

Rite Water Solutions Impact Report 2022



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Foreword

More than 2.2 billion people around the world do not have safely managed drinking water. In 2010 the United Nations (UN) recognized access to safe and clean drinking water as a human right. UN's Sustainable Development Goal (SDG) 6 aims to ensure availability and sustainable management of water and sanitation for all. Access to safe drinking water has been a grave challenge for India. Unsafe drinking water imposes a huge health and economic burden on the country. Contaminated water leads to spread of diseases like diarrhoea, cholera, skin infections, typhoid and hepatitis. About 70% water sources in India are contaminated and chemical contamination leads to further health hazards. 66 million Indians are at risk due to excess fluoride and 10 million due to excess arsenic in groundwater. Water related diseases cause immense suffering to the people, especially the poorest, impose treatment costs, keep children away from school and men and women away from work, and result in significant mortality.

I saw first hand, the severe impact of drinking water contaminated with high fluoride in Dongarpur village in 2008. I spent a lot of time figuring out an affordable and sustainable solution for the issue, which set us on the course we are today, on a mission of ensuring safe and potable drinking water to excluded populations in the remotest corners of India. The COVID-19 pandemic has demonstrated the critical importance of sanitation, hygiene and adequate access to clean water for preventing and containing diseases. UN experts have said that COVID-19 will not be stopped without access to safe water for people living in vulnerability¹.

India has made significant progress in access to safe drinking water both in rural and urban areas. Under the government's flagship initiative - *Jal Jeevan Mission*, over 89 million rural households, of the total 192.7 million have gained access to safe water so far. Currently, at Rite Water we treat more than 5 million liters of water every day and reach out to close to 2 million people. We have grown at more than 60% annually and continue to expand our impact. We have tried to bring out the stories beyond numbers in our first impact report, which will help you appreciate the real issues of real people and the context of our work.

We know that the issue is too large for us to solve alone. We, therefore, collaborate with technology providers, manufacturers and implementers to expand our impact and contribute to national and global goals. We acknowledge the role of our investors, corporate partners and the national and state governments in our impact story. We are also grateful to our team, which works tirelessly and the welcoming communities whose collaboration makes it all possible.

Vinod Gaan

Chairman

¹ <https://www.ohchr.org/en/NewsEvents/Pages/DisplayNews.aspx?NewsID=25738&LangID=E>

Summary

Impact in Numbers



10+
Technology Solutions



2,327
Community Water
Treatment Plants



5 million
litres water purified daily



11
States



8
Low Income States



1.93 million
people with access to safe
drinking water



4,200+
livelihoods promoted



150
SHG Water ATM
Enterprises



40 million
Litres of wastewater
recycled annually



Directly aligned to
SDG 6
Contributes to
9 SDGs



3,533 million
NPV of Social Benefits in INR



89.7%
Social IRR

As of **March 31, 2021**

Context

India is experiencing a very significant water challenge. About 82% of rural households in India do not have individual piped water supply, and 163 million live without access to clean water. India ranks at the bottom in water quality. About 70% of the water supply is likely contaminated, resulting in nearly 200,000 deaths each year. About 86% of diseases in India are directly or indirectly linked to poor quality drinking water, stemming from biological and chemical contaminants.

Introduction

Rite Water Solutions (India) Private Limited ("Rite Water") is a social enterprise that focuses on providing comprehensive, cost effective and sustainable solutions for safe drinking water to habitations across India. It builds and operates community water treatment and supply systems for villages and urban slums, in partnership with state governments and corporates. The company began with an electrolytic fluoride removal plant in Dongargaon village near Nagpur in 2008. It expanded to community solutions for treatment of all kinds of contaminants in drinking water.

Impact capital from Samridhi

In 2014, Rite Water secured investment from Samridhi Fund, an impact fund with contributions from Foreign, Commonwealth and Development Office (FCDO), UK Government and Small Industries Development Bank of India (SIDBI). With this impact capital, it expanded from 140 treatment plants in 3 Low Income States (LIS) to 2,327 plants in 8 LIS in India.

Development Impact

Access to safe drinking water: Rite Water has enabled access of safe drinking water to about 2 million people across more than 2,300 habitations, in difficult and some of the poorest areas in India. It impacts the most vulnerable population – poor and without alternative, especially women and children in the household. It is the cheapest source of treated water, available free or at a nominal cost of INR 4 for 20 liters.

Health and well being: Beneficiaries surveyed have most commonly reported alleviation of gastro-intestinal and skin issues with regular use of treated water. In areas with fluoride contamination, relief from dental and bone issues has been observed.

Livelihood opportunities: It has more than 115 employees and its water plants employ more than 2,000 operators. It has created livelihood opportunity for about 1,650 women from 150 SHGs, who manage water ATMs as an enterprise.

Green Solutions: Rite Water has installed more than 150 plants, which run on renewable solar energy. Rite Water uses most efficient and environment friendly technologies like Electrolytic De-Fluoridation and Hybrid Ion Exchange, with minimum effluents and high water recovery. It is also involved in recycling of waste water in cities.

