

Rivers Make Rivals

Is Kashmir condemned to escalating cyclical conflict over the Indus?

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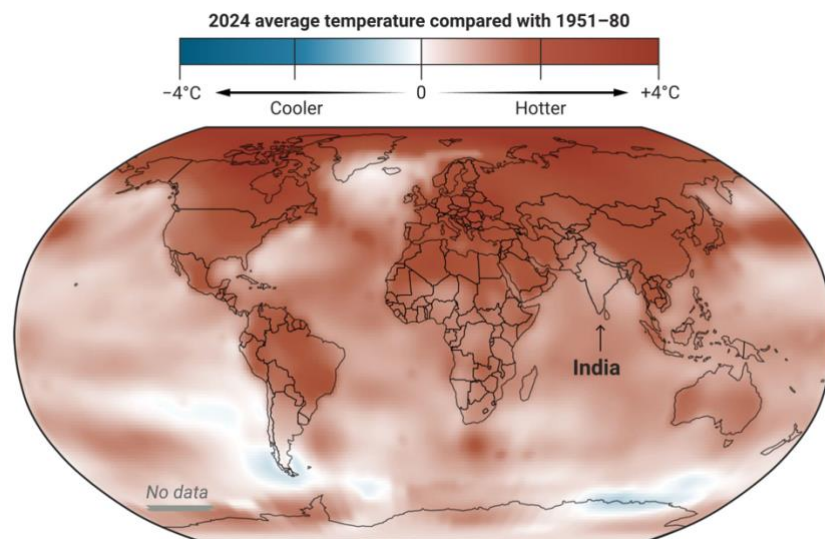
I had many interesting experiences during my 30-something years at Monsanto, but one of the highlights was a personal invitation from “Linda S” to meet at Langley, with around 20 or so of her similarly unnamed CIA colleagues. It was May 2011, a few days after the Agency had taken down Osama Bin Laden, so they were still giddy over that daring and successful mission.

But the topic of our visit was completely different. The Agency was gathering intel on whether Monsanto had any forthcoming technology to help avoid the climate-induced famine that their analysis suggested would be coming to certain parts of the world. Projected at each end of the meeting room was a detailed global heat map, with prominent hot spots in Nigeria and Pakistan.

Beginning at that May 2011 meeting and in subsequent years, it has become increasingly clear to me that India and Pakistan are on a collision course of escalating cyclical conflict over control of the headwaters of the Indus, much of which lies in the disputed region of Kashmir. Understanding why this should be so is relatively straightforward.

In 2023, India overtook China as the world’s most populous country, now having nearly 1.5B people. India has long adopted an agricultural policy of subsidized irrigation (based mainly on groundwater) that enables it to be almost entirely self-sufficient for food. This extensive irrigation results in considerable evaporative cooling, which is likely responsible (along with air pollution) for why India has managed to avoid much of the warming experienced by the rest of the world, as evident in this image from a [recent article](#) in *Science*.

But this side-benefit of current excessive irrigation is likely to be quite temporary. This is because the rate at which ground water is now being pumped is far faster than the aquifers are being replenished, an imbalance that will continue to worsen as the planet furthers its present warming trajectory (see the figure on the following page from a recent published analysis by [Bhattarai et al., 2023](#)).



(GRAPHIC) M. HERSHER/SCIENCE; (DATA) NASA GODDARD INSTITUTE FOR SPACE STUDIES, GISS SURFACE TEMPERATURE ANALYSIS VERSION 4

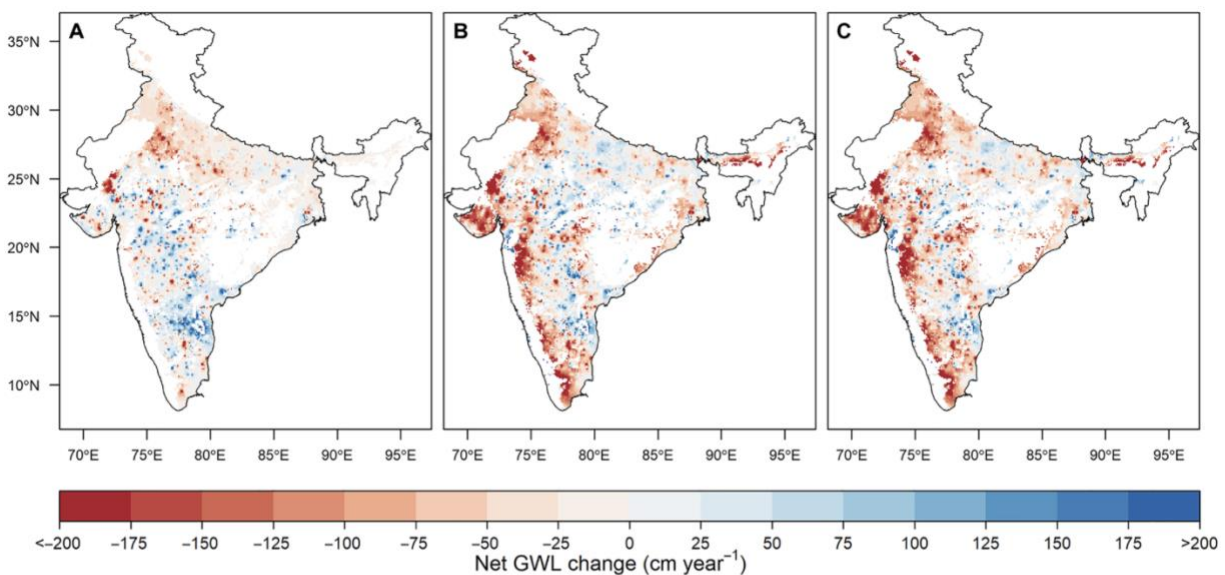
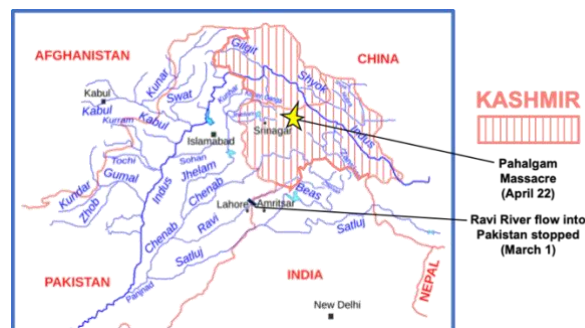


