

The Scientific Temper of Climate Change Coverage in Indian Newspapers

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Abstract

Despite the efforts of several science communication organizations, coverage of science and science based issues remains very low in the worldwide media in general and Indian media, in particular. In contrast, the Indian media has seen an escalation of climate change reporting in the last decade. Climate change being an issue with far reaching social and economic implications, coverage of the issue is likely to have policy implications. Media coverage of scientific issues to a large extent informs policy decisions. Thus scientific coverage of an issue like climate change will result in scientific policies. In order to ensure this, the scientific temper of coverage of an issue like climate change needs to be tracked. This study of the scientific temper of climate change coverage in three mainstream English language newspapers published from New Delhi, Mumbai and Chennai shows that there has been very little attempt to involve science and scientists in the reportage. Majority of the news reports have used politicians as primary claim makers and have been sourced from the UN or IPCC reports. In comparison the number of reports using scientists as the primary claim makers and sourced from peer-reviewed journals is very low and has remained almost constant over the years.

Keyword: Climate Change, Environment, Newspaper Coverage, Media.

Introduction

The year 2007 can be termed as the year of the 'Himalayan Blunder' among scientists and communicators dealing with climate change. The Fourth Assessment report published that year by the Intergovernmental Panel on Climate Change (IPCC)

projected that Himalayan Glaciers 'are receding faster than in any other part of the world and, if the present rate continues, the likelihood of them disappearing by the year 2035 and perhaps sooner is very high if the Earth keeps warming at the current rate' (IPCC, 2007). Media coverage of this projection rang alarm bells all over the world (Bagla, 2009).

Initially, challenged by a report by the Ministry of Environment and Forests (Raina, 2013), the IPCC had to withdraw this projection in the Fifth Assessment Report published in 2014 acknowledging that the initial prediction in the Fourth Assessment Report was done on the basis of 'grey literature' (IPCC, 2014).

This incident centering around communication of one of the most highly talked about science streams of this decade, calls into question the scientific temper of climate journalism, all over the world, in general, and India, in particular.

Newspapers have been a very important source of information on science and technology all over the world. For many it is the only source of information about science and the scientific world and such reportage is believed by a huge population as the absolute truth (Nelkin, 1987). Coverage in newspapers — which is generally guided by the newspaper's own policies and programmes, and whatever in the estimation of the newspaper management is popular among its readers — is more focused on topics like political developments, economy, business, education, entertainment, art and culture and crime. Science and technology occupies a very miniscule space in mainstream newspapers because it is perceived by newspaper authorities as less popular (Dutt & Garg, 2000).

As scientific issues are less covered they become even less popular and hence, remain outside the popularity cycle. Science particularly has historically not been popular among the public. As a result, newspapers have by and large neglected its coverage making it even more remote to the lay readers (Pellechia, 1997).

However, attempts all around the world are underway to make science more accessible to the general reader, and this has resulted in the development of dedicated science pages in some mainstream newspapers around the world. The Indian media has

also played its role in bringing science to the people. To name a few newspapers, The *Hindu* has dedicatedly covered science in its weekly science pull out as well as in the main paper; *The Telegraph* runs a weekly science pull out called the Know How, as does *The Statesman*, while *The Times of India* runs a weekly science page.

Though the coverage is much less than is necessary to increase the scientific temper of the country, there has been an improvement over the situation where science was considered an alien turf.

Despite science and technology being a low priority area of coverage, climate change has seen an escalation of science-based stories around the globe (Boykoff, 2010). Research shows that among all science and technology issues, environmental coverage occupies the second highest position, and among all environmental issues, a vast majority of articles (77 % in India) are on climate change (Dutt & Garg, 2012).

The Increase in Stories on Climate Change

Climate change coverage in international newspapers has significantly increased in the last decade, especially since 2007, with progressive increase thereof (Billet, 2009; Boykoff, 2010).

