MOVING TOWARDS SDG-6

THROUGH WATER MANAGEMENT AND WASTEWATER TREATMENT

You will never solve poverty without solving water and sanitation”.

~MATT DAMON

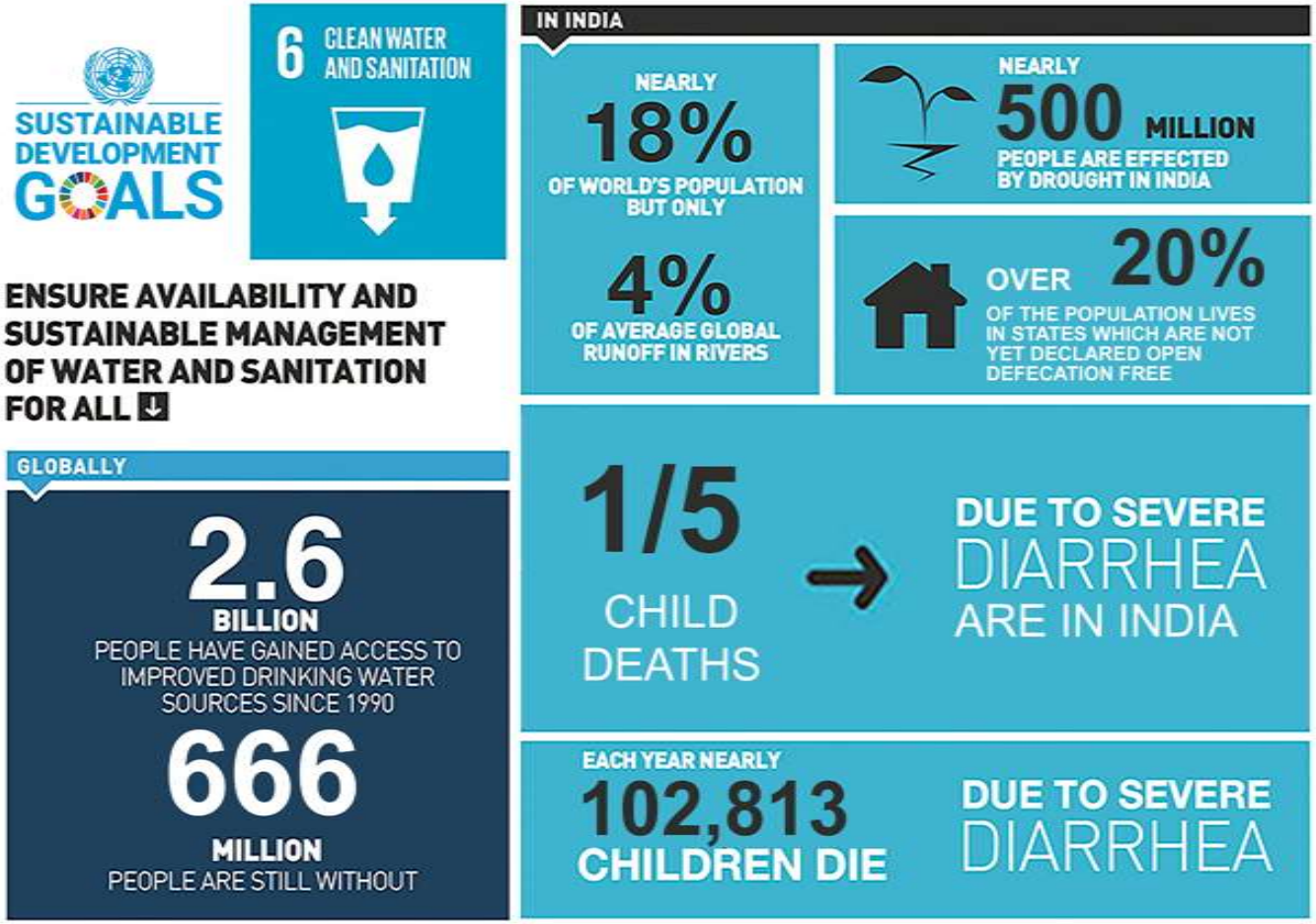
According to the Nitiayog's report 2018

'Only 4% fresh water will be available for the 16% of population.'

United Nations announced 17 Sustainable Development Goals in which the Goal 6 is to ensure safe drinking water to all

And this water should be-

- **AVAILABLE**
- **ACCESSIBLE**
- **CLEAN**


SUSTAINABLE DEVELOPMENT GOALS
6 CLEAN WATER AND SANITATION
ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL
GLOBALLY
2.6
BILLION
PEOPLE HAVE GAINED ACCESS TO IMPROVED DRINKING WATER SOURCES SINCE 1990
666
MILLION
PEOPLE ARE STILL WITHOUT
IN INDIA
NEARLY
18%
OF WORLD'S POPULATION BUT ONLY
4%
OF AVERAGE GLOBAL RUNOFF IN RIVERS
NEARLY
500 MILLION
PEOPLE ARE EFFECTED BY DROUGHT IN INDIA
OVER 20%
OF THE POPULATION LIVES IN STATES WHICH ARE NOT YET DECLARED OPEN DEFECATION FREE
1/5
CHILD DEATHS
DUE TO SEVERE DIARRHEA ARE IN INDIA
EACH YEAR NEARLY
102,813
CHILDREN DIE
DUE TO SEVERE DIARRHEA

WATER ACTION DECADE (2018-2028)

- Launched on 22 march 2018

the sustainable development and integrated management of water resources for achievement of social, economic and environmental objectives;

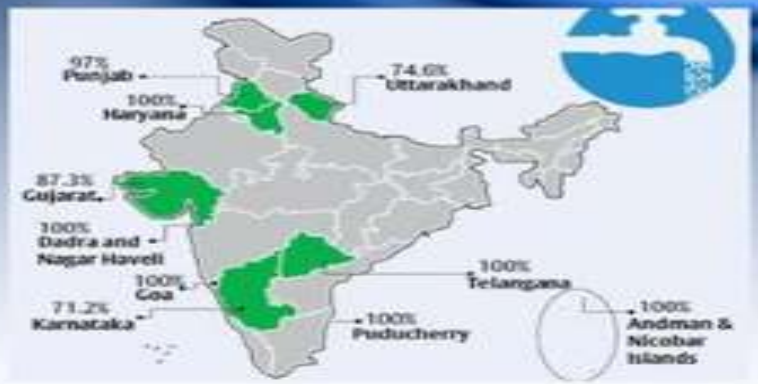
the implementation and promotion of related programmes and projects; and

the furtherance of cooperation and partnerships at all levels to achieve internationally agreed water-related goals and targets, including those in the 2030 Agenda for Sustainable Development.

Government Schemes

JAL JEEVAN MISSION

TO PROVIDE SAFE AND POTABLE DRINKING WATER THROUGH FUNCTIONAL HOUSEHOLD TAP CONNECTION IN RURAL INDIA BY 2024.



Total rural households

on 28/04/2022

19,31,99,823

Rural household tap connections

on 28/04/2022

9,47,22,886

49.03 %

SWACHH BHARAT ABHIYAN

1. TO PROMOTE CLEANLINESS AND HYGIENE.

2. TO ELIMINATE OPEN DEFECATION.

3. IMPROVE SOLID WASTE MANAGEMENT.

Research Methodology

- using secondary data.

SAMPLE SIZE AND CRITERIA OF SELECTION-

- 8 states, two from each zone of India according to their performance.
- 34 districts stratified randomly sampling chosen.

India's sewage generation and treatment capacity statistics

Total sewage generation in urban areas is 72,368 MLDs

Total 1631 STPs having capcity 36,668 MLD.

Out of this, only 1093 are functional

Sewage generation and treatment capacity of states

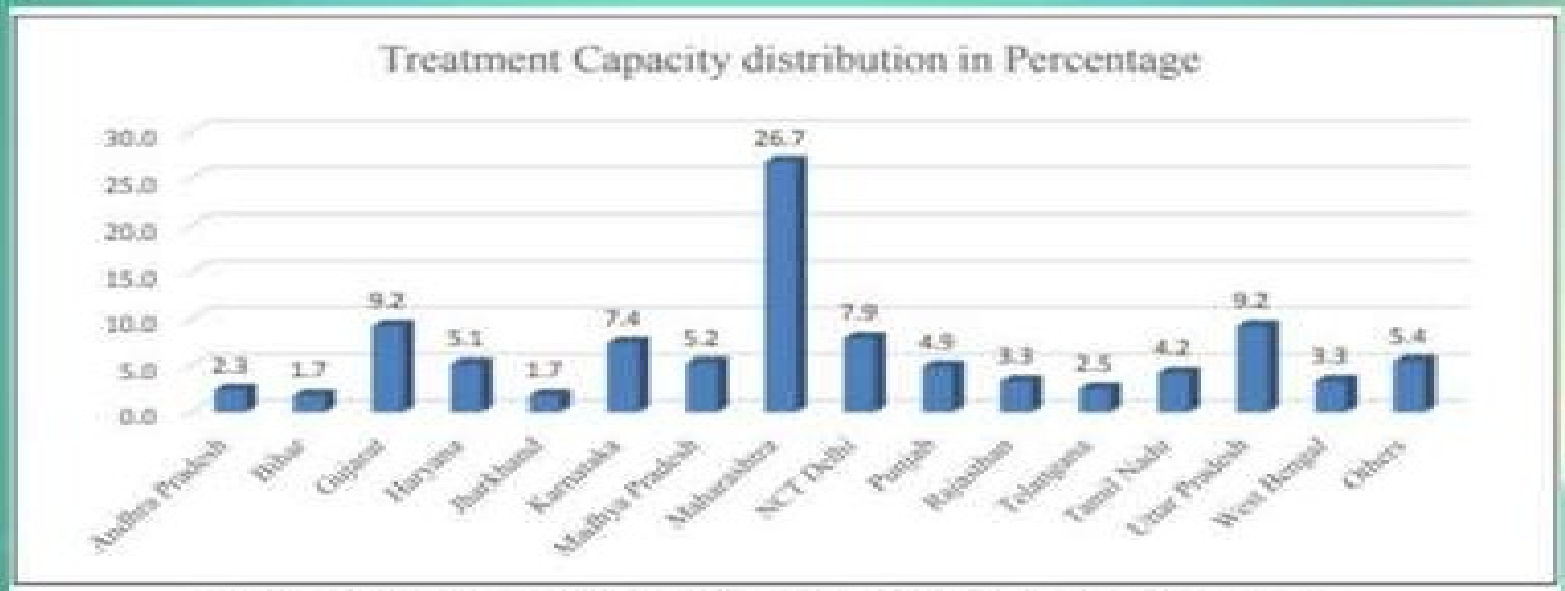


Figure 3.3 : Sewage Treatment Capacity Distribution in Percentage

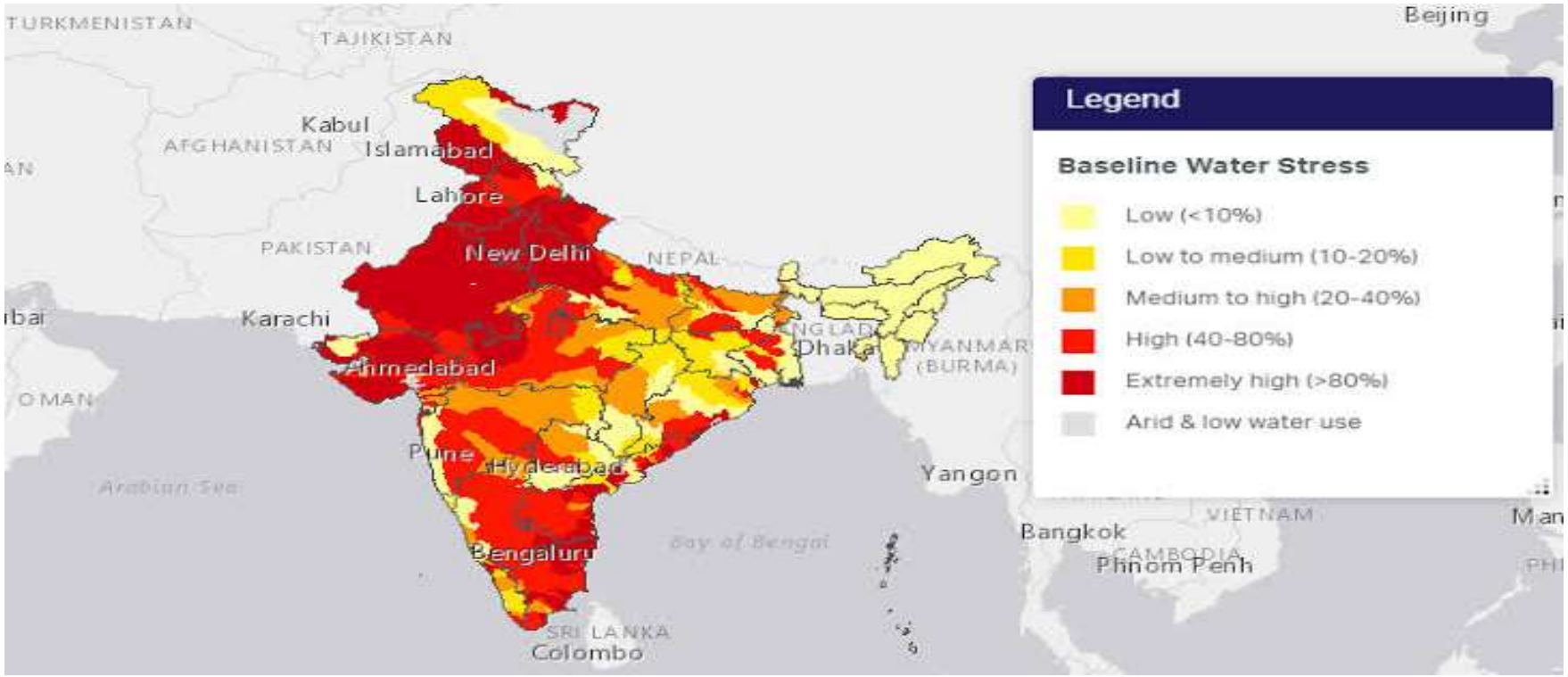
STPs IN DIFFERENT STATES AND DISTRICTS OF INDIA

