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A HANDBOOK FOR REPORTING ON CLIMATE CHANGE IN SOUTH INDIA

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A handbook for reporting on climate change in South India

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Introduction

Talking at an event in Kerala in early 2020[1], Indian ecologist Madhav Gadgil said, 'the world is changing rapidly due to global warming, and India is particularly susceptible to this warming with effects more far-reaching than most other countries.' Gadgil is most famous for the Western Ghats Ecology Expert Panel (WGEEP) report, popularly known as the Gadgil report, which was submitted to the government in 2011. In the report, he repeatedly warned about the catastrophic damage that is inevitable if India's forests are sacrificed at the altar of infrastructure, mining and other development, especially when these forces combine with climate change[2].

The Western Ghats is only a part of the diverse ecological systems that make up India. Along with its stark socio-economic divisions, the country is among the most vulnerable to climate change, with millions of lives at risk. It is critical that we understand who is going to be affected by climate change, how its impacts will manifest across communities and landscapes, and whether isolated cases of effective climate action can be replicated on a large scale.

Remnants of a landslide that wreaked widespread damage in parts of Wayanad district in Kerala during the 2018 floods. Credit: Yashodara Udupa, 2019.

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[1] The Week, 2020. https://www.theweek.in/news/india/2020/02/04/india-at-greater-risk-of-global-warming-than-rest-of-the-world-madhav-gadgil.html

[2] Western Ghats Ecology Expert Panel, 2011. https://www.cppr.in/wp-content/uploads/2013/03/Gadgil-report.pdf

But stories around climate change are not easy to tell. They are complex, technical, and develop slowly. In newsrooms where speed is king, accurate and comprehensive reporting on environmental crises often takes a hit. Scientific rigour and accuracy, sensitive representations and consistent reportage on more slow-onset events such as drought and sea-level rise are critical to build public awareness and set the agenda for more ambitious climate policies that cater to the needs of the most vulnerable.

This handbook is part of an effort by the Indian Institute for Human Settlements (IIHS) to translate in-depth research on climate change into valuable lessons for journalists in order to navigate this complex space more meaningfully. IIHS is uniquely placed to do this for two main reasons. First, IIHS is the only non-governmental Indian organisation that has observer status in the Intergovernmental Panel on Climate Change (IPCC)[3]. IIHS Director, Aromar Revi, and faculty members, Chandni Singh and Amir Bazaz, have key roles in the authorship of two Assessment Reports and the Special Report on 1.5 degrees. IIHS has been central to the creation of a set of Summary Reports by IPCC, including at CoP24, to take cutting-edge climate science to wider audiences.

Second, the Word Lab at IIHS, which anchors its editorial and publication function, works with researchers to publish their work in public-facing formats including data stories, features, and photo essays, and has helped write, edit and publish over 120 public pieces since 2016. In addition, the lab teaches writing skills to build capacity; researches questions on language, translation and access to quality content; and curates an annual writings festival open to the public, City Scripts.

We were able to work towards blending these two areas of expertise and put together multilingual resource material that journalists and students can freely access and use to inform their reporting.

While this handbook focuses on climate change impacts and resources relevant to the southern states of India, we are also sharing an exhaustive glossary drawn from the IPCC reports and other resources and translating them into five different languages to ensure key terms related to climate change are clearly understood and communicated to a wider audience.

We have also carried out an analysis of media reports to understand how environmental issues and extreme climate events that have affected Karnataka and Tamil Nadu are covered. What frames do they use, do they sensationalise suffering, do they only focus on financial compensation, whose voices do they platform and is a perspective on climate change linked to these articles on local impacts – these are some of the questions we sought to understand. Part of our findings have been used to inform sections of this handbook as well.

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[3] IPCC, 2018. https://www.ipcc.ch/site/assets/uploads/2018/11/IPCC-observers.pdf

This handbook is not an exhaustive resource that covers the wide range of impacts manifesting across India and only delves into the southern states' climate-changed future. While the chapter on key impacts is specific to a region, the bulk of this book details general best practices and compiles links to resources that would be useful for journalists and students interested in covering environmental change.

The handbook will be translated to Kannada and Tamil to expand the reach of such critical resources to a much larger, diverse audience.

In the public imagination, climate change has largely been associated with images of polar bears perched on melting blocks of ice or of young activists leading large climate marches in Europe or of world leaders convening for annual summits. Climate change has thus remained a distant issue. As the next chapter explains, **it is critical that Indian journalists care about climate change and we hope that this handbook will be a useful guide for you and your newsroom to report climate change better**. As humans try to cope with these larger-than-life events, you too can be part of the fight, bringing the right information, set in the most relevant context, to your readers.

Fishing boats parked on Marina Beach as storm clouds churn over Chennai, one of India's most densely-populated coastal settlements. Credit: Yashodara Udupa, 2019.

Media Review: News Coverage of Urban Drought and Extreme Weather Events

Our project began with a media review. Drawing from existing analyses, we aimed to qualitatively assess the content of news reports to identify trends and existing gaps in representation of climate change-related disasters and resource depletion.
We used a sample of 80 articles from four different news publications focusing on four different events or time periods – Urban drought in Chennai and Bengaluru, 2018 Cyclone Gaja and Kodagu floods of 2018 and 2019. As evident and in line with the overall project, our analysis was restricted to events experienced in only two states – Karnataka and Tamil Nadu – and does not claim to offer a comprehensive overview of climate change impacts manifesting across the country.

Framing analysis of media can be carried out in different ways. For this exercise, we derived a method of classifying stories largely based on Semetko and Valkenburg's study4 of news coverage of European politics which identified five news 'frames': i) responsibility (where an article accords blame or credit to the government/ individuals/ communities for inaction or for taking proactive measures), ii) conflict (when a story emphasises the friction or conflict between different groups or individuals), iii) human interest (when the story is presented from an emotional point of view or where it is personalised), iv) economic consequences (when the story highlights economic consequences on an individual, community, the state), and v) morality (when a story is discussed from a religious or moral point of view)5.
The following graph summarises our findings. Of the 80 articles we analysed, the frames that appeared the most were responsibility, human interest and economic consequences. The idea behind this was not a value judgement on reporting, but a way to prompt reflection on what angles are prioritised over others.

In addition to identifying the 'what' in news stories, another key factor to understanding representation is the 'who'. For this, we drew from a study6 in which the author identified four categories of 'social fora' - the political establishment, scientists or research bodies, environmental NGOs and the general public (or affected communities/individuals). Our review also followed this broad categorisation to find that affected individuals and communities were featured most prominently, followed by government officials and politicians, as illustrated in the graph below.

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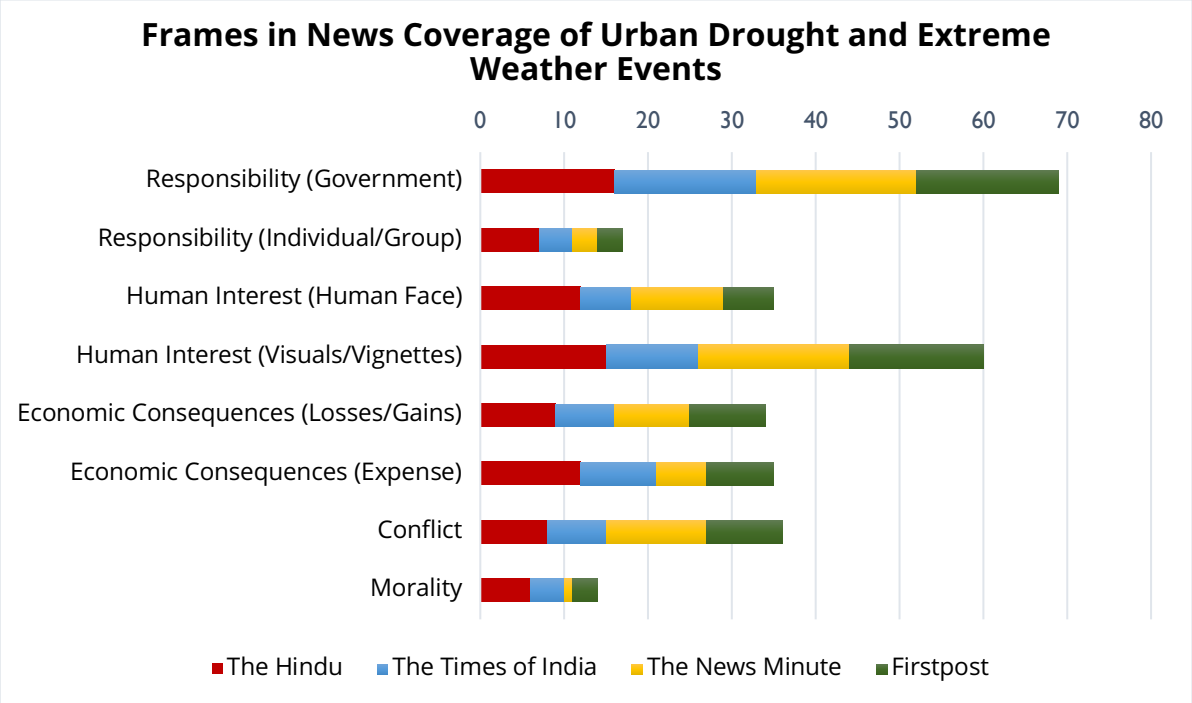
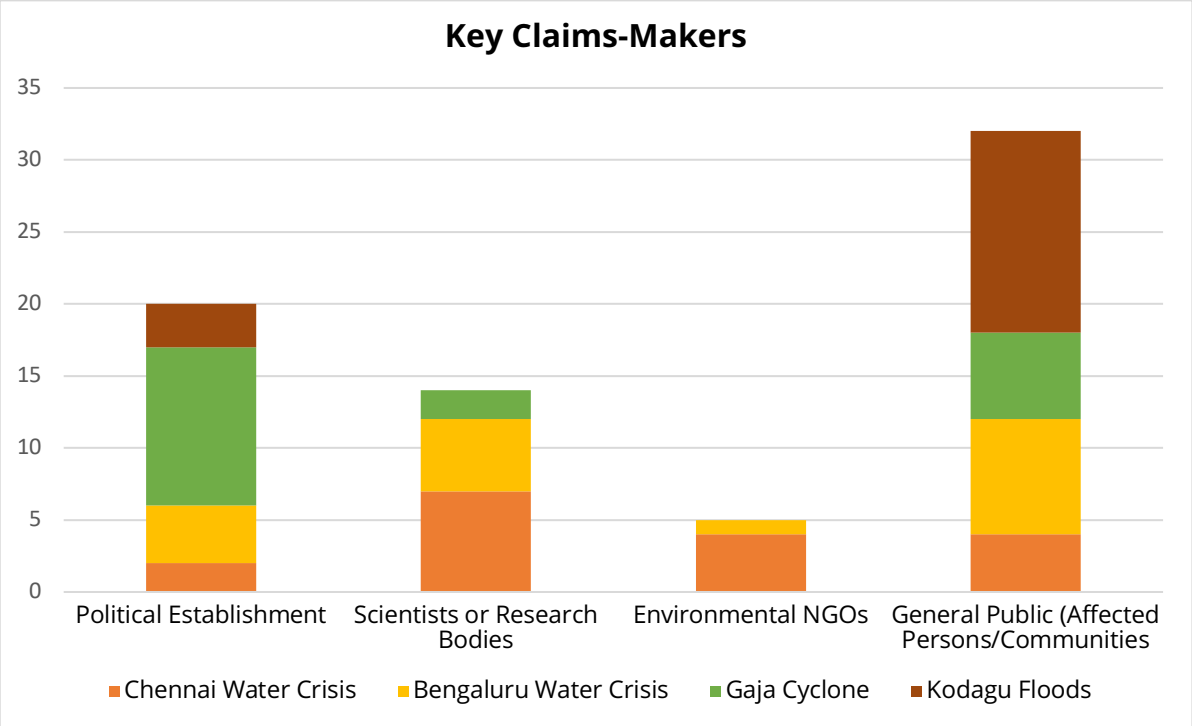
[4] Semetko, H. A., & Valkenburg, P. M. (2000). Framing European politics: A content analysis of press and television news. Journal of communication, 50(2), 93-109. https://doi.org/10.1111/j.1460-2466.2000.tb02843.x
[5] This method was applied by Dirikx and Gelders in their analysis of climate change coverage in Dutch and French newspapers. Dirikx, A., & Gelders, D. (2010). To frame is to explain: A deductive frame-analysis of Dutch and French climate change coverage during the annual UN Conferences of the Parties. Public understanding of science, 19(6), 732-742. https://doi.org/10.1177%2F0963662509352044
[6] For this, we drew from Yan Wu, whose study sought to understand who the main 'claims-makers' are in media coverage of climate change issues. Wu, Y. (2009). The Good, the Bad and the Ugly: Framing of China in News Media Coverage of Global Climate Change. In T. Boyce and J. Lewis (Eds). *Climate Change and the Media.* 158-173. Peter Lang.


