




WATER THE ELIXIR OF LIFE

By Ramki PKF S&S



Colgate's 2016 super bowl ad –on saving water

- ▶ <https://www.youtube.com/watch?v=IS4lGnGfHTw>
 - ▶ Search in YouTube- Super Bowl 2016: Colgate Ad
 - ▶ It tells you that brushing teeth with faucet running wastes 4 gallons of water –which is more than what many people around the world have in a week!



Some startling facts on water

By Ramki PKF S&S

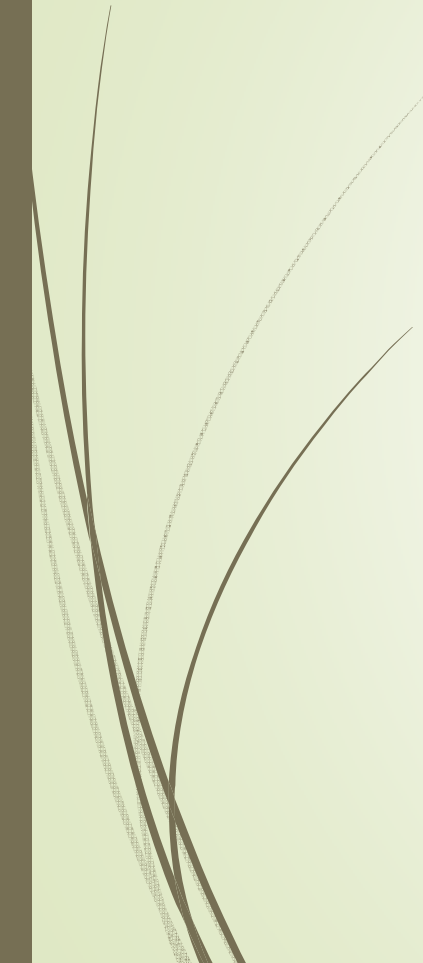


Startling facts from water.org-1

- ▶ 663 million people - 1 in 10 - lack access to safe water.
- ▶ 2.4 billion people - 1 in 3 - lack access to a toilet.
- ▶ Twice the population of the United States lives without access to safe water.
- ▶ 1/3 of the global population lives without access to a toilet.



Startling facts from water.org-2

- ▶ More people have a mobile phone than a toilet.
 - ▶ A review of rural water system sustainability in eight countries in Africa, South Asia, and Central America found an average water project failure rate of 20 - 40 percent.
 - ▶ Globally, 1/3 of all schools lack access to safe water and adequate sanitation.
- 



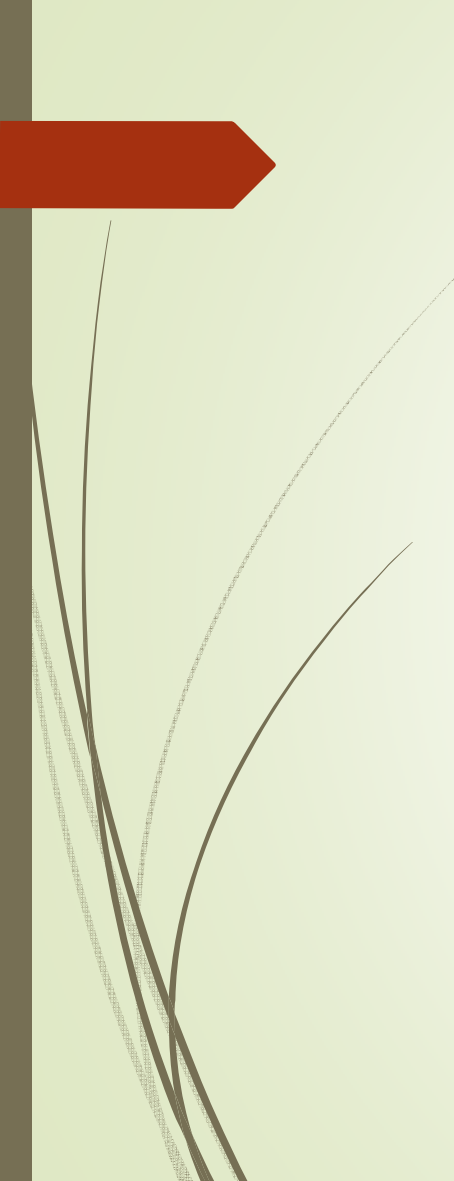
Startling facts from water.org-3

- ▶ In low and middle-income countries, 1/3 of all healthcare facilities lack a safe water source.
 - ▶ **The water crisis is the #1 global risk based on impact to society** (as a measure of devastation), as announced by the World Economic Forum in January 2015.
- 