State	City/Town	Total STP Capacity(MLD)
	NORTH ZONE	
	Patna	109.55
	Karmalichak	40
Bihar	Bhagalpur	11
	Agra	220.75
	Etawah	23.945
	Mainpuri	23
	Varanasi	101.8
Uttar Pradesh	Saharanpur	38
	West Zone	
	Calangute	0.08
	Margao	27.5
	Mormugao	34
Goa	Panaji	13
	Gandhinagar	88
	Vadodara	276.5
	Talaja	3
	Bhavnagar	80
	Palitana	4.5
Gujarat	Ahmedabad	70

STPs IN DIFFERENT STATES AND DISTRICTS OF INDIA

State	City/Town	Total STP Capacity(MLD)
	SOUTH ZONE	
Karnataka	Kolar	13.16
	Chikballapura	5.1
	Chamarajnagar	12.34
	Hassan	10
	Mandya	15.67
Kerala	Thiruvananthapuram	107
	Ernakulam	5.1
	Kottayam	0.09
	Alappuzha	0.18
	EAST ZONE	
West Bengal	Jagaddal Bhatpura	28.5
	Kankinara	10
	Baidyabati	6
	Bandipur	14
Jharkhand	Bokaro	33.572
	Jamshedpur	73.15
	UCIL Jadugora ES	6.086

Delhi, Chandigarh, Rajasthan Uttar Pradesh and Punjab are the most water stressed regions of India (NITIAYOG JUNE 2018 REPORT)



CRISIS IN PUNJAB

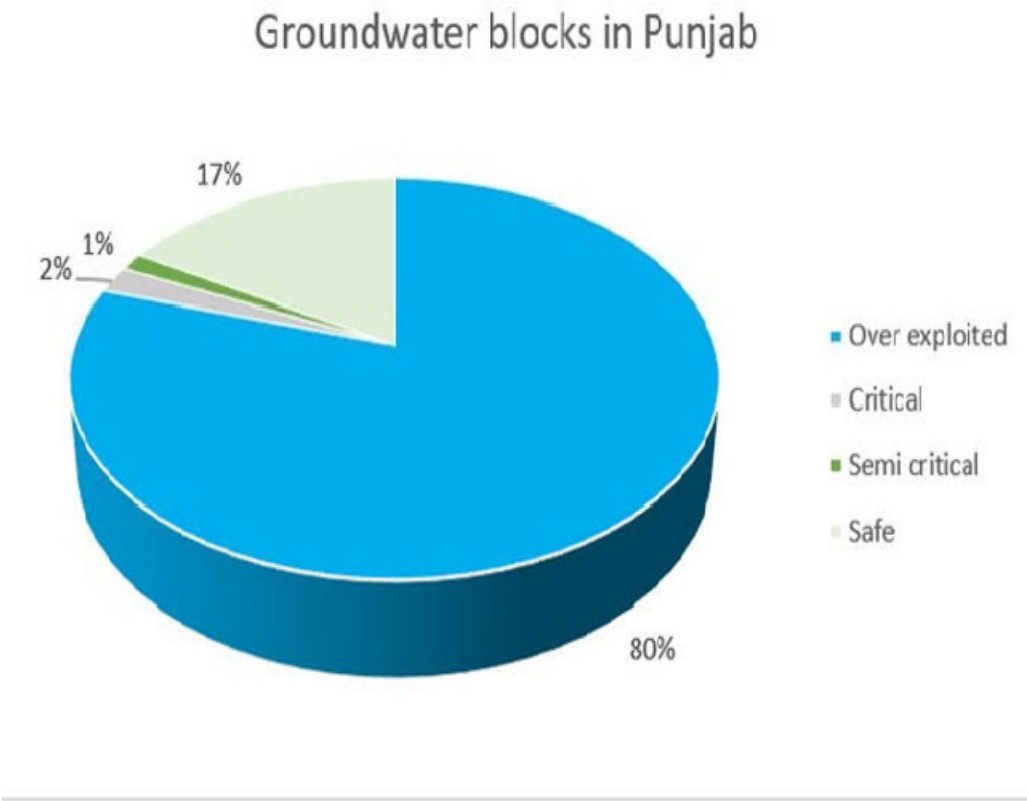
- **Shift in cropping pattern and cropping intensity**
- **Canal water supplies and switch to**

ground water

- **Free/subsidized power**

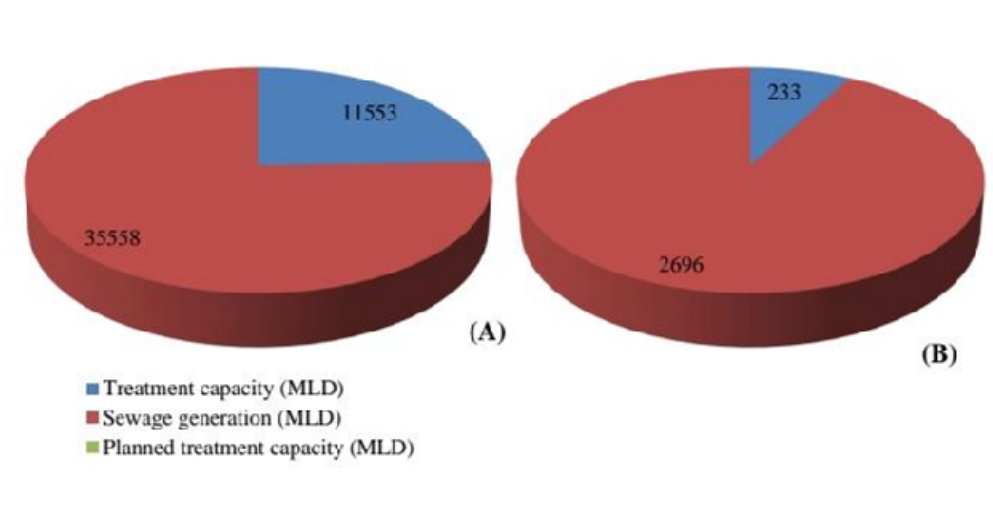
Impact of rainfall on ground water

- **Availability of ground water at shallower depth**



CURRENT WASTE WATER TREATMENT CONDITIONS

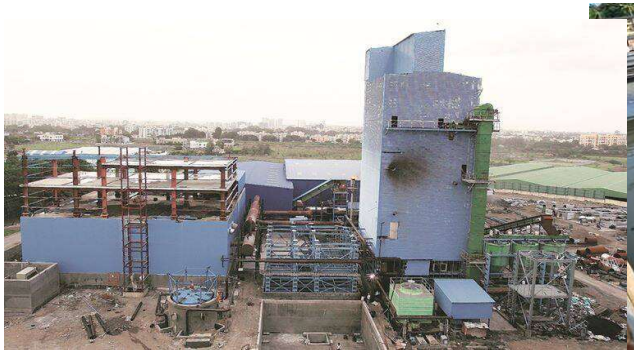
- **Class 1 and Class2 cities are producing 38254 million litres of waste water on a regular.**
- **Out of which only 21% is treated.**
- **There is an increase in the trend of urbanisation pollution, sewage generation and treatment capacity.(CPCB 2009 report)**



WASTE WATER MANAGEMENT ISSUES -

1. **INSUFFICIENT CAPACITY OF WASTE WATER TREEATMENT PLANTS.**

1. **INCREASED WASTE WATER GENERATION.**



SECTOR WISE WATER UTILISATION AND DEMAND

- IRRIGATION
- DRINKING WATER
- INDUSTRY
- ENERGY
- OTHERS

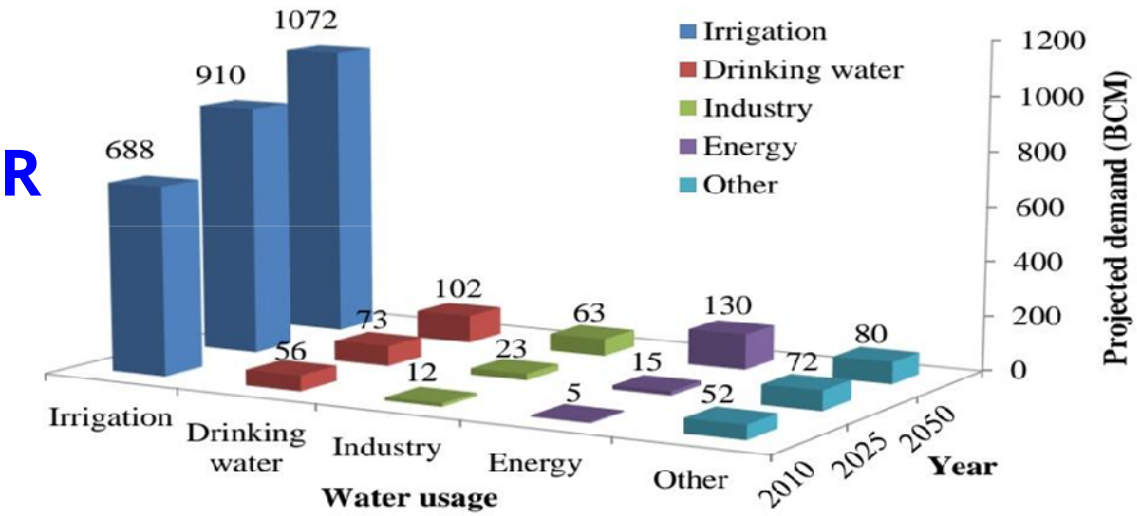


Figure 1: Projected water demand by different sectors (CWC, 2010)

CAUSES OF HIGH WASTE WATER GENERATION

1. RAPID URBANISATION
2. EXPONENTIAL POPULATION INCREASE
3. INDUSTRIALISATION

This is high time to understand that for maintaining a sustainable future,

reusing and recycling of water resources is very essential.

REUSE -to extend life by reusing or modifying it
RECYCLE-collecting and reprocessing it
REDUCE -bringing down the use of water

RECOMMENDATIONS

FOR WATER AND WASTE WATER MANAGEMENT

1. EXTENSIVE RECYCLING OF WASTE WATER BY PARTIALLY TREATING IT AND RELEASING INTO RIVER SYSTEM OR

2.TREATING IT TO HIGH STANDARDS AND RESUSING IT.

2.USING WASTE WATER FOR IRRIGATION

BENEFITS - LOW FERTILIZER REQUIREMENT (NPK)
15-27% HIGH CROP YIELD

DISADVANTAGES- SALINITY INCREASES OF SOIL WHICH CAN RESULT INTO

1.ENCOURAGEMENT OF GROWTH OF WEEDS ,ALGAE
2.DETERIORATE GROUNDWATER AND DOWNSTREAM QUALITY

ALREADY BEING PRACTISED IN VADODARA AND GUJARAT -NO ALTERNATIVE SOURCE OF IRRIGATION ,SO WASTE WATER IS SOLD OUT TO FARMERS AND PUMPS ARE RENTED TO LIFT IT, ALSO CREATING AN OCCUPATION. 73000 Ha of land in India are done through waste water irrigation

GOVERNMENT /LEGISLATIVE CHANGES

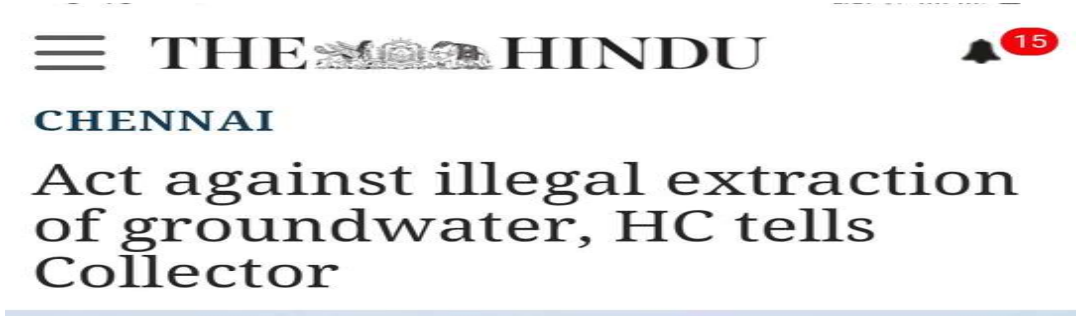
1.PROVIDING INCENTIVES TO INDUSTRIES TO INVEST IN POLLUTION CONTROL.

