



CSIR IN MEDIA

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Nation That Suffered Worst Drought in Decades Is Water Exporter

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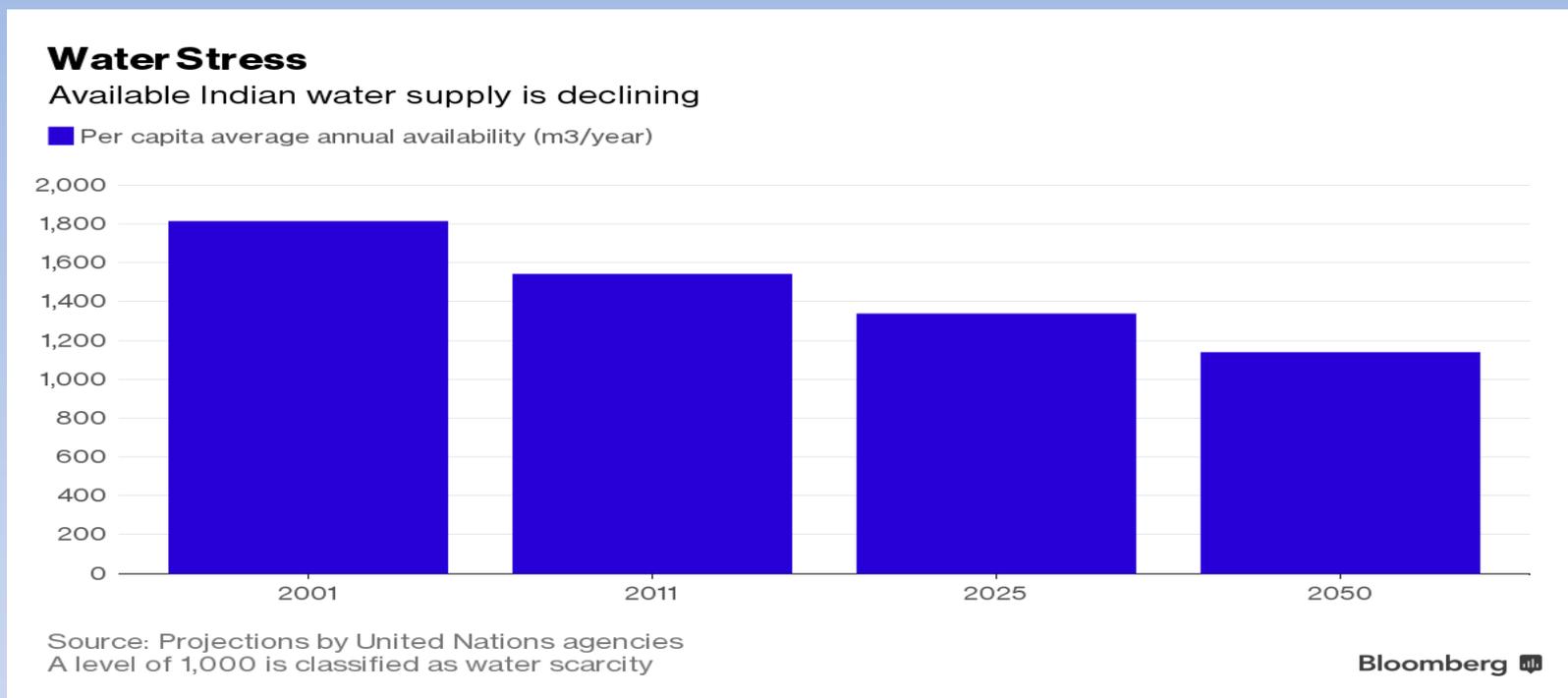
Workers unload wheat at a grain market in Karnal, Haryana.

Jaiveer Arya wipes sweat from his brow as he squats in the shade and watches workers weigh his wheat crop at a grain market in India's northern Haryana state. He's hoping for a good price from exporters.

Unseen in Arya's 850 kilograms of wheat is about 128 kilograms of water that's embedded within the food. Arya and millions of farmers like him in India account for about 2.5 percent of global agriculture exports, meaning that a large amount of water embedded in produce is shipped overseas and lost for good by a nation still emerging from one of its worst droughts in decades.

- **India ships out large amounts of water embedded within grains**
- **That's adding to the challenge of managing depleting supplies**

"We export agriculture products without any thought," said Prashant Goswami, director and climate scientist at CSIR-National Institute of Science, Technology and Development Studies in New Delhi. "When water is embedded in a product that's exported, it's lost forever. That's a bigger danger for our water."



Goswami estimates India could exhaust available water supplies in less than 1,000 years because of net exports of food such as rice and wheat. He argues officials must change farming policies to turn the deficit in trade in embedded water into a surplus. Growing demand from industry and the nation's 1.3 billion people is also adding pressure for better management of the resource.

Rice Sales



India -- the world's top rice exporter -- shipped agricultural commodities worth more than 2.6 trillion rupees (\$39 billion) overseas in 2013-2014, government data show. The nation exported about 25 cubic kilometers of water embedded in its agricultural exports in 2010. That's enough water to meet the needs of nearly 13 million people.