Frames in News Coverage of Urban Drought and Extreme Weather Events
0
10
20
30
40
50
60
70
80
Responsibility (Government)
Responsibility (Individual/Group)
Human Interest (Human Face)
Human Interest (Visuals/Vignettes)
Economic Consequences (Losses/Gains)
Economic Consequences (Expense)
Conflict
Morality
The Hindu
The Times of India
The News Minute
Firstpost


Key Claims-Makers
35
30
25
20
15
10
5
0
Political Establishment
Scientists or Research Bodies
Environmental NGOs
General Public (Affected Persons/Communities
Chennai Water Crisis
Bengaluru Water Crisis
Gaja Cyclone
Kodagu Floods

We included a couple of additional research questions in our analysis such as: Does the article link the event/issue to anthropogenic climate change? If so, what source is used to substantiate this claim? This is discussed in chapter two of this handbook in more detail.

We do not replicate these frameworks exactly and we only derive from them for the purpose of this exercise[7].

[7] A detailed report on this exercise and its findings will be available from the IIHS Knowledge Gateway from May 2021.

Why Should Indian Journalists Care About Climate Change?

In the year 1800, the German naturalist and inspiration to some of humanity's greatest thinkers, Alexander von Humboldt, saw the devastating environmental effects of colonial plantations at Lake Valencia in Venezuela. He observed that deforestation had made the land barren, water levels of lakes were falling, and the fertile soil of the surrounding mountain slopes were washed away without the trees to hold them in place. He talked about how harmful human-induced climate change can be, effectively becoming the first person to talk about this phenomenon. In what appears rather prophetic in retrospect, he warned that human activity was meddling with the climate and that this could have unforeseeable impacts on future generations.

As we write this handbook on how to report on climate change in India, particularly South India, the region is experiencing increasingly frequent disasters. These disasters are caused, in part, due to anthropogenic activities. As Humboldt rightly predicted two centuries ago, **climate change is leading to disastrous impacts on human society and South Asia is on the frontlines[8], suffering from multiple disasters just over the last two decades**.

Within South Asia, focusing just on the southern region of India, we see that this region has witnessed some of its worst droughts, extreme heat waves, heaviest rainfalls and floods, the most powerful cyclones and a tsunami event. If we take the rest of India into consideration, the tragic list of disasters only grows longer. The Uttarakhand and Ladakh cloud burst events of 2013 and 2010 respectively, which claimed hundreds of lives, or Cyclone Amphan last year, which ravaged West Bengal, especially its Sundarbans regions, are only a few examples of this.

According to the United Nations Office for Disaster Risk Reduction (UNISDR), India is among the countries most vulnerable to disasters. A report[9] released in 2018 estimated that India has lost more than USD 80 billion and thousands of lives to disasters in the 20-year-period from 1998. This, despite the same report acknowledging that loss data is not available for 87 per cent of disasters in low-income countries.

In India, millions are already rendered vulnerable due to various factors such as caste, gender or the region in which they live. The country's unemployment rate is soaring as well, with the latest figures showing the rate of unemployment to be at 7.8 per cent[10]. Climate change adds another layer of risk and uncertainty to these existing structural issues.

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[8] Frontline, 2020. https://frontline.thehindu.com/social-issues/crisis-of-migration/article32643380.ece
[9] UNISDR, 2016. https://www.unisdr.org/2016/iddr/IDDR2018_Economic%20Losses.pdf
[10] The Economic Times, 2020. https://economictimes.indiatimes.com/news/economy/indicators/indias-unemployment-rate-rises-further-employment-rate-lowest-since-june/articleshow/79428634.cms

At the same time, citizens, countries and communities are attempting to tackle fast-accelerating climate change by coming up with innovative solutions to both adapt to and mitigate the phenomenon[11]. Be it pledges made by countries to go carbon-neutral within decades, large-scale national investments in renewable energy, or locally-focussed solutions such as shifting to sustainable farming or recycling waste more effectively, there is a strong will and tenacity to deal with the problems at hand.

As journalists for various media in English and other Indian languages who report on the ground, whether it is from major urban centres like Bengaluru or Chennai, or a tiny hamlet deep inside the mountain folds of the Western Ghats, disasters and other long-term effects of climate-change are ubiquitous in our lives. It is not enough for just the science reporter or the newly-christened beat of environment reporters to care about climate change. **Any district reporter, business reporter, health reporter and even crime and sports reporters need to now be cognisant of the effects of this global phenomenon** and how it relates to their areas of interest.

In this handbook, we provide you an overview of how any Indian journalist can keep themselves better informed about climate change and a few suggestions to cover this locally and globally relevant issue.

Sea sediment deposition in coastal villages of Nagapattinam, Tamil Nadu caused by Cyclone Gaja in 2018. Long-term changes in the local ecology often get largely overlooked in post-disaster recovery. Credit: Chandni Singh, 2019.

[11] Hegde, G., Singh, C., Kaur, H. (2018). Adaptation as Innovation: Lessons from smallholder farmers in rainfed Karnataka http://www.assar.uct.ac.za/sites/default/files/image_tool/images/138/South_Asia/IIHS/IIHS%20Booklet%20English%20FOR%20WEBSITE%2023%20March%202018.pdf

A Climate Change Perspective That is Missing

Accelerating climate change is widely agreed to be one of the key reasons for increasingly frequent and intense disasters as well as long-term adverse effects such as droughts and prolonged extreme heat. Despite this, the connection between climate change and the local event is seldom made in climate reportage.

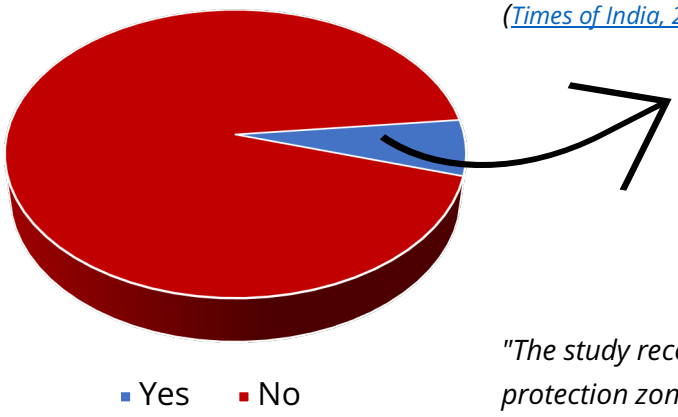
In the southern Indian context, disasters such as the Kerala and Karnataka floods of 2018 and 2019, and the South India floods of 2015 received extensive coverage in the media. **While the damage caused by these floods were reported extensively, there was little introspection by media houses as to the reasons for such catastrophic events.** Similarly, long drawn out and recurring disasters such as the chronic water crisis in cities such as Chennai, Hyderabad and Bengaluru, inter-state riparian conflicts due to low water levels at the river-head, and increasing durations of extreme heat are, by and large, only reported in the mainstream media as and when the disaster event occurs. Little to no connection is made to anthropogenic factors that play a significant role in causing the disaster.

Residents in Bengaluru's lower-income areas are worst affected by water scarcity during the summer months. Long lines waiting for supply by these private water tankers is a common sight in many Indian cities. Credit: IIHS Media Lab.

This was apparent from a media review we carried out at IIHS. This review focused on four publications - *The Hindu, The Times of India, The News Minute and Firstpost* - and four disasters or extreme weather events - the 2018 Gaja Cyclone, the Kodagu floods in 2018 and 2019, as well as urban drought in two of southern India's largest cities, Chennai and Bengaluru. The review aimed to identify key trends in reporting and existing gaps in the representation of climate change-related disasters.

Based on a framework used by studies on news framing, this review studied 80 articles and attempted to slot them into five broad news 'frames' of responsibility, human interest, conflict, morality and economic consequences, as explained in the introduction.

One of the additional research questions we used for our analysis was: Does the article link the issue or event to climate change and, if yes, what sources did they use? We found that only five of the 80 articles reviewed were found to even mention climate change and none of them cited specific studies or sources.