- **DECONGEST CITIES**
- **PROVIDE SUBSIDIES**
- **INSTALLATION OF EFFLUENT TREATMENT PLANT IN INDUSTRIES, PROVIDE TAX REBATE.**

2. BRINGING GROUNDWATER UTILISATION UNDER GOVERNMENT MONITORING

- **NO ACCESS WITHOUT PERMISSION**
- **ENFORCING HEAVY TAXING TO DISCOURAGE HOUSEHOLD USAGE AS WELL AS DRILLING OF BOREWELLS.**

ILLEGAL SELLING OF GROUNDWATER FOR COMMERCIAL USES.


THE HINDU

CHENNAI

Act against illegal extraction of groundwater, HC tells Collector

KARNATAKA GROUND WATER (REGULATION AND CONTROL OF DEVELOPMENT AND MANAGEMENT) ACT, 2011

Kerala Ground Water (Control and Regulation) Act, 2002 (Act No. 19 of 2002).

COMMUNITY EFFORTS

- INCREASING CIVIL SOCIETY PARTICIPATION BY ORGANISING
- EVENTS SPREADING AWARENESS ABOUT WATER MANAGEMENT PRACTISES
- PROGRAMS TO TRAIN PEOPLE ABOUT BEST MANAGEMENT PRACTISES.
- ORGANISING ACTIVITIES IN SCHOOLS TO TEACH STUDENTS THE SAME.
- CUTTING DOWN WATER SUPPLY ATLEAST ONCE A WEEK TO MAKE PEOPLE REALISE THE SIGNIFANCE OF WATER.

ACKNOWLEDGEMENT

We are highly thankful to Mr Mukesh Kulshreshtha sir and NHRC to give us this opportunity and to have a deeper insight on importance of clean water and waste water management in India through this research paper. We also express our gratitude to our mentor, Ms Sakshi Thapar for her support and guidance throughout this project. The guidance we got was of immense importance and helped all of us to learn and improvise a lot

MOVING TOWARDS SD-6 THROUGH WATER MANAGEMENT AND WASTE WATER TREATMENT

DATE OF PRESENTATION: 29 APRIL 2022

PRESENTED BY:

- NISHTHA GIRDHAR, UNIVERSITY OF PUNJAB
- NITIN KUMAR PRADHAN, SOA NATIONAL INSTITUTE OF LAW
- POOJA SHARMA, JAMIA MILIA ISLAMIA
- PRASHANT, UNIVERSITY OF DELHI
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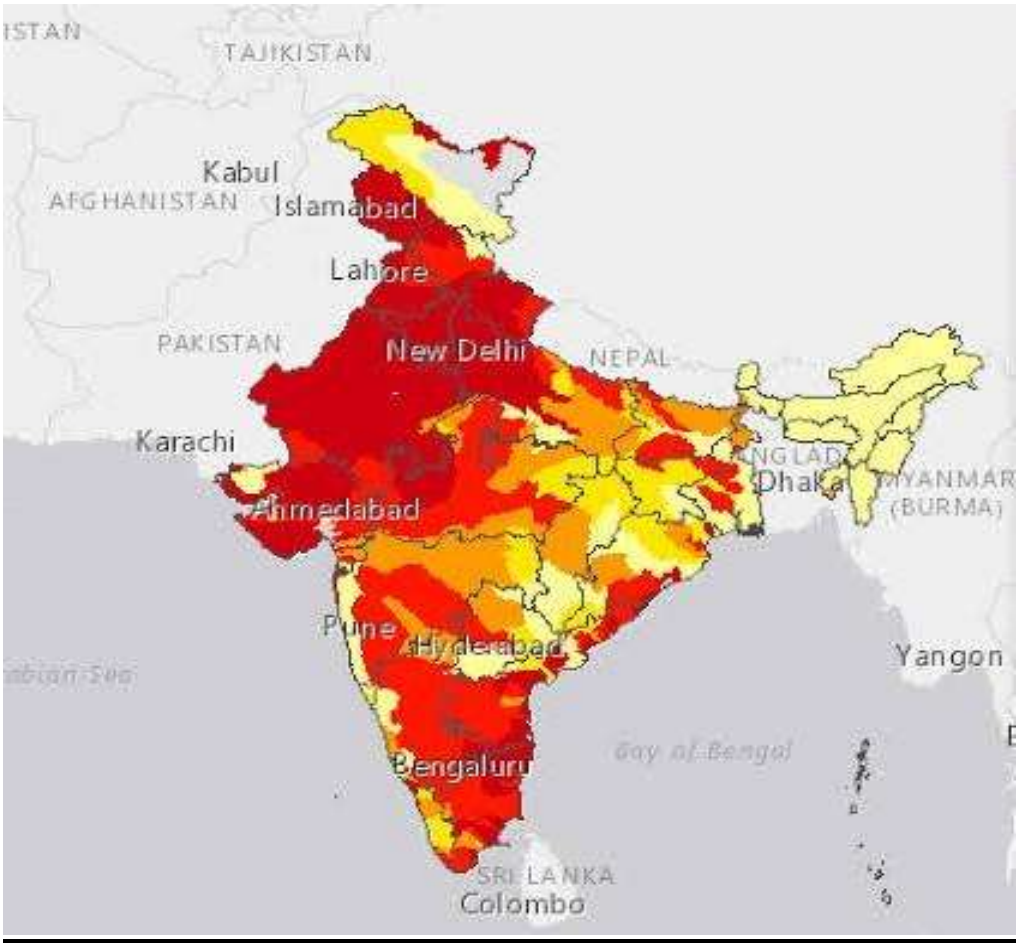
- PRATIKSHA SINGH, AMU
- PREETI PRAGYAN BEHERA, UNIVERSITY OF CALCUTTA
- PRINCY JOSEPH, GURU GHASIDAS VISHWAVIDYALAYA CENTRAL UNIVERSITY
- RASHMI SINGH, UNIVERSITY OF MYSORE
- RITIKA, CHHAJU RAM LAW COLLEGE, HISSAR
- SAKSHI MISHRA, MOTILAL SCIENCE COLLEGE

MOVING TOWARDS SDG6 –Through Water and Wastewater Management

- **Sustainable development-clean water and sanitation situation in India**
- **Wastewater disposal and management practices and solutions**
- **Government policies, legislations and right to water**
- **How far India has come and what are possible solutions and recommendations for improvement.**



ABSTRACT

United Nations in the year 2015 upgraded Millennium Development Goals to Sustainable Development Goals as a measure targeting urgent environmental, political and economic challenges that are facing the world right now. Subsequent Water Action Decade again presses upon the mandatory participation in mobilizing action that will help transform how we manage water. Nationally, policies and programs like Namami Gange, Jal Shakti Mission, Swachha Bharat Abhiyan are paving way for Sustainable use as well as management of resources.

In this report we are dealing and attempting to answer the following main objectives-

•How far India has come in its goal of Sustainable Development of Water and Sanitation?

•Current picture of waste water disposal and waste-water management?

•Government policies and measures to support SDG-6?

•With context to the present conditions, what else is required to achieve the goals?

KEYWORDS- Millenium Development Goals(MDGs), Sustainable Development Goals(SDGs), Sewage Treatment Plants(STPs), waste water.

INTRODUCTION-

"Water is a gift of nature. Human hand cannot be permitted to convert this bounty into a curse, an oppression. The primary use to which the water is put is drinking, it would be mocking nature to force the people who live on the bank of a river to remain thirsty, whereas others incidentally placed in an advantageous position are allowed to use the water for non-drinking purposes."

~Justice Kuldeep Singh

In the whole world 71% of Earth's surface is covered with water while 97% of the oceans hold water and 2.5% earth's freshwater stored in the form of glaciers, ice-caps, snowy mountain ranges, etc. but this water is unavailable to the world. Only 0.5% fresh water is available for consumption to the world which is very less if we see the population which is nearly about 7.9 billion as per 2022. India is ranked at position 133 in the world in terms of water availability per person per annum. According to the reports of NITI Aayog, states of Maharashtra, Gujarat, Andhra Pradesh, Karnataka, Jharkhand, Rajasthan, Uttar Pradesh, Punjab, Delhi, Bengaluru and Chennai have been facing serious crises since 2018. The question is whether we are taking accurate measures to resolve this problem?

In 2000, the United Nations took an initiative called Millennium Development goals which focus on mainly development of three areas i.e., Human Capital, Infrastructure and Human Rights and for this purpose they have mentioned 8 goals with the target of halving poverty by 2015 among which its Goal 7 talks about Environmental Sustainability. After that, Sustainable Development goals were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 and herein SDGs replaced MDGs. The aim of SDGs is to meet the urgent Environmental, Political and Economic challenges which are facing the world , so, from here we can say that SDGs works on wider aspect and there are 17 goals mentioned in SDGs through which we can make sustainable development.

The term sustainable development implies that we ought to use the natural resources in such a manner so that it will be accessible to our future generation. Moreover, these are the necessities which have been given to us by our forefathers

and it is our obligation to use them in the way that they will be accessible to the group of people yet to come. On the off chance that appropriate measures are not taken today then, maybe our future generation will face circumstances we couldn't envision today. Goal number 6 of SDGs talks about 'Clean Water and Sanitation'. Now a question emerges: what is clean water and sanitation?

Well, here clean water alludes to that water which can be drunk and is disinfected to avoid exposure to countless sicknesses to keep communities healthier. If the water is debased, there are chances of transmission of infections like Cholera, Dysentery, Diarrhoea, Hepatitis A, Typhoid and Polio. According to WHO universally, somewhere around 2 billion individuals utilize a drinking water source sullied with defecation which is a grave risk to their wellbeing. As indicated by CBHI and the Ministry of Health and Family Welfare surveyed 2,439 individuals who died in 2018 through water-borne diseases like Cholera, Diarrhoea, Typhoid and Viral Hepatitis among which 1,450 were kids who were younger than five years.

Matt Damon said –

"*You will never solve poverty without solving water and sanitation".*

As we all realise that nobody can envision his/her existence without water. Furthermore, it is not necessarily the need of water but it is about the quality of water that should be clean for human consumption. During Pandemic it has been seen that hand washing helps stop Coronavirus however, in a nation like India which is confronting water shortage. How is it within the realm of possibilities in such a situation to stop spreading an illness which can be forestalled through washing hands? In a couple of locales of India like in a town Kaithi which is situated in Bundelkhand of India dealt with an issue wherein there is just a single tap which is shared by five families for water. In Indian Constitution Article 21 discusses 'Right to Life' herein right to life does not mean just living, it envisages that each human has the right to live in a perfect climate and must have access to all the natural resources like water and air which are necessary for better and healthy living. Clean water and sanitation are not just our constitutional right mentioned under Part III of Indian Constitution, it is our human right as well which

is available to us by birth. In the present scenario, the Government of India has taken many initiatives for providing clean water throughout the territory among which one is 'Jal Jeevan Mission' the Motto of this Mission is "Har Ghar Nal Se Jal". The main vision of this mission is to provide adequate and safe drinking water in every home of rural areas through Tap connections by 2024. The programme will also talk about the apparatus source of sustainability measures as mandatory elements such as water conservation, rain water harvesting to store the water for consumption and irrigation facilities and also provide tap connections to the school, health centres, community centres, etc. This would contribute to the development of the nation and also justifying the SDGs goals as conservation of water can be reused for portable purposes and benefits can be availed by the local population by implementing such guidelines

LITERATURE REVIEW

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal agenda to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

The 17 SDGs are integrated; they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.

A 40 percent shortfall in freshwater resources by 2030 coupled with a rising world population has the world careening towards a global water crisis. Recognizing the growing challenge of water scarcity the UN General Assembly launched the Water Action Decade on 22 March 2018, to mobilize action that will help transform how we manage water.

Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources. It is a subset of water cycle management. Of the water resources on Earth only three percent of it is fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. Of the remaining one percent, a fifth is in remote, inaccessible areas and much seasonal rainfall in monsoonal deluges and floods cannot easily be used. At present only about 0.08

percent of all the worlds freshwater is exploited by mankind in ever increasing demand for sanitation, drinking, manufacturing, leisure and agriculture.

When we compare with the world, India is one of the most water stressed regions. In India 600 millions are facing extreme water stress, according to NITI Aayog 2018. By 2030 the water demand could be twice the existing supply which could lead to severe water scarcity for millions of people and this leads to 6% loss to countries GDP. So it is high time to understand the importance of managing our water needs and resources in the most efficient and effective manner. To maintain a sustainable future, reusing and recycling of water resources is very essential.

``We used to have to fetch water from the bore well 2km away from our home. The daily grind made the men late for work, and we fell sick more often,' Geeta recalls. Today, Geeta, near full term in her second pregnancy, is both relieved and happy. Thanks to the IDA supported Jal Nirmal Project, the family now has a water connection at home. 'We now get water for two hours each day."

~Geeta Bhogan

The proportion of households with access to water sources has increased to 68% in 1992-93 to 89.9% in 2015-16. But the fact of no improvement in sanitation facilities is a rising concern. According to the World Bank's report 520 million Indian people were defecating in open which is the largest number in the World.