Cost Benefit Analysis

The cost benefit estimation for Rite Water was done by considering the price that people are willing to pay as a proxy of its utility or benefits, along with employment and profits generated and all the capital invested in the company as the cost. The estimation yields benefits of INR 3.5 billion, Social Internal Rate of Return (SIRR) of 89.7% and a Benefit Cost Ratio (BCR) of 14.3, as of March 31, 2021.

Impact in Stories

The report also brings out the variety of Rite Water's work, impact and context through the following case studies:

1. RO Plant in Naugaya village of Bharatpur District in Rajasthan
2. Solar EDF Plant in Chechariya Panchayat of Garhwa District in Jharkhand
3. Piped Water in Terasi Tola, Purnea, Bihar
4. SHG run RO Plant and Water ATM at Trimurtee Nagar, Nagpur City

Contribution to SDGs

Rite Water contributes to the Sustainable Development Goals (SDGs). It is directly aligned to SDG 6 and contributes to SDGs 1, 3, 5, 7, 8, 9, 10, 11 and 17. During its journey of creating impact for 2 million, it has partnered with various public and private sector partners and won various accolades.



The Context

India has 4% of the world's available freshwater resources, but is home to 17% of the world's population. India is experiencing a very significant water challenge. Approximately, 820 million people of India have per capita water availability close to or lower than 1000 m³ – the official threshold for water scarcity as per the Falkenmark Index². About 82% of rural households in India do not have individual piped water supply, and 163 million live without access to clean water close to their homes³. Average per capita water availability, which is already low enough for India to be categorized as water stressed, is expected to reduce further to 1140m³ by 2050, close to the official water scarcity threshold⁴. India ranks as 120th among 122 countries in the Water Quality Index, and approximately 70 percent of the water supply in India is likely contaminated, resulting in nearly 200,000 deaths each year⁵.

About 86% of diseases in India are directly or indirectly linked to poor quality drinking water. Annually about 37.7 million Indians are affected by waterborne diseases, 1.5 million children die of diarrhea and 73 million working days are lost leading to an economic burden of \$600 million a year⁶. In addition, chemical contamination of nitrate, fluoride, iron, arsenic and other heavy metals in water leads to various levels of discomfort to crippling and sometimes life threatening diseases to people.

² Central Water Commission. 2015. Water and Related Statistics. <http://cwc.gov.in/sites/default/files/water-related-statistics-2015.pdf>

³ Water Aid. 2018. The Water Gap: The State of The World's Water 2018 <https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/The%20Water%20Gap%20State%20of%20Water%20report%20lr%20pages.pdf>

⁴ Ministry of Water Resources. Shortage of Water. <https://pib.gov.in/newsite/PrintRelease.aspx?relid=168727>

⁵ NITI Aayog, 2018

⁶ <https://washmatters.wateraid.org/publications/drinking-water-quality-in-rural-india-issues-and-approaches>

Who we are?

Our Company

Rite Water Solutions (India) Private Limited ("Rite Water") is a social enterprise that specializes in potable water and water quality improvement solutions. It focuses on providing comprehensive, cost effective and sustainable solutions for safe drinking water to habitations across India, where water sources are chemically and biologically contaminated.

The very existence of our company is premised on building a better and more sustainable future by improving the quality of the abundantly available, yet extensively exploited and contaminated resource - WATER. The company is able to achieve this by providing a sustainable approach to water treatment and inspiring communities to be more responsible about water sources.

Our Promoters



Vinod Gaan, Chairman

B. Tech., Chemical Engineering



Abhijeet Gaan, MD & CEO

BE BITS-Pilani, MBA-SP Jain

Our Investor



The company received investment from an impact fund, Samridhi, set up by the Foreign, Commonwealth and Development Office, UK Government and Small Industries Development Bank of India (SIDBI) and managed by SIDBI Venture Capital Limited.

What do we do?

Rite Water builds and operates community level water treatment and supply systems for villages and urban slums. It partners with state governments and corporates, which provide the capital expenditure to set up these treatment plants. The partners also bear the operation and maintenance costs, but in some cases it is recovered through sale of the treated water at nominal rates.

Our Mission

To expand sustainable technology and infrastructure to ensure safe and potable drinking water to excluded populations in remotest corners of India and contribute to Sustainable Development Goals.

Our Vision

Clean up the utmost important natural resource – Water, through sustainable means to ensure sufficient quality and quantity of drinking water to all Indians and in time expand our services to rest of the developing world.

Our Story - How it all began?

The company was incorporated in the year 2004 as Nagpur Aquatic Private Limited (NAPL) to design, manufacture, and deal in assembling, testing, erecting, commissioning, servicing, operating and maintaining water treatment plants and projects. We began by setting up a manufacturing facility for water disinfection plants at Maharashtra Industrial Development Corporation (MIDC) premises in Nagpur during the year 2005.

The first product of the company was an electro-chlorination plant, an onsite generator of chlorine, useful for disinfection of water. The development of this product gave the company experience in electro-chemical process and electrochemistry-based products. To increase the product portfolio, in 2008, the company partnered with Siemens Water Technologies, world's biggest water treatment equipment manufacturing company. The company became a channel partners to offer chemical feed automation solutions based on Siemens technology.

