

INDIA'S WATER WOES AND WAY FORWARD

"Water is the driving force of all nature"
- Leonardo Da Vinci

According to UN World Water Development Report (2003), ~~by 2025~~ India will join ~~the~~ countries having ABSOLUTE WATER SCARCITY!

This alarming fact highlights the water woes that India faces. With 2% of world's area, 16% of world's population, India receives only 4% of the global precipitation and ranks a lowly 133 in terms of water availability per person per annum. With an area of 32.8 lakh sq km, the renewable water resources are only about 2000 sq km per annum. Due to our unique geography and drainage pattern, we are plagued by both floods and droughts making it

good introduction
puts things in
perspective

imperative for proper ^{water} planning and management for availability and accessibility of water for all.

The water woes faced by India includes multidimensional problems - water scarcity leading to water stress, polluted water, over-exploitation of water, excessive use and unequal access to water among different social groups and different regions.

Water scarcity may be an outcome of large and growing population and consequent greater demands for water and unequal access to it. A large population ~~in~~ needs more water not only for domestic use but also to produce more food. Hence to facilitate higher food production, water

resources are being overexploited to expand irrigated areas and dry season agriculture. It may lead to falling groundwater levels adversely affecting water availability and food security of the teeming millions.

Moreover

Moreover the agriculture, being the largest consumer of water, often wastefully uses this precious resource. Due to lack of technological developments, farmers ~~still~~ depend on tube wells, canals, wells for irrigation. Subsidised irrigation and electricity further aggravates the wasteful tendency. Mismatch between agro-climatic conditions and crops grown leads to water intensive crops being grown in dry regions leading to extra irrigation requirements. Eg: Rice and, sugarcane and cotton being grown in Punjab, Western UP which are agroclimatically dry. ^{Ironically} Besides, we are a net exporter of water in terms of ^{water intensive} crops being exported.

Post independent India witnessed rapid urbanization, industrialization creating vast opportunities for us. This has on the other hand these industries and cities are exerting huge pressure on fresh water resources. Industries, apart from being heavy users of water also use hydroelectricity for power. In India, hydroelectric power contributes 22% of total electricity produced. Moreover, multiplying urban centres with large and dense populations and urban lifestyles have not only added to water and energy requirements, but have further aggravated the problem. Most housing colonies have their own groundwater pumping devices and there is little sense of conservation habits - with leaking taps, water kept open during brushing, washing cars etc.

The scarcity of water can also be due to bad

quality of water. due to pollution by pesticide / insecticide runoff, industrial effluents, Sewage discharge, heavy metals, warm water added by industries, dead bodies disposed in rivers, human excreta, garbage etc. According to a CSE Report, "India's rivers have all turned to a toxic stream. Even the big ones like Ganga and Yamuna are far from pure. The assault on Indian rivers - from population growth, agricultural mechanization, urbanization and industrialization is enormous and ~~growing~~ growing by the day. This entire life stands threatened".

Mismanagement and overexploitation of available water adds to the problems. Lack of water meters in urban areas, little awareness on water conservation, not capping amount of water to be used in each sector, etc have impoverished this resource and led to an ecological

crisis that may have profound impact on our lives.

Besides the geographical position of India, erratic, uncertain and irregular nature of Monsoon, perennial Northern rivers and seasonal Southern rivers, etc have led to bats cycles of floods and droughts in various regions of India. The severe droughts in Vidarbha, Marathwada and Gujarat in 2015-16 led to imposition of sec 144 (curfew) in cities in fear of water riots. This was followed by scenes of floods in UP, Bihar, Gujarat, West Bengal in ~~30~~ Aug 2016. Such paradoxical situation aggravates the water woes and demands scientific planning and management.

To plan the future, we must look into the past. Archaeological and historical records show

that from ancient times we have been constructing sophisticated hydraulic structures like dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation. Eg: The water storage bawadi of Delhi, Sringaverapura water structure, Mandu's Mahal (in MP), Chandragupta Maury's dams, irrigation systems, Kalinga, Nagarjunakonda, Kolhapur, Hauz Khas etc. Moreover there existed an extraordinary tradition of water-harvesting system. People had in depth knowledge of rainfall regime, soil ^{type} pattern and developed wide ranging techniques to harvest rainwater, groundwater, river water, flood water in keeping with ecological conditions and their water needs. Eg: In Himalayas, people build 'guls' or 'kuls' for agriculture. Roof top rainwater harvesting was used in Rajasthan. In flood plains of Bengal, people developed inundation channels to irrigate. In Jaisalmer, khadins and tohadis in other parts of Rajasthan was used.

give these
ideas in
water
H govt.
probably through
end of essay

In semi-arid regions of Bikaner, Barmer, all houses had underground tanks for storing water for drinking. Even in Shillong, Meghalaya which houses Mawyn Mawsynram and Cherrapunji which receive the highest rainfall in world, they face water scarcity. Nearly every household harvest rain water and 15-25% of total water requirements are fulfilled by rainwater harvesting.