"Drought-like conditions have been spreading across Tamil Nadu at an alarming pace, partly because of its inherent nature of its vast parts being in the rain-shadow region and partly because of climate change." (*Times of India, 2020*)

"The city, with its cyclical flood and drought situation, is also perhaps the most visible example of the climate change crisis that the world is contending with." (*The News Minute, 2019*)

"The study recommends demarcation of groundwater protection zones, construction of check dams across waterways and additional subsurface storage tanks to cope with the loss of natural resources over the past century and adapt to climate change." (*The Hindu, 2018*)

The attribution to climate change appears in the form of either vague throwaway statements or brief quotes from experts.

In addition to examples in the figure above, a report about the drought in Chennai in The Hindu says, "'Chennai is in the midst of its most severe drought yet, and the situation is only going to get worse as global warming contributes to erratic monsoon patterns," says R. Rajkumar, Chief Chemist at Metrowater[12].

A report in Firstpost about the water crisis in Bengaluru attempts to provide a little more detail. However, it does not clarify which estimate or attribute it to any study:

'Freshwater resources around the world were already badly stressed before heat-trapping carbon emissions from fossil fuels began to warm Earth's surface and affect rainfall. Pollution in many forms is tainting water above ground and below. By one estimate, the world will face a 40-percent water deficit by 2030 if climate change continues unchecked'[13].

From our limited sample, another notable trend was that the extreme events covered in our analysis - Cyclone Gaja and the Kodagu floods - did not allude to climate change.

We are not claiming that both these specific events can be definitively linked to climate change. Take the case of Cyclone Gaja and Tamil Nadu's exposure to storms: One study on cyclones along the Indian coast claims, 'Cyclone frequency is projected to decrease, although their wind speeds are expected to increase with antecedent exposure to storm surges and flooding'[14]. The IPCC's Special Report on Global Warming of 1.5°C also says that over the Bay of Bengal, 'tropical cyclones and severe tropical cyclones have exhibited decreasing trends over the period 1961–2010, although the ratio between severe tropical cyclones and all tropical cyclones is increasing', quoting Mohapatra et al., 2017[15].

More intense storms can cause more fatalities and damage property and livelihoods unless adaptation strategies account for these stronger storms and the nature of their impact - be it through storm surges, greater wind speeds or rainfall. **Fatalities and the ability to recover are closely linked to income and it is imperative that the impact of such storms on marginalised, coastal communities are clearly documented in order to work towards minimising future impacts.**

A total of 20 articles on the two devastating events were covered in this analysis and yet not one was found to use the widespread concern and interest in the news about the event, to draw discussion towards climate change, the likelihood of more severe cyclones and the

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[12] The Hindu, 2018. https://www.thehindu.com/news/national/tamil-nadu/water-sources-aplenty-but-city-still-thirsty/article17529548.ece

[13] Firstpost, 2018. https://www.firstpost.com/india/after-cape-town-bengaluru-set-to-face-major-water-crisis-atrocious-state-of-bellandur-lake-a-result-of-apathy-by-authorities-4350769.html

[14] Rao, A.D., Upadhaya, P., Pandey, S., Poulose, J., 2020. Simulation of extreme water levels in response to tropical cyclones along the Indian coast: a climate change perspective. Nat. Hazards 100, 151–172. https://doi.org/10.1007/s11069-019-03804-z

[15] Mohapatra, M., Srivastava, A. K., Balachandran, S., & Geetha, B. (2017). Inter-annual variation and trends in Tropical Cyclones and Monsoon Depressions over the North Indian Ocean. In *Observed Climate Variability and Change over the Indian Region* (pp. 89-106). Springer, Singapore. https://doi.org/10.1007/978-981-10-2531-0_6

urgent need to adapt. As an article by the World Meteorological Organisation states[16], "There is a clear opportunity for the media to discuss the most visible impacts of climate change in their coverage of weather disasters, though it is an opportunity that is missed far too often."

We also found that even when references are made to climate change, they are seldom well-substantiated. As Painter et al's 2020 paper[17] on the Indian media's coverage and attribution to climate change stated, "...the norm was to use generic phrases to describe the link between such events and climate change...some politicians and NGOs seem too hasty to draw connections between specific weather events and climate change prior to the publication of rigorous scientific evidence, and journalists seem too reluctant to question them."

Media coverage of extreme events tends to focus on the immediate aftermath of a disaster. It is equally important to return to affected regions and follow up on rebuilding projects and how the place and people are recovering. This picture was taken in Alappuzha district in Kerala, a year after the 2018 floods. Credit: Yashodara Udupa.

[16] WMO, 2016. https://public.wmo.int/en/resources/bulletin/unnatural-disasters-communicating-linkages-between-extreme-events-and-climate

[17] Painter, J., Osaka, S., Ettinger, J., & Walton, P. 2020. Blaming climate change? How Indian mainstream media covered two extreme weather events in 2015. Global Environmental Change, 63, 102119. https://doi.org/10.1016/j.gloenvcha.2020.102119

India's Climate Future

Various global analyses of climate risk repeatedly evaluate India as being among the most vulnerable to the effects of climate change. According to the Global Climate Risk Index 2019[18], published by the environmental think tank Germanwatch, India was the fifth worst-affected country in the world due to climate change. The country suffered the highest number of fatalities due to climate change and second-highest monetary loss. According to various government and scientific bodies such as the Reserve Bank of India (RBI) and the Ministry of Earth Sciences (MoES), the future, unfortunately, doesn't portend well either. In 2019, for the first time in its history, the RBI warned about the risks of climate change in its annual report[19]. It particularly flagged concerns about the impacts of climate change, in terms of volatile rainfall intensity, increase in extreme events and rising temperature, having implications for India's agriculture outlook.

Future of the Human Climate Niche, a study published in the journal, Proceedings of the National Academy of Sciences of the United States of America (PNAS)[20], states that if carbon emissions continue unabated, by the year 2070, 3.5 billion people might be living outside the climate niche that humans have thrived in for over 6,000 years. India tops the list of people who will be affected with more than 1.2 billion Indians set to be subject to 'unliveable conditions' due to extreme heat.

In the report, *Assessment of Climate Change over the Indian Region*[21], published by the MoES, India's leading scientists and researchers state that climate change has increased and will continue to increase India's average temperature. They have also flagged the warming of the Indian Ocean, changes in rainfall patterns, droughts, sea-level rise, tropical cyclones, changes in the Himalayas as key concerns in the Indian subcontinent.

Various Indian and global bodies[22][23] have also estimated that India stands to bear a tremendous financial burden due to climate change. If the business-as-usual scenario – where little change is made to adapt to or mitigate climate change – continues, India's GDP is set to shrink by 10 per cent by the end of this century[24]. Millions of Indians are set to be displaced as

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[18] Eckstein, D., Künzel, V., Schäfer, L., & Winges, M. 2019. Global climate risk index 2020. Bonn: Germanwatch. https://germanwatch.org/sites/germanwatch.org/files/Global%20Climate%20Risk%20Index%202019_2.pdf

[19] Reserve Bank of India. 2019. https://www.rbi.org.in/Scripts/AnnualReportPublications.aspx?Id=1286

[20] Xu, C., Kohler, T. A., Lenton, T. M., Svenning, J. C., & Scheffer, M. 2020. Future of the human climate niche. Proceedings of the National Academy of Sciences, 117(21), 11350-11355. https://doi.org/10.1073/pnas.1910114117

[21] Krishnan, R., Sanjay, J., Gnanaseelan, C., Mujumdar, M., Kulkarni, A., & Chakraborty, S. 2020. Assessment of Climate Change over the Indian Region: A Report of the Ministry of Earth Sciences (MoES), Government of India (p. 226). Springer Nature. https://library.oapen.org/bitstream/handle/20.500.12657/39973/2020_Book_AssessmentOfClimateChangeOverT.pdf?sequence=1

[22] Acclimatise, 2019. https://www.acclimatise.uk.com/2019/09/03/from-droughts-to-floods-the-cost-of-climate-change-for-india-continues-to-mount/

[23] The Hindu Business Line, 2018. https://www.thehindubusinessline.com/economy/climate-change-can-cost-india-28-of-gdp-by-2050-world-bank/article24282307.ece

[24] Livemint, 2019. https://www.livemint.com/politics/policy/climate-change-may-shrink-india-s-economy-by-10-study-1566218656198.html

climate change renders their homesteads unliveable because of phenomena such as sea-level rise and changing rainfall patterns[25]. Additionally, the possibility of another devastating pandemic such as the Covid-19 pandemic is projected to increase, especially in India[26].

Apart from the tangible effects, what is often overlooked is climate change's intangible effects on people and society such as on their ways of living and livelihoods, altering practises which have sometimes existed for millenniums.

For example, the indigenous pastoral tribe, the Todas, of whom only 2,978 individuals are left, according to the 2011 Census, have been adversely affected by anthropogenic factors. The Todas reside only in the upper reaches of the Nilgiris hills and anthropological evidence indicate that they have been living in this region for close to 3,500 years. For the Todas, the Toda buffalo, a genetically isolated population found only in this region, and the Awvul grass (*Eriochrysis rangacharii*), also found only here, are sacred. The Toda way of life revolves around the buffalo and the Awvul grass is used to thatch their temple roofs. Due to a variety of human-induced factors such as planting of exotic plant species for the production of timber and global warming[27], the buffalos are finding less grasslands to graze upon. This has affected their population severely. A 2013 report estimated that only about 3,000 of the buffaloes remain today. Also, the Awvul grass is becoming rarer[28]. Toda traditions and cultural practices shaped over the course of three millennia are now on the verge of collapsing.

In already deeply patriarchal societies, such as those that exist in many parts of India, the increasing difficulties due to climate change impact men and women differently. In many cases, the women bear the brunt of the impact[29]. Various studies[30] have found that factors such as not being able to move freely without a male escort has resulted in a higher number of women casualties during disasters, especially in countries where there is a high level of discrimination against women.