During the period 2006-2008, the Company engaged in research and development (R&D) activity to design, manufacture and provides potable water solution. In 2008, we came across *Dongargaon*, a village in Chandrapur district, about 100 kms from Nagpur. More than half the children in this village were suffering from deformed teeth (dental fluorosis) and painful and deformed bones (skeletal fluorosis). The source of water in the village was underground water accessed through a bore-well and a dug well. The water had high fluoride contamination. We started work on the problem and developed a treatment system based on electrolytic fluoride removal technology and set up the pilot plant in Dongargaon. The solution came as a big relief to the villagers. Post implementation of the plant and the technology, the Government of Maharashtra gave us the project to set up similar plants in fluoride affected villages of Maharashtra. Since then, we built community solutions for treatment of all kinds of contaminants in drinking water. In 2012, we changed the name of the company to Rite Water Solutions (India) Private Limited.

How Impact Capital helped us expand our impact

In 2014, Rite Water got investment from Samridhi Fund, an impact fund which focused on creating impact in eight low income states (LIS) of India. The fund made additional follow on investments in 2018 to support our plans. The impact focused capital helped us to expand and deepen our impact. With this impact capital, we expanded from 140 treatment plants to 2,327 plants and from just three low income states to all the eight. In addition to the LIS, we also work in poor regions of Maharashtra, Karnataka, and Andhra Pradesh. We reach out to poor and excluded communities in some of the remotest parts of India today.

Solutions Offered

Rite Water offers solutions for all kinds of chemical and biological contamination in drinking water

Nature of Contaminant	Suitable Technology	Rite Water Solution
Salinity (Hardness)	Reverse Osmosis	AQUA-RO
Fluoride	Electro-coagulation Nano Technology (Nano Material)	AQUA EDF ® HIX-Nano ®
Biological (Bacteria/Viruses)	Electro-Chlorination Ultra Violet Ultrafiltration	ENCEE CHLOR ® AQUA –UV AQUA-UF
Nitrate	Nitrate Exchange	AQUA-NRP
Arsenic	Electro-coagulation Nano Technology (Nano Material)	AQUA-ARP HIX-Nano ®
Multiple	Reverse Osmosis	AQUA-RO
Iron	Oxidation and Chlorination Media Filtration	Aqua – IRP

Our Impact

Access to safe drinking water

Outreach: Rite Water has enabled access of clean and safe drinking water to about 2 million people across more than 2,300 habitations in India.

Rite Water Outreach	Amount
No. of States	11
No. of Low Income States	8
Districts in Low Income States	64
Total Installations	2,327
People impacted	1.93 Million

Poor and Remote Geographies: Rite Water works in difficult and some of the poorest geographies in India. It works in all the Low Income States (LIS), as per the World Bank classification, namely Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan and Uttar Pradesh. As per the recent Multidimensional Poverty Index (MPI) of the NITI Aayog, it works in states and districts with high incidence of poverty⁷. It mostly works in rural India, where the population as well as the infrastructure is poorer. Majority of the villages are remote and difficult to reach and several are in tribal areas.

Impacts the poorest and most vulnerable people: Rite Water works in poor villages with identified water contamination issues. Majority of the residents here suffer the ills of water contamination. Rite Water plants offer safe water in these locations, which do not have any alternative safe water supply. There is no discrimination and everyone in the habitation has access to the treated water. However, it impacts the poorest most as they use public sources of water and generally lack the ability to treat it on their own. Even within the household, it impacts the women and children more who have the primary responsibility of fetching water in most rural contexts. Women and children are also the most neglected when it comes to seeking healthcare for water related health issues.

Affordability: Rite Water works with the government or corporate grantors to make treated water available free in most locations. In some locations the water is sold at a nominal rate of INR 4 for 20 liters. Primary research by Oxford Policy Management has confirmed that relatively poor households in a *kuccha* (*mud*) house were willing to pay for clean water. In all locations the water from Rite Water is the cheapest source of clean and safe drinking water.

⁷ NITI Aayog, 2021

Health and well being

Drinking contaminated water leads to various diseases and health hazards. Biological contamination leads to waterborne diseases such as diarrhea, dysentery, cholera, typhoid etc. High level of chemical contamination in water also leads to serious health implications as detailed below.

Contaminant	Health Impact
Fluoride	Fluorosis ⁸ , a crippling disease caused by deposition of fluorides in the hard and soft tissues of body. Low concentration may cause staining of teeth (dental fluorosis). Higher concentrations may result in stiffness of joints, the back, severe pain, deformities and ultimately marked disability (skeletal fluorosis).
Arsenic	Long-term exposure to arsenic from drinking-water can cause cancer and skin lesions. It has also been associated with cardiovascular disease and diabetes. In utero and early childhood exposure has been linked to negative impacts on cognitive development and increased deaths in young adults.
Nitrate	Consuming too much nitrate can affect how blood carries oxygen and can cause <i>methemoglobinemia</i> . It can cause skin to turn a bluish color, decreased blood pressure, increased heart rate, headaches, stomach cramps, and vomiting can result in serious illness or death.
Iron	High iron in water leads to an overload (<i>hemochromatosis</i>) which can cause gastrointestinal problems include nausea, vomiting, diarrhea and stomach pain and diabetes. Excess iron can also damage the liver, pancreas, and heart.
Salinity	Elevated water salinity results in bad taste and is linked with health outcomes such as hypertension and pre-eclampsia (high blood pressure) in pregnant women, skin diseases, acute respiratory infection and diarrheal diseases.