But as a response to the report, the emergence of flagship programmes including the Swachh Bharat Abhiyan to clean India, The National Rural Drinking Water Programme, and Namami Ganga,which aims at the conservation of the River Ganga.

The growth of population, urbanization and industrialization reciprocates into generation of tonnes of waste and waste-water. The current statistics highlight the fact that India treats only 1/3rd of wastewater it generates which is an alarming fact

due to the receding water resource according to the Central Pollution Control Board.

Class 1 and Class 2 cities are producing 38254 million litres of waste water on a regular basis out of which only 21% of its total gets treated. According to the report of the Central Pollution Control Board, there is an increase in the trend of urbanization pollution, sewage generation and treatment capacity.

Central Pollution Control Board (CPCB) studies depict that there are 269 sewage treatment plants (STPs) in India, of which only 231 are operational, thus, the existing treatment capacity is just 21 percent of the present sewage generation. The remaining untreated sewage is the main cause of pollution of rivers and lakes. The large numbers of STPs created under Central Funding schemes such as the Ganga Action Plan and Yamuna Action Plan of National River Action Plan are not fully operational.

Presently in India there is no policy mandate at the central level specifically for waste water management. Untreated sewage waste is one of the major causes of surface water and groundwater pollution in India. The Water (Prevention and Control of Pollution) Act, 1974 was the first legislative measure to address the issue of water pollution and conservation in the country. This Act deals with wastewater discharge as a matter of pollution. The water Act is complemented with the Water (Prevention and Control of Pollution) Cess Act, 1977. This Act gives financial resources for Central and State Boards established under Water Act by levying taxes from individuals carrying on any industry and local industries. It also gives incentives for installation of wastewater treatment plants by granting rebates of 25% of payable cess. The Environment (Protection) Act 1986 empowers the central government to prescribe sewage and effluent discharge standards, investigate and ensure compliance and conduct research.

The National Urban Sanitation Policy's (2008) vision for urban sanitation in India is that 'All Indian cities and towns become totally sanitized, healthy and livable and ensure and sustain good public health and environmental outcomes for all citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women.'

As on 2012, the monitoring network comprised of 2500 stations in 28 States and 6 Union Territories spread over the country and covered 445 Rivers, 154 Lakes, 12 Tanks, 78 Ponds, 41 Creeks/Seawater, 25 Canals, 45 Drains, 10 Water Treatment Plants (Raw Water) and 807 wells. Of the 2500 stations, 1275 were on rivers, 190 on lakes, 45 on drains, 41 on canals, 12 on tanks, 41 on creeks/seawater, 79 on ponds, 10 on Water Treatment Plants (Raw Water) and 807 were Ground water stations.

The Municipal Solid Waste (Management and Handling) rules was notified in the year 2000 by the MoEF requiring Urban Local Bodies to collect waste in a segregated manner as well as transport, process and dispose it using safe and scientific methods. This was replaced in 2016 by the new Solid Waste Management Rules (SWM), 2016.

In 2014, the Central Public Health and Environmental Engineering Organization (CPHEEO) in collaboration with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) had also published a Municipal Solid Waste Management (MSWM)Manual with an aim to guiding all urban areas in the country towards Sustainable Municipal Solid Waste Management, adopting the aspects of waste minimization at source with an emphasis on the 3R principles of reduce, reuse and recycle.

The 2008 National Urban Sanitation Policy (NUSP) made local governments responsible for behavioral change, total sanitation and 100 percent safe waste disposal. It envisages that cities will implement City Sanitation Plans prioritizing areas that need urgent attention, and implementing long-term plans in parallel, with emphasis on mobilizing all city stakeholders and raising the importance of behavior change, practices and installations for safe and sanitary disposal of all wastes of the city on a sustainable basis.

The Swachh Survekshan Report published by the Ministry of Urban Development in 2017 presents the results of a massive sanitation survey undertaken across 500 cities in India and is expected to provide a comprehensive assessment of the sanitation status of cities and foster a spirit of competition among cities through publishing their scores and rankings.

The draft National Urban Faecal Sludge and Septage Management (FSSM) Policy (Ministry of Urban Development, 2017) says that the problem of faecal sludge and septage / sewage must be addressed in a holistic manner, with a strategy that provides for minimum needs and is appropriate and affordable for all areas and population considering the local situation.

LAWS, RULES, MANUALS, POLICIES, GUIDELINES AND REPORTS ON SANITATION, WASTE MANAGEMENT AND POLLUTION CONTROL-

• 1974 - Water (Prevention and Control of Pollution) Act

• 1988 - Water (Prevention and Control of Pollution) Act, Amendment

• 1977 - The Water (Prevention and Control of Pollution) Cess Act

• 2000 - Municipal Solid Waste (Management and Handling) rules, Ministry of Environment and Forest (MoEF), (Replaced in 2016 by the Solid Waste Management Rules)

• 2003 - The Water (Prevention and Control of Pollution) Cess Act, Amendment

• 2008 - National Urban Sanitation Policy (NUSP), Ministry of Urban Development

• 2008 - Guidelines for Water Quality Management, Central Pollution Control Board

• 2011 - Water Pollution in India. Report No. 21 of 2011-12, Comptroller and Auditor General of India

• 2012 -Status of Water Quality in India, Monitoring of Indian National Aquatic Resources Series: MINARS/36 /2013-14, Central Pollution Control Board

• 2014 - Municipal Solid Waste Management Manual, Central Public Health and Environmental Engineering Organization &Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

• 2016 - Plastic Waste Management Rules, (MoEF)

• 2016 - e-waste (Management) Rules,(MoEF)

• 2016 - Bio-Medical Waste Management Rules, (MoEF)

• 2016 - Construction and Demolition Waste Management Rules

• 2016 - Hazardous and Other Wastes (Management and Transboundary Movement) Rules,(MoEF)

• 2016 -Solid Waste Management Rules, (MoEF)

• 2016 - Swachhta Status Report, 2016, Ministry of Statistics and Programme Implementation

• 2017 - Swachh Survekshan (Urban Sanitation Report), Ministry of Urban Development

• 2017 – Draft Policy on National Urban Faecal Sludge and Septage Management (FSSM)

However, it may be noted that in spite of all this institutional and legal support for the control of water pollution across the country, an audit by the Comptroller and Auditor General of India, 2012 found that there is no specific policy with regard to water pollution either at the central or state level incorporating prevention of pollution, treatment of polluted water and ecological restoration of polluted water bodies and that without this, government efforts in these areas would not get the required emphasis and thrust.

JAL JEEVAN MISSION

Jal Jeevan mission was launched on 15 August, 2019 to provide safe and potable drinking water to all rural households in India through functional household tap connections by 2024. The jal jeevan mission is based on community approach and wishes to create ‘jan andolan’ for water. It aims to provide water accessibility by sustainable measures, recharge and reuse through grey water management, water conservation, rain harvesting. The government is expected to spend Rs 3.50 lakh

crore to provide functional household tap connections to provide water to rural households at a capacity of at least 55 litres per capita, per day by 2024. For the year 2023, the government has allocated Rs 60000 crore for the Jal Jeevan mission.

SWACHH BHARAT ABHIYAN

Swachh Bharat mission was launched on 2 October 2014 by Prime Minister Narendra Modi, with an aim to eliminate open defecation, improve hygiene and cleanliness and to provide universal sanitation facilities throughout the country. The Swachh Bharat mission has 2 schemes, Swachh Bharat Mission (gramin) for the rural areas and swachh bharat mission (urban) to focus on the urban areas. The swachh bharat mission was launched throughout India making it a people led movement. The swachh bharat mission has 2 phases; phase I was from 2014-2019. The main objectives of this phase were to eliminate open defecation, to create awareness on hygiene and cleanliness etc. The second phase will be implemented from 2020-2025 with the aim to improve the waste management system and to maintain open defecation free status. Till now about 1096.10 lakh household toilets in rural areas and 62.64 lakh toilets in the urban area have been constructed. About 4371 cities, 711 districts and 6 lakh villages have declared themselves open defecation free.

The swachh bharat mission has brought a new change in the society. Today more people have household sanitation facilities, the number of disease related water and sanitation have reduced. It has also created a new economy for jobs, manufacturing and cleanliness products in rural India. The swachh bharat mission is a true tribute to Mahatma Gandhi

METHODOLOGY-

For the qualitative and quantitative analysis of this research paper to study the waste management in the country through the state and its district has been done using the secondary data available on the CPCB website. After that data is analyzed and the good performing and lagging states in terms of waste management by them are identified. Then for a detailed study two states (one good

performing and one bad performing) are selected from each zone- North, South, West and East zones. Their districts are selected randomly and in such a way total 8 states and 34 districts are studied exhaustively. In the last, access to safe drinking water in households of India (in percent) in all the states has been studied comparatively for the year- 1991, 2001 and 2011.

State-wise Sewage Generation and Treatment Capacity-

There are 1,631 STPs (including proposed STPs) with a total capacity of 36,668 MLD covering 35 States/Union Territories. Out of 1,631 STPs, 1,093 STPs are operational, 102 are Non-operational, 274 are under construction and 162 STPs are proposed for construction. Sewage generation from urban areas is estimated to be around 72,368 MLD. States /UT's not installed any STP are Andaman Nicobar & Islands, Arunachal Pradesh, Assam, Lakshadweep, Manipur, Meghalaya and Nagaland.

State-wise sewage generation and treatment capacity is given in following table-

States	Total sewage generation (MLD)	Installed capacity		Actual quantity treated/capacity utilized			Fluoride in groundwater (above 1.5 mg/l)	Arsenic in groundwater (above 45 mg/l)
		Mld	% of sewage generated	Mld	% of total sewage generated	% of installed capacity		
Andaman & nicobar islands	23	0	0	0	0	0	-	-
Andhra Pradesh	2882	833	29	309	11	37	12	3
Arunachal Pradesh	62	0	0	0	0	0	-	-
Assam	809	0	0	0	0	0	9	19
Bihar	2276	10	0	0	0	0	13	22

Chandigarh	188	293	156	235	125	80	-	-
Chhattisgarh	1203	73	6	6	0	8	19	-
Daman and Diu	67	24	36	7	10	29	-	1
Goa	176	66	38	25	14	38	-	-
Gujarat	5013	3378	67	2687	54	80	22	12
Haryana	1816	1880	104	1284	71	68	21	15
Himachal Pradesh	116	136	117	51	44	38	-	1
Jammu & Kashmir	665	218	33	49	7	22	2	3
Jharkhand	1510	22	1	15	1	68	12	2
Karnataka	4458	2712	61	2712	1786	40	30	2
Kerala	4256	120	3	47	1	39	5	-
Lakshadweep	13	0	0	0	0	0	-	-
Madhya Pradesh	3646	1839	50	536	15	29	43	8
Maharashtra	9107	6890	76	4242	47	62	17	-
Manipur	168	0	0	0	0	0	1	2
Meghalaya	112	0	0	0	0	0	1	-
Mizoram	103	10	10	0	0	0	-	-
Nagaland	135	0	0	0	0	0	1	-
NCT of Delhi	3330	2896	87	2412	72	83	7	2
Orissa	1282	378	29	50	4	13	26	1
Puducherry	161	56	35	30	19	54	-	-
Punjab	1889	1781	94	1360	72	76	19	10
Rajasthan	3185	1086	34	478	15	44	33	1
Sikkim	52	20	38	14	27	70	-	-
Tamil	6421	149	23	995	15	67	25	9

Nadu		2						
Telangana	2660	901	34	706	27	78	10	1
Tripura	237	8	3	1.5	1	19	-	-
Uttar Pradesh	8263	3374	41	2510	30	74	34	28
Uttarakhand	627	448	71	187	30	42		
West Bengal	5457	897	16	213	4	24	8	9
Total	72368	31841	44	20236	28	64		

SOURCE-
https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMTIyOF8xNjE1MTk2MzIyX21lZGlhcGhvdG85NTY0LnBkZg==

Even if the percentage of actual quantity treated or installed capacity of the STP's are high, the state has high level of Fluoride and Arsenic. This high level of presence of Floride and Arsenic in the groundwater is harmful and can cause crippling skeletal damage (fluorosis) , cancer and skin lesions. In case of Gujarat the percentage of actual quantity treated when compared to the installed capacity is very high (80%) but still the level of Fluoride and Arsenic is alarming, counter steps should be taken to curb this as soon as possible by process like Nano filtration which has been found to be most appropriate method to remove Fluoride and Arsenic.