With sectors such as agriculture being the worst affected by climate change and women making up over 80 per cent of the workforce in India's agrarian sector[31], this too results in disproportionate consequences for women in the country. Moreover, with rising temperatures driving up the risk of certain diseases[32], women, as the primary family caregivers in many

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[25] Quartz India, 2020. https://qz.com/india/1806064/india-vulnerable-as-climate-refugees-surge-amid-floods-droughts/
[26] India Climate Dialogue, 2020. https://indiaclimatedialogue.net/2020/11/06/could-the-himalayas-harbour-the-next-pandemic/
[27] Sukumar, R., Suresh, H., & Ramesh, R. (1995). Climate Change and Its Impact on Tropical Montane Ecosystems in Southern India. Journal of Biogeography, 22(2/3), 533-536. https://doi.org/10.2307/2845951
[28] Down to Earth, 2019. https://www.downtoearth.org.in/news/wildlife-biodiversity/aliens-in-toda-paradise-67836
[29] United Nations. https://www.un.org/en/chronicle/article/womenin-shadow-climate-change#:~:text=Consequently%2C%20women%20are%20less%20able,develop%20skills%20or%20earn%20income
[30] Neumayer, N. and Plümper, T. (2007) The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981–2002, Annals of the Association of American Geographers, 97:3, 551-566. https://doi.org/10.1111/j.1467-8306.2007.00563.x
[31] Dhara, V. R., Schramm, P. J. & Luber, G. (2013). Climate change and infectious diseases in India: Implications for health care providers. The Indian Journal of Media Research, 138(6), 847-852. https://pubmed.ncbi.nlm.nih.gov/24521625/
[32] The Hindu Business Line, 2013. https://www.thehindubusinessline.com/news/Women-do-80-of-farm-work-own-only-13-land-Oxfam/article20677370.ece

communities, must devote time to care for sick family members that they would otherwise spend on their fields, on other work or their education. As climate change worsens, threatening families heavily dependent on subsistence agriculture, **women in India and around the world can expect to face even greater obstacles in achieving sufficient education, greater economic opportunities and gender equality[33].**

Key impacts of climate change-related events on South India

The following are some of the consequences of climate change-related events that southern India will be or is already subject to.

Tropical cyclones

Towards the end of last year (2020), two deadly tropical cyclones hit the coasts of Tamil Nadu within two weeks – Nivar and Burevi. In the last few years, there has been at least one powerful tropical cyclone that affected southern India. Historically, eight out of ten deadliest tropical cyclones in the world have originated over the Bay of Bengal. A large but relatively shallow embayment of the North Eastern Indian Ocean, the Bay occupies an area of about 2,173,000 square kilometres, with an average depth of more than 8,500 feet (2,600 metres).

Out of the 36 most deadly tropical cyclones in recorded history, 26 have been over this region[34]. The Bay of Bengal, which occupies just over 0.6 per cent of the global ocean area, has been responsible for more than 50 per cent of all cyclone-related deaths in the world. It is widely agreed in the scientific community that global warming is making these storms more intense.

Sea-level rise

The global sea level has been rising at an average of 1.8 mm every year over the last century, according to the IPCC's fifth assessment report. The report states that ocean thermal expansion and melting ice near the Earth's poles, both attributed to human-caused global warming, have been the dominant contributors to global mean sea-level rise since the 20th century. The Global Risk Report 2019, published by the World Economic Forum (WEF)[35], states that sea-level rise can have an adverse impact on drinking water facilities, internet connectivity and energy as well as on infrastructure such as roads and ports in coastal cities.

The coastal regions of southern India are expected to be directly affected by sea-level rise. In 2018, the MoEFCC said that the sea level along the Indian coast can rise up to 2.8 feet by the

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[33] Rao, N., Mishra, A., Prakash, A., Singh, C., Qaisrani, A., Poonacha, P., ... & Bedelian, C. (2019). A qualitative comparative analysis of women's agency and adaptive capacity in climate change hotspots in Asia and Africa. *Nature Climate Change*, *9*(12), 964-971. https://doi.org/10.1038/s41558-019-0638-y

[34] Weather Underground. https://www.wunderground.com/hurricane/articles/deadliest-tropical-cyclones

[35] World Economic Forum, 2019. http://www3.weforum.org/docs/WEF_Global_Risks_Report_2019.pdf

year 2100[36]. This will result in enormous loss of land along the coastline, especially in the delta regions of various major rivers. The beaches will get closer and the farmlands along rivers such as Cauvery and Godavari will be completely submerged. In cities too, the impacts will be disastrous[37]. For example, a global study by the US-based organisation Climate Central[38] predicts that regions that are four kilometres inland in cities such as Chennai will be affected by flooding related to sea-level rise by the year 2050.

Chennai faces multiple hazards including coastal flooding due to extreme storm surges and cyclones. The rapid growth of built-up area in the city over the last two decades has impacted natural drainage channels and wetlands leading to higher flood incidence[39]. Credit: Yashodara Udupa.

Extreme heat

Not just southern India but the entire Indian subcontinent is already suffering from the adverse consequences of extreme heat. The years 2015 and 2019 recorded the longest heat waves in India, with 40°C plus temperatures lasting for more than a month and in some

[36] The New Indian Express, 2018. https://www.newindianexpress.com/nation/2018/dec/22/sea-level-is-projected-to-rise-by-35-to-346-inches-between-1990-and-2100-1915154.html

[37] Singh, C., Madhavan, M., Arvind, J., & Bazaz, A. (2021). Climate change adaptation in Indian cities: A review of existing actions and spaces for triple wins. *Urban Climate*, *36*, 100783. https://doi.org/10.1016/j.uclim.2021.100783

[38] The Times of India, 2019. https://timesofindia.indiatimes.com/city/chennai/chennai-the-sea-is-coming-and-it-might-sink-faraway-lands/articleshow/71845205.cms

[39] Jain, G, Singh, C, Coelho, K and Malladi, T (2017) Long-term implications of humanitarian responses: the case of Chennai. IIED Working Paper. IIED, London. https://pubs.iied.org/10840IIED

regions for more than 45 days. Since the year 2010, more than 6,000 people have died across India due to extreme heat.

Drought

Summer in India is now synonymous with water crises in its cities, especially in cities like Chennai and Bengaluru[40] and with parched fields in rural India. With erratic rainfall and an increasingly unpredictable monsoon, there is no respite from this scenario. On 10 June 2019, more than 44 per cent of the country was under various degrees of drought conditions. It is not only decreasing rainfall but increasing use of groundwater in agriculture that are causing these droughts. Regions of the southern Indian states, especially Andhra Pradesh, Telangana, Tamil Nadu, and Karnataka are especially vulnerable to droughts and with successive drought years, the situation is only becoming worse[41].

Extreme rain events and floods

In the last five years, there have been at least three extreme rain events in southern India, namely, the Kerala and Karnataka floods of 2018 and 2019 and the floods of 2015. A combination of unplanned development, climate change-induced extreme weather and inadequate preparation for disasters have resulted in all of these events taking a major toll on people's lives and livelihoods.

In the floods of 2015 alone, 347 people lost their lives and over Rs. 50,000 crore worth of property was damaged. Another major consequence of extreme rains are landslides, especially in the Western Ghats. In regions such as Kodagu in Karnataka, entire villages have been wiped out by landslides, not to mention the loss of coffee plantations and other commercial crops which could take decades to restore.

