

Is the Taj Doomed?

The Taj Mahal is in grave danger. While air pollution is turning the monument brown, severe degradation of the Yamuna is likely to ruin its foundation. If not tackled on a war footing, India's only 'Wonder of the World' may one day become a rotting remnant of the glory that was. Or worse, it may just slide off its pedestal into the mud

Infographics by NILANJAN DAS

A RIVER FULL OF SORROW

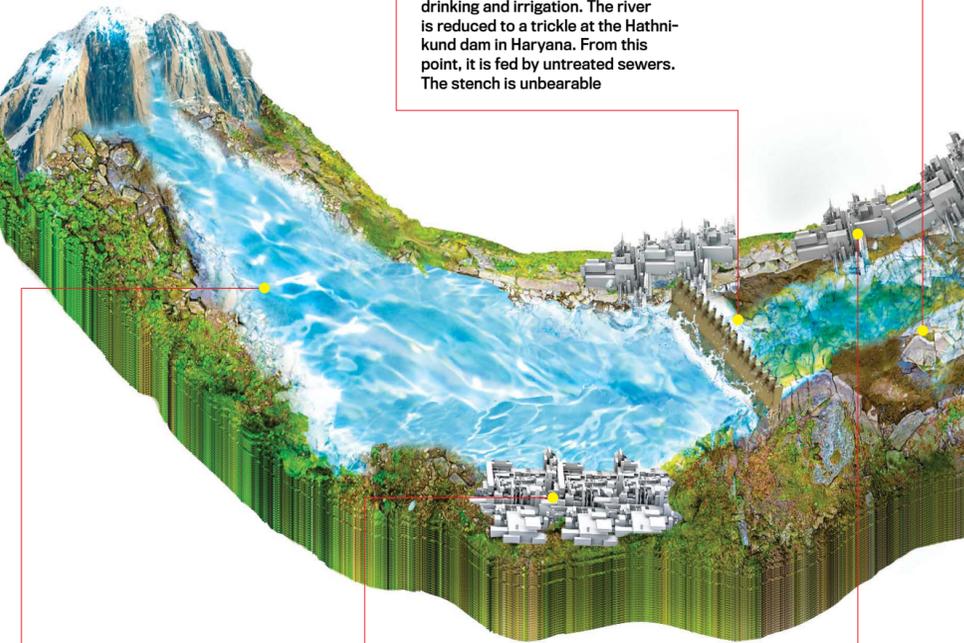
99%

WATER VOLUME THE YAMUNA LOSES

After diversion into two canals for drinking and irrigation. The river is reduced to a trickle at the Hathnikund dam in Haryana. From this point, it is fed by untreated sewers. The stench is unbearable

ECOLOGICALLY DEAD

Between Panipat and Agra, the river is black and stinking, with municipal, domestic and industrial waste pouring into it from 22 drains in Haryana, 42 in Delhi and 17 in Uttar Pradesh



CLEAR, BLUE AND SPARKLING

The Yamuna springs from the pure meltwaters of the Yamunotri glacier on the Banderpooch peaks in the Lower Himalayas in Uttarkashi, Uttarakhand

FIRST INTERVENTION

The Yamuna enters the plains at Dakpathar, Uttarakhand. A weir, 3 hydel plants and a tourist complex destroy fish, turtles and water birds

MINING ON RIVERBANK

A canal meets the river 20 km downstream at Paonta Sahib, a Sikh pilgrimage site and an industrial town; stone and sand mining goes on at the riverbank, in open defiance of Supreme Court directives

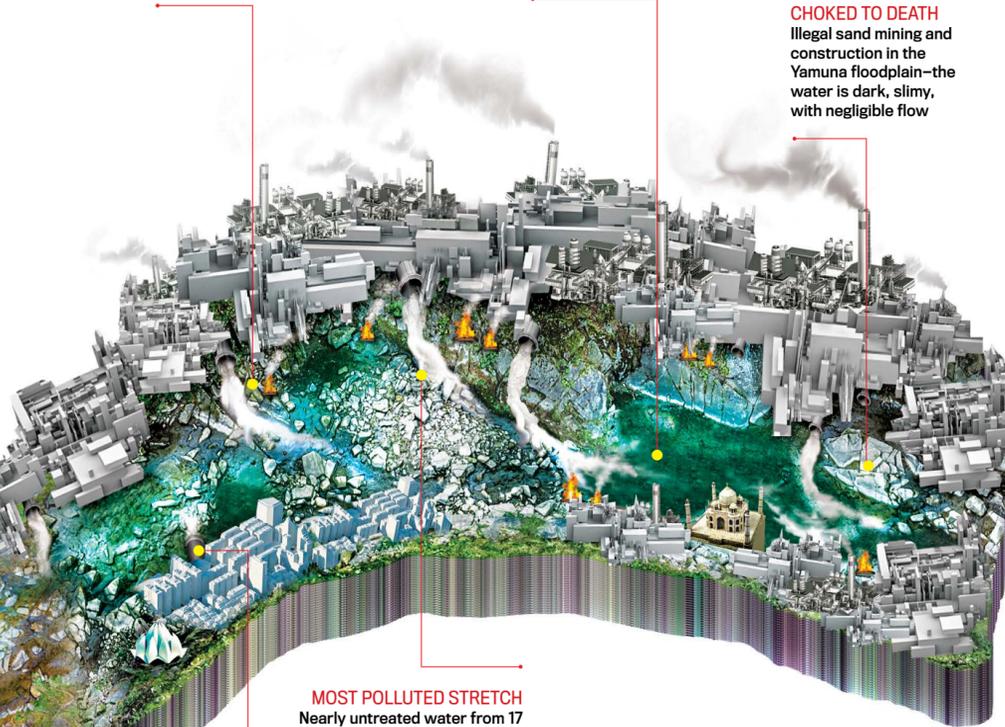
CAPITAL CALAMITY

Delhi drains out almost all the water, dumps 80% of its solid waste into the river between Palla, Wazirabad, ITO and Okhla barrages