A reflection of this is seen in the international media as well. South America/Africa, Oceania, Asia/Middle East and Europe saw increases of 85%, 79%, 68%, and 67% respectively, in 2009 as compared to 2004; whereas America saw a rise of 59% (Brüggemann & Engesser, 2013).

This increase in coverage to an extent coincided with the Conference of Parties of the IPCC which was an yearly occurrence, which are the debates among countries on pinning the responsibility for climate change as well as the responsibility of mitigation action.

Besides, every year on the World Environment Day, Climate Change stories saw a surge. Additionally, the approach of coverage of the issue has also changed significantly. This is largely because climate change has assumed global importance and it is now being seen to impact a whole range of issues in the social, political, scientific and especially business and economy

fronts. Another important reason behind the increase in coverage is the focused efforts on the part of international organisations like the United Nations Environment Program, Intergovernmental Panel on Climate Change, some governments and several Non-Governmental Organisations to spread awareness.

How the International Media has dealt with Climate Change: The Scientific Angle

Clearly, as climate change coverage increases journalists, who are the key actors in interpreting scientific information, play a crucial role in projecting the science to the people and become central to the public understanding of the science (Brüggemann & Engesser, 2013).

Thus the role of journalism in the development of scientific temper, on an issue, increases with the increase in its coverage. Therefore, as much as it is important to attempt to increase the coverage of science, it is also important to keep track whether the interpretation and communication of scientific information follows the principles of scientific temper (Boykoff & Roberts, 2007).

However, adherence to journalistic practices like dramatization, personalization, and novelty, authoritative tone and attempting to balance both sides of the news report in climate change coverage has led to news coverage that is informationally deficient (Boykoff & Boykoff, 2007).

Despite gradual emergence of consensus on the existence and anthropogenic origin of climate change, the scientific consensus was not found to be reflected in the US papers and UK tabloids in the mid 2000s (Boykoff, 2007 a) as well as in television coverage of the issue (Boykoff, 2008 a). Rather, an impression of conflict and contention was projected (Boykoff, 2007 b) and the issue was widely framed in terms of debate, controversy, or uncertainty (Antilla, 2005). Predominance of fatalistic and alarmist discourses rather than a scientific approach of addressing the issue characterized the coverage of the issue in the two countries, as were tones of fear misery and doom, rather than climate justice and risk (Boykoff, 2008 b). Also, there was no increase in coverage of the scientific consensus over the years

of study (Boykoff & Mansfield, 2008). Besides, top political figures rather than scientists were the major claimmakers or sources used by journalists in their coverage (Carvalho & Burgess, 2005).

Climate Change as a Multidisciplinary Issue

Climate change is a multidisciplinary issue in which some aspects are political and some are related to peer-reviewed scientific results.

For example, the question whether climate change is a serious threat is a political one influenced by the interpretation of seriousness. Typically also, approach to both climate change and mitigational methods, such as green fuel, are also intensely fought political battles in developed countries, such as between the Republicans and Democrats in the US.

On the other hand, the question of whether climate change is caused by human activity is one of scientific consensus depending on the strength of evidence provided by researchers. These are often clubbed in Indian news media coverage of climate change. Recognizing that scientific aspects can be political and influenced by bias, certain scientific methods have been developed over the years to insulate the effect of bias on scientific results.

The follies in the communication of climate change are twofold. The first involves clubbing of the questions, resulting in lack of clarity of issues and confusion among the public. In climate coverage several disparate aspects and questions surrounding the issue are clubbed into one 'great change debate'. As a result issues are not placed in context and public understanding is hampered (Boykoff, 2008 b).

The second problem involves ignoring the scientific methodology developed over the years for selecting news because of the enthusiasm of highlighting or denouncing an issue which stems from the aforesaid journalistic practices of dramatization, personalization and novelty. Ideology works as a powerful selection device in deciding what is scientific news, i.e. what the relevant "facts" are, and who are the authorized 'agents of definition' of science matters. As a result, the approach of

climate change reporting the world over has largely been that of either alarmism or of denial (Hulme, 2007).