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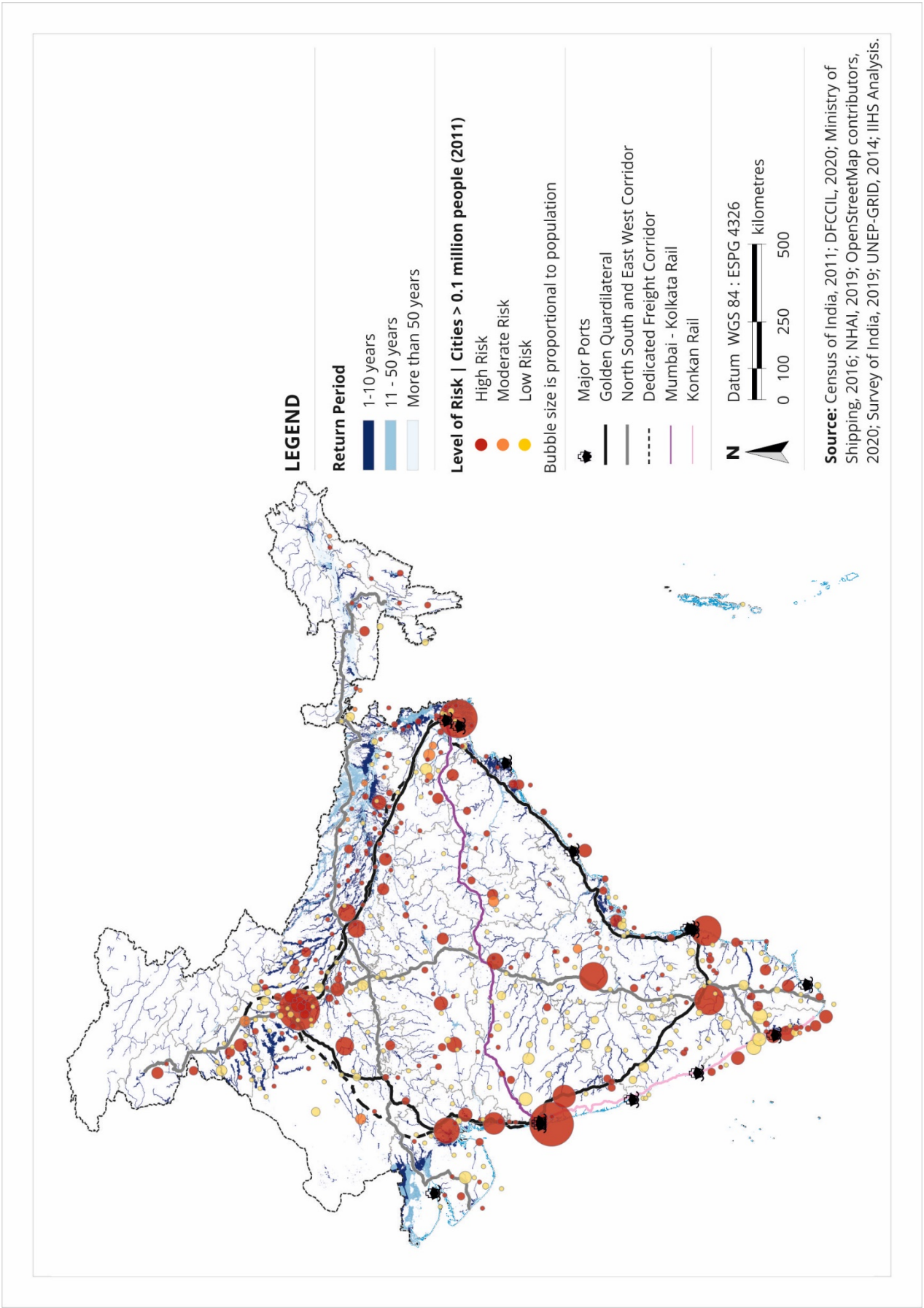
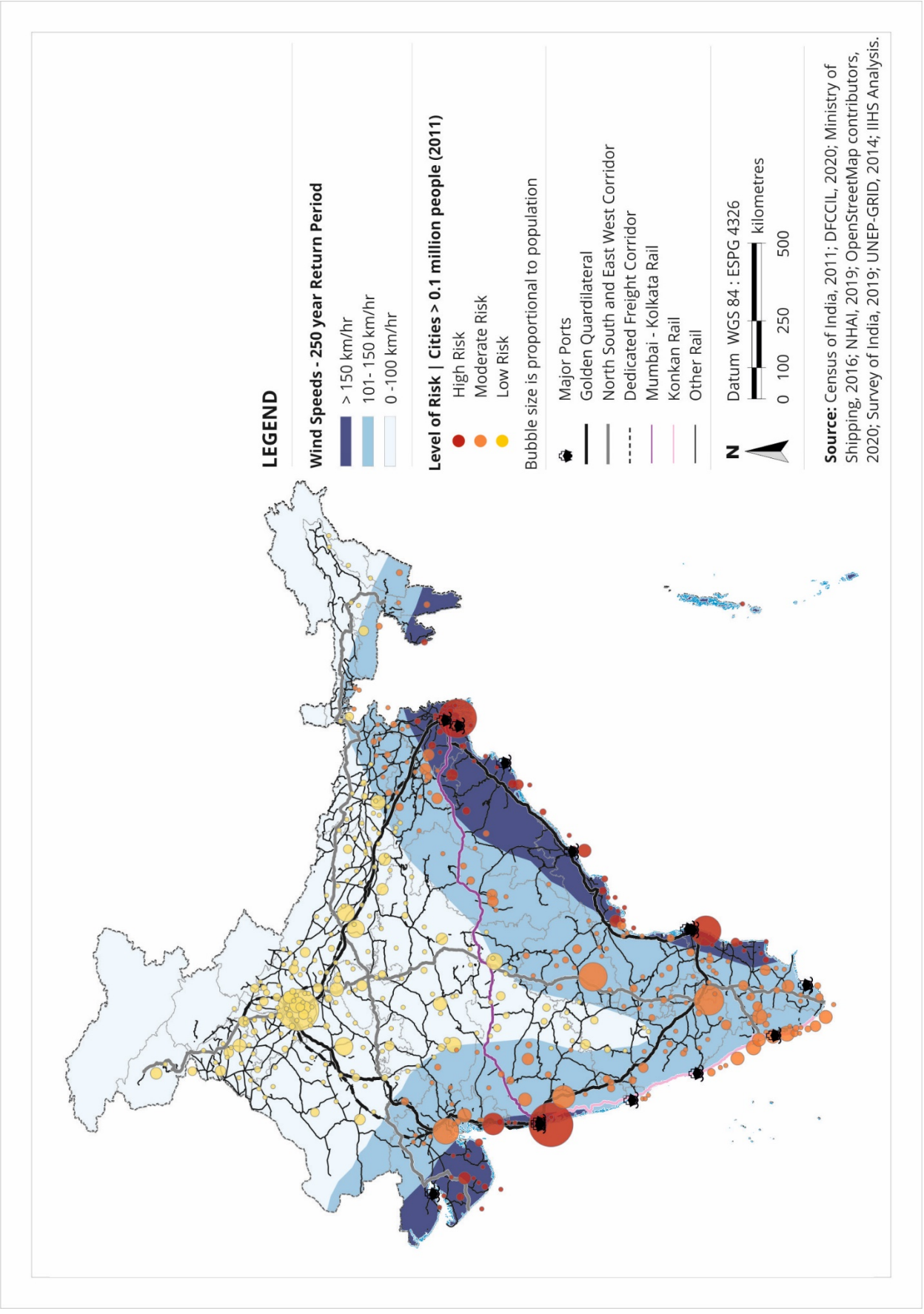
[40] Basu, R., & Bazaz, A. (2016). Assessing climate change risks and contextual vulnerability in urban areas of semi-arid India the case of Bangalore. CARIAA-ASSAR Working Paper. International Development Research Centre, Ottawa and UK Aid, London. http://www.assar.uct.ac.za/sites/default/files/image_tool/images/138/Info_briefs/Contextual%20vulnerability%20in%20Bangalore%20-%20CARIAA%20ASSAR%20Working%20Paper%203.pdf

[41] Firstpost, 2017. https://www.firstpost.com/india/south-indias-drought-part-1-five-states-face-a-severe-water-crisis-made-worse-by-the-onset-of-summer-3394636.html

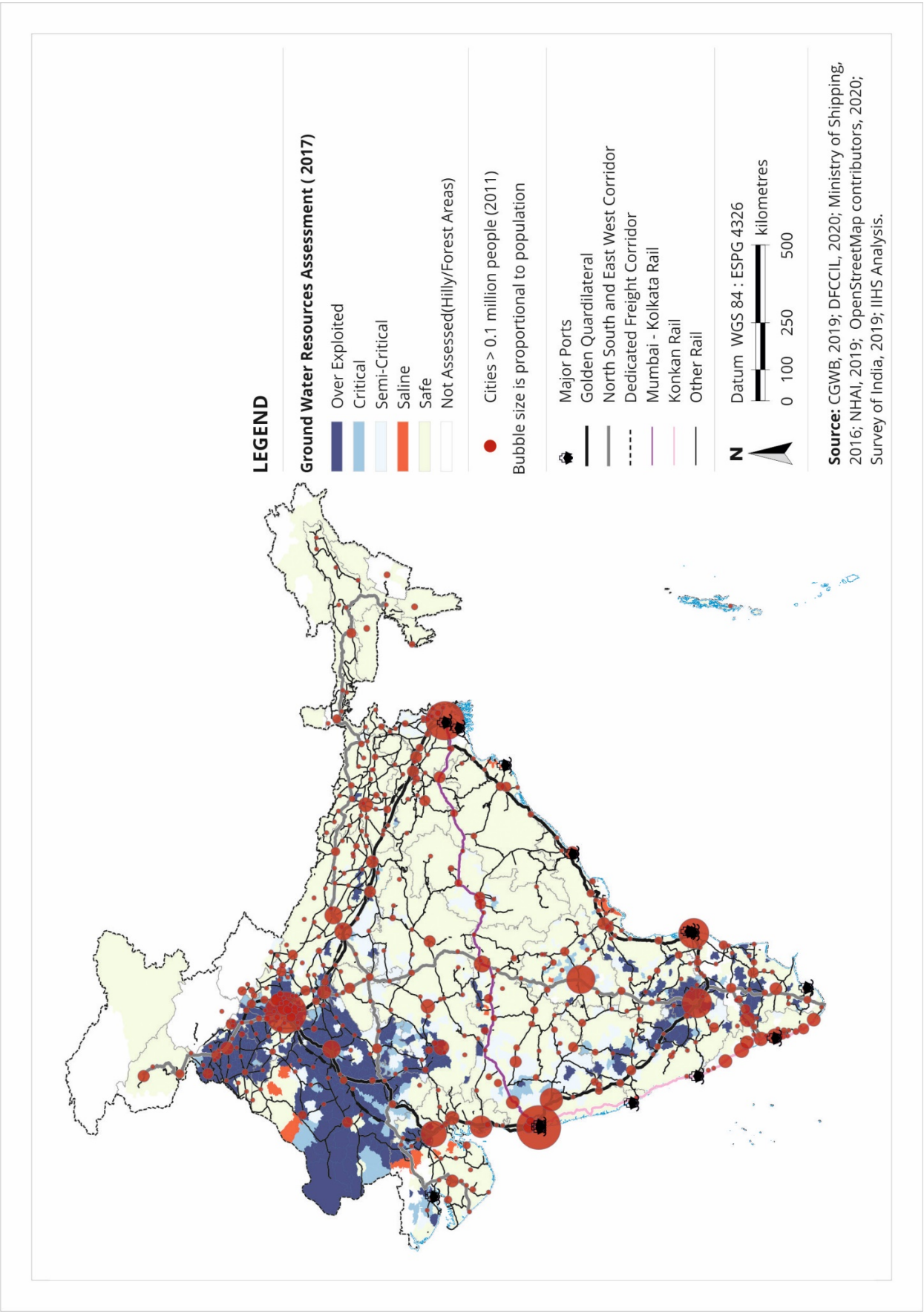
Flood Hazard Risk Map



Cyclone Hazard Risk Map



Ground Water Resources Assessment



Is it climate change or a climate crisis?

In May 2019, the British newspaper The Guardian announced a style guide change[42]. They said they will prioritise terms such as 'climate crisis or breakdown' and 'global heating' over the more common 'climate change' and 'global warming'. The paper said it has decided to do this to introduce terms that more accurately describe the environmental crises facing the world. They also updated other terms, opting for 'wildlife' over 'biodiversity', 'fish populations' instead of 'fish stocks' and 'climate science denier' instead of 'climate sceptic'.

The paper quoted Greta Thunberg, the Swedish teenager and climate activist who had asked, "It's 2019. Can we all now call it what it is: climate breakdown, climate crisis, climate emergency, ecological breakdown, ecological crisis and ecological emergency?"
The Guardian has also decided to include global carbon dioxide levels[43] to their daily weather reports. As Katherine Viner, the editor-in-chief of The Guardian at the time said, "People need reminding that the climate crisis is no longer a future problem – we need to tackle it now, and every day matters."

In India, since reporting on climate change is not as pervasive as it should be, the debate on the terminology to be used might be a little premature. Nevertheless, it is useful to be cognisant about these important trends in climate change coverage in the international media.

[42] The Guardian, 2019. https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the-environment
[43] The Guardian, 2019. https://www.theguardian.com/environment/2019/apr/05/why-the-guardian-is-putting-global-co2-levels-in-the-weather-forecast

Best Practices in Climate Reporting

India has a diverse and vibrant media ecosystem which caters to different sections of society. While television news is consumed the most, digital news sites and legacy media are also key stakeholders in news dissemination. Seven of the top 20 media organisations with the largest print circulations are located in India. While most of the largest-circulated dailies are in Hindi, *the Times of India* in English, *Dina Thanthi* in Tamil, and *Malayala Manorama* and *Matrubhumi* in Malayalam are among the top 10 circulated dailies in India.