UNFIT FOR ANY USE The Yamuna gets all the waste from Ghaziabad, Noida, Greater Noida; at Mathura, the Gokul barrage robs it of more water while the Masani nullah empties more waste: remains of ghats, cremation grounds, industrial chemicals

IT'S A SEWER At Agra, it's no longer a river, but a sewer; with 630 MLD of untreated municipal sewage dumped every day, floating filth, plastic, tannery waste, cadavers and carcasses, toxic metal discharge from industry...

CHOKED TO DEATH Illegal sand mining and construction in the Yamuna floodplain—the water is dark, slimy, with negligible flow



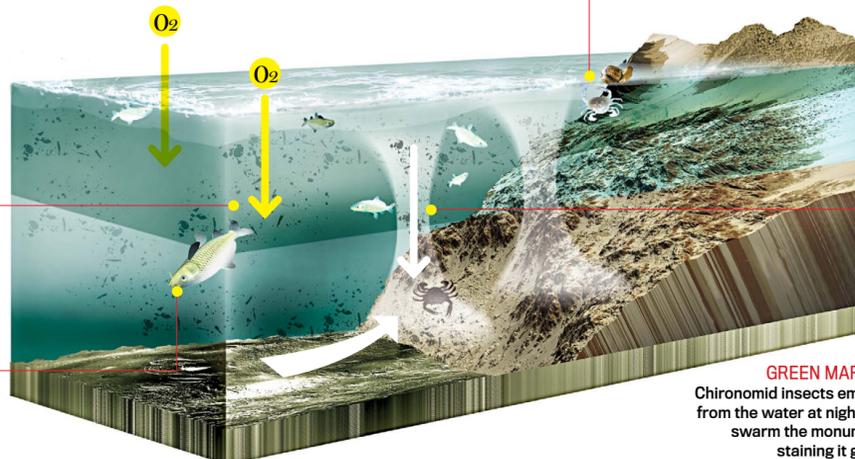
MOST POLLUTED STRETCH Nearly untreated water from 17 drains in UP, the water turns poisonous from here, full of filth, microbes, heavy metals, arsenic, residual ash and coal

O₂

0 MG/ L OF DISSOLVED OXYGEN at a few locations near Agra. Healthy rivers should contain at least 5 mg/ L for marine life to thrive

POISONOUS WATERS

The Yamuna behind the Taj is greyish-black, smells of rotten eggs, marked by blooming algae and dead fish



GREEN MARBLE

Chironomid insects emerge from the water at night and swarm the monument, staining it green

A TOXIC NEIGHBOURHOOD

WORST POLLUTERS Open burning of trash by the Agra municipality; burning of scrap tyres to extract iron; wood-burning crematoriums; forest fires; chullahs—in homes and small-scale industries; on-road and off-road diesel engines; industrial emission

DISCOLOURING THE TAJ Scientists have found that tiny dust particles, black carbon (soot) and brown organic carbon are sticking to the Taj surface. They absorb ultraviolet light, giving the white marble a dirty brown hue

50

TIMES MORE BIOCHEMICAL OXYGEN DEMAND (BOD) than the permissible limit, by the time the Yamuna flows through Agra; indicates very high levels of pollution, which promotes the proliferation of harmful insects and microbes



DEADLY PARTICLES Open burning of waste and diesel fumes release tiny carbon particles that stick to the marble. They are insoluble in water and hard to remove. The only way to reduce emissions is to identify and eliminate the sources of pollution

BROWN CARBON Solid waste from animal and crop sources; meat processing waste; leather tanning waste; stubble burning in nearby states; these are the biggest sources of hazardous brown carbon in the air, Agra's enduring bane

SAND IN THE AIR Dust particles, mostly from the Rajasthan deserts, and illegal sand mining, increase the level of suspended particulate matter in the air. Sand particles also abrade the marble

FOUNDATION FEARS

WELL FOUNDATION The Taj is built on gigantic wooden slabs atop a well foundation, to stabilise the river-bank sand. Rows of columns and archways keep it from sliding into the river

RIVER DIVERTED A series of conduits, and drainage pipes encased in stone and mortar built in to divert the river water

UNKNOWN DEPTHS Caissons, or watertight hollow cylinders, cased in ebony or mahogany, and filled with rubble and masonry, extend deep into the river bed

WOOD BASE GOES BRITTLE The wooden parts need to be moist, to retain flexibility and strength. With the Yamuna receding, it's feared the logs and boards have become brittle and that the Taj might cave in

2,000

METRIC TONNES of waste is dumped in the open in Agra city every day

24

PER CENT Municipal waste is burnt on the roadside, releasing particulate matter

9

PER CENT Or less is Agra's green cover now, against the national goal of 33%

* Artist's Impression