Communities where Rite Water has installed treatment plants have seen a significant decline in the cases of diarrhea, skin diseases, kidney disorders, weak bones, and dental problems. There is evidence of abatement of fluorosis in communities around some of the oldest plants in Maharashtra. Beneficiaries surveyed have most commonly reported alleviation of gastro-intestinal and skin issues with regular use of treated water.

Experts have acknowledged the role of safe drinking water in containing COVID-19 pandemic. Post COVID-19, the company has come up with a wide range of disinfection and sanitization solutions under the initiative "Beyond Corona", to protect communities against the novel Corona virus.

Livelihood opportunities

Rite Water generates employment directly and indirectly. It has more than 115 employees on the company rolls. In addition, it employs several vendors in manufacturing of water treatment plants and its parts. This leads to indirect livelihood generation and promotion of small and medium enterprises (SME). Its community water plants gainfully employ more than 2,000 local operators. It has successfully implemented Water ATM Microenterprise model, where Women Self Help Groups (SHGs) manage the water treatment plant and ATM and earn from water sales. It has promoted livelihoods and created empowerment opportunity for about 1,650 women from 150 such SHGs.

Green Solutions

Use of Clean and Renewable Energy: Rite Water uses solar energy based treatment plants in far flung areas with unreliable electricity supply. The company has installed more than 150 such plants, which conserve 87,600 kWh of grid power annually. This power is not only renewable but reduces green house gases by 20 times

⁸ National Health Portal of India: <https://www.nhp.gov.in/disease/non-communicable-disease/fluorosis>

compared to coal fired thermal power plants, which produce majority of electricity in India. This leads to estimated reduction of 77,400 Kg of CO₂, 583 Kg of SO₂ and 358 Kg of NO from the environment annually⁹.

Environment Friendly Technology: Rite Water uses case appropriate and most efficient and environment friendly technologies for treatment and cleaning of water. The treatment technologies used often have minimum effluents and high water recovery.

Its Electrolytic De-Fluoridation (EDF) technology, licensed from CSIR-NEERI, coagulates and removes the fluoride permanently, making the environment fluoride free over a period of time¹⁰. Other technologies transform fluoride from one form to another, which goes back to the environment.

Rite Water has used HIX (Hybrid Ion Exchange) from WIST Inc., USA, a nanotechnology-based resin platform capable of consistently removing arsenic and fluoride. HIX has half the capital expenditure, 6X lower energy requirements and 2X water recovery compared to Reverse Osmosis (RO).

The EDF and HIX technology lead to 99% water recovery compared to about 50% for reverse osmosis.

In addition, Rite Water is also involved in recycling of waste water. It has set up 12 decentralized Sewage Treatment Plants across gardens next to *Nallas* (Drains) in Nagpur city. It is recycling 40 million liter water annually. Water is supplied in Red Tankers for non-potable uses like construction, gardening and washing.



⁹ *Estimated from research paper* - M. L. Mittal, C. Sharma and R. Singh, 2012, Estimates of Emissions from Coal Fired Thermal Power Plants in India

¹⁰ Electrocoagulation as a Promising Defluoridation Technology from Water: A Review of State of the Art of Removal Mechanisms and Performance Trends: <https://www.mdpi.com/2073-4441/13/5/656/pdf>

Cost Benefit Analysis

WHO estimated the benefit-cost ratio (BCR) for the necessary interventions of attaining universal access to drinking-water in South Asia as 3.7 in 2012¹¹. Access to clean drinking water reduces health risks and frees-up time for education and other productive activities, as well as increases the productivity of the labor force¹². For Rite Water, we could not estimate the benefits related to better health, lower healthcare costs, higher productivity and more time. However, we took measurable proxy for the benefits.

- The price that people are willing to pay for clean and safe drinking water was considered as a proxy of its utility or benefits perceived by the people.
- Employment of locals was considered a benefit to the society. There is one operator for each plant and the average salary was taken as an average of Bihar and Rajasthan.
- Rite Water profits were also considered as benefits
- The societal benefits are still underestimated as we did not include wages of Rite Water employees, earnings of SHG women, who manage plants as an enterprise or vendors and suppliers of Rite water
- Environmental benefits of solar power have also not been taken into consideration
- All the capital invested in the company since 2014 were considered the cost for the analysis

The estimation yields a **Social Internal Rate of Return (SIRR) of 89.7%** and a **Benefit Cost Ratio (BCR) of 14.3**, as of March 31, 2021.



