphasize particular aspects of the issue. Those serving as opinion-makers on the issue must employ language that resonates with the public. With growing emphasis on the communication of climate change, newspapers are increasingly giving focus to scientific findings and less to those that deemphasise climate research.

Not just the media of developed countries but also of developing countries are covering the issue. The reason can be attributed to those findings which clearly suggest that more than developed countries it will be the developing nations that will be more affected by climate change.

This study revealed that there were no major differences in the way that climate change was framed between newspapers of both the countries. There is an upward trend of covering the issue in neutral scientific frame and valid scientific frame. Contention science frame within the time period of the study first increased and then decreased showing that as climate change activism is gaining momentum the voices of sceptics are being less quoted in the media.

Climate change has become so apparent that it has become almost difficult to ignore or deny the phenomenon. So instead of focussing on contention or scepticism of climate change, newspapers are giving prominence to neutral or valid science frame. Thus, climate change communication in newspapers is being framed predominantly as scientific reality and not being depicted as a hoax.

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