At one end of the spectrum are the alarmists who attribute any change in climate to the rise in green house gas emissions due to human activity, and at the other end of the spectrum are the deniers who say that none of the changes are due to the above mentioned reasons. This may be due to the very norms of news production and the nature of news industry which survives on scare and controversy (Rivers, 2008). Falling in between these extremes, the public swings between belief and disbelief.

Also notable is the use of political rather than scientific agencies to justify pre-decided positions and to bring the issue to the notice of the people rapidly (Carvalho & Burgess, 2005).

Communication of Uncertainty

Communication of uncertainty is a crucial challenge in scientific communication. Any scientific result in general and climate change, in particular, has a certain level of uncertainty ingrained in it. This uncertainty is not a deterrent to policy decisions and ways can be found to factor in a certain level of uncertainty into decision making.

But, if the uncertainty is not communicated in the news coverage and acknowledged during interactions with the public, science runs the risk of losing credibility due to some instances of deviations from actual situations from scientific projections.

For example, the prediction of the path of a storm involves high level of uncertainty. If this is not properly communicated and warnings are not communicated to people at the right time, the people ultimately affected will lose faith in the capability of science.

However, given that news by its very nature is authoritative, communication of uncertainty becomes a challenge. If it is not properly communicated to the people, uncertainty may be construed to be a weakness of science (Shakley & Wynne, 1996).

Numerous attempts have been made to frame uncertainty so that while the factor is acknowledged, it does not affect people's

belief in science. However, this remains the Achilles' heel in climate change coverage. Many of these factors have affected the scientific content of climate change coverage the world over (Carvalho, 2007).

While there are some attempts to study the scientific content of climate reporting by the international media, the scientific content of climate change reporting in India has largely remained unexamined.

Case Study on Indian Media: The Scientific Angle

The country can pride itself of newspapers published in more than 100 different languages and dialects. Among them Hindi and English occupy very prominent positions. English dailies published from these metropolitan cities account for a significant portion of the circulation. The mainstream English papers that are most prominent are *The Times of India*, the *Hindustan Times*, *The Indian Express*, the political and financial capitals of the country and the *Hindu* published from Chennai.

Though science and technology news occupies a miniscule part of news coverage in Indian newspapers, for many in India, newspapers remain the only source of information on science. This is why it is necessary to keep track of the scientific basis of the science coverage in Indian newspapers because it can have a great bearing on the public understanding of science and can often form the sole basis of scientific policies.

This study probes into the scientific content of climate change coverage in three major Indian newspapers selected on the basis of reach because of the number of editions the newspapers bring out.

Methodology

Selecting News Media

The newspapers were selected on the basis of which one has the maximum number of editions and have a substantial circulation in the four metros. Also, these are the editions that most of the country's policymakers read. Thus they can be assumed to have a substantial influence on the decisions that policymakers take and therefore impact the policy framing of the country.

Climate change news reports and articles were searched for in the archives of the newspapers, on the basis of four keywords

- global warming
- climate change
- GHG and
- IPCC.

Those stories which have these three words mentioned in the headline or in the first three paragraphs were shortlisted.

Sampling

The treatment of climate change by these three newspapers was assessed through a focus on the main articles published by each newspaper between 2005 to 2010 including opinion and editorial pieces. Each of the papers were sampled for the terms 'Climate Change', 'Global Warming', 'Greenhouse Gas*', and 'IPCC' in the first three paragraphs.

Use of these search terms is well established in climate change media analyses (Antilla 2005) and choosing articles that refer to the key words in the first three paragraphs ensures that the overwhelming number of casual references to climate change in many articles do not skew the main coverage of the issue (Billet, 2009).

