"The best practices compiled show the commitment towards water conservation by different stakeholders. The case studies are concise and well presented. This book has a wealth of inspiring projects which are worthy of emulation."

Mr. Suresh Prabhu
Chairman, Council for Energy, Environment and Water

"Our Cup of Joy is a unique compendium showcasing some of the best practices in water. The format is easy to understand and thought provoking. The case studies provide inspiration for promoting water conservation practices in the country."

Mr. U N Panjiar
Secretary, Ministry of Water Resources, Govt. of India

"This book is an excellent resource for industry. The case studies presented are comprehensive and easy to read. I am sure the compendium would assist Indian industry to adopt appropriate water saving strategies."

Mr. Jamshyd N Godrej
Chairman and Managing Director, Godrej & Boyce Mfg Co. Ltd.

CII

Confederation of Indian Industry
Since 1895

CII

INDIA'S BEST PRACTICES ON WATER

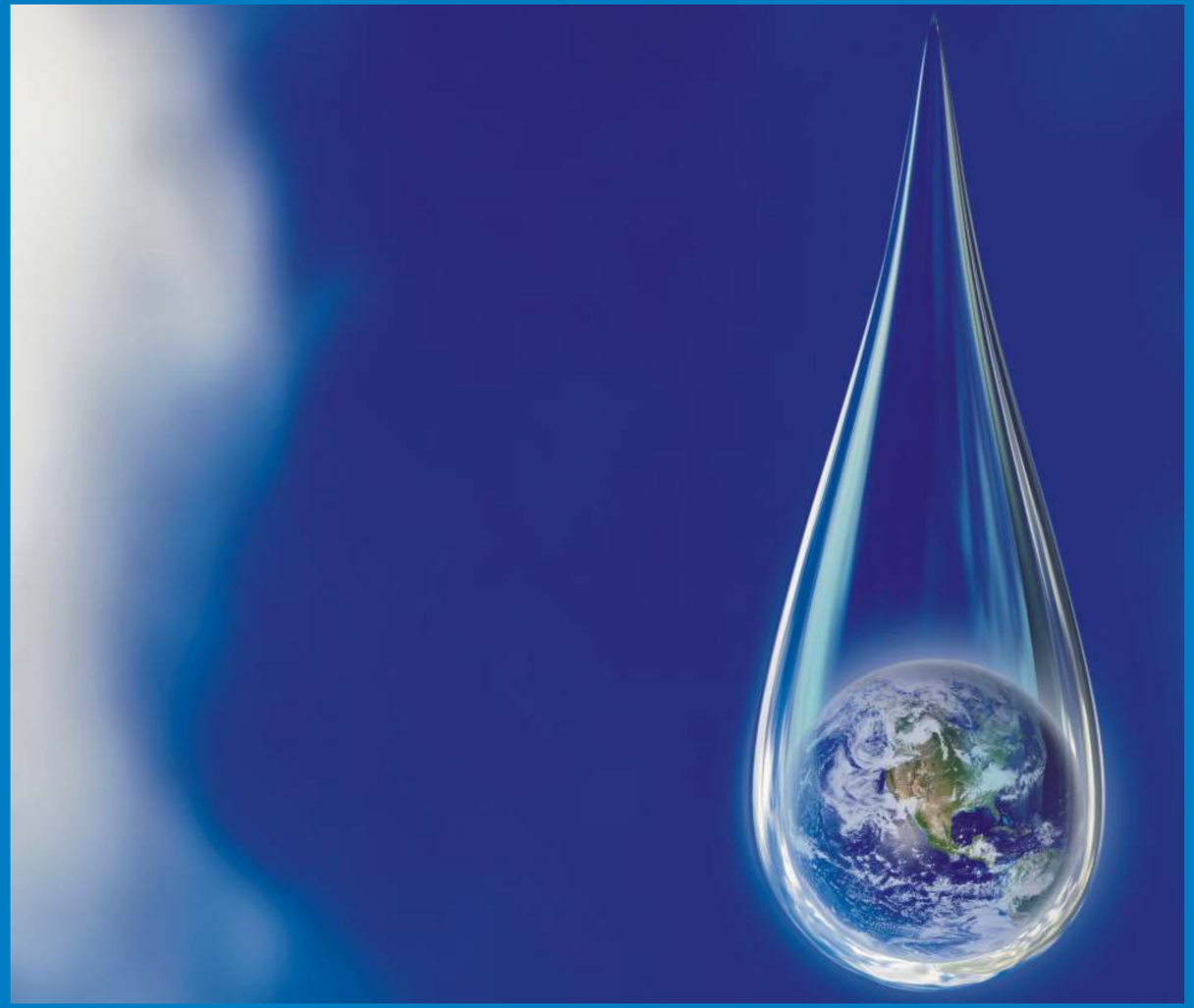
Vol. I

CII

Our Cup of Joy

India's Best Practices On Water

WATERCOM



"*A*s the global economy grows, so will its thirst.
This is not an issue of rich or poor, north or south.
All regions are experiencing the problem of water stress.
There is still enough water for all of us -
but only so long as we keep it ***clean***,
use it more ***wisely*** and
share it ***fairly***.

Governments must engage and lead, and the private
sector also has a role to play in this effort."

Ban Ki-Moon
Secretary-General,
United Nations, New York

Our Cup of Joy

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About the CII WaterCom Logo

Holy water is usually received in cupped hands.

This simple and elegant logo captures the need to conserve every drop of water.

Message

India will become the world's third largest economy in the world by 2050. With fast expanding economic growth, India faces an increasingly strident demand on its scarce natural resources such as water. India's finite and fragile water resources are stressed and depleting while various sectoral demands are growing rapidly.

Water has become a commodity of crucial importance, for all sectors. There is a need to take proactive measures for effective water management. All stakeholders need to actively participate in the water conservation movement. To enable the process, CII National Committee on Water has brought out an excellent publication on Water Conservation.