Hundreds of millions of people in India grappled this year with one of the country's worst droughts in decades, following two years of poor rainfall and the onset of intense summer heat. The June-September monsoon is bringing some relief, but a longer-term challenge looms from competition for supplies.

Arya, 44, grows both rice and wheat in his 10-acre smallholding near the border of Haryana and Uttar Pradesh states. Another common crop in the region is water-intensive sugar cane.

Speaking at the market in May, Arya said he draws water from a 170-foot well for irrigation, five times deeper than when his father tilled the farm. He added that he's had to bore deeper three times in the last five years.

Unseen Depletion

Policies that effectively provide farmers with free water as well as free electricity to run pumps are stoking over-exploitation, according to Ashok Gulati, an agriculture economist and former chief of India's Commission for Agricultural Costs and Prices.

"Who has seen the future?" he asked. "Farmers can't see how much water's being depleted underground."



Water commuters wait in line to fill containers at the Vivekananda Chowk water tank in Latur, Maharashtra.
Photographer: Dhiraj Singh/Bloomberg

India is one of the world's biggest users of groundwater, and the World Resources Institute estimates more than half of the nation faces high water stress. A 2009 study by the University of California, Irvine, and the National Aeronautics and Space Administration showed groundwater depletion in northwestern India from 2002 to 2008 was equivalent to a net loss triple the capacity of Lake Mead, the largest man-made reservoir in the U.S.

Import Flood?

One possible policy step for Asia's No. 3 economy is to curb sugar cane subsidies and abolish levies on imports of the sweetener, to encourage farmers to grow crops that need less water, Gulati said.

"Let imports flood the market," he said.

India could learn from China, according to Goswami, who's published his work on embedded water in the journal Nature along with co-author Shiv Narayan Nishad, a mathematician at the M.S. Ramaiah University of Applied Sciences in Bengaluru.

China imports more water-intensive produce while exporting food that uses less water, their research shows. "Policy makers need to sit down and ensure that we import food in such a way that we bring in more water," Goswami said. "The world is no longer innocent of this virtual water trade."

<http://www.bloomberg.com/news/articles/2016-07-11/nation-that-suffered-worst-drought-in-decades-is-water-exporter>

Archana Chaudhary & Pratik Parija | July 12, 2016

NIIST's novel technology to check acidic pollutants in TiO₂ production by PSUs

CSIR-NIIST



Cancer causing Acidic effluent flow from public sector undertakings (PSUs) in Kerala involved in the production of titanium dioxide (TiO₂) pigment could be minimised if it opts for a novel technology. This innovative technology developed by CSIR- National Institute for Interdisciplinary Science and Technology (NIIST) would help reduce 75 percent acidic pollutant discharge in the production of TiO₂ from ilmenite ore extracted from the black sands of Kerala.

Now, this new technology developed at NIIST proved successful in the production of titanium feedstock with more than 90% TiO₂ in laboratory and semi pilot plant scale. The process is most environment friendly with more than 70% reduction in acid consumption and bulk of the iron is removed in the form of oxides, free of excess acidity and chloride contamination, CSIR- NIIST director A Ajayaghosh told TOI.

"This new technology assures to reduce 75 percent acidic effluent discharge by removing iron from ilmenite" NIIST senior scientist Harikrishna Bhat told TOI. Further he said, Ilmenite mineral from coastal sands of Kerala contains 58 percent titanium dioxide (TiO₂), iron and iron oxide. The technology involves removing iron from ilmenite through metallisation and rusting process to separate 80 to 85 percent TiO₂. This rutile grade TiO₂ is further enriched to produce 90 per cent TiO₂, which is high rutile grade titanium dioxide, a white pigment used as paints for aerospace components. The titanium alloy developed from high grade TiO₂ is resistant to high temperatures and corrosion and is used for aircraft, armour plating, naval ships, spacecraft's, he said.

As part of technology transfer, NIIST has partnered with a Tamilnadu based company VV Minerals which is keen to demonstrate the technology at its 100 Tonnes per day capacity plant facility. The company in the presence of its director V Subramanian has already signed an agreement with NIIST to implement the technology.

The PSUs involved in TiO₂ production include Kerala Minerals and Metals Limited (KMML) at Chavara and Travancore Titanium Products (TTP) at Veli. TTP's mode of production of TiO₂ pigment is through the sulphate process using sulphuric acid to produce anatase grade TiO₂. It is considered lesser grade TiO₂ used for interior paints and electronic components, compared to KMML's rutile grade TiO₂ produced from chloride route using hydrochloric acid. Both these PSUs indicate that they have sewerage treatment facilities, yet the acidic discharge could be minimised further, if it opts for change.

While, Kerala PSUs are yet to opt for the technology. "I had appraised about this technology process to KMML and it could be inducted with minimum investment. I will also write to the concerned Ministry to take it forward for such state PSUs," Ajayaghosh said.

<http://timesofindia.indiatimes.com/city/thiruvananthapuram/NIISTs-novel-technology-to-check-acidic-pollutants-in-TiO2-production-by-PSUs/articleshow/53178793.cms>

Laxmi Prasanna | Jul 12, 2016