The time period of news coverage was selected on the basis of key events relating to climate change. In October 2005, the Kyoto Protocol came into effect and in November 2010 the 16th Conference of Parties of the United Nations Framework on Climate Change took place in Cancun, Mexico. In both cities, crucial deliberations took place on the way forward after the Kyoto Protocol expires in 2012 took place. These years have also recorded a huge increase in news coverage on climate change (Boykoff, 2010) and have seen important Indian national policies like the National Action Plan on Climate Change come into existence.

This resulted in 1,104 news items. From entire lot, the opinion pieces, editorials and interviews were removed because these represented personal opinions and did not reflect the general pattern of news coverage (Billet, 2009). This resulted in 993 news items.

The stories were then analyzed with the help of SPSS to find out

- **Year-wise Distribution, Source-wise Distribution** (whether the news story was sourced from peer reviewed journals, UN reports or non-peer reviewed reports),
- **Primary Claim Maker-wise Distribution** (what is the nature of people first quoted in the news report — politicians, scientists and so on) and also
- **Distribution of Stories** that projected the existence of climate change and its causes.

The data was also crosstabulated to find how coverage of the existence of climate science, causes behind climate change, and its establishment on the basis of scientific evidence changed over the years, how source of stories changed over the years, and how the nature of claim makers changed over the research period.

The Categories used are given below:

First there are the Basic Data on each news report

- Date
- Month
- Year
- Newspaper in which it appeared

S-1 — Indicating the principal source of the report, which can be a

1. Scientist, who is quoted
2. Politician, who is quoted
3. Growth Interest groups, such as industry, financial institutions, World Bank, IMF, etc., who is quoted
4. Environmental interest groups, especially NGOs specializing on climate change, who is quoted
5. Non-ascriptional, or reports in which no one is quoted but speaks of recent developments or coming events
6. Other groups: often many groups, such as humanitarian or even religious groups have spoken on broad climate change issues

Codes used on coverage of climate change and impacts

C1 — Coverage of existence of climate change

1. Article argues that rapid, unusual climate change **does not** exist today
2. Article argues that rapid, unusual climate change **may** exist today
3. Article argues that rapid, unusual climate change **does** exist today

S3C2 — Coverage of the causes of climate change

1. Article suggests that present-day climate change is **naturally** forced
2. Suggests that present-day climate change may be **naturally and/or anthropogenically** forced
3. Suggests that present-day climate change is **anthropogenically** forced

R

1. Article uses **environmental change** as evidence for climate change
2. Article uses **scientific research** as evidence for climate change

S-4 — This indicates the quality and standing of a report mentioned in the news

1. Peer reviewed science journal
2. IPCC / UN
3. Non-peer reviewed journal or government studies
4. Other sources

Results

Climate Change Stories Increasing

The frequency of climate change reports shows an increasing trend through the years. It increased significantly in 2007 (from 3% in 2006 to 20.9% in 2007 increase of 18%) and reached an all time high among six years in 2009 (32.7%). There was a nine per cent reduction, however, in 2010 (23.7%).

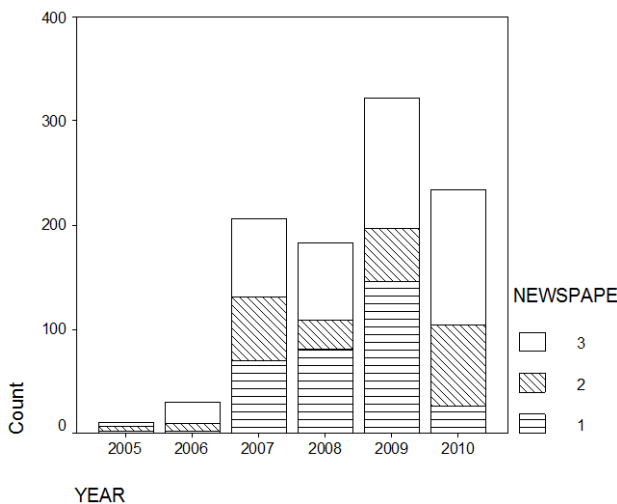
Table 1 — Year-wise frequency of climate change stories

