

Upstream water piracy threatens communities and environments

Water piracy by upstream countries threatens the environment and communities of downstream regions. Professor Miah Adel, University of Arkansas at Pine Bluff, US, has investigated the former USSR's greed for economic excellence – and therefore, regional power – by upstream water piracy, the environmental politics of upstream water use, and how certain countries like India and China are monopolising precious resources for economic gain and regional supremacy. Among the damaging effects to people and livelihoods, water resource depletion is also linked to climate change. Through highlighting the impacts of water piracy on people, animals, and landscapes, water resources can be better managed to ensure equal access by all.

Greed for economic excellence and regional power drives some upstream developed countries to build dams and barrages across international rivers. However, acquisition of water resources in this way deprives downstream countries of the same precious resource and puts them under economic hardship and subjugation. Dr Miah Adel, professor of physics at the University of Arkansas at Pine Bluff and Executive Vice President of non-governmental organisation Humane Water, has investigated the phenomenon of upstream water piracy and the damaging domino effect this weapon of ecosystem destruction has upon people, wildlife, climate, and the environment.

A CONNECTED PLANET

Across the globe, river basins cause ongoing disputes between countries as many share access to the same rivers – examples include the Nile, Zambezi, Senegal, Niger, Jordan, Tigris-Euphrates, Indus, Ganges, Teesta, Mekong, Rhine, Danube, Douro, Dnieper, Vardar, Pilcomayo, Parana, Bermejo, and Grande de Tarija. To highlight the internationality of the world's rivers, up to 39 countries can share more than 90% of a single river basin. If one upstream country monopolises access to a river to support greed-based domestic, agricultural, and industrial uses, it can have enormous consequences for many countries.

Riparian (river-associated) environments can change dramatically because of water piracy. Upstream construction of dams and barrages weakens downstream river discharges, increases silt deposition at distributaries' mouths, raises the downstream parent river and

distributaries' beds, and blocks water discharges to inland floodplains and other surface water bodies. Silted riverbeds fail to accommodate the sudden rush of water released from upstream dams and barrages, causing devastating flooding and riverbank erosion during the wet season.

As river discharge decreases, saline water fronts move upstream, altering the sweet-water ecosystem dynamics. Scanty river discharges create surface water scarcity, leading to increased humidity as smaller bodies of surface water heat up more quickly and evaporate early in the season at a faster rate. Additionally, a lack of recharge water and overdependence on groundwater leads to sunken

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groundwater tables, while dried out floodplains destroy breeding grounds for fish, the cheapest source of calcium and animal proteins, and consequently cause malnutrition among people as well as decrease biodiversity.

For humans, dried rivers lead to increasingly costly transportation of goods and services as navigable routes along inland waterways are lost. Scarce water resources cause changes in agricultural



practices and a loss of fishermen's livelihoods, resulting in international migration. With the depletion of surface-water resources, there is an overdependence on groundwater. However, with sunken water tables,

The domino and feedback effects of upstream countries' monopoly river access will be a weapon of ecosystem destruction for the downstream countries.

people are forced to dig tubewells more than 80m deep to find drinking water. Shallow tubewells are abandoned because aquifers dry up or contain arsenic-contaminated water. Surface water bodies that could absorb heat turn into heat reflecting and emitting bodies, causing crops to burn in fields. Culturally, changes to river flow have eradicated religious observances, water sports, and facilities for pastimes in the affected regions

CLIMATE CHANGE FROM PIRACY

If these impacts were not incentive enough to encourage action against water piracy, Adel's research has highlighted an additional concern of water resource depletion masked under CO₂ accusation – a lack of water bodies can cause climate change. Predominantly,



Patients suffering from arsenic poisoning.

climatologists focus on the problem of global CO₂ production increasing global temperatures and subsequently reducing surface water. Yet it may be the lack of water itself that causes climate change. In downstream, water-depleted countries, increased summertime heating and wintertime cooling has been observed; therefore, water resource depletion causes global warming vis-à-vis cooling as is observed today.