Despite these great platforms for news dissemination, various research papers[44] on the issue have found that Indian media's coverage of climate change is stunted at best. While TV news seldom makes any reference to the phenomenon, the situation in other media has vast room for improvement as well. A research paper published by Hopke et al. in 2019, found that only nine per cent of the articles examined in four Indian English language newspapers and one newswire mentioned climate change in their coverage of heat waves in India between 2013 and 2018. The researchers had studied five countries, Canada, China, India, the United States, and the United Kingdom and found that Indian media had least mentions about climate change.

Despite the Indian media's relative lack of interest in the issue, climate change is and will continue to affect all of our lives. As reporters covering the phenomenon, we need to know how to connect seemingly disparate events and place it within the climate change framework. The key challenge for journalists is to communicate complex ideas about climate change in an easy to understand manner. For example, how do we communicate the idea that any one particular extreme weather event might not be directly because of climate change but the frequency of such events is increasing because of the phenomenon?

In this section, we give you a few quick tips and pointers which will hopefully help you think about and report better on climate change and other allied areas of interest. With support from the newsroom, reporters in various media can be a key link that helps people make sense of climate change as it affects their everyday life.

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[44] Keller, T. R., Hase, V., Thaker, J., Mahl, D., & Schäfer, M. S. (2020). News Media Coverage of Climate Change in India 1997–2016: Using automated content analysis to assess themes and topics. Environmental Communication, 14(2), 219-235. https://doi.org/10.1080/17524032.2019.1643383

Quick tips for finding stories and reporting about climate change

Reporting about climate change can seem daunting at first sight. It is such a gargantuan issue with seemingly no solution in sight. There is no need to feel bogged down by the enormity of the issue though. Here, we have compiled a list of pointers that we think will help you report better about climate change. Some of our team members are journalists who have covered this issue extensively and these tips are a combination of learnings from their personal experience as well as suggestions drawn from UNESCO handbooks for reporting on climate change[45].

1. **Follow the money**: As any good investigative journalist will tell you, 'the money is where the story is'. Climate change is no outlier to this. Every year, thousands of crores of rupees is spent on various programmes and development projects related to or dealing with climate change.
   As journalists, if you can find out where the money is coming from, it will surely lead to great stories. For example, where is the money for various adaptation and mitigation projects in your area coming from? Who controls this money? How is this money awarded? Is it a loan or a grant? Who spends it? Who makes sure it does what it is meant to do? Who funds the NGOs and the politicians? Which companies stand to profit from action to address climate change? Who stands to lose?

   Each of these questions will lead to stories that are not only relevant but also extremely pertinent to understanding the climate change debate better.

2. **Localise the issue**: Scientists all around the world publish new research every day, policymakers make new announcements, environmental activists' issue new demands and, as we all know, extreme weather events are getting more frequent. Even if some of these developments are happening in different parts of the country or the world, journalists can find ways to make them meaningful to readers and viewers of their language media. For example, huge swathes of land in southern India are being taken over for various solar power generation projects. These projects are meant to contribute to India's commitment to shifting to renewable energy, thus reducing the amount of Greenhouse Gases the country emits. While these decisions are determined by national and international policy, it also has a tangible effect on people residing in these regions where the solar power generation projects are coming up. Thus, as a journalist, you can think of bringing in the global backdrop upon which this enormous local change is happening.

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[45] UNESCO, 2013 and 2018. https://en.unesco.org/getting-the-message-across#:~:text=A%20new%2C%20free%20handbook%2C%20for,in%20Asia%20and%20the%20Pacific.&text=This%20Handbook%20is%20part%20UNESCO's,Communication's%20Series%20on%20Journalism%20Education.

3. **Look at everything through a climate change perspective:** For any new development that you come across, be it in a change of policy, an emerging business model, a new invention, anything really, make sure to ask the following questions: How could this new development affect climate change? and How could climate change affect the prospects of this new development? This can lead to great story ideas that you can explore in-depth.

4. **Stay updated on climate change coverage:** Make sure you use the various tools available at your disposal such as Google alerts, various social media tools, newsletters etc. to stay abreast of the latest developments in climate change. There are also sites such as the Climate News Network that offers stories that journalists can adapt for their own use (http://www.climatenewsnetwork.net/). A list of many more useful sites are listed later in this book, in the 'Further Reading' section.

5. **Network, network, network.** A journalist can never have too many sources. Since climate change affects everyone, journalists can build large contact lists of sources from a variety of different sectors. These include policymakers, intergovernmental organisations, UN agencies, civil society organisations and research centres. A journalist reporting in various districts and cities can also keep in touch with farmers, fishers and other members of the general public. Some of the best stories emerge from sources who are keenly aware of the situation on the ground.

6. **Don't restrict yourself to only one media:** If you are a freelance journalist reporting in English or a regional language, this is a great time to not just write but use different media to report. These can be media with varying scope in terms of the reportage you can carry out for them as well as their audience. Podcasts are the up and coming medium followed by many thought-leaders across the world, so while out reporting, you record audio which can later be crafted into an exciting podcast such as the Disasters: Deconstructed Podcast or the NPR podcasts on climate change and environment.
   Another medium that is hugely beneficial to local populations is community radio. For example, Kadal Osai FM, a community radio in southern Tamil Nadu, has been doing a great job reporting about climate change in a manner in which it is relevant to the fishing community who make up almost all of their listeners. Other community radio stations such as Radio Namaskar, in Konark, Odisha; the Community Radio Consortium for Environment Protection (CRCEP) which includes seven community radio stations in Uttarakhand; and the Madurai-based Kalanjiam Community Radio have also been effective in spreading awareness about climate change and acting as emergency sources of information during a disaster.

7. **Humanise your stories:** Health, adequate resources and the security of a good future for their children/ the next generation are among the most important concerns for Climate

change is having a decisive impact on all of this. Therefore, when reporting on climate change, try to bring in the impact of the development you are writing about on these aspects that people are concerned about. Talk about one person or a community and how their specific scenario can be a reflection of a larger change due to climate change. You can also quantify the effects of action and inaction and if research is available, spell out how much it will cost to act or worse, how much will inaction cost (For example, if the costs of carbon emissions are factored into electricity charges, then the price of every unit will increase tenfold).

8. **Know your audience:** At the end of the day, the only person who matter when writing any story is the reader. All the work you put in has to keep them in mind. In case you are dealing with a complicated issue related to climate change, it is best to provide at least a one-line explainer before you move onto the next segment of your story. Always read the story out loud before you send it to your editor and if you have the time, sleep on it and read it again in the morning, putting yourself in your audience's shoes. Glaring gaps which you might have overlooked while filing the first draft are bound to pop up when you do this.

9. **Connect with your audience:** People's values and political views are great influences on their attitudes about climate change. Connecting with widely-shared public values, or points of 'local interest' in your stories makes it more likely that they will be received well by your target audience.

10. **Make the reader 'see' the story:** Many climate and environmental stories are complex, but they can often be illustrated with appropriate visuals that represent the issue and make it an engaging human story. Journalists should always ask, 'How can I visualise this story?' Perhaps it can be a photo-essay, a portrait series, a short online explainer video, a more in-depth documentary, or a clear and easy to understand infographic. A good photo series or video can vividly explain the issue to readers. This report in the New York Times Magazine about climate refugees is a great example of this[46].

11. **Make sure you get enough diverse voices:** The celebrated journalist, Ed Yong, of The Atlantic, wrote a piece[47] few years ago about how he tried to fix the gender imbalance in his reporting. As in every other field, gender biases are entrenched in the media too. Be conscious of your bias, not just gender-based but also, caste and class bias. Make sure every story you report about climate change, includes voices from all affected stakeholders, especially the most vulnerable. For example, this report in *Indiaspend*[48] made sure all stakeholders were well-represented.

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[46] The New York Times Magazine, 2020. https://www.nytimes.com/interactive/2020/07/23/magazine/climate-migration.html
[47] The Atlantic, 2018. https://www.theatlantic.com/science/archive/2018/02/i-spent-two-years-trying-to-fix-the-gender-imbalance-in-my-stories/552404/
[48] Indiaspend, 2019. https://www.indiaspend.com/why-disaster-rehab-must-focus-on-landless-dalit-farmers/

12. **Read academic work:** Scientific journals can seem daunting at first but like everything else, it's all about practice. As a journalist interested in reporting about climate change, scientific journals should be your first port of call. An easy short-hand to find out if any particular article can be of interest to you is to read the abstract, of course, but also to glance through the introduction and discussion sections of the article. Developments that are extremely relevant to your region are bound to pop up on a regular basis. As you read more scientific journals, you will also notice that you are able to read them with increasing ease.

13. **Find exciting news stories from press releases:** While most journalists get tired of receiving a seemingly never-ending trail of press releases from government departments, educational institutions, think tanks, research organisations and PR firms, there can be great stories in some of these releases. Instead of just copy-pasting the press release and producing a drab report, research a little bit more about the topic at hand before you file your story. For example, a press release about climate finance might be quite uninteresting at first sight, but if you find that the money is going to a controversial project or will affect a major change in the region where any project is being funded, it can make for an exciting, important story.

14. **Sources are everywhere:** To get to know about climate change, reading peer-reviewed journals or government and PR press releases are not the only way. Go out onto the field, talk to farmers, small businessmen, students, workers, and researchers. Find out how increasing heat or any particular extreme weather event has affected them in the long and short-term. These are the real impacts of climate change and as journalists, you can provide a voice to these people who are often ignored.

15. **Take a closer look at climate change solutions and their efficacy:** While it is extremely important to report about various mitigation and adaptation measures that are taken to deal with climate change, not all of them receive the amount of coverage they deserve. For example, large-scale renewable energy projects receive enormous coverage in the media, most of it focused on the scale of the projects and its economic dividends. While this is good, it is also important that other effective climate change solutions, such as public awareness programmes that enable behavioural change (campaigns that encourage people to consume lesser or not to litter), receive adequate media coverage too[49]. These solutions are also an essential cog in the wheels of climate action.

[49] Cooldavis.org, 2008. https://www.cooldavis.org/wp-content/uploads/Guide-on-behaviour-change.pdf

16. **Lead with what you know:** Uncertainty is a feature of climate science that shouldn't be ignored or side lined. It can become a major stumbling block in getting your readers to grasp the gravity of the issue though. Focus on the 'knowns' before the 'unknowns' in your story and emphasise where there are areas of strong scientific agreement around a topic[50].

17. **Highlight success stories:** In India and around the world, enterprising individuals and organisations are coming up with innovative solutions to both adapt to and mitigate climate change. For example, Sonam Wangchuk, a Ladakhi educationist came up with the idea of ice stupas to help conserve water in the high-altitude desert region. Wangchuk is just one among hundreds of such innovators who are contributing to India's climate action efforts. As journalists, apart from talking about the stark realities of climate change, always try and report about such successful efforts. They will not only give confidence to your readers that the problems at hand can be dealt with, but your stories could also serve as an inspiration for other such potential innovators.