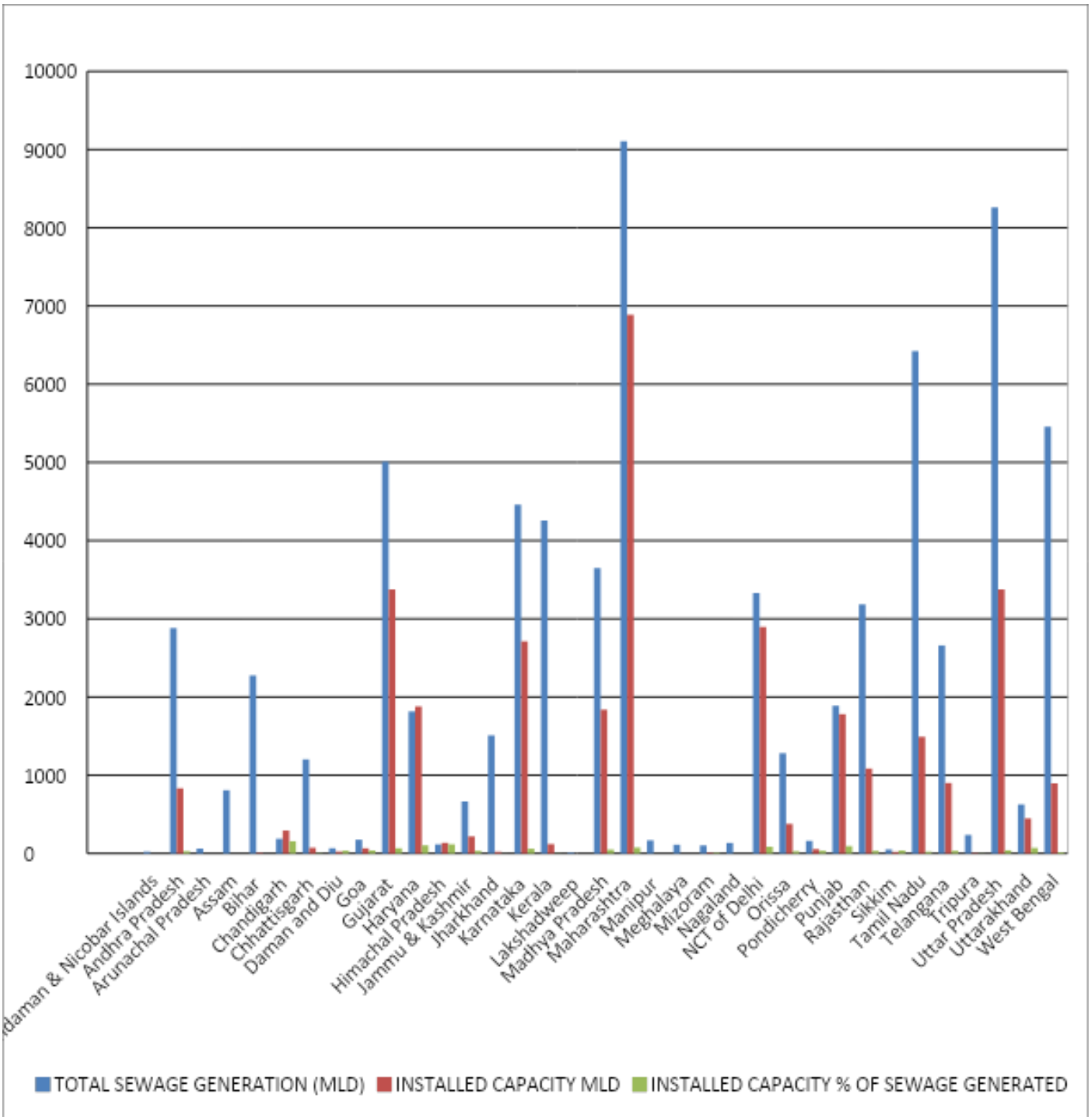


Figure 1 representing graphical representation of comparative data of sewage generated in different states

Identification of states with better installed capacity of STPs in descending order-

Percentage of reuse of treated sewage is maximum in Haryana (80 %) followed by Puducherry (55 %), Delhi (50 %), Chandigarh (35 %), Tamil Nadu (25%), Madhya Pradesh (20 %), Andhra Pradesh (5 %). NCT of Delhi has set target to increase their re usage from 12.5 % to 60%

State-wise Installed capacity In Descending Order		
State	**Installed Capacity (In MLD)**	**Number of STPs Installed**
Maharashtra	6890	154
Gujarat	3378	70
Uttar Pradesh	3374	107
NCT Delhi	2896	38
Karnataka	2712	140
Haryana	1880	153
Madhya Pradesh	1839	126
Punjab	1781	119
Tamil Nadu	1492	63
Rajasthan	1086	114
Telangana	901	37
West Bengal	897	50
Andhra Pradesh	833	66
Uttrakhand	448.18	71
Odisha	378	14
Chandigarh	293	7

State-wise Installed capacity In Descending Order		
State	Installed Capacity (In MLD)	Number of STPs Installed
Jammu & Kashmir	218	24
Himachal Pradesh	136	78
Kerala	120	7
Chhattisgarh	73	3
Goa	66	11
Puducherry	56	3
Daman, Diu & Dadra Nagar Haveli	24	3
Jharkhand	22	2
Sikkim	20	6
Bihar	10	1
Mizoram	10	1
Tripura	8	1
Total	**31841**	**1469**

Figure 2 STATE WISE COMPARISON OF STP CAPACITIES

SOURCE-
https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMTIyOF8xNjE1MTk2MzIyX21lZGlhcGhvdG85NTY0LnBkZg==

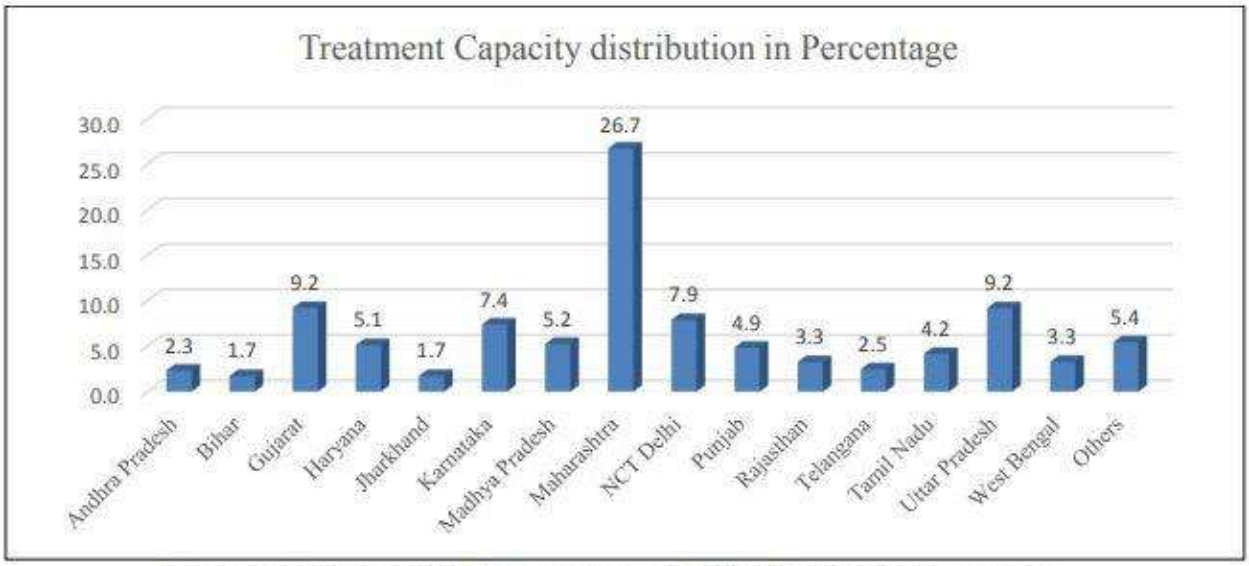


Figure 3.3 : Sewage Treatment Capacity Distribution in Percentage

https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMTIyOF8xNjE1MTk2MzIyX21lZGlhcGhvdG85NTY0LnBkZg==

STPS IN DIFFERENT STATES AND DISTRICTS OF INDIA-

NORTH ZONE-

1. **STPs AT BIHAR**- Bihar generates around 2276 MLD of sewage and total capacity

(Including proposed) is 631 MLD (25 STPs). Bihar is chosen as ill performing state from the north zone after analyzing the statistics previously. The districts of Bihar are chosen randomly- Patna, Karmalichak and Bhagalpur.

City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/ Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)
Patna	Saidpur STP Old Unit, Patna	Information not provided	Operational	4.55	ASP
	Saidpur STP,Patna		Operational	45	ASP
	Beur STP, Patna, Bihar		Operational	35	ASP
	Pahari, Patna-7		Not functional at the time monitoring	25	Aerated Lagoon
Karmalichak	Karmalichak		Operational	4	Aerated Lagoon
Bhagalpur	Bhagalpur STP		Operational	11	Aerated Lagoon

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

Based on the data analysis, following observations can be deciphered-

1. Installed capacity is 10 MLD (0.43 %) while the sewage generation is 2276 MLD, which shows that there is a lacuna in treatment capacity of 2266 MLD (99.56 %).

2. Out of 10 MLD installed capacity, operationalized capacity is zero.

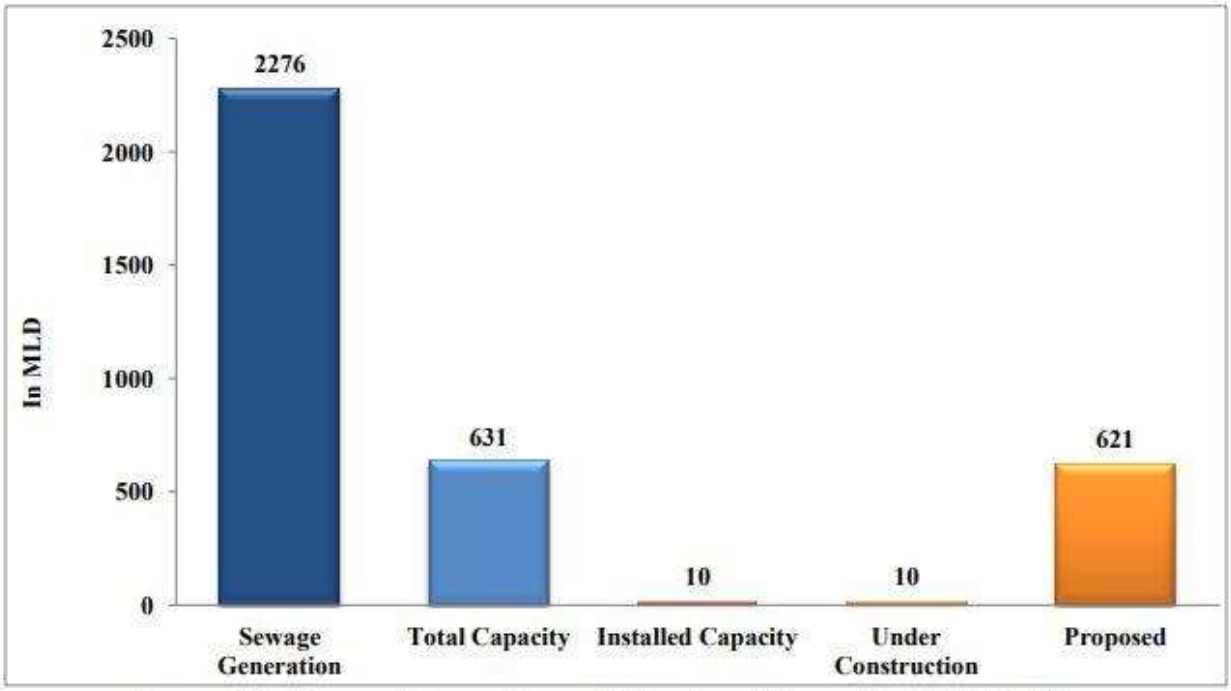


Figure 4.2 : Sewage Generation and Treatment Capacity (MLD) - Bihar

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

2. **STPs AT UTTAR PRADESH**- Estimated sewage generation for the State of Uttar Pradesh is 8,263 MLD and total treatment capacity is 3,374 MLD (107 STPs).
   Uttar Pradesh has been chosen as the better performing state of the North Zone according to the statistics mentioned above. The district chosen randomly involves- Agra, Etawah, Mainpuri, Varanasi, Noida & Saharanpur

City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)	Consent Status
Agra	Boodhi Ka Nagla	Information not provided	Operational	2.25	WSP	Not obtained
	Pilakhar		Operational	10	WSP	Not obtained
	Dhandhupura		Operational	78	UASB	Not obtained
	Jaganpur, Sikandarpur		Operational	14	UASB	Not obtained
	Bhim Nagri, Devri Road.		Operational	12	UASB	Not obtained
	Sadarwan (Bichupri)	2013	Operational	40	UASB	Not obtained
	Sadarwan (Bichupri) New	2014	Operational	36	UASB	Not obtained
	Dhandhupura New	2014	Operational	24	UASB	Not obtained
	Kalindi Vihar	2014	Operational	4.5	UASB	Not obtained
Etawah	STP at near Tiksi Mandir, Etawah (In Yamuna Action Plan)	2000	Operational	10.445	OP	Not obtained
	STP at Mauza Umrain, Etawah (In State Sector and UIDSSMT)	2014	Trail run complete but presently Non-Operational	13.5	OP	Not applied
Mainpuri	STP at Moja Ordya, Padaria, Mainpuri (In State Sector and UIDSSMT)	2013	Not Operational on full capacity	23	UASB	Not applied

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

Varanasi	Dinapur	Information not provided	Operational	80	Trickling Filter	Not applied
	Bhagwanpur		Operational	9.8	ASP	Not applied
	DLW, maduadih		Operational	12	ASP	Not applied
Noida	Sector-50		Operational	34	UASB	Information not provided
	Sector-54		Operational	27	UASB	
	Sector-54		Operational	9	OP	
	Sector-50		Operational	25	SBR	
	Sector-123		Operational	35	SBR	
	Sector-91	Information not provided	Operational	5	OP	
	Sector-54		Operational	33	SBR	
	Sector-168		Operational	50	SBR	
	Kansa, Greater Noida	2013	Operational	137	SBR	Applied
Saharanpur	Malhipur	2008	Operational	38	UASB	Not applied

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

On analysis it was found that-

1. Installed capacity is 3,374 MLD (40.83 %) against sewage generation of 8,263 MLD. It shows that there is gap of 4,889 MLD (59.17 %) in treatment capacity.