¹¹ WHO, 2012, Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage by G. Hutton

¹² OECD, 2011, Benefits of investing in water and sanitation: an OECD perspective:
<https://www.oecd.org/berlin/47630231.pdf>

Cost-Benefit Analysis of Rite Water Impact

(As on Mar 31, 2021)

Financial Year	2014	2015	2016	2017	2018	2019	2020	2021	Terminal Value
Community Water Treatment Plants	140	260	387	750	1,170	1,498	1,814	2,327	
Households Served	20,500	33,460	88,480	1,50,000	2,45,080	2,77,880	3,09,480	3,86,430	
Population Served	1,02,500	1,67,300	4,42,400	7,50,000	12,25,400	13,89,400	15,47,400	19,32,150	
Million Liters of Water Consumed	12	19	51	86	140	159	177	221	
Figures in INR Million									
Benefits									
Monetized Benefits of Safe Water	4.7	7.6	20.2	34.3	56.0	63.5	70.7	88.3	
Earnings of Local Plant Operators	5.5	10.1	15.1	29.3	45.6	58.4	70.7	90.8	
Rite Water Profits	5.0	6.4	6.9	28.8	69.8	94.6	148.3	144.0	
Total Benefits	15.1	24.2	42.2	92.3	171.4	216.5	289.7	323.0	6,783.3
Costs									
Capital Invested by Samridhi	40.0	-	46.0	14.0	-	100.0	-	(60.0)	
Capital Invested by Banks	34.0	24.0	43.0	44.0	15.0	28.0	-	-	
Total Costs	74.0	24.0	89.0	58.0	15.0	128.0	-	(60.0)	
Net Benefits (Benefit - Cost)	-58.9.0	0.1	-46.6	34.6	156.2	88.7	289.7	383.0	6,783.3
Social IRR	89.7%								
Net Present Value of Benefits	3,533.3								
Net Present Value of Costs	246.9								
Benefit Cost Ratio	14.3								

Assumptions

Average annual water consumption per household = 571 Liters (Rite Water data)

Benefits of clean water to households (based on willingness to pay) = INR 0.4 /Liter¹³

Discount Rate = 10% (Conventionally used for development projects)

Perpetuity growth rate = 5%

¹³ Estimated by Oxford Policy Management in their independent research during evaluation of Samridhi Fund

Impact in Stories



Sweet Water at Last

Geography: Bharatpur, Rajasthan

Problem: Salinity

Solution: Reverse Osmosis (RO)

“ Earlier we used to bring water from the well which was very salty and would dry up in summers. Since the RO is installed we get sweet water conveniently and cooking also takes less time. ”



Naugaya is a small village in Sesar Block of Bharatpur District. Bharatpur, is home to the famous Keoladeo National Park, a World Heritage Site, which attracts thousands of rare migratory birds. Bharatpur is also known for one of the highest salinity in eastern Rajasthan¹⁴. Naugaya has a population of over a thousand people and most of the inhabitants are agriculturists. Groundwater is the main source of water for the village. People generally used wells and bore well hand pumps to draw water. The groundwater in the village is highly contaminated with Total Dissolved Solids (TDS) of over 3,000 parts per million and is unfit for drinking. There is high chloride, fluoride and nitrate content in water. Residents of the village recall that the water tasted salty, and they had difficulty cooking. Joint pains and gastro-intestinal problems were widespread.

All this changed in November 2016, when Rite Water installed a community water treatment plant in the village. Under a Public Private Partnership, the “Amrit Jal Pariyojana” Rite Water collaborated with the Government of Rajasthan to install the treatment plant in the village. It has installed the plant and takes care of its operation and maintenance. The government provided the cost of setting up the plant and covers some of the maintenance costs. To cover the entire operating cost, Rite Water sells water at a nominal cost of Rs. 4 for 20 liters of treated water.

The plant uses the Reverse Osmosis (RO), Ultra Filtration (UF) and Ultra Violet (UV) technology to treat the water, which takes care of the particles, dissolved solids as well as biological contaminants. The plant has a capacity of treating 500 liters per hour and can easily take care of the requirement of the village. It has also installed a water ATM to facilitate hassle free sale of water. Every household has

¹⁴ Rajasthan State Ground Water Atlas, 2013

been issued a smart Water ATM Card, which is recharged on the 5th of every month and can be used to buy water seamlessly. Rite Water has appointed Surendra Singh, a local, as operator of the plant.

Now the villagers get pure and safe drinking water which is “sweet” (without salinity) in taste. The TDS level in the treated water is 280. “Water not only tastes sweet, it has made cooking easier”, most villagers testify. The residents no longer have persistent issues of joint pains and gastric trouble. Naugaya is not the only village facing such drinking water issues in Rajasthan. There are villages where people could not make tea, as milk would curdle due to high salinity. In one particular village people from neighboring villages would not marry off their daughters because of brackish water. But all these are forgotten issues now. Rite Water has installed such community water treatment RO plants in 409 villages, cumulatively providing safe and potable drinking water to more than 200,000 people and employed 409 local operators.