I am happy to mention that this book is an important milestone, to showcase some of the best practices implemented by different Organizations and Industry. This compendium will be an important resource and guide book for all stakeholders and can be easily adapted in your organization to facilitate efficient water management.

I congratulate Mr. Sanjeev Chadha for his leadership role and CII National Committee on Water in bringing out this excellent compendium.

Hari Bhartia
President
CII

Foreword

Every cloud, they say, has a silver lining.

Well – if our impending water crisis is a dark, threatening cloud – then this compilation of WaterCom Best Practices is most definitely the welcome ray of hope.

Across our vast country, there are some outstanding examples of truly pioneering work on water management across sectors, with proven, and extremely impressive results. If we are able to replicate this work across our country and if we are able to convert these "islands of excellence" into oceans of positive change, I can assure you that our impending water crisis will be a thing of the past.

These WaterCom Best Practices have been chosen by experts with great care. Each one of them has delivered concrete and measurable results. Each one of us can learn, and hugely benefit from them. The amazing fact is that most of these WaterCom Best Practices can be replicated at a reasonable cost, with the benefits far outstripping the investments.

I urge you to look through this book with care, and do one of two things. One: Identify a couple of relevant WaterCom Best Practices, and adopt them in your organization, community or beyond. Join the ocean of change. Two: If you happen to know of work which is deserving to be part of the WaterCom Best Practices, please share it with us and add to "Our Cup of Joy".

Sanjeev Chadha
Chairman
CII WaterCom

How to use Our Cup of Joy

"Our Cup of Joy" is a compendium of the top 50 best practices on Water Management across our country. We call them the WaterCom Best Practices.

Each of the following pages showcases one such WaterCom Best Practice in simple, clear terms. It outlines the objective of the project, results achieved, the 'size of prize' if this WaterCom Best Practice were to be scaled up, and salient features of the project.