India and the serious water problem

- **India has the world's largest number of people without access to safe water**, according to a report released to mark World Water Day on Tuesday (Mar 22, 16)
- I.e 7.6 crore people or 5% of population
- People can spend as much as 17% of income on water (in Papua New Guinea it is higher than 50%!)
- Poor management of water resources is the biggest problem and over-extraction of ground water has aggravated the crisis.
- Communities fall back on a single or distant source of drinking water, often leading to disputes and increased discrimination against the main water fetchers, particularly women.
 - Source: 8 crore in India deprived of safe drinking water_ Study - Times of India



Global warming worsens water problem

- Snow packs are a water source for millions
- And these are vanishing every minute
- So the water crisis is going to further deteriorate
- Justin S. Mankin, an earth scientist at [Columbia University](#), and his colleagues analyzed 421 drainage basins in the Northern Hemisphere that depend on rainfall and snowmelt.
- They found that 97 basins, currently serving two billion people, depend heavily on snowmelt.
- The scientists calculated that the likelihood the basins would receive less snow in the coming century was 67 percent.

■ Source: Billions of People Depend on Water From Shrinking Snowpacks - The New York Times.html




Technology solutions

By Ramki



Microbots- a billion of them in a syringe

- Imagine an army of 20,000 tube shaped reusable microbots scavenging 80% of lead from 3 mm of tainted water in one hour at a cost of 5 cents a litre! Bye bye Flint like problems!
 - Methods of ridding water of contaminants vary: Chemicals, filters, membranes, electric current –now microscopic, self-propelled, aquatic microbots can do this!
 - Three layered bots-
 - Outer layer of Graphene which binds to heavy metals
 - Middle layer of nickel to give bots magnetic polarity
 - a Platinum inside for propulsion
- Source: Nano Letters -Graphene based microbots for Toxic Heavy metal Removal and recovery from water



ISRO to help Karnataka locate water sources

- ▶ Bhuvan satellite would be used to locate the water sources
 - ▶ [Isro to help Karnataka find water sources - Times of India.html](#)
- ▶ Scientists from Stanford university have demonstrated that satellite-collected data can accurately measure aquifer levels,
- ▶ a finding with potentially huge implications for management of precious global water sources.



Innovative solutions

- ▶ Drinkable book
 - ▶ <http://waterislife.com/clean-water/new-technology>
- ▶ Lifestraw makes contaminated water safe to drink
 - ▶ <http://lifestraw.com/>
 - ▶ I have one!
- ▶ Soil Sensors Can Cut Farms' Water Use By a Quarter During Drought
 - ▶ <https://www.cropx.com/> (helps farmers to reduce water consumption)
- ▶ smart shower head that flashes red when someone uses too much water!
 - ▶ Developed by French firm Start & Blue, Hydrao has built-in LED lights that change colour as more and more water is used.



Innovative solutions contd.

- A [new reusable polymer that can remove pollutants from flowing water within seconds, just like air fresheners trap invisible air pollutants in the home and remove unwanted odours.](#)
 - Found out by a team, led by Will Dichtel, associate professor at Cornell University in US,
 - Source: [New polymer could purify water in seconds - The Times of India.html](#)
- We lost huge amount of water during the last rains in Chennai and soon may be we will be facing water shortage in a year; what if you can store all the water?
 - A world-class underground discharge channel has been constructed on the outskirts of Tokyo. The tunnel, dug about 50 meters below ground, extends 6.3 km in total. The underground construction, comprising vertical shafts to store floodwater – which look more like gigantic tanks – and a mammoth water tank supported by towering pillars weighing 500 tons each, is far beyond anyone's wildest imagination.
 - Source: [World-Class Underground Discharge Channel _ Tech & Life _ Trends in Japan _ Web Japan](#)



Innovative solutions contd.

- ▶ A tiny robot that powers itself by swallowing dirty water (feeds on Algae and dead plants) could one day play a major role in environmental clean-up efforts.
 - ▶ Its called 'Row-bot' developed by Bristol Robotics Lab
 - ▶ Source: Bristol University's tiny 'row-bot' turns dirty water into electricity (Wired UK).html
- ▶ Researchers, led by an Indian-origin scientist, have found an energy efficient material for removing salt from seawater to yield drinkable water.
 - ▶ The material, a nanometre-thick sheet of molybdenum disulfide (MoS₂) riddled with tiny holes called nanopores, is specially designed to let high volumes of water through but keep salt and other contaminants out. MoS₂ showed the greatest efficiency, filtering through up to 70% more water than graphene membranes.
 - ▶ Source: PIO expert finds material to help 'drink from sea' - The Times of India.html



Wastage of precious water

By Ramki



Is India the biggest (Virtual) exporter of water?