Valid	Year	Frequency	Percent	Cumulative Percent
	2005	11	1.1	1.1
	2006	30	3.0	4.2
	2007	206	20.9	25.1
	2008	183	18.6	43.6
	2009	322	32.7	76.3
	2010	234	23.7	100.0
	Total	986	100.0	

Among the three newspapers studied, *The Hindu* had the highest frequency of coverage, *Times of India* was next in line followed by *Indian Express*. *The Hindu* accounted for 43.5% of coverage, *The Times of India* 33.4% while *Indian Express* accounted for 23.1% of coverage.

Between the three papers studied, while the coverage of climate change stories in *Hindu* and *Indian Express* largely increased over the years, (except for a slight fall in the coverage by *The Hindu*) that in *The Times of India* fell drastically in 2010 (Graph 1).

Graph 1 — Distribution of climate change stories in the three newspapers over the years



1 — *The Times of India*, 2 — *Indian Express*, 3 — *The Hindu*

Focus on Scientific Aspects: Acknowledgement of Existence, Attribution of Causes and Evidence of Climate Change

All articles acknowledged the existence of climate change and not a single article was found in the three papers which disputed this. About 70% of articles attributed climate change to anthropogenic sources and about 30% were silent about the source. Only one article said it was not due to anthropogenic sources and one projected uncertainty about the source.

Table 2 — C 1: Stories acknowledging existence of climate change

		Frequency	Percent	Cumulative Percent
Valid	3	969	98.3	100.0
Missing	System	17	1.7	
Total		986	100.0	

Table 3 — S3C2: Stories attributing causes

		Frequency	Percent	Cumulative Percent
Valid	1	1	0.1	0.1
	2	1	0.1	0.3
	3	689	69.9	100.0
	Total	691	70.1	
Missing	System	295	29.9	
Total		986	100.0	

1 — Cause of climate change is not anthropogenic, 2 — Cause may be anthropogenic 3 — Cause of climate change is anthropogenic

Only about 28.8 % of articles site any evidence of climate change. However, among them most (25.7%) cite scientific evidence probably playing safe by relying on published papers and only about 3% reply on environmental evidence.

Table 4 — R: Distribution of stories on evidence of climate change

		Frequency	Percent	Cumulative Percent
Valid	1	31	3.1	10.9
	2	253	25.7	100.0
	Total	284	28.8	
Missing	System	702	71.2	
Total		986	100.0	

1 — Article uses environmental change as evidence for climate change,

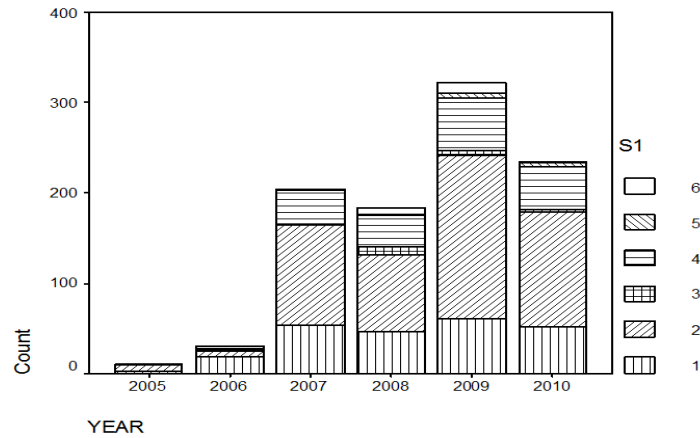
2 — Article uses scientific research as evidence for climate change

The Science Shy Media

Media was found to be depending heavily on politicians as their primary source claim makers. More than half of the reports had politicians as the first claim maker (52.5%). About one fourth (23.4%) were attributed to scientists as the first sources while 18 percent were from environmental sources. Very few articles (about 2% percent were attributed to growth interest). In 2006, the number of scientists quoted (18) was more than the number of politicians quoted (7) for climate change stories. While other numbers increased, the increase was far steeper in for politicians than in case of scientists and in 2010 the number of politicians (128) quoted was almost double that of scientists (51) (Graph 2).

