



INDIAN SUMMER: 3 ESSAYS ON HEATWAVE VULNERABILITY, ESTIMATION AND ADAPTATION STRATEGIES

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SUMMARY

Dr. Azhar's research focuses on the intersection of public health and health policy. This MEERTALK focused on three essays that he wrote for his dissertation to obtain his Ph.D. in Public Policy from the Pardee RAND Graduate School in Santa Monica, CA. He began his talk with a simple question: Why study heat waves? The answer, unfortunately, is that heat waves systematically target the most vulnerable populations among us. Simply plotting where the maximum recorded temperature is going to be in a given day does not give an accurate depiction of the incidence of heat related injuries and stressors. Moreover, heat waves are underreported and understudies; not only because "heat wave" is hardly ever listed as the official cause of mortality on a death certificate, but also because the associated public health statistics are often spotty - particularly in a large developing states such as India. Spotty health statistics aren't the only public health issue at hand in India. Health expenditure is only 1% of GDP, and an increasing share of the population is developing comorbidities that can make the impact of extreme heat that much worse. Furthermore, with large percentages of the population working outdoors, subsisting on small amounts of money per day, and living in inadequate facilities, the population writ large is exceptionally vulnerable. With heatwaves – and heat related deaths – only projected to increase in frequency as the climate continues to warm and India's population continues to grow, it is essential that we raise the alarm bells now and do whatever we can to mitigate human suffering in the years ahead.





SUMMARY CONT'D

The first paper that he discussed focused on a vulnerability assessment that he conducted. By using a variety of data sources ranging from the Indian Census to NASA temperature data, he was able to identify the areas most vulnerable to heat on a district level. Districts in the central parts of the country have high and very high Heat Vulnerability Indices (HVIs). This is, in part, due to India's geography, with natural borders such as the Himalaya serving to lock in hot air: particularly before the cooling monsoon rains can set in. HVIs were assembled using a variety of demographic, economic, public health, and climatic data.

The findings from the paper on mortality estimates suggest that most heat deaths are not medically certified. Moreover, they are often underlying causes that compound with other comorbidities. Unfortunately, the trend has been increasing deaths due to heat-related illnesses in recent years. By examining deaths by age group, it is evident that working age Indians have the most reported deaths: either because these deaths are more likely to be reported or because they are more likely to be working in the agricultural sector and have much more exposure to the sun. Men are more likely to die than women and, if current trends hold, we could witness almost 90,000 deaths due to heat by the end of the century. Unfortunately, a lack of data prevented him from examining how the mortality estimates would break down by age group in the projections up to the year 2100.

His paper on adaptation strategies featured interviews with subject matter experts and relevant stakeholders. Often, cultural practices of wearing large amounts of cloth, or not having an ability to urinate during the day (and thus drink appropriate amounts of water) can act as compounding factors that exacerbate the impacts of heat waves. Unfortunately, many of the temperatures used in his work were taken from airports and don't factor in the urban heat island effect, meaning that projected mortality and economic costs could be even higher than anticipated.

Dr. Azhar emphasizes that some parts of the country will be more affected than others, with rural and urban poor having the most exposure. Males in working age groups also need specific help. While there is no clear cut answer (after all, what should you do if the air temperature around you is too hot to survive and you don't have air conditioning?) it is clear that a suite of adaptation policies will be needed, alongside more bottom up, ethnographic research.



MEER COMMUNITY QUESTIONS



- With the increase in comorbidities in India (cardiovascular disease and diabetes), how do you think that will impact public health?
 - A: The vast majority of heat related deaths are indirect deaths, where the person is already sick and the person's physiological reserves are stretched to the max. These two illnesses will only make matters worse.
- How can families now adapt when old cultural adaptive practices such as sleeping on the veranda may no longer work?
 - A: He really doesn't know the answer. Families could potentially have grass curtains to ward off mosquitos? It is not clear what the solution is.
- Why are simple solutions like MEER being ignored?
 - A: There is precedent for this with pol houses, which are naturally cooler/store water in the basement where it can remain cold. The color of the clothes was also a passive adaptation method. These types of lifestyle changes are not expensive or technologically sophisticated, but could have a big impact.
- Have you done any quantitative research on how passive cooling can help alleviate thermal intolerance?
 - A: That type of work is being looked at by others. One of his team members has conducted a lot of physiological studies. Dr. Azhar, did a study on construction workers and found around 10% of workers were not just sick, but hospitalized. Ambient temperature at all times exceeded the allowable standard in the U.S. for these workers, meaning they shouldn't have been working at all. Unfortunately, very few studies document this.





LIVE AUDIENCE QUESTIONS

- Are the temperatures described in the book *Ministry for the Future* likely to occur?
 - A: He hasn't read the book. He emphasizes that what we would see is that because parts of the Indian subcontinent would become unlivable, there will be mass migration: much of it intra-country migration. There is nowhere to go from India, so will be a huge movement of people, and the average infrastructure is not prepared to take in that many people
- Why is there such bad reporting in terms of deaths of the poor?
 - A: This is a reflection of the bad state of healthcare in the country. Public health infrastructure in particular is in a state of disrepair. The healthcare system is also extremely weak. More than half of the positions of government doctors are still vacant due to a lack of money and qualified applicants.
- Does the region that you studied also have cold wave events? Could there be an increased danger of cold wave events or a need for more heating fuels during those times?
 - A: Cold can be an issue in some areas, but this isn't nearly as big a deal as heat as you can always put on another layer. You can't always keep taking layers off, however.
- Has there been any effort in bringing overseas Indian professionals to assist with emergency humanitarian aid?
 - A: He hasn't heard of any effort in this regard. The National Disaster Management Agency now recognizes extreme heat. Finally, it is important to emphasize that many of these deaths are preventable with simple measures (including the simple awareness that heat can be deadly).