Today, in western Rajasthan, sadly the practice of rooftop rainwater harvesting is on decline as plenty of water is available due to the Rajasthan Canal. But ~~this~~ practice needs to be revived. For Eg: In Genda thur, a remote backward village in Mysore, villagers have installed rooftop rainwater harvesting structures and the village has earned the rare distinction of being rich in rainwater. Similarly Tamil Nadu is the first and only state in India which has made rooftop rainwater

harvesting ~~compulsory~~ to all houses. There are legal provisions to punish the defaulter.

* Science should be universal, Technology should be local. Local technological and innovative

solutions can help to address water woes. For

Eg: In Meghalaya, a 200 year old system of tapping stream and spring water by using bamboo pipes is prevalent. It saves about

It About 18-20 litres of water enter the bamboo pipe system, gets transported to

hundreds of metres and finally reduces to 20-30 drops per minute at the site of the

plant. Similar indigenous practices from other parts of India should be replicated over other

larger areas. A mix of indigenous and

international technology can solve some of our water problems.

good

Understanding the Agro-climate zones of our Country and ^{integrated} Watershed management ^{are} the need of the hour. River basin should be the basic unit of development. The nature of ~~the~~ ~~northern~~ Himalayan and Plateau rivers must be understood and policy makers must sensitize farmers to grow crops suitable to those regions. For ~~Eg~~ ^{eg} Farmers in Rajasthan, Maharashtra etc must be encouraged to grow coarse grain crops like jowar, bajra, ragi and pulses which are water-frugal while water-intensive crops like paddy, sugarcane must be left for ^{Eastern} rich areas.

Water-conservation practices like using drip irrigation, sprinkler irrigation, dry zone agriculture, solar pumps, renewable energy sources etc must be focussed upon. More Research and Development should be done in our agriculture

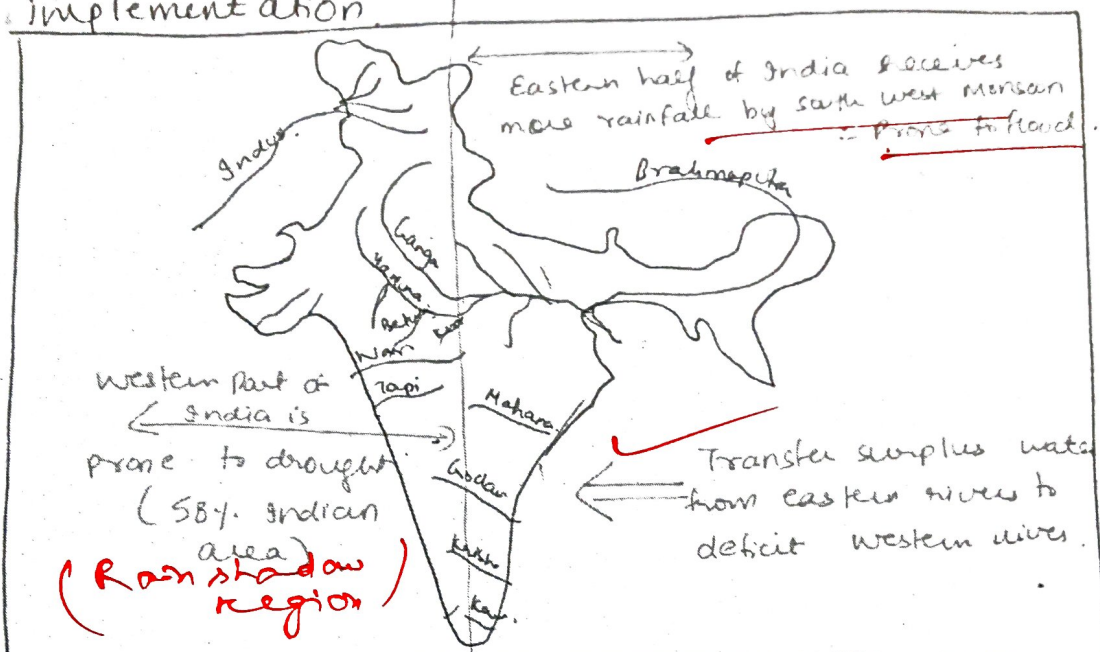
universities. The Start-Up India, Stand-Up India scheme which encourages entrepreneurs can come in handy here. Entrepreneurs can be encouraged to focus on ~~dev~~ ~~inventing~~ water conservation techniques for farmers, industries, cities etc. Success stories and model villages must be publicised by media to generate awareness. Social media platform can be used to sensitize the population about ~~importance~~ of water. Self Help groups, civil society, cooperatives, people's participation, PRIs, urban local bodies - All stakeholders must be engaged in water conservation exercises. ✓