Peer-reviewed journals are not on the priority list as the source of stories on climate change for the Indian national media. It heavily depended on the UN and the IPCC reports as their source of stories and to an extent on non-peer reviewed reports for their source of stories and relatively less on peer reviewed journals as their source of stories. This number increased from 1 in 2006 to 40 in 2009, fell to 30 to 2010. There was a sharp increase to 51 in 2007. This may be because in 2007 an agreement on a timeline and structured negotiation on the post-2012 framework was negotiated upon, resulting in the Bali action plan — a crucial turning point in the climate negotiations. Subsequently, it fell in 2008, rose again in 2009 and fell significantly in 2010. This alternate rise and fall may have been dependent on the significance of the IPCC COP that year. The

Graph 2 — Nature of claim makers in climate change stories



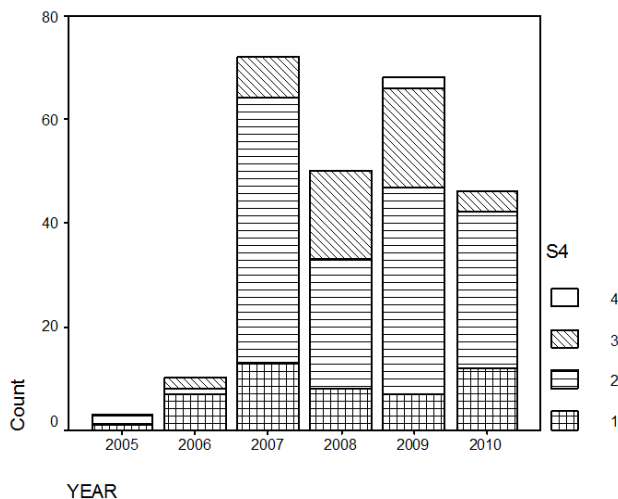
1 — Scientist, who is quoted, 2 — Politician, who is quoted, 3 — Growth Interest groups, such as industry, financial institutions, World Bank, IMF, etc., who is quoted, 4 — Environmental interest groups, especially NGOs specializing on climate change, who is quoted, 5 — Non-ascriptional, or reports in which no one is quoted but speaks of recent developments or coming events, 6 — Other groups: often many groups, such as humanitarian or even religious groups have spoken on broad climate change issues

Even in case of reports about scientific results, media depended on politicians for quotes.

rise in 2008 was because that year was scheduled to establish an ambitious global climate agreement for the period from 2012 when the first commitment period under the Kyoto Protocol expires.

Yet, despite this rise and fall in coverage, the number of newspaper stories based on peer reviewed journals remained almost constant. It was 7 in 2006 7 in 2009. It however rose 2007 and 2010 to 13 and 12 respectively. However, this rise was low compared to the rise in number of articles based on UN and IPCC reports. The number of stories based on non-peer reviewed government and other reports kept rising (2 in 2006 to 9 in 2009). But it suddenly fell significantly in 2010 — this particular year saw some articles sourced from peer-reviewed journals.

Graph 3 — S-4: This indicates the quality and standing of a report mentioned in the news



1 — Peer reviewed science journal, 2 — PCC / UN,
3 — Non-peer reviewed journal or government studies, 4 — Other sources

For example, in a report published December 5, 2010 in *Times of India* on steps that India is taking to protect wheat from global warming, the Minister of State for Agriculture, a politician is the first claim maker who is quoted on the state of wheat production in the country. No scientist is quoted and no peer-reviewed journal is mentioned in the entire report even while referring to the effect of heat stress in some parts of India and about decrease of grain yield.