2. Out of 3,374 MLD of installed capacity developed, operationalized capacity is 3,224 MLD (95.55 %) and actual utilized capacity is 2,510 MLD (77.85 %). Further, capacity of complied STPs is only 2,114 MLD.

3. STPs based SBR, UASB and ASP technologies are predominant as compared to natural treatment systems.

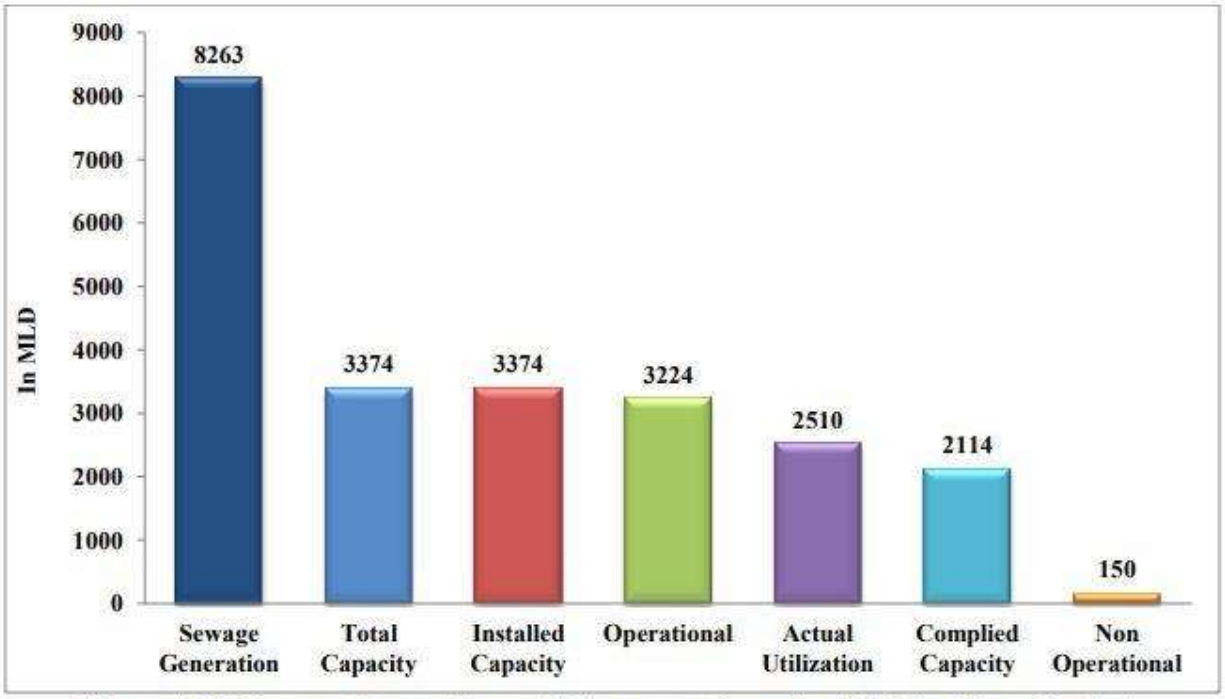


Figure 4.26: Sewage Generation and Treatment Capacity (MLD) – Uttar Pradesh

SOURCE- https://nrcd.nic.in/

WEST ZONE-

3. **STPs AT GOA**- Goa produces around 176 MLD of sewage while it has the total capacity(including the proposed) as 104 MLS(14 STPs)
   Goa has been chosen as the ill performing state of the West zone and its districts randomly chosen are as follows- Calangute, Margao, Mormugao and Panaji.

City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/ Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)
Calangute	Calangute	2014	Under Contstruction	0.08	MBR
Margao	Navelim	2000	Operational	7.5	ASP
	Navelim Shirvodem	2014	Under Construction	20	ASP
Mormugao	Baina	1985	Operational	14	ASP
	Baina	2014	Under Construction	20	SBR
Panaji	Patto	2002	Operational	0.5	TF
	Tonca	2005	Operational	12.5	ASP

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

On analysis it was found that:

1. There is gap in treatment capacity of 110 MLD (62.5 %).

2. Out of 66 MLD installed capacity developed, operationalized capacity is 44 MLD (66.67%).

3. Exact utilized capacity is 25 MLD out of 44 MLD operational capacity and all the STPs are obeying the norms.

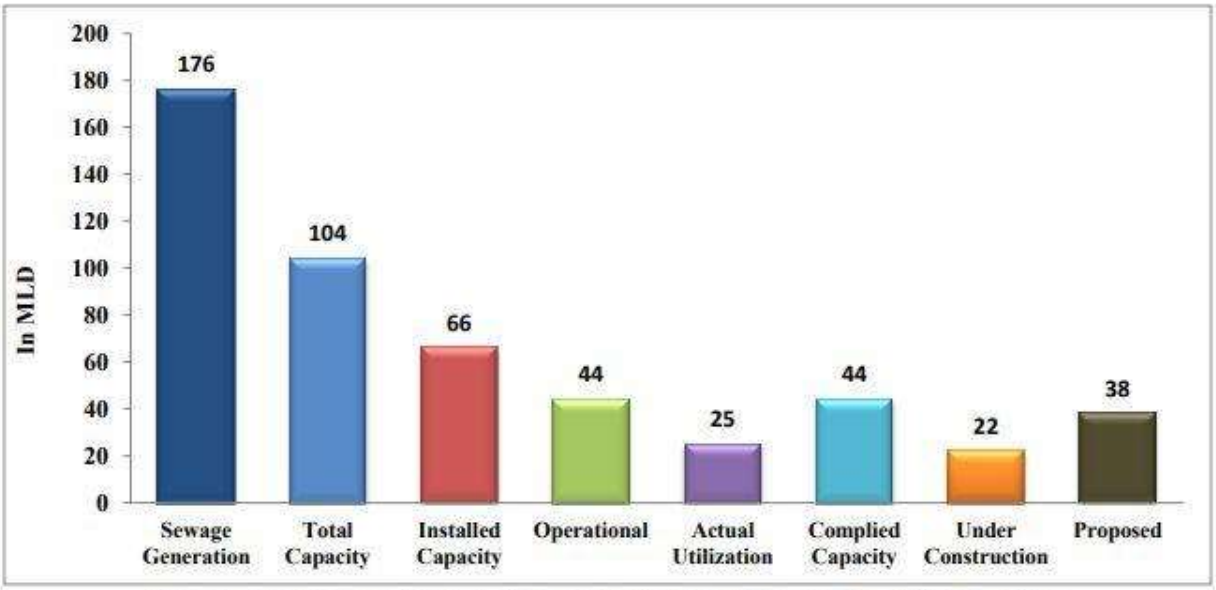


Figure 4.6: Sewage Generation and Treatment Capacity (MLD) – Goa

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

4. **STPs AT GUJARAT- Gujarat** is chosen as the better performing state of the West Zone according to the statistics discussed above. The districts chosen randomly involve- Gandhinagar, Vadodara, Bhavnagar and Ahmedabad.

Sl. No	City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)	Consent Status
1	Gandhinagar	STP of Capital Project, Jaspur, Gandhinagar	2008	Operational	76	ASP	Valid CCA up to 24/03/2016
2		Basan STP, S No. 218,219, Near IIT, Palaj-Basan road, Basan. Tal. & Dist. Gandhinagar	2014 (Proposed)	Constructed but yet not commissioned	2	SBR	NOC(CTE) Granted
3		Sargasan Sewage Treatment Plant S. No. 111, Sargasan, Tal. & Dist. Gandhinagar	2014	Operational	10	SBR	NOC(CTE) Granted and applied for CCA of the GPCB
4	Vadodara	STP of VMSS, Atladara-I	2000	Operational	43	ASP	Consent Valid up to 18/09/2014
5		STP of VMSS, Tarsali	1998	Operational	52	UASB	Consent Valid up to 15/09/2014

Talaja	Talaja Nagarpalika, Bhavnagar, Gujarat	2005	Operational	3	ASP	-
Bhavnagar	Ruvapari Road ,Bhavnagar, Gujarat		Proposed	35	UASB	Presently having Oxidation Pond 20 MLD capacity consists 5 MLD industrail effluent of GIDC, Chitra & 15 MLD domestic W/W
	Nari Road Bhavnagar, Gujarat		Proposed	45	UASB	Presently having Oxidation Pond 20 MLD capacity consists 5 MLD industrail effluent of

Palitana	Palitana, Dist. Bhavnagar, Gujarat	2005	Operational	4.5	OP	
Ahmedabad	S. No. 93,10,113,115,117(P),118,119,92,104,105,109,111,112,116,120 near Vinobabhavenagar, Vill. Vinzol, Ahmedabad	2011	Operational	70	UASB	13/08/2018

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

On analysis it was found that:

1. Installed capacity is 3,378 MLD (67.38 %) while the sewage generation is 5,013 MLD. It shows that there is a gap in treatment capacity of 1635 MLD (32.61 %).

2. Out of 3378 MLD installed capacity developed; operational capacity is 3358 MLD (99.40 %).

3. Actual utilized capacity is 2,687 MLD out of 3,358 MLD operational capacities.

4. STPs based on SBR and ASP technologies are predominant as compared to natural treatment systems

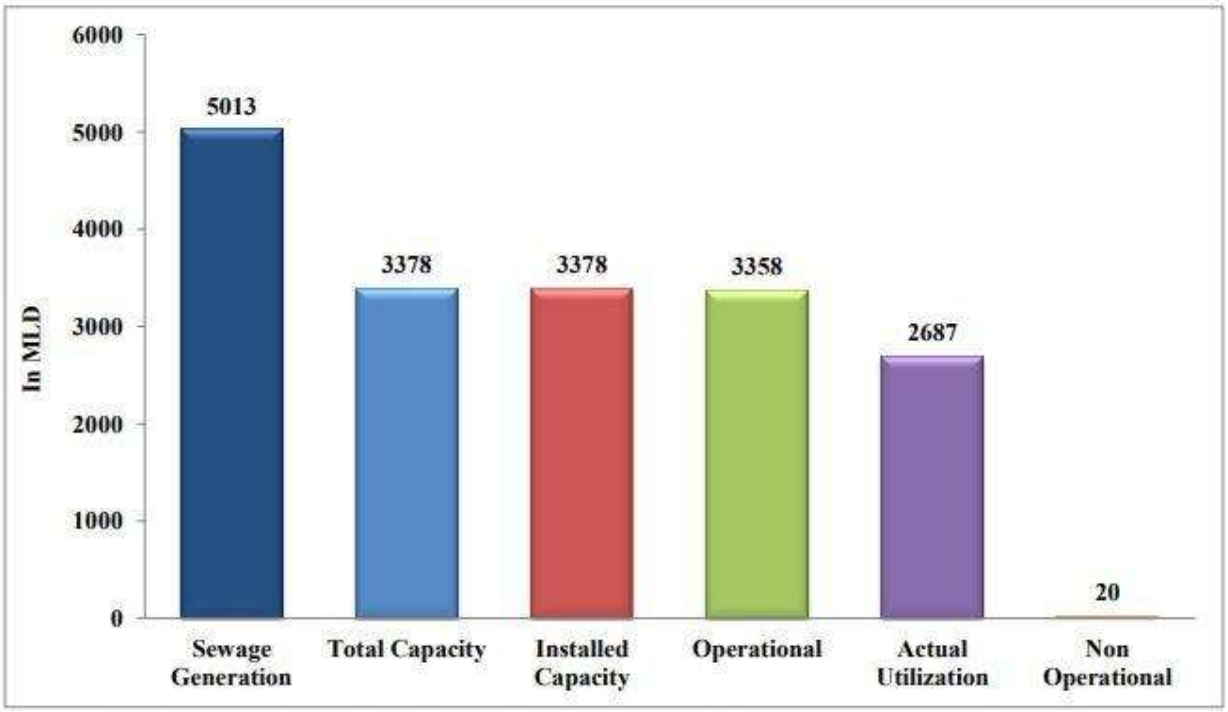


Figure 4.7: Sewage Generation and Treatment Capacity (MLD) – Gujarat

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

SOUTH ZONE-

5. **STPs AT KARNATAKA-** Karnataka is chosen as the better performing state of the South Zone according to the statistics discussed above. The district/town chosen randomly involves- Kolar, Chikballapura, Chamarajnagar, Hassan and Mandya.