Extreme climatic changes result from a lack of downstream water bodies which would normally absorb and store excess heat in the summer and release this heat during the cooler winter months, helping to control seasonal temperature fluctuations. For every 1°C temperature rise, a 12% increase in lightning occurrence has been observed. Therefore, increasing summer temperatures by depleting surface water body coverage is raising the risk of fatality from lightning strikes to people and animals, alongside damaging property.

The climatic impacts of water piracy have been observed historically in the Aral Sea basin, after the former USSR diverted water from the Amu Darya and the Sir Darya for cotton production, leading to the Aral Sea basin almost completely drying up. What water remains is highly saline, impacting local ecology as native fish can no longer survive here. Moreover, dust and salt storms are becoming more frequent.

Seasonal changes have heightened too, with short-lived, hotter summers and longer, colder winters, marked by decreased precipitation.

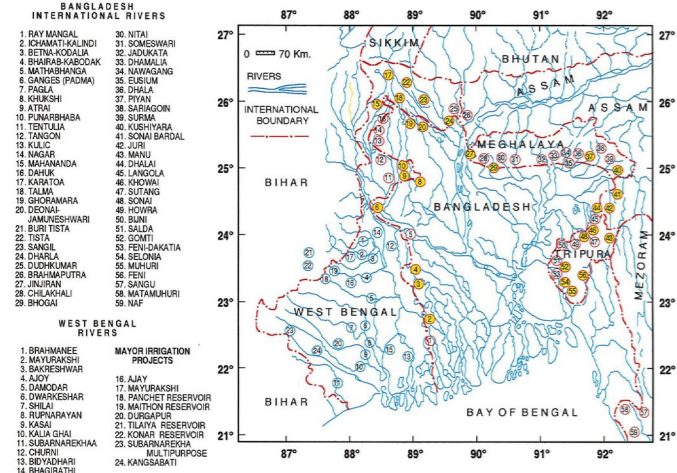
INDIA'S MONOPOLY ON WATER

A similar story has unfolded in downstream regions of the Ganges.

There are almost sixty rivers between India and Bangladesh. Surrounding Bangladesh, India has built the Great Ring of Dams and Barrages across more than 50% of these international rivers, using bluffing, blackmailing, bullying, and cornering to pirate water resources. The Farakka Barrage, just 18km from the Indo-Bangladesh border in the upstream Ganges, is one grand example. With one third of Bangladesh's population relying on this river, the impacts of the barrage on downstream regions are extremely concerning.

India has pirated the Ganges' water since 1975. Adel's research reveals that in recent years, piracy of the Ganges' water by the Farakka Barrage has reduced the river's discharge through the lower basin by more than 75%, decreasing downstream water availability in floodplains, canals, lakes and ponds, alongside lowering the groundwater table by 15 to 30 times compared to the pre-piracy period. Additionally, the effects of changes to the Ganges on Bangladesh's population are compounded by the drastically reduced discharge of the neighbouring Teesta

The effects Bangladesh has suffered following the upstream water piracy from the Ganges, the Teesta, and other international rivers should be a universal lesson to be learned by governments, politicians, policy-makers, planners, World Bank and other donors, judges of international arbitration court, environmentalists, and academicians to avert a potential global crisis.



The Great Ring of Dams and Barrages around Bangladesh's borders (left). Pirated water (below).



River as it flows from the Himalayas to meet the Brahmaputra in Bangladesh. The Teesta now experiences a silt-rich flow that blocks the riverbed in lowlands, increasing the risk of flooding in a country already prone to such disasters (more here). The deluge suffered by north-west Bangladesh in 2022 when India opened its dams and barrages is unprecedented.

BANGLADESH ON THE BRINK
Bangladesh is experiencing climatic impacts from upstream water piracy of the Ganges basin. Since the 1980s, parts of Bangladesh have seen summer temperatures exceed 42°C while winter temperatures have fallen to 2°C. Using 1982 as the baseline for comparing recent climatic changes resulting from water piracy, the average summertime and wintertime temperatures for Bangladesh are now 1°C more and 0.5°C less, respectively. The mode of summertime maximum temperature occurred 414 times more. Maximum relative humidity has increased by more than 2% since 1982, while the 95% maximum and 70% minimum relative humidity mode occurred 1,322 and 84 times more, respectively. The frequency of 100mm or more of rainfall and monthly average rainfall have declined by 50% and 30% respectively.

