

Evidence from the Samdrup Jongkhar Initiative

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‘Brown Cloud’ Penetrates Bhutan

Ambient Air Quality and Trans-boundary Pollution in Bhutan

By Linda Pannozzo, Lead Researcher, Samdrup Jongkhar Initiative (SJI)

As you cross the border from the dusty, chaotic sprawl of Darranga, India, into Bhutan, the pace and the landscape change abruptly. The flat plains of Assam give rise to the rugged and verdant jungles of Samdrup Jongkhar dzongkhag, where forest covers four-fifths of the landscape, and the place is as much a home to a vast array of flora and fauna as it is to the 36,000 people who live there. By comparison the Indian state of Assam teems with a population of more than 27 million—38 times the entire population of Bhutan—340 people per square kilometre compared to Bhutan’s average of 17.

Thus, in the span of a short space and time—passing under the dragon and garuda of the border gate—one defining reality becomes crystal clear: Bhutan is extraordinary and unique, but also incredibly vulnerable. In fact, it has fallen victim to some of the worst consequences of industrialization-gone-mad in the rest of the world. For one, although its contribution to the global climate crisis is negligible at best, Bhutan is considered to be highly vulnerable to its effects—glacial lake outburst flooding, other weather-related disasters, and human health impacts.

But the burning of fossil fuels worldwide isn’t just contributing to climate chaos, it’s also having a serious impact on the air.

Brown cloud penetrates Bhutan

From November until March, I had the privilege of working with the Samdrup Jongkhar Initiative (SJI), which aims to raise living standards and self-reliance in an ecologically-friendly way. Field research brought me to villages where farmers described the challenges to achieving food security and finding markets that worked for them. They spoke of how the climate and rainfall amounts were changing and how productivity in their fields was declining.

During that time, the research team was stationed in Dewathang, a town located 18 km from the steamy border. On a clear day, we could see beyond the foothills to the plains of Assam and its patchwork of fields. But clear days were few and far between. At first we thought the haze was fog, or the result of a forest fire. But as the days became weeks it became apparent that what we were witnessing was much more sinister.

Here, in arguably one of the most pristine countries on earth, we were engulfed in air pollution. Interestingly, what had become obvious to us was not as obvious to the Bhutanese around us, who seemed to have adjusted to the significant change in air quality perhaps because it had occurred gradually, over a long period of time.

The satellite image, taken in February 2006, shows a band of polluting haze—covering northern India, and trapped by the Himalayan range, intruding into the skies of southern Nepal, Bhutan, and Bangladesh. This is the haze we gazed upon daily.



Studies indicate that what has been identified as the “Atmospheric brown cloud,” is worse in winter when there is less rain to wash the pollution from the air, and is likely caused by a wide range of sources: coal-fueled power plants in India and China, particles from burning wood and forest fires, vehicle emissions, and factories.

Health impacts of air pollution

Two decades of scientific evidence has established an undeniable correlation between air pollution and illness. Statistics show that on days when air pollution is worse, more people die and are admitted to hospital for heart and lung problems. Studies indicate the

“brown cloud” has alarming health consequences, including bronchitis, pulmonary edema, chronic bronchitis, emphysema, cancer, asphyxiation, and even death in cases of high doses, and eye, nose, and throat irritation at low doses.¹

One major 2002 UNEP study—the first time the “brown cloud” was assessed for impacts on climate, agriculture, and health—found that nearly 2 million people die each year in India alone from conditions related to the atmospheric air pollution.²

A 2008 report by Bhutan’s National Environment Commission found the occurrence of respiratory diseases in Bhutan is also very high. During the period 2003-2006, there were more than 1 million respiratory disease-related referral cases and 436 deaths due to respiratory problems—accounting for 20% of deaths caused by all diseases. NEC points out, that despite this high rate of respiratory illness, there is currently no national study assessing the correlation between air pollution and the occurrence of respiratory disease.³

Brown cloud cuts farm output

In addition to the untold health effects, research now indicates that the pollution-laden clouds drifting into Bhutan could also be adversely affecting agricultural productivity. The 2002 UNEP study reported that the haze, which covers roughly 10 million square kilometres, can result in up to 30% reduction in direct solar radiation, causing declines in agricultural output.⁴ It also reported that the haze suppresses rain, and can settle on plants as dust, soot, and fly ash, further shielding plant leaves from solar radiation.⁵

Using climate models and historical data on Indian rice harvests, U.S. researchers found that the brown cloud reduced rice harvests by 11% and concluded the reduced productivity effect would be greater in areas that use rain to water their crops.

Ambient air quality for Bhutan are presently very limited. According to the NEC, daily PM₁₀ monitoring over time has so far been done only in Thimphu, Rinchending, Pasakha, Gomtu, and Kanglung.⁶ At the same time, it recognizes that transboundary air pollution is a concern and a monitoring station has been established at Gelephu with plans to set up additional stations in “strategic locations around the country.” Bhutan is also party to a 1998 declaration by South Asian countries on transboundary air pollution, requiring all signatories to initiate studies and programmes on air pollution.⁷

Air quality data from the Gelephu station (also bordering the Indian State of Assam) are not yet available. Once they are, it will be possible to identify the quality of the air being breathed, whether it is correlated with declines in human health, and whether it could be the culprit in reduced agricultural productivity reported by farmers in the southern reaches of Bhutan.

For further information, visit www.sji.bt. The Samdrup Jongkhar Initiative research is kindly funded by the International Development Research Centre, Canada

ENDNOTES

¹ United Nations Environment Programme. 2002. Asian Brown Cloud: Climate and Other Environmental Impacts Study. UNEP. Available from <http://www.rrcap.unep.org/issues/air/impactstudy/Executive%20Summary.pdf>. p. 42.

² Ibid. Health effects and morbidity figures cited in *The Lancet*. Pollution cloud over south Asia is increasing ill health. Volume 360, Issue 9332. August, 2002. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(02\)09762-3/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(02)09762-3/fulltext)

³ NEC, 2008, p. 50.

⁴ UNEP, 2002, p. 38.

⁵ Ibid.

⁶ NEC, 2008, p. 49; Personal communication with Tshewang Dorji, Senior Environment Officer, NEC, April 26, 2011.

⁷ Bhutan is party to the 1998 Male Declaration on Control and Prevention of Air Pollution and its Likely Trans-boundary Effects for South Asia. UNEP serve as the Secretariat for the Declaration, which focuses on the need for countries to carry forward, or initiate studies and programmes on air pollution in each country in the South Asian subregion. NEC, 2008, p. 54.