18. **Don't just look at the disasters:** Reporting on climate change is not just about reporting about disasters and their aftermath. It is important to look at the larger picture and see the long-term changes at play. Find stories about slow but long-term changes. For example, stories about glacial melts or extreme heat are possibly as relevant to your readers as a story about a recent disaster. There is a lot of information available about these long-term changes which you can use to make your stories engrossing. In the further reading section, we direct you to some of the organisations which regularly publish such information.

Reporting on specific aspects about climate change

As we know climate change has a consequence on various facets of human life and society. The following are some key areas on which climate change has a definitive impact. In this section, we offer suggestions as to how these various areas of interest and their connection to climate change can be covered.

Migration, displacement and climate change

1. How does climate change affect migration and human mobility?
2. How does climate change affect human migration? What are the challenges faced by the community when migrating due to climate change?
3. Who are the environmental migrants in your region? What are their stories?
4. What measures have your state government put in place for the welfare of these migrants? For example, Kerala has a robust education policy for children of migrant workers.

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[50] National Geographic, 2019. https://www.nationalgeographic.com/environment/global-warming/global-warming-overview/

5. Are there environmental migrants in your region? What are their patterns of migration and how are their mobility and adaptation linked with climate change?
6. What role does migration play in adaptation to climate change?
7. Are people in your region migrating to cities or other parts of the country due to climate change? Where are they going? What are they leaving behind?

Human rights dimension of climate change

1. Who are most vulnerable to climate change? What are the segments of the society affected by climate change?
2. How does climate change affect human rights? Which dimension of these rights affect the community/region the most?
3. What are the principal threats to human security from climate change?
   Who are the most affected people in your communities/region? How are they affected by climate change differently from other groups? Are their vulnerability and needs addressed in any policy/adaptation plan? How can their vulnerability to climate change be reduced? Are they involved/engaged in the formulation of government plans and strategies addressing climate change?
4. Is there any relevance between climate change and food security on social and political stability?
5. What are the links between climate change and its impact on political, economic and social fragility in the region in which you are reporting from?

Climate change and culture

1. How can climate change and the changes in natural resources affect culture and livelihood and its related activities?
2. How are rural livelihoods and, therefore, cultural practices and associated impacts on natural capital affected by changes in climate?
3. What are the effects of culture on climate change mitigation and adaptation[51]?
4. How do different cultures adapt to significant environmental changes?

[51] Few, R., Spear, D., Singh, C., Tebboth, M. G., Davies, J. E., & Thompson-Hall, M. C. (2021). Culture as a mediator of climate change adaptation: Neither static nor unidirectional. *Wiley Interdisciplinary Reviews: Climate Change*, *12*(1), e687. https://doi.org/10.1002/wcc.687

After disasters, relocating people away risky places remains popular but it can take years for these relocation sites to thrive. Picture of houses built after the tsunami in Nagapattinam, Tamil Nadu. Credit: Chandni Singh, 2018.

Gender dimension of climate change

1. Why is climate change a gender issue?
2. How and why does climate change affect women differently? What are the different impacts of climate change on women?
3. How are women engaged in climate change adaptation and developing disaster risk reduction plans? How are young people engaged in the process of adaptation to climate change?
4. What are the roles of women in climate action in your region? Are there examples of women-led movements that have enabled climate change mitigation or adaptation? For example, the Kudumbashree mission for poverty eradication in Kerala has played an important role in the state's recovery from extreme weather events.

Climate change and health

The link between climate change and health is strong. At the same time, there are many false assumptions about the direct and indirect effects on human health due to climate change. Especially in times such as this, journalists need to be skilled in explaining risk and uncertainty. They also need to grasp what scientists and researchers are sure about and what they are still not completely confident about. Regardless of climate change, health is an overwhelming area of interest for all consumers of media. Therefore, placing the links between climate change and health into a wider context of other health priorities is also key while reporting on this.

1. What does climate change mean for existing health threats? What new health threats could climate change pose?
2. How certain are scientists about these threats? What other factors are at play?
3. How much of a risk is there in a particular short or long-term climate change-linked event? And how does it compare to other risks?
4. How reliable is the baseline data (about incidence of increase in zoonotic diseases, and about anthropogenic factors like deforestation exacerbating their spread, for instance)?
5. What would hospitals and government departments need to do to be prepared for a climatic disaster or new disease outbreak?
6. What are the co-benefits of acting to limit the threats climate change poses to health?
7. What does your state's adaptation programme of action say about health? Are they looking at health through a climate change lens when designing their policies?
8. What has your state done so far to adapt to the health impacts of climate change?
9. What are the health consequences of being subject to extreme heat?
10. Does a particular fallout of climate change exacerbate the spread of disease?
11. How can your region/ the country's health sector adapt to the risks posed by climate change?

Cities and climate change

India is among the most rapidly urbanising regions in the world and is expected to double its urban population by the year 2050. At last count, there were at least 53 cities with a million-plus population and a total of 317 cities in the country[52]. One of the key risks that Indian cities are facing is heat stress and exacerbated urban heat island effects[53]. Other risks that Indian cities face due to climate change include flooding, sea level rise and urban droughts.

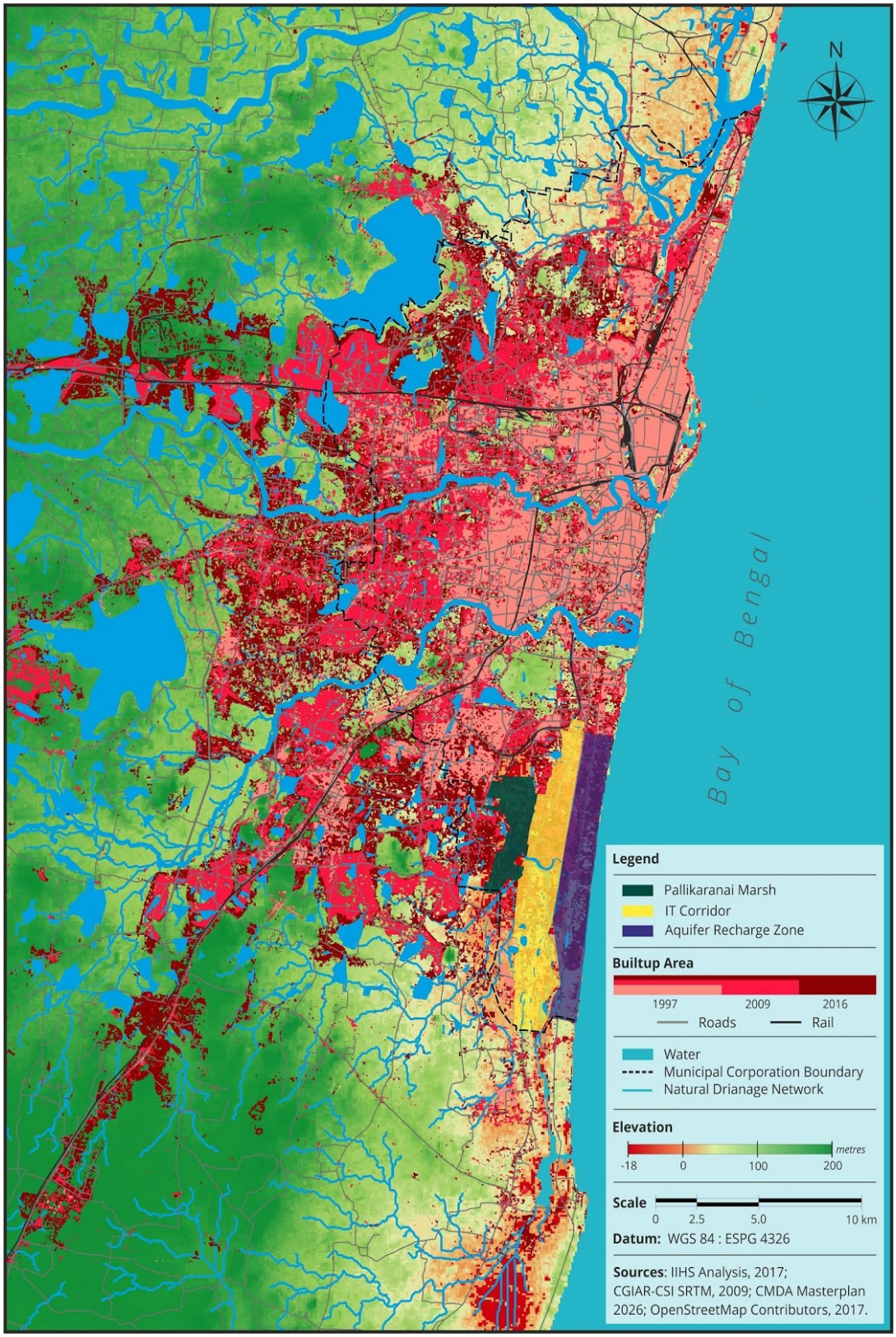
[52] PIB,GOI, 2011. https://web.archive.org/web/20150630112755/http://pibmumbai.gov.in/scripts/detail.asp?releaseId=E2011IS3
[53] Livemint, 2011. https://www.livemint.com/mint-lounge/features/is-extreme-heat-making-india-unlivable-11601034638011.html

While the risks are aplenty, India is also in a unique position where many of its urban centres are being developed or are going to be developed in the next few decades. This has allowed the government and urban planners to factor in climate change adaptation and mitigation into their masterplans[54]. There are also initiatives like the Heat Action Plans (HAP) that multiple cities across India have devised to deal with extreme heat. As journalists, tracking and chronicling these developments can make for extremely interesting and relevant stories for your readers, especially those located in urban centres, regardless of whether they are big or small.

1. Is your city or the city you report about part of India's smart cities mission? If it is, what aspects of the mission are addressing climate change-related issues as it applies to your city?
2. What are the major climate change-related issues affecting your city? What are the measures that your city planners and administrators are taking to deal with them?
3. How are climate change mitigation and adaptation measures funded for your city? Are the funds being used as efficiently as they can be?
4. What are some of the changes that residents are making to adapt to the changing conditions? Can they be replicated elsewhere?
5. Is your city's development trajectory jeopardising its efforts to deal with climate change or destroying its natural resources? If so, what should be done to prevent or redirect this development?