City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)
Kolar	Kolar		Operational	10.16	
	Srinivasapura		Operational	3	
Chikballapura	Chikballapura		Under Contstruction	3.1	
	Chintamanai		Yet to commission	2	
Chamarajnagar	Kollegal		Operational	3.34	
	Chamarajnagar		Under Contstruction	9	
Hassan	Hassan		Operational	10	
Mandya	Chikkegowdanadoddi, Mandya		Operational	9.2	
	Guttahalu, Mandya		Operational	1.58	
	Maddur		Operational	3.5	
	Srirangapatana		Operational	1.39	

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

On analysis it was found that:

1. Installed capacity is 2,712 MLD (60.83 %) against sewage generation of 4,458 MLD. It shows that there is gap of 1,746 MLD (39.17 %) in treatment capacity. Also, estimated sewage generation for the State of Karnataka is 4,458 MLD and total capacity (including proposed) is 2,712 MLD (140 STPs).

2. Out of 2,712 MLD of installed capacity developed, operational capacity is 1922 MLD (70.87 %).

3. Actual utilized capacity is 1786 MLD (92.92 %) and further, capacity of complied STPs is only 1168 MLD.

4. STPs based on SBR, OP and ASP technologies are predominant.

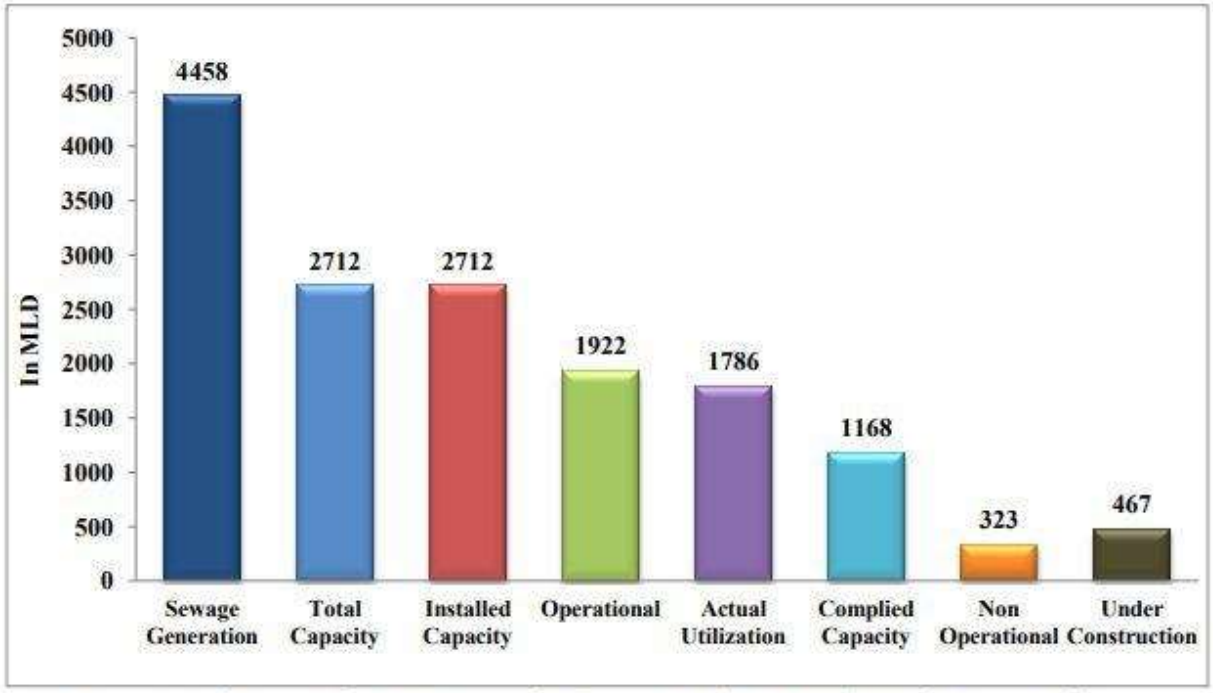


Figure 4.12: Sewage Generation and Treatment Capacity (MLD) – Karnataka

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

6. **<u>STPs AT KERALA-</u>** Kerala is chosen as the ill performing state of the South Zone according to the statistics discussed above. The districts are chosen randomly involves-Thiruvananthapuram, Ernakulum, Kottayam and Alappuzha. Estimated sewage generation for the State of Kerala is 4,256 MLD and total capacity (including proposed) is 120 MLD (07 STPs)

City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)
Thiruvananthapuram	Muttathara,	01.11.2013	Operational	107	ASP with extended aeration
Ernakulam	Marine Drive-GCDA-STP	1984	Operational	0.6	ASP with extended aeration
	KWA STP at Elamkulam	1970	Operational	4.5	ASP
Kottayam	Kumarakam(Common STP for House Boat)	2007	Operational	0.09	Diffused aeration attached growth process
Alappuzha	Kunnumma village (Common STP for House Boat)	2014	Operational	0.18	Electrolytic coagulation

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

On analysis it was found that-

1. Installed capacity is 120 MLD (2.82 %) against the sewage generation of 4,256 MLD. It shows that there is a gap in treatment capacity of 4136 MLD (97.18 %).

2. Out of 120 MLD installed capacity developed, operationalized capacity is 114 MLD (95%) and actual utilized capacity is 47 MLD only

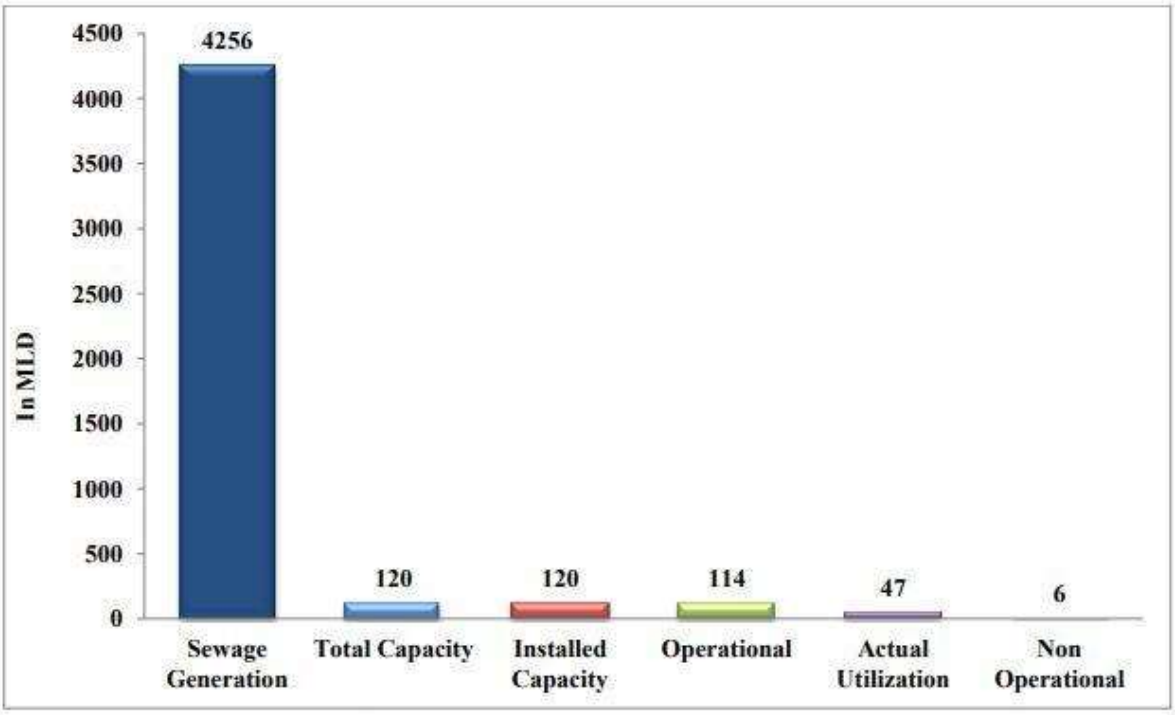


Figure 4.13: Sewage Generation and Treatment Capacity (MLD) – Kerala

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

EAST ZONE-

7. **STPs AT WEST BENGAL**- West Bengal is chosen as the better performing state of the East Zone according to the statistics discussed above. The districts chosen randomly involve- Jagaddal Bhatpara, Kankinara, Baidyabati and Bandipur. Approximate sewage generation for the State of West Bengal is 5,457 MLD and total capacity (incl. proposed) is 1,202 MLD (65 STPs).

City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)	Consent Status
	Titagarh		Non Operational	4.5	OP	No
Jagaddal Bhatpara	Jagaddal Bhatpara New		Non Operational	10	ASP	No
	Jagaddal Bhatpara Old		Non Operational	8.5	ASP	Not Known
	Jagaddal Bhatpara		Non Operational	10	OP	NO
KANKINARA	KANKINARA STP, MADRAIL,Bhatpara		Non Operational	10	OP	NO
Baidyabati	Baidyabati		Operational	6	OP	No
Bandipur	Bandipur		Operational	14	OP	Not Known

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

On analysis it was found that-

1. Installed capacity is 897 MLD (16.43 %) against the sewage generation of 5,457 MLD. It shows that there is gap of 4,560 MLD (83.57 %) in treatment capacity.

2. Out of 897 MLD of installed capacity developed, operationalized capacity is 337 MLD (37.56 %) and actual utilized capacity is 213 MLD (63.20 %). Further, capacity of complied STPs is only 126 MLD.

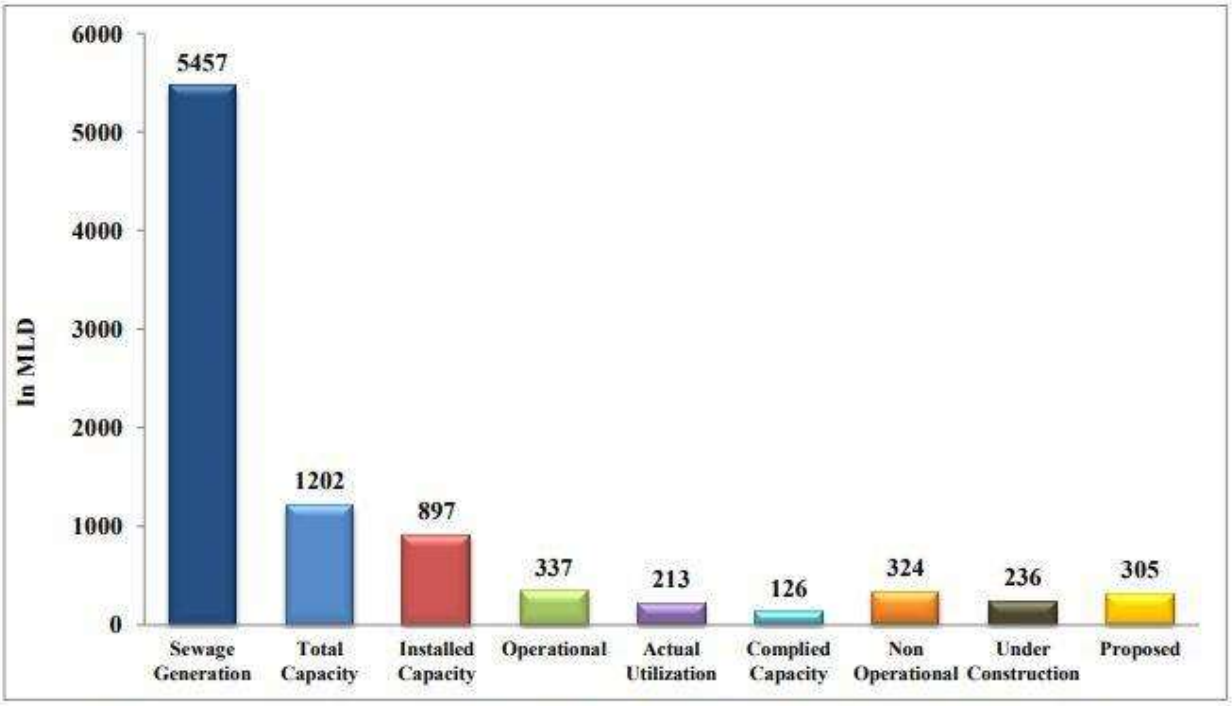


Figure 4.26: Sewage Generation and Treatment Capacity (MLD) – West Bengal

8. **<u>STPs AT JHARKHAND</u>**- Jharkhand is chosen as the ill performing state of the EAST Zone according to the statistics discussed above. The districts chosen randomly involve- Bokara, Jamshedpur, and UCIL Jadugora ES. Approximately, sewage generation for the State of Jharkhand is 1510 MLD

and total capacity (including proposed) is 639 MLD (12 STPs)

City/town	STP Location	STP Commissioned in (Year)	Status (Operational/ Non-Operational/Under Construction)	STP Installed Capacity MLD	Technology (UASB / ASP / OP / SBR / MBR/ FAB Etc.)
Bokaro	IEL Gomia Township	50 years ago	Operational	1.6	SAS
	BSL Township(a) Sector 12	Not Known	Operational	10.4	Lagoon
	(b) Sector 6	Not Known	Operational	5.85	Lagoon
	(c) Sector 11	Not Known	Operational	2.57	Lagoon
	(d) Dhandabara	Not Known	Operational	11.4	Lagoon
	(e) Camp II	Not Known	Operational	0.582	Lagoon
	(f) BGH	Not Known	Operational	1.17	Lagoon
Jmshedpur	STP Kharkai	1952	Operational	16	ASP
	STP Bara	1994	Operational	45	ASP
	Baridih STP Unit-I	1952	Operational	4.5	OP
	Baridih STP Unit-II	1964	Operational	7.65	OP
UCIL Jadugora, ES	Jadugoda STP	1995	Operational	4.086	ASP
	NarwaPahar STP	1995	Operational	2	ASP

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

On analysis it was found that-

1. Installed capacity is 22 MLD (1.45 %) against sewage generation of 1510 MLD. It shows that there is a gap of 1488 MLD (98.55 %) in treatment capacity.