The report reads: ‘Research findings of ICAR (Indian Council for Agricultural Research) on wheat crop has indicated that there is about 3 to 4 per cent decrease in grain yield with 1 degree Celsius rise in temperature during grain filling stage’. However, breaking away from norms of science journalism followed internationally, the article does not check whether the claims of ICAR are from any peer-reviewed journal or not.

Likewise, another report by the Indian news agency Press Trust of India published in *Times of India* on November 9, 2010 which talks about ‘Climate Friendly Crops which can fight global warming, but does not attribute the finding to any peer-reviewed journal’.

All the papers studied mostly used politicians as the primary claim makers. However among these three papers, *The Hindu* had the largest percentage of articles with scientists as primary claim makers 28%. This was followed by the *Indian Express* with 23% and *Times of India* had only 20%. In *Indian Express* the percentage of climate change articles using politicians as the first claim makers was the highest at 63% and in *The Hindu* it was the lowest (45%).

In all the three newspapers the highest number of news reports were generated from UN and IPCC reports. While in case of *Times of India* more than 60% of news reports were generated from UN and IPCC reports, in case of *Indian Express* more than 80% of news reports were from the UN and IPCC reports. However, in case of *The Hindu*, the percentage of news reports from UN and IPCC reports were less than 50%. Among the three papers, *The Hindu* had the highest percentage of reports from peer-reviewed journals 27.3% as against 12 % for *Times of India* and 14% for *Indian Express*. The total number of stories in the three papers from peer-reviewed journals was almost the same as the total number of stories from non-peer reviewed journals.

Question of Uncertainty

The Indian national media came of age on climate change issues at a time when scientific consensus on the existence of climate change and its causes and evidence had already been established through the IPCC reports. As a result, major questions of uncertainty were not relevant. Thus, almost all stories on climate change in the Indian media acknowledged the existence of climate change and attributed it to anthropogenic causes. Mentions of uncertainty were not found in almost any of the reports.

Discussions

Despite the surge of climate change stories after 2006, bulk of the increase was because of stories on climate change politics, negotiations and awareness generation. This is evident from Graph 3 in which 1, which represents stories from peer-reviewed journals, remains constant over the six years of study.

By 2007, the science of the existence of climate change and its anthropogenic source had already been established as a scientific consensus. Hence, projection of the existence of climate change and that of its anthropogenic origin had been accepted by the Indian media and they rested in the news report by default. These were not the main focus of the news report.

Moreover, higher use of IPCC, UN and non-peer reviewed reports than peer reviewed reports indicates that the Indian mainstream media was not much dependent on science for reporting climate change. One of the standard practices for choosing science stories in science journalism has been to bank on peer-reviewed papers of reputed journals. This ensures that the paper or the report that is communicated to the public has passed the scrutiny of experts and checked from the maximum possible aspects. Non-adherence to this practice runs the risk of communicating to the public unverified and non-vetted scientific facts.

That the Indian mainstream media may not be adhering to these standards indicated that the media actors or journalists and editors are not discreet in their choice of what they will communicate to the public and what they will not. On one hand, this may result in the communication of undue alarmism and on the other hand, it may lead to unscientific denial.

Besides, by increasingly quoting politicians as the primary claim-makers in the news report, Indian media may be projecting climate change as more of a political issue than a scientific issue. Though politicians may have been increasingly used to bring the issue to the limelight, this trait of coverage runs the risk of developing public understanding of climate change as an issue that involves more of politics and less of science. This may in turn result in people taking the issue less seriously.

Besides, just like all other sciences, results of climate change research have largely been presented by the media as absolutely certain. So over the years, neither the media, nor the public has developed the maturity or the capability to appreciate that all sciences in general and climate science in particular has a certain level of uncertainty embedded in its results.

The nature of news production, as it exists today, is such that complexity or duality of issues is not reflected in the stories. As a result, uncertainty, which is an integral part of any science news report in general and climate change news report in particular is not communicated in the reports.