Click to see the video: [Sweet Water At Last](#)



Fluoride Free Water in Difficult Geographies

Geography: Garhwa, Jharkhand

Problem: Fluoride

Solution: Solar Electro De-Fluoridation

“ All the villagers used to drink water from wells and hand-pump, which had high fluoride and water. We had knee pain, all kinds of joint pain and teeth also turned yellow. Since this has been built, we don't have back ache or knee pain, teeth are clean and digestion is also good ”



Tiwari Tola in Chechariya Panchayat is a small village, 36 Kms north-west of the district headquarters in Garhwa. Garhwa is highly forested and Naxal affected district of Jharkhand, carved out of Palamu in 1991. It lies at the north western corner of Jharkhand, bordered by Sonabhadra District of UP and Balarampur District of Chhattisgarh. Jharkhand is the second poorest state in India, while Garhwa is one of the poorest districts of the state¹⁵. As per Public Health and Engineering Department (PHED) data, Garhwa suffers from excessive fluoride in water.

In Tiwari Tola, fluoride in water had reached alarming levels at 3 parts per million (ppm), against the permissible maximum limit of 1.5. The water also has high iron content. The villagers had already started experiencing the ills of high fluoride. Issues like joint pain, stained teeth, teeth deformation, indigestion, diarrhea and dehydration were common in the village. The inhabitants of the village are farmers, who grow paddy, maize and oilseeds as the major crops. Tiwari Tola is a remote village, accessible by a single narrow and patchy road and receives only 12-15 hours of electricity in a day. Rite Water in collaboration with the PHED, Government of Bihar, set up an environment friendly drinking water treatment solution contextualized to the unique needs of Tiwari Tola. Round the clock electricity availability was an issue, so the treatment plant uses solar power from solar panels set up on the roof of plant building. The plant uses “green and clean” electrolytic de-fluoridation (EDF) technology to treat

¹⁵ Multidimensional Poverty Index 2021, NITI Aayog

the water. EDF is an electrochemical technique for permanently removing a variety of unwanted dissolved particles and suspended matter including fluoride, without any reject or discharge. The cost of treatment is just one-tenth of Reverse Osmosis (RO).

The Fluoride content in the treated water in Tiwari Tola ranges between 0.1 to 0.5 ppm, which is completely safe for drinking. The excess iron is also removed. The residents are quite happy with the clean treated water, available on the turn of a tap. The plant is operated by Vishal Kumar Tiwari, a local from the village. Rite Water operates 152 similar solar water de-fluoridation plants which provide safe drinking water to more than 4,500 households.

Click the link to view the video: [Fluoride Free Water](#)



Tap Water for Every House

Geography: Purnea, Bihar

Problem: Iron

Solution: Piped Tap Water

“ Earlier we faced a lot of water scarcity. We used to bring water from the pond, from the canal. We could see that the water was not worth drinking but I had no solution! I faced a lot of issues, sometimes stomach ache, sometimes gas, sometimes teeth and gum problems...”

”



Phool Devi, dressed in a radiant red sari, can hardly hide her grin as she talks about the recently installed tap water in her *Tola* (hamlet). Phool Devi, 32, is a resident of Terasi Tola of Sukhsena West Panchayat in Purnia District. Purnia has the lowest literacy rate and is one of the poorest districts in Bihar, the poorest state of India. Terasi Tola is a poor village with a population of only 560. Phool Devi recalls that drinking water in her village had a metallic taste and people routinely suffered from stomach problems and nausea. The water would stain her utensils with reddish brown spots. The water had very high iron contamination and was unfit for drinking. She says we knew the water is dirty and contaminated but we had no recourse. She remembers that getting water used to be an arduous task for her family of six. She used to fetch water from the well for drinking and from the pond or the canal for washing, with her young daughter often extending a helping hand. Most people in Sukhsena had never seen water gushing out of a tap.

Today she gets tap water right in front of her house. The water is clear, odorless and tastes good. Life has become so much better. Her small kid gleefully gulps down the tap water. She thanks the government and Rite Water for bringing clean and convenient tap water to her village. Under the *Har Ghar Nal ka Jal Yojna* (Tap Water for Every House) of Bihar Government, aimed at providing safe drinking water to the people in rural areas, Rite Water installed the complete set up for tap water in the village in August 2020. This includes pumping groundwater through a borewell, a treatment plant, an elevated storage tank, distribution pipeline and household tap connections. Rite Water set up a treatment plant with a capacity of 8,000 liters per hour. A local has been employed as plant operator. Water is supplied for two hours each, in the morning and the evening. Currently, the water is available free to the villagers but eventually every household will be charged Rs. 30.

About 11 districts in Bihar have high iron, 11 districts have high fluoride and 14 districts have high arsenic contamination in water. Rite Water is working in five districts – Iron affected Purnia and Saharsa, Fluoride Affected Banka, Jamui and Nawada. It has installed tap water in 397 villages ensuring access to clean drinking water for more than 200,000 people in these districts. It uses anion adsorption based cleaner technology which reduces water wastage. It has generated livelihoods for local operators and is contributing to better health and hygiene.

Click on the link to view the video: [Har Ghar Nal Ka Jal](#)



Empowering Women Through Water ATM Enterprise

Geography: Nagpur, Maharashtra

Problem: High TDS

Solution: RO + Water ATM

“ We had this SHG for 10 years, but earlier we had no work. Someone was stitching for a while, some were washing utensils, but mostly we did household work, Only 3 years ago we started the Water ATM work, we make a sale of more than Rs. 32,000 every month now.”