- ▶ In 2014-15, India exported 37.2 lakh tonnes of *basmati*.
- ▶ To export this rice, the country used around 10 trillion litres of water.
- ▶ To put it another way, **India virtually exported 10 trillion litres of water.**
- ▶ Except for Brahmaputra and Mahanadi, all river basins experience water scarcity for a major part of the year. The two most populous basins—Ganga and Indus (part of this in Pak)—suffer significant-to-severe levels of water scarcity for 7 and 11 months in a year, respectively.
- ▶ **Can we afford this?**
 - ▶ **Source: India is the biggest virtual exporter of water - Livemint.htm**



Water festivals like Songkran festival in Thailand

- ▶ Thailand's Songkran festival brings thousands of locals and tourists to the streets for one of the world's biggest water fights during the hottest month of the year.
- ▶ The three-day festival, in which dousing each other with water symbolizes the washing away one's misfortune wastes a LOT of water.
 - ▶ Mashable : Thailand held a country-wide water fight, in spite of drought.html



What Indian villages can teach!

By Ramki



PAANI ATM'S IN PATODA-a model village

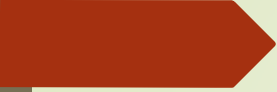
- ▶ On the fringes of Aurangabad, Maharashtra
- ▶ Know- water more precious than money
- ▶ Strict rules on water usage
- ▶ Stringent water audits
- ▶ Water meters in every household
- ▶ Entire water is recycled
- ▶ Bunds built to save rain water
- ▶ In stabilization ponds multiple forms of bacteria and algae cleanse water
- ▶ Water model developed by Bhaskar Pere-Patil (class VII)

▶ Source: TOI May 1 2016

Water ATM of Patoda

- ▶ 20 litres of filtered mineral water free to all residents of village
- ▶ Water ATM cards
- ▶ Operates 24X7
- ▶ Additional water at Rs 5 per 1000 litres





Water harvesting in Laponiya, Rajasthan

- Water harvesting defies drought for last 30 years
- Traditional water harvesting
- Ground water gone to 500 ft in nearby areas is available at 15-40 ft here
- They supply water to 10-15 surrounding villages!
- Idea of Lakshman Singh a school drop out
- Villagers stay away from water intensive crops
- During summer only green fodder and vegetables allowed
- As land got greener they started dairy farming
- Each household makes 30-45 k a month selling milk!
- Non profit –Gram Vikas Navayuvak Mandal Laponiya (GVNML)
- Example followed in 58 neighboring villages

■ Source: TOI May 1, 2016



Chowka system of water harvesting

- Small interconnected sloping rectangular pits, nine inches deep made in 400 bighas (160 acres) pasture land
- Pits are bordered with mud embankment
- As water assembles in one chowka it flows into adjacent one
- Spreads evenly because of bunds
- After crossing several chowkas water finally moves into a pond
- This method
 - Makes top layer of soil moist
 - Recharges ground water
 - Enables growth of native grasses and shrubs
 - Helps harvesting rabi crop without irrigating fields



International co- operation

By Ramki




India -Israel cooperation

- India and Israel co-operating in water conservation, recycling and desalination
- In Chennai a Israeli desalination plant is already in operation
- In Agriculture Israel's drip irrigation methods are popular in many parts of India
 - India, Israel to further cooperation to water conservation – Livemint
- Why Israel?
 - **Sixty percent of Israel is desert. The country averages less than 25 inches of rain a year. And yet it still produces almost all of its own food. Water is considered a national resource.**



Solutions

By Ramki



You can't control what you do not measure

- Install water meters
- Compare consumption with similar homes, offices etc.
- check your water footprint
 - <http://www.watercalculator.org/>



Solutions by Water.org

- ▶ WATER CREDIT
 - ▶ Microfinance loans for water connections or toilets
 - ▶ IKEA foundation recently made a Euro 12.4M contribution to Water credit projects in India, Indonesia
- ▶ The new ventures fund
 - ▶ Source of innovation funding to pilot, disseminate and scale initiatives that address the underlying causes of water crisis



Small things add up..

- ▶ attend to leaky taps
 - ▶ A typical household loses 2-20k gallons of water p.a due to leaks
- ▶ Turn off faucet when shaving or brushing teeth;
- ▶ Fill up sink to do dishes;
- ▶ use the smaller flush when option is there ;
- ▶ use save water options in washing machines;
- ▶ opt for not changing towels, bed spreads daily in hotels;
- ▶ Reduce shower time;
- ▶ Meat consumes lot of water; going vegetarian once a week can save hundreds of gallons per meal



Excellent article on how we can help

- Mashable: How you can help improve water quality and access around the globe
 - Most of the solutions are taken from this article



Donate to organisations doing great work in water

- [Water.org](http://www.water.org)
- <https://donate.charitywater.org/donate/home><http://www.wateraid.org/us>
- <https://www.thirstproject.org/donate/><https://www.unicefusa.org/donate/support-unicefs-water-and-sanitation-programs>
- <https://www.waterforpeople.org/donate>
- <http://www.globalwomenswater.org/>
- <http://www.womenforwater.org/openbaar/index.php>
- <http://www.charitywater.org/projects/countries/india/>
- http://thewaterproject.org/wells_for_india
- <http://www.hihindia.org/environment-natural-resource-management> (does also Community drinking water programs)