[54] Reuters, 2020. https://www.reuters.com/article/india-climate-change-floods/feature-caught-by-deluges-and-droughts-indias-cities-look-to-become-climate-smarter-idINL8N2HB14R?edition-redirect=uk

Map showing growth of built-up area in Chennai city (1997-2016)



This map, created by the IIHS Geospatial Lab, shows how Chennai grew over its lakes and to the detriment of critical ecological areas such as the Pallikaranai Marsh and the Aquifer Recharge Zone. A detailed report about this is available here: https://scroll.in/article/929551/in-maps-how-chennai-grew-over-its-lakes

Bookmark These! A List of Useful Resources for Further Reading

As the 19th century French author, Andre Maurois said, “Writing is a difficult trade which must be learned slowly by reading great authors; by trying at the outset to imitate them; by daring then to be original and by destroying one's first productions.”

His advice applies well to reporting on climate change too. Over the years, there has been amazing work on the issue done by journalists from India and elsewhere. Below are links to news websites that carry stories related to climate change.

Indian news media websites to follow for climate change coverage

1. Down to Earth magazine/ Climate Change: https://www.downtoearth.org.in/climate-change
2. Mongabay India: https://india.mongabay.com/
3. Carbon Copy: https://carboncopy.info/
4. IndiaSpend/ Climate Change: https://www.indiaspend.com/category/climate-change/
5. India Climate Dialogue: https://indiaclimatedialogue.net/
6. The Wire Science: https://science.thewire.in/
7. The Hindu/ Science and Environment: https://www.thehindu.com/sci-tech/
8. India Water Portal: https://www.indiawaterportal.org/
9. India Biodiversity Portal: https://indiabiodiversity.org/
10. India Environment Portal: http://www.indiaenvironmentportal.org.in/category/1937/thesaurus/climate-change/
11. Nature India: https://www.natureasia.com/en/nindia/
12. PARI: https://ruralindiaonline.org/
13. LiveMint/ Climate Change tracker: https://www.livemint.com/mint-lounge/features/climate-change-tracker-key-indian-voices-on-the-climate-crisis-11597352371162.html
14. NDTV/ Climate Change: https://www.ndtv.com/topic/climate-change
15. Hindustan Times/ Climate Change: https://www.hindustantimes.com/topic/climate-change
16. Carbon Copy: https://carboncopy.info/
17. India Climate Dialogue: https://indiaclimatedialogue.net/

International media to follow for climate change coverage

1. Carbon Brief: https://www.carbonbrief.org/
2. Climate Change News: https://www.climatechangenews.com/
3. Reuters/ Climate Change: https://www.reuters.com/subjects/focus-climate-change
4. The Guardian/ Climate Change: https://www.theguardian.com/environment/climate-change
5. Associated Press/ Environment: https://apnews.com/hub/environment
6. Nature.com: https://www.nature.com/news/
7. NASA Climate news: https://climate.nasa.gov/news/
8. Inside Climate News: https://insideclimatenews.org/newsletter

9. National Geographic/ Environment: https://www.nationalgeographic.com/environment/
10. The Energy News Network: https://energynews.us/
11. Science Daily.com/ Climate Change: https://www.sciencedaily.com/news/earth_climate/climate/
12. New York Times/ Climate and environment: https://www.nytimes.com/section/climate
13. DeSmog Blog: https://www.desmogblog.com/
14. SciDev.Net: http://www.scidev.net

For data on climate change

1. World Bank Climate Indicators: http://data.worldbank.org/topic/climate-change
2. Climate Funds Update (CFU): http://www.climatefundsupdate.org/
3. Dara Climate Vulnerability Monitor: http://daraint.org/climate-vulnerability-monitor
4. Intergovernmental Panel on Climate Change (IPCC) Data Distribution Centre: http://www.ipcc-data.org

Podcasts about climate change to follow

1. Living on Earth: https://www.loe.org/
2. NPR Podcasts on environment: https://www.npr.org/sections/environment/
3. Suno India/ Climate Emergency: https://www.sunoindia.in/climate-emergency/
4. Deutsche Welle's Living Planet: https://www.dw.com/en/living-planet-environment-stories-from-around-the-world/a-19385797
5. Warm regards: https://warmregardspodcast.com/
6. The Climate Minute: https://massclimateaction.podbean.com/
7. Can't take the heat: https://www.stitcher.com/show/cant-take-the-heat
8. TIL Climate: https://climate.mit.edu/users/tilclimate-podcast
9. Hot take: https://www.hottakepod.com/
10. Mothers of Invention: https://www.mothersofinvention.online/
11. A matter of degrees: https://www.degreespod.com/
12. Inherited: https://www.stitcher.com/show/inherited
13. How to save a planet: https://gimletmedia.com/shows/howtosaveaplanet
14. Drilled: https://www.drillednews.com/podcasts
15. Disasters, Deconstructed Podcast: https://podcasts.apple.com/us/podcast/disasters-deconstructed-podcast/id1464487896

The following are some websites of organisations that can help you get in touch with the right people when working on your climate change stories.

United Nations and other international organisations

1. United Nations/ Climate Change: https://www.un.org/sustainabledevelopment/climate-change/
2. Food and Agriculture Organisation of the United Nations – FAO www.fao.org/climatechange
3. The UNFCCC website has a database of local coping strategies, which journalists can search by hazard (e.g. drought) and impact (http://maindb.unfccc.int/public/adaptation/). It also has details of the National Adaptation Programmes of Action in each of the countries in Asia.
4. The Eldis dossier on adaptation includes detailed information organized by theme and region, as well as a comprehensive listing of organizations that work on adaptation and are good sources for journalists. http://www.linkingclimateadaptation.org/
5. UN-REDD is the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries. http://www.un-redd.org/
6. UN Inter-Agency Standing Committee Taskforce on Climate Change: http://www.humanitarianinfo.org/iasc/pageloader.aspx?page=content-subsidi-common-default&sb=76
7. UN Environment Programme World Conservation Monitoring Center (UNEP-WCMC) http://www.unep-wcmc.org/
8. UN Commission on Sustainable Development: http://www.un.org/en/development/
9. World Health Organization: Protection of the Human Environment: http://www.who.int/peh/index.html
10. World Meteorological Organization: http://www.wmo.int/pages/index_en.html
11. World Water Organization (WWO) http://www.theworldwater.org/
12. Global Environment Facility (GEF) http://www.thegef.org/
13. Global Water Partnership (GWP) http://www.gwp.org/
14. South Asian Association for Regional Cooperation (SAARC) http://www.saarc-sec.org/
15. South Asia Cooperative Environment Programme (SACEP) http://www.sacep.org/
16. The Adaptation Fund https://www.adaptation-fund.org/
1. IUCN: https://www.iucn.org/

Civil society organisations

International

1. CARE's Climate Change Information Centre: http://www.careclimatechange.org/
2. Climate Action Network – International http://www.climatenetwork.org/
3. Climate South Asia Network http://climatesouthasia.org/
4. Foundation for ecological security: http://fes.org.in/

Indian

1. Centre for Environmental Education India (CEE) http://www.ceeindia.org/
2. Centre for Science and Environment India (CSE) http://www.cseindia.org/

Government (State/ Union)

1. Ministry of Environment, Forests, and Climate Change: http://moef.gov.in/
2. Environmental clearance certificates' data website: http://parivesh.nic.in/
3. National Disaster Management Authority: https://ndma.gov.in/
4. Tamil Nadu State Action Plan on Climate Change: https://www.environment.tn.gov.in/tnsapcc
5. Karnataka State Natural Disaster Monitoring Centre: http://ksndmc.org/
6. Directorate of Environment and Climate Change, Kerala: http://envt.kerala.gov.in/climate-change/
7. Telangana State Climate Change Centre: http://www.tsccc.eptri.com/
8. Department of Science, Technology, and Environment: https://dste.py.gov.in/

Academics and researchers

International

1. On Natural Disasters: https://www.nonaturaldisasters.com/useful-information
2. The Intergovernmental Panel on Climate Change website has some pages for journalists, which include press releases, information about meetings, and fact sheets. http://www.ipcc.ch/press_information/press_information.htm
3. The Intergovernmental Panel on Climate Change's (IPCC) Working Group II (http://www.ipcc-wg2.org/) covers impacts, vulnerability and adaptation.
4. Climate Outreach from IPCC Scientists: https://climateoutreach.org/
5. Centre for International Earth Science Information Network http://www.ciesin.columbia.edu
6. Centre for International Forestry Research (CIFOR) http://www.cifor.org/
7. Climate & Development Knowledge Network http://cdkn.org/regions/asia/
8. Global Climate Observing System https://www.wmo.int
9. International Institute for Sustainable Development www.iisd.org
10. World Agroforestry Centre – ICRAF www.worldagroforestry.org
11. International Crops Research Institute for Semi-Arid Tropics: https://www.icrisat.org/tag/climate-change-research/

Indian

1. Indian Institute for Human Settlements/ School of Environment and Sustainability: https://iihs.co.in/schools/school-of-environment-and-sustainability/
2. Centre for Climate Change Research, Indian Institute of Tropical Meteorology (IITM): http://cccr.tropmet.res.in/home/index.jsp or https://www.climate.rocksea.org/
3. Indian Meteorological Department: https://internal.imd.gov.in/pages/press_release_mausam.php
4. Divecha Centre for Climate Change, Indian Institute of Science: http://dccc.iisc.ac.in/

5. Department of Science and Technology/ Climate change: https://dst.gov.in/climate-change-programme
6. Tata Institute of Social Sciences/ Centre for climate change and sustainability studies: https://www.tiss.edu/view/6/mumbai-campus/school-of-habitat-studies-2/centre-for-climate-change/research-6/
7. The Energy Resources Institute (TERI): https://www.teriin.org/climate
8. World Resources Institute (WRI)- India/ Climate change: https://www.wri.org/our-work/topics/climate
9. Centre for Excellence in Climate Modelling, Indian Institute of Technology (IIT)- Delhi: http://dcecm.iitd.ac.in/
10. Civil Engineering Department, IIT-Gandhinagar: https://civil.iitgn.ac.in/
11. M.S.Swaminthan Research Foundation: https://www.mssrf.org/content/climate-change
12. Indian Council for Agricultural Research: https://icar.org.in/

Journalist networks

1. Global Investigative Journalism Network: https://gijn.org
2. International Journalists Network: https://ijnet.org/en
3. Clean Energy Wire network: https://www.cleanenergywire.org/clew-network
4. Earth Journalism Network: https://earthjournalism.net/
5. Climate News Network: https://climatenewsnetwork.net/training/

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