Schemes of Government like Pradhan Mantri Krishi sinchai Yojana which focuses on Per drop more crop and Accelerated Irrigation Benefit must be properly implemented. The Namami Gange programme which aims to clean

river Ganga and Ganga-Gram Yojana for development of ~~villages~~ and cities along Ganga should be implemented in letter and spirit. International Eg from Thames river of London and Rhine of Germany can be good models to emulate. The Neeranchal programme assisted by world Bank would also lead to integrated watershed development. State specific Projects like Mission Bhagirathi by Telangana Govt for providing clean drinking water can be ~~model~~ emulated at national level. (Sud)

The long term project of interlinking of ~~was~~ rivers in India can be a long term solution. with inter state river water disputes rising day by day - Krishna river dispute, Suleij-Yamuna canal, Cauvery water dispute, Mahadei and Mahanadi disputes etc, it an amicable solution must be found before going for such large projects. Moreover first

Pilot projects should be tried like Ken-Betwa, Krishna-Godavari and environmental and social impact assessments must be done before going for implementation.



Interlinking of Rivers

Not only India, but also the g world - in general faces the problems of water scarcity. The North-South Divide has transformed into a water divide with the developed regions with luxurious lifestyles having ^{much} more water per capita.

than the developing and LDCs (least developed countries) which face acute water scarcity, food insecurity, hunger, malnutrition and lacking social infrastructure. Recognizing this, the UN has said, "water is crucial for sustainable development including environmental integrity and alleviation of poverty and hunger and is indispensable for human health and well being". August is celebrated as water quality week and 22nd March is designated as World Water Day. The sustainable development Goals adopted in 2015 also include eliminating hunger and poverty which includes access ^{to} and affordable water as its goals. A collaborative efforts is needed whereby industrialized nations should provide technological and financial assistance to developing world to overcome their water woes. A good ex is the ~~the~~ help of drip irrigation technology from Israel to India and

Inter India-Germany collaboration for river management. An International water Alliance on lines of International Solar alliance could also be a good initiative whereby all countries could cooperate and coordinate to solve the global water crisis and avert ~~the~~ ^a next world war on water.

Our Constitution is enshrined with the principles of liberty, equality and fraternity. ~~A~~ ~~would~~ water scarcity is as much a social, political and economic issue as it is a moral and ethical one. Water is the most fundamental necessity of life and in this 21st Century, India which is the fastest developing economy, water woes should not plague our citizens. As the Koran says, "By means of water we give life to everything".

Saanya - India's water woes & the way forward

Dear Saanya,

you have written a very good essay. Here are few ideas to enrich it:-

- a) you have good knowledge base, however a proper framework is need of the hour.
- b) you have mentioned very good points & issues, but you have to deal with one issue at a time to cast some clarity on the essay.
For e.g:- Deal Urbanization & Industrialization separately.
- c) Try to give key themes their space and a devoted paragraph.
- d) you have drawn a map, which is good for this kind of essay but you also can show how certain regions are ~~more~~ facing ~~more~~ acute water-shortage than others.
- e) Discuss how green revolution led to abuse of water and resulted in soil salinity.
- f) Delve little into philosophical angle - such as - "it is an irony that we live in a watery world, yet we face water scarcity"

- g) Discuss how we can tap rainwater, run-off-the-river dams, ground water recharge etc.
- h) Highlight how concrete jungle of urbanization led to ground water depletion.
- i) ~~Highlight~~ you ~~for~~ have given some good case studies.
- j) Give few innovative solutions:-
- 1) tapping water from air moisture
 - 2) getting potable water from sea etc.
- k) Also discuss policy related issues. Highlight public & private water mgmt. and the issues attached with it. There is an example in one of the NCERT books about Brazil/Argentina (check it) about water mgmt by public authorities. Check that as that can be a good case study.
- Overall, you have written a very good essay. Keep it up. Try to segregate concepts and deal one at a time in a coherent manner. This will bring a ^{very} good clarity to your essay.
- Above all, you have real potential to score high in this paper. We only tried to highlight the missing parts, do inculcate them. And yes, do delve into how water uses ~~may~~ differ between ~~for~~ an urbanite and a rural household. You have written very good points, keep writing.
- Best of luck —