2. Installed STPs can be operated at 100 % of capacity. However, actual utilized capacity is only 15 MLD and meeting the consented norms.

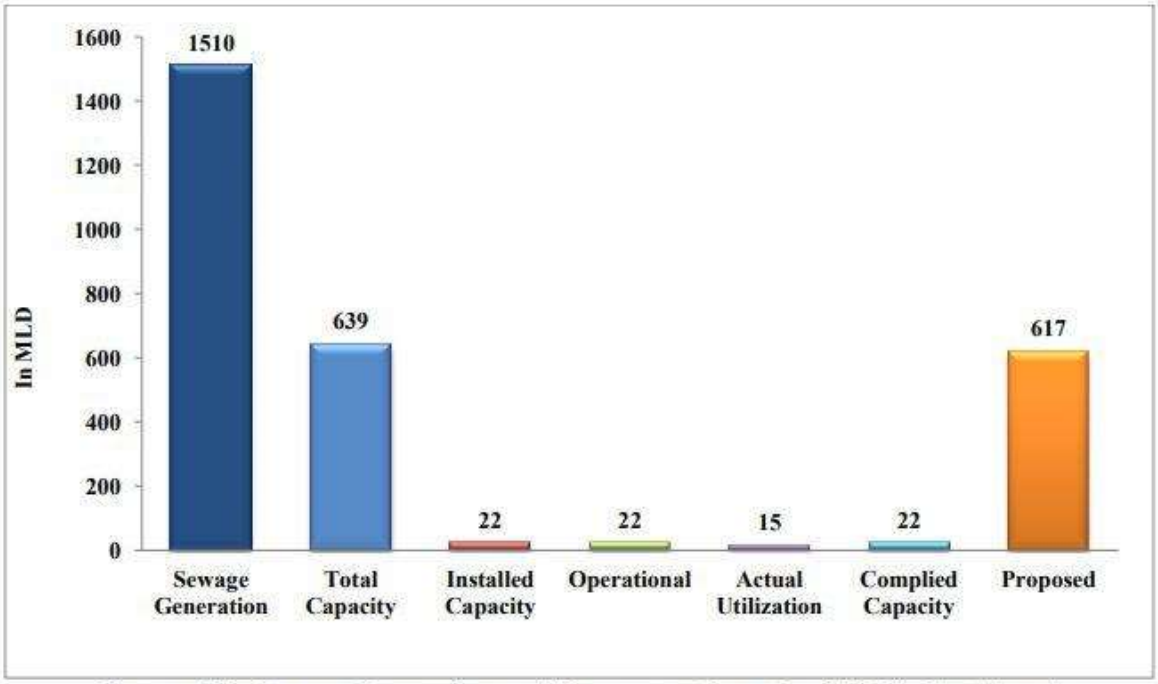


Figure 4.11: Sewage Generation and Treatment Capacity (MLD) - Jharkhand

SOURCE-
https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

WASTEWATER CHALLENGES

According to The UN Wastewater Assessment Programme-

a.High Income Countries -Treat approximately 70% of the waste water

b.Upper Middle Countries -Treat approximately 38% of the waste water.

c. Lower Middle Income Countries -Treat approximately 28% of the waste water.

d. Low Income Countries -Treat approximately 8% of the waste water

1. Rise in population as well as large scale urbanization has led to increase in sewage discharge that far exceeds the rate of natural purification.

2. Excess nutrients, generated cause eutrophication in the water body and gradual deterioration of the water quality.

▪1 in 4 health care facilities lacks basic water services.

▪3 in 10 people lack access to safely managed drinking water services and 6 in 10 people lack access to safely managed sanitation facilities.

▪At least 892 million people continue to practice open defecation.

▪Women and girls are responsible for water collection in 80 per cent of households without access to water on premises.

▪Between 1990 and 2015, the proportion of the global population using an improved drinking water source has increased from 76 per cent to 90 per cent.

▪Water scarcity affects more than 40 per cent of the global population and is projected to rise. Over 1.7 billion people are currently living in river basins where water use exceeds recharge.

▪2.4 billion people lack access to basic sanitation services, such as toilets or latrines.

▪More than 80 per cent of wastewater resulting from human activities is discharged into rivers or sea without any pollution removal.

▪Each day, nearly 1,000 children die due to preventable water and sanitation-related diarrheal diseases.

▪Approximately 70 per cent of all water abstracted from rivers, lakes and aquifers is used for irrigation.

▪Floods and other water-related disasters account for 70 per cent of all deaths related to natural disasters.

CONDITION OF WASTEWATER MANAGEMENT SYSTEM IN INDIA -

The global population growth has declined from 2.2% per year to 1.0% in past 50 years according to the World Bank report and India recorded 0.97% by the year 2020 This decline may represent a positive development though the bigger contrast lay in the fact that even a 0.97 or 1.0% growth amounts to a growth of 81 million people per year.

This indicates a net increase of 1 person every 2 seconds by the World Bank Report posing a greater threat to the natural resources of the country. And by the year 2030, India will be the most water stressed country in the World according to the report of Niti Aayog.

The image of India in the monsoon season when it receives average rainfall of 200-300 mm which floods the city of Ahmedabad, Hyderabad and the other metropolitan cities, the water stress narrative calls out for a direct attention to the Water Management as well as the Waste Water Management in India.

And as the demand of the water resource will be twice the supply by next year(Niti Aayog) it is of paramount importance to Reuse and recycle the available resource.

PRESSURE DUE TO THE BOOMING ECONOMY-

TABLE 20.1 Wastewater Generation and Treatment Capacity in Urban Centres

Parameters	*Class I cities*					*Class II towns*				
	1978–9	*1989–90*	*1994–5*	*2003–4*	*2009*	*1978–9*	*1989–90*	*1994–5*	*2003–4*	*2009*
Number	142	212	299	423	423	190	241	345	498	498
Population (millions)	60	102	128	187	187	12.8	20.7	23.6	37.5	37.5
Water Supply (mld)	8638	15,191	20,607	29,782	44,448	1533	1622	1936	3035	3371
Wastewater Generated (mld)	7007	12,145	16,662	23,826	35,558	1226	1280	1650	2428	2696
Wastewater treated (mld) (per cent)	2756 (39)	2485 (20.5)	4037 (24)	6955 (29)	11,553	67 (5.44)	27 (2.12)	62 (3.73)	89 (3.67)	234
Wastewater untreated (mld) (per cent)	4251 (61)	9660 (79.5)	12,625 (76)	16,871 (71)	24,004	1160 (94.56)	1252 (97.88)	1588 (96.27)	2339 (96.33)	2463

Source: Bhardwaj (2005).

India emerging as the fastest growing economy being 6th largest in terms of Gross Domestic Product and 3rd largest by purchasing Power Parity relies heavily on its water resource to fuel industries and the agriculture sector. The rapid expansion of the metropolitan cities and urbanization has put immense pressure on the infrastructure as well as the policy framework of the administration. Rural area and slum areas belonging to low economy receiving less to no attention, the systems currently in action are not enough optimized enough to handle the perpetuating rise of problems.

The growth of population, urbanization and industrialization reciprocates into generation of tonnes of waste and waste-water. The current statistics highlight the fact that India treats only 1/3rd of wastewater it generates which is an alarming fact due to the receding water resource according to the Central Pollution Control Board.

Class 1 and Class 2 cities are producing 38254 million litres of waste water on a regular basis out of which only 21% of its total gets treated.

According to the report of the Central Pollution Control Board, there is an increase in the trend of urbanization pollution, sewage generation and treatment capacity.

Around 52,133 MLD of untreated sewage is let out into river systems. The time has arrived when sewage should be utilized and considered as a resource which can be used to fulfill the water requirement of the industrial sector as well as for irrigation.

Central Pollution Control Board (CPCB) studies depict that there are 269 sewage treatment plants (STPs) in India, of which only 231 are operational, thus, the existing treatment capacity is just 21 per cent of the present sewage generation. The remaining untreated sewage is the main cause of pollution of rivers and lakes. The large numbers of STPs created under Central Funding schemes such as the Ganga Action Plan and Yamuna Action Plan of National River Action Plan are not fully operated. The operation and maintenance (O&M) and power cost in some of the typical sewage treatment plants is presented in Table 20.3. The development process in India is gaining momentum and the rural population which is devoid of basic infrastructural facilities will have to be given parity in terms of water supply and sanitation. This process of change is likely to generate huge volume of

wastewater in rural areas as well. It would be appropriate to design water and wastewater management plans optimally so that competing pressures on water resources can be eased. There is a need to plan strategies and give thrust to policies giving equal weightage to augmentation of supplied water as well as development of wastewater treatment facilities, recycling, recovery, recharging, and storage. The future of urban water supply for potable uses will depend majorly on efficient wastewater treatment systems, as the treated wastewater upstream urban centres will be the source of water for downstream cities. This chapter tries to deal with the various issues of sanitation and health.

Present Practices of Wastewater Reuse- The volume of wastewater generated by domestic, industrial, and commercial sources has increased with population, urbanization, improved living conditions, and economic development. The productive use of wastewater has also increased, as millions of small-scale farmers in urban and peri-urban areas of developing countries depend on wastewater or wastewater polluted water sources to irrigate high-value edible crops for urban markets, often because they have no alternative sources of irrigation water.

Policy Framework for Wastewater Management in India-

Presently in India there is no policy mandate at the central level specifically for waste water management. Untreated sewage waste is one of the major causes of surface water and groundwater pollution in India. The Water (Prevention and Control of Pollution) Act, 1974 was the first legislative measure to address the issue of water pollution and conservation in the country. This Act deals with wastewater discharge as a matter of pollution. The water Act is complemented with the Water (Prevention and Control of Pollution) Cess Act, 1977. This Act gives financial resources for Central and State Boards established under Water Act by levying taxes from individuals carrying on any industry and local industries. It also gives incentives for installation of wastewater treatment plants by granting rebates of 25% of payable cess. The Environment (Protection) Act 1986

empowers the central government to prescribe sewage and effluent discharge standards, investigate and ensure compliance and conduct research.

Differences in Policy Schedule VII of Indian Constitution Identifies Water as state matter, but explicitly it is mentioned in union list. It enables parliament to make a loss on regulating and developing interstate waters in large public interest. But state retains autonomy to frame loss regarding use of water within state like water supply, drainage, water storage etc. constitutional mechanisms resulted in power imbalances between centre and state creating federal jurisdictional ambiguity.

CONCLUSION- The estimated sewage generation of the major cities in India is 38354 million per day(MLD) while the sewage treatment capacity is just 11786 MLD. There is a huge gap and to solve the problem of accessiblity and cleanliness of water, this lacuna needs to be filled. And by the recommendations suggested SDG 6 can be easily achieved and by achieving this goal other SDGs will be automatically achieved as this waste management sector has huge untapped potential of generating employment and in turn contributing towards the economy of the nation.

RECOMMENDATIONS-

A. For water and waste water management-

1. Extensive recycling of waste water by partially treating it and releasing into river system or

2. Treating it to high standards and reusing it.

3. Using wastewater for irrigation-

- Benefits- Low fertilizer requirement (npk) 15-27% high crop yield
- Disadvantages-

i) salinity increases of soil which can result into
ii) Encouragement of growth of weeds algae
iii) Deteriorate groundwater and downstream quality

Already being practiced in vadodara and gujarat-no alternative source of irrigation so wastewater is sold out to farmers and pumps are rented to lift it, also creating an occupation.

B. Government /legislative changes-

1.Providing incentives to industries to invest in pollution control.

- Decongest cities
- Provide subsidies
- Installation of effluent treatment plant in industries, provide tax rebate.

2. Bringing groundwater utilisation under government monitoring
    - No access without permission
    - Enforcing heavy taxing to discourage household usage as well as drilling of borewells.

Example of cases where illegal selling of groundwater for commercial uses happened-


THE HINDU

CHENNAI

Act against illegal extraction of groundwater, HC tells Collector

- Karnataka ground water (regulation and control of development and management) act, 2011
- Kerala ground water (control and regulation) act, 2002 (act no. 19 of 2002).

C. Community efforts-

- Increasing civil society participation by organising
- Events spreading awareness about water management practises
- Programs to train people about best management practises.
- Organising activities in schools to teach students the same.
- Cutting down water supply atleast once a week to make people realise the signifance of water.

CITATIONS-

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