Fig. 4. Climate change will accelerate groundwater depletion across northwest, southern, and central India.

The figure compares the (A) 2004–2013 mean or current net GWL change (cm year^{-1}) with those predicted for (B) 2050 (i.e., 2041–2060 average climate) and (C) 2070 (i.e., 2061–2080 average climate) using regression results, and projected climate under the RCP2.6 scenario, and potential reductions in irrigation use that may occur as groundwater tables fall. The current GWL change map (A) shows an inverse distance weighted interpolated map of mean GWL loss for the 2004–2013 period across 1604 groundwater measurement locations.

As shown above in panel A, current groundwater depletion is generally concentrated in the northwest of India, at rates of up to 2 meters per year. However, by mid-century and beyond, such groundwater depletion rates will be widespread throughout the country. It is not publicly disclosed how much water remains in these aquifers, but such “mining” of groundwater is clearly unsustainable and will force India to seek alternatives.

And that’s where Kashmir comes into the picture – and why the US National Security community is rightfully concerned. As shown at right, control of this region is disputed between India and its western neighbor, Pakistan. This is also where the Indus River has its headwaters. Pakistan is wholly dependent on the Indus as its primary source of freshwater, and a 1960 treaty (the [Indus Waters Treaty](#)) gives around 70% of the overall river flow out of Kashmir to Pakistan.



However, India has its eyes on that water and has multiple large dam projects underway. One of these, on the Ravi River, [began full operation on March 1](#), stopping any water from flowing into Pakistan at that point, just upstream of Lahore, Pakistan’s 2nd largest city and the 27th largest in the

world (population of more than 14 million). India had been given the right to all Ravi River water in the Indus Waters Treaty, but this was certainly a provocative move. Less than two months later (on April 22, last Tuesday), a group of terrorists [massacred 26 non-Muslim tourists](#) (and injured 20 others) in a remote forested region (Pahalgam) not far from the disputed line of control between the Indian and Pakistani parts of Kashmir.

Now the two nuclear-armed nations seem on the brink of yet another major war, which would be their fifth since they became separate, independent nations in 1947. On April 23, India announced it was withdrawing from the Indus Waters Treaty, a decision that Pakistan has quite understandably labeled as an act of war.

What will come next for Kashmir? It's hard to imagine the conflict over water being settled peacefully, given the history of these rivals. As a fan of etymology, I find it to be fascinating that the words "river" and "rival" share a common Latin origin: "rivus" (small stream or brook). It's easy to imagine neighboring tribes being in conflict over control and use of any stream forming the shared boundary.

But stepping back to consider the global context, India and Pakistan sit just to the east of Southwest Asia. That's where the Bible originated and its text describes the region as being central to our history and our future. The biblical story is not primarily about rivers, but the Euphrates figures prominently. It is first mentioned in Genesis 2 and then again in Revelation 16, when the world is eerily predicted to experience a worsening climate of intense heat (Rev 16:9) and a drought that subsequently dries up the Euphrates (Rev 16:12). The text goes on to describe a widespread conflict that will arise following these climactic climate events, with global rivals gathered near a hill in northern Israel: "Har Megiddo", i.e. Armageddon.

But fortunately, that's not the end of the story. The final chapters tell of the "river of the water of life" (Rev 22:1) a river that is no longer a source of rivalry or conflict, but one of eternal peace and healing, to be shared by a multiethnic multitude comprising "every nation, tribe, people and language" (Rev 7:9), including past rivals. That's sounding better every day, compared to what we're now facing down here.