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Karuna Ravi Gaekwad is the President of Pradnyashil Mahila Bachat Gat, a Self Help Group (SHG) of 11 fellow women in Trimurtee Nagar of Nagpur City. Against the backdrop of the Water ATM that her Self Help Group manages, she is beaming proudly as she recounts its story. The Water ATM along with the Reverse Osmosis (RO) treatment plant and a Water Chiller in Trimurtee Nagar was set up in 2018. Rite Water built the plant under a CSR initiative of Pernod Ricard India, which provided the capital expenditure. Unlike Rite Water's usual model where it takes up the responsibility of operating the plant, it chose Pradnyashil SHG for operation and management. The SHG runs the Water ATM as an enterprise, earning through the sale of water and taking care of all operating expenses.

The SHG had been around for about 10 years, only doing savings and lending to its members from the group corpus. Most women were doing household chores and only some doing odd jobs like working as a house-maid or stitching. Karuna recalls that the journey was not easy. Their family members and friends said that they will not be able to manage the plant. She herself was full of self doubt. But representatives from Rite Water motivated and convinced them and supported them at every step.

The Water ATM caters to a population of about 1,000 in its catchment providing clean drinking water. At the ATM 20 liters of treated water is available for only Rs. 5, and Rs. 10 in case it is chilled. The buyers of water range from shopkeepers, government offices, to students and households from nearby slum. Most of the buyers are regulars who are convinced of the water quality and feel it is available at a much lower price compared to any other RO plant. The sale is made through pre-paid smart cards,

which make accounting and cash management easier for the SHG. The SHG sells 3,000 to 4,000 liters of water everyday, earning about INR 35,000 monthly and making profits of over Rs. 20,000.

Income and Expenses	Amount (Rs.)
Monthly Income from water sale	35,000
Electric Bill	7,000
Operator Salary	5,000
Other Operating expenses	1,500
Cleaning charges	1,000
Monthly Expenses	14,500
Net Earnings	20,500

Karuna admits with a chuckle that the SHG members are now treated with respect. Her husband has also been quite supportive since the SHG took up the management of the RO plant. The women have been managing this sustainable social enterprise for more than 3 years now. It is bringing safe water at affordable prices to people in Trimurtee Nagar and has helped the women members achieve true economic and social empowerment.

Rite Water has set up 150 such plants, which are managed by SHGs in different parts of Maharashtra. They cumulatively serve a population of about 150,000 with affordable, safe drinking water. In addition they provide livelihood and dignity to about 1,600 poor women.

Click on the link to view the video: [Water ATM SHG Enterprise](#)



Contribution to SDGs



SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs) are 17 global goals adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. As a social enterprise, Rite Water is directly aligned to SDG 6 and contributes to the achievement of several of these goals.



Rite Water's existence, its mission and vision is premised on SDG 6. It directly contributes to SDG 6 by ensuring access to safe and affordable drinking water to about 2 million excluded people.



Majority diseases in India are linked to poor quality drinking water. Healthcare costs pushed 55 million Indians into poverty in a single year. About 73 million working days are lost due to water borne diseases in India, leading to an economic burden of \$600 million a year in India.

Contributes to "No Poverty" by reducing healthcare expenses due to diseases from biological and chemical contamination of drinking water, and promoting a healthier population, which can earn better.



About 86% of diseases in India are directly or indirectly linked to poor quality drinking water. Annually about 37.7 million Indians are affected by waterborne diseases, 1.5 million children die of diarrhea.

Majority habitations where Rite Water works had reported health issues related to contaminated water. By bringing safe drinking water, contributes to good health and well being of communities in remotest parts of India.

Has started wide range of disinfection and sanitization solutions to prevent the spread of COVID-19.



Women and girls have the predominant responsibility of getting drinking water in rural households of India, which often is time consuming and tedious. In addition cooking with salty and hard water is a challenge for them. Women's health care needs arising out of contaminated water are most neglected when healthcare access and costs are an issue.

Contributes to Gender Equality Through availability of clean drinking water for women closer to, or in their homes. This frees-up time for education of girls and other productive activities for women.

Enables economic and social empowerment of thousands of women through Women SHG managed water kiosk enterprises and contributes directly to SDG 5.



Uses solar powered treatment plants for Fluoride removal. It currently operates 152 solar powered plants, saving 87,600 kWh of coal fired power every year. This power is renewable, cheaper and leads to reduction of Green House Gases (GHG) - estimated reduction of 77,400 Kg of CO₂, 583 Kg of SO₂ and 358 Kg of NO emissions annually.



Employs 115 full time employees and creates wage employment for people through projects and vendors. Generates livelihood opportunities for 2327 plant operators (one for each installation, locally). Generated livelihood opportunities for 150 SHGs having about 1650 women members, who operate Water treatment plants and ATMs as an enterprise.



Rite Water develops sustainable, resilient and inclusive infrastructure for access to safe drinking water in India. It promotes innovations and technology such as reverse osmosis, Electro-coagulation, Nano-technology, Electro-chlorination, Ultra-Violet, Ultrafiltration, Nitrate exchange, Oxidation and Media-filtration.



Brings clean drinking water to excluded and disadvantaged communities with no alternative. Through its water treatment plants, it addresses regional, gender, social and tribal inequalities in access to clean drinking water.