Ultimately, climate change is a scientific issue with socio-economic as well as political fallouts. If the science is placed out of focus and scientific methodology is not followed in the selection and coverage of stories, there is risk of unproven claims of effects and solutions hogging the limelight. Apart from undue alarmism, this may mislead the policymakers, who often base their decisions on media coverage of 'scientific results'. The Himalayan blunder was the result of ignoring scientific methodology. There may be more such blunders.

References

- Antilla L (2005) Climate of scepticism: US newspaper coverage of the science of climate change, *Global Environmental Change* 15 (2005): 338-352
- Bagla P (2009) No Sign Yet of Himalayan Meltdown: Indian Report Finds, *Science* 326 (5955): 924-925.
- Billet S (2009) Dividing climate change: global warming in the Indian mass media, *Climatic Change* 99 (1): 1-16.
- Boykoff M (2010) Indian media representations of climate change in a threatened journalistic ecosystem, *Climatic Change* 99:17-25.
- Boykoff M T (2007) Flogging a dead norm? Newspaper coverage of anthropogenic climate change in the United States and United Kingdom from 2003 to 2006, *Area* 39 (4): 470-481.
- Boykoff M T (2007) From convergence to contention: United States mass media representations of anthropogenic climate change science, *Transactions of Institute of British Geographers* 32: 477-489.
- Boykoff M T (2008) Lost in translation? United States television news coverage of anthropogenic climate change 1995-2004, *Climatic Change* 86: 1-11.
- Boykoff M T (2008) The cultural politics of climate change discourse in UK tabloids, *Political Geography* 27: 549e569.
- Boykoff M T and Boykoff J M (2007) Climate change and journalistic norms: A case-study of US mass-media coverage, *Geoforum* 38: 1190-1204.
- Boykoff M T and Mansfield M (2008) Ye Olde Hot Aire: reporting on human contributions to climate change in the UK tabloid press, *Environmental Research Letters* 3, 28 April, 2008.
- Boykoff M T and Roberts J T (2007) Media Coverage of Climate Change: Current Trends, Strengths, Weaknesses, Human Development Report 2007/2008.

- Brüggemann M and Engesser S (2013) Climate Journalists as Interpretive Community: Identifying Transnational Frames of Climate Change, National Centre of Competence in Research (NCCR), Challenges to Democracy in the 21st Century, Working Paper No. 59.
- Carvalho A (2007) Ideological cultures and media discourses on scientific knowledge: re-reading news on climate change, *Public Understanding of Science* 16: 223-243.
- Carvalho A and Burgess J (2005) Cultural Circuits of Climate Change in U.K. Broadsheet Newspapers, 1985-2003, *Risk Analysis* 25 (6): 1457-1469.
- Dutt B and Garg K C (2000) An overview of science and technology coverage in Indian English-language dailies, *Public understanding of Science* 9 (2): 123-140.
- Dutt B and Garg K C (2012) S&T Coverage in English-language Indian Dailies, *Journal of Science Communication*, 11(3): A01.
- Hulme M (2007) Mediated Messages about Climate Change: Reporting the IPCC Fourth Assessment in UK Print Media, School of Environmental Science, University of East Anglia, Norwich, UK, A Submission to *Science Communication*.
- Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report
- Intergovernmental Panel on Climate Change (2014) Fifth Assessment Report
- Nelkin, D (1987). *Selling science*, NY: Freeman.
- Pellechia M G (1997) Trends in science coverage: a content analysis of three US newspapers, *Public Understanding of Science* 6 (1): 49-68.
- Raina V K (2013) Himalayan Glaciers, State of the Art Review of Glacial Studies, Ministry of Environment and Forestry, Government of India.
- Rivers C (2008) *Selling Anxiety, How the news media scare women*, University Press of New England.
- Shakley S and Wynne B (1996) Representing Uncertainty in Global Climate Change Science and Policy, *Science, Technology and Human Values* 21 (3): 275-302.