Adel's research shows that following depletion of heat-storing surface water bodies, post-baseline summer heat storage loss is ten times more than pre-baseline. Consequently, there is less heat stored, causing extreme summer temperatures and relative humidity (as, for example, 45% evaporation occurs from groundwater extracted for agricultural irrigation). In winter, there is a corresponding deficit of heat storage, causing bitter cold. People, particularly elderly populations and babies, become victims of extreme weather.

INDIA'S POLITICAL POWER
Geopolitics continues as India also threatens to cut off Pakistan's water supply by continuing to build dams across the source waters for Pakistan's rivers. This

Adel hopes that countries will start to follow Mahatma Gandhi's words: 'The world has enough for everyone's need, but not enough for everyone's greed', and that influential people, such as the Nobel Laureate Professor Alley, will understand that energy solvency cannot stop upstream water piracy.

would have devastating impacts on livelihoods that rely on rivers for food production and employment in farming and animal husbandry. If India continues its water piracy and cuts off Pakistan's water supply completely, then India would be breaking the 60-year-old Indus Water Treaty.

This situation is unfolding elsewhere too. As China and India continue to construct dams and barrages across international river discharges for economic benefits and downstream subjugation, their activities threaten the lower Mekong and Brahmaputra basins with the prospect of turning them into the Aral Sea basin – completely devoid of water. The effects Bangladesh has suffered following the upstream water piracy from the Ganges, the Teesta, and other international rivers, should be a universal lesson to be learned by governments, politicians, policy-makers, planners, World Bank and other donors, judges of international arbitration court, environmentalists, and researchers to avert a potential global crisis.

PROTECTING WATER RESOURCES
Given the widespread effects of upstream water piracy on downstream communities and environments, both directly through the lack of water and from the domino and feedback effects of induced climate change, Adel stresses the need for climatologists to make researching water piracy a priority. Greater study of the climatic changes in downstream areas resulting from water piracy is needed to show that the loss of large water bodies is not always caused by rising CO₂ levels.

It is further suggested that, to satisfy the greed for economic superiority, nations transition from hydroelectric power to other renewable energy sources, including wind and solar power, to avoid pirating the downstream ecosystem's elixir water resources. Taking action is necessary to prevent upstream countries from taking more than their fair share of international water resources. Adel hopes that countries will start to follow Mahatma Gandhi's words: 'The world has enough for everyone's need, but not enough for everyone's greed', and that intellectuals like the Nobel Laureate Professor Alley will understand that energy solvency cannot stop upstream water piracy.



Behind the Research

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Dried-up river Ganges in Bangladesh.

Research Objectives

Professor Adel examines upstream water piracy and its consequences.

Detail

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Bio
Professor Miah Muhammad Adel performs multidisciplinary science research at the University of Arkansas at Pine Bluff and at the NGO Humane Water. He hails from the Ganges basin in Bangladesh. From his boyhood days, he vividly remembers the abundant surface water resources and week-long rains which are hard to imagine during the water-piracy period.

Personal Response

What more can be done to persuade climatologists that water piracy, rather than rising CO₂ levels, is the cause of so much pressure on international water resources?

Upstream water piracy-related climatic changes need to be well documented and circulated to a greater number of audiences to make it a public issue. This will help to point out climatologists' responsibilities and to convince intellectuals like the Nobel Laureate Professor Alley that, rather than energy insolvency, the greed for economic excellence and regional power leads to upstream water piracy. Publishing organisations should publicise the havoc of this weapon of ecosystem destruction. Likewise, I am continuing to push the American Meteorological Society to include the topic – water exploitation-induced climatic changes – at its annual meeting. Efforts need to be continued.



Farakka Barrage across the Ganges river.