Contributes to sustainable cities and communities by treating waste water in cities and ensuring clean water in urban slums.



Contributes to SDG 17 by leveraging partnerships for accessing global technologies, financing and local execution capabilities for the above goals.

Technology partners include Siemens, Bhabha Atomic Research Centre (BARC), Council of Scientific and Industrial Research – National Environmental Engineering Research Institute (CSIR – NEERI), Purolite and Lehigh University, USA. Received capital from UK Government through the Samridhi Fund. Partnered with the CSR initiative of a large number of Corporates.



Our Partners

State Government and Public Sector Undertaking



Private Sector Undertaking



Awards and Recognition



VIA–Best SSI 2017, at hands of Nitin Gadkari, Hon Minister, Transport & Water Resources, GOI



ASSOCHAM Award: Most innovative company in Water, 2017



Bihar Innovation Forum Award 2014 at hands of Shri Nitish Kumar, Chief Minister, Bihar



Maharashtra Industries Excellence Award, 2016 at hands of Shri Devendra Fadnavis, CM, Mah



Social Entrepreneur Award - At hands of Union Minister, Shri Nitin Gadkari



Recognized by Finance Minister of Mah for contribution for safe drinking water to rural habitations in Mah, 2018



OHSSAI Award for best upcoming company in Health & Environment Space, 2019



Abhijeet Gaan & Mike German CTO WIST Inc. receiving award from Dr. John Holdren, Advisor to President of USA & Director White House Office of Science & Technology Policy and Prof. K Vijay Raghavan Secretary Dept. of Science & Technology, India



United States-India Science & Technology Endowment Fund

Vision for Impact

We, at “Rite Water”, believe access to safe water should be a basic right of every citizen. While most of us reading this report can pay for a water purifier, we cater to a population that cannot. We deploy situation specific most affordable and environment friendly technologies to ensure safe water to excluded communities. As a company, we have continuously improved our environmental, social and governance (ESG) standards. Rite Water prides itself in being an **impact enterprise** and acquiring a leadership position among what we call “Safe Water Enterprises (SWEs)”.

Last few years’ global developments have been unprecedented. Populations and economies battered by a raging pandemic followed by a war, we can all ill afford. However, the recent developments have put health and hygiene on the center stage. We see rising awareness on the importance of clean drinking water among people and policy making. Increasing awareness, rising incomes, reducing cost of technology and impetus by the government has led to an extraordinary growth in the drinking water industry, despite economic challenges.

The government in India has shown increasing focus on drinking water. In 2019 all water related ministries were merged to create the **Ministry of Jal Shakti** (“Ministry of Water-Power”), which launched government’s “Jal Jeevan Mission” and its flagship program – “Har Ghar Jal” for universal coverage of piped water. The program has a massive outlay of INR 3.6 trillion (\$ 50 billion). We are seeing rising volumes and size of projects/tenders. Some of the projects are so large that they literally exclude small or mid size firms like ours. A quality and cost based selection would reward genuine players, intent on making long term impact. Also getting timely payments is an industry wide challenge. Simple mechanisms like penal interest for delayed payments and a cut-off period for approval of invoices will improve liquidity and sustainability of players in the industry. In the most viable model, CAPEX of water treatment is provided by the government or philanthropists. Thus, SWEs actually require working capital and loads of it. But with an asset light model in India, it is next to impossible to raise working capital loans without collateral. There is need of cash flow based financing of working capital.

It has been proven time and again that it is very difficult to recover CAPEX of water treatment plants through water sale. However, instituting minimal user charges for long term and sustainable operations management seems like a sensible plan. Government is the largest and most significant stakeholder in the industry and any serious player cannot grow without working with the government. Rite Water is committed and aligned to India’s Jal Jeevan Mission and SDG 6 and our team will work tirelessly towards these goals.

Currently, we work in 11 states of India reaching out to more than 1 million people in some of the remotest and poorest areas. We would like to grow steadily, but sustainably and extend our impact to more than 20 states of India covering at least 10 million people by 2025. We aspire to be a leader in ESG standards as well. We continuously embrace innovation and remain committed to our cause.

A quote by John C. Maxwell embodies our belief - “Ordinary people with commitment can make an extraordinary impact on their world.”

We need all the support we can get from governments, investors, bankers and ordinary citizens to create un-impeded impact in these challenging times.

Abhijeet Gan

MD & CEO



Sambodhi is a multidisciplinary research and analytics company offering evidence driven insights to stakeholders in global development. We are measurement experts with a flair for innovation and improvisation to meet the rising demand for actionable data.

Sambodhi offers a range of solutions based on monitoring and evaluation sciences as well as data analytics to enhance operational efficiency and optimize decision making process. We are knowledge partners and advisors to donors, governments, implementers, and public and private sector organizations across the world.

Sambodhi has in-house researchers and specialists across a range of practice areas including education, environment, livelihoods, public health, and WASH with cross-cutting focus on gender equity, inclusion, and resilience. We have successfully completed projects across several geographies and have a presence in South Asia, Southeast Asia, and Sub-Saharan Africa.



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