A best practice cannot be a best practice if it is not shared with, and adopted by others. Against each WaterCom Best Practice, you will see the name/s and contact of the Water Champions who made it possible. Each of our Water Champions is committed to sharing all information, and answering all your queries about his/her WaterCom Best Practice. Please do reach out to them to learn more about the best practices which you are planning to adopt.

Finally, if you are aware of good work done on water by your organization, or others – we are very keen to hear from you. Please send us candidates for WaterCom Best Practices as per the template used in the published case studies, to K.S.Venkatagiri, Principal Counselor, CII – Sohrabji Godrej Green Business Centre at k.s.venkatagiri@cii.in. If selected, we will definitely publish them in the second edition of "Our Cup of Joy".

BEST PRACTICES IN

WATER MANAGEMENT

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Improved Water Management Practices for Sugarcane Cultivation

WWF India

Furrow irrigation for sugarcane cultivation

Sugarcane field

Dr. Parikshit Gautam
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Murli Dhar
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OBJECTIVE

Improved water management practices for sugarcane cultivation in Godavari Basin (Aurangabad district)

RESULTS

- Enhancement of sugarcane yield by 15-20%
- Water saving of 22.08 million m^3/year (@ 2,760 m^3/ha) in 8,000 ha
- Additional profit of ₹ 93.6 million (about 30% increase in gross margin) among the farmers
- Increase in water application efficiency (ratio of the volume of water stored in the root zone of the soil during irrigation to the volume of water applied) from 40 – 50% to 80 - 90%

SIZE OF PRIZE

- 2.75 billion m^3/year of water savings in sugarcane cultivation
- ₹ 11.7 billion additional income for farmers
  (Extrapolated for 1 million ha, which is 25% of total land under sugarcane cultivation in India)

HOW ACHIEVED

- A manual on Better Management Practices (BMP) for sugarcane cultivation developed and widely distributed among farmers
- Better Management Practices adopted by farmers include:
  - Micro irrigation and straight furrow irrigation
  - Use of bio pesticide
  - Integrated Nutrient Management
- Dissemination of practices through training, workshops and field trial plots
- Partnership developed with Water and Land Management Institute for developing Best Management Practices for sugarcane cultivation
- Formation of farmer groups
- Local research station, Govt. and District Agriculture Department involved in BMP demonstration and trials
- Project executed under European Commission funded project - 'Thirsty Crop'

Improved Water Management Practices for Cotton Cultivation

WWF India

Cotton field

Woman collecting cotton

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Murli Dhar
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Ph: (011) 41504821

OBJECTIVE

Improved water management practices in cotton production in Andhra Pradesh and Maharashtra

RESULTS

- Implemented in 13,800 ha
- Water saving of 0.97 million m^3/year (@ 676.5 m^3/ha)
- Reduction in 26% fertilizer consumption and 50% pesticide consumption

SIZE OF PRIZE

1.7 billion m^3/year of water savings in cotton cultivation
(Extrapolated for 2.5 million ha, which is 25% of total land under cotton cultivation in India)

HOW ACHIEVED

- A manual on Better Management Practices about cotton prepared and distributed widely among farmers
- Better Management Practices adopted by farmers include:
  - Micro irrigation and alternate furrow irrigation
  - Use of bio pesticide and soil moisture conservation
  - Mechanical practices for the control of pest population such as deep ploughing, pheromone traps etc.
- Dissemination of technology through training workshops and field trials
- Partnership developed with CRIDA, ICARA, grassroot NGOs like Mari and Krishi Vigyan Kendra
- Local research station and district agriculture department are involved in demonstration of the practices and trials
- Implemented under the European Commission funded project - 'Thirsty Crop'

Efficient Water and Pest Management through Bt Cotton Cultivation

Monsanto India

Bollgard Bt cotton bolls

Cotton picking

Cotton ginning mill

Gyanendra Shukla
gyanendra.shukla@monsanto.com
Ph: (022) 28247246

OBJECTIVE	Adopt more efficient water and pest management systems in cotton cultivation
RESULTS	• Bt cotton used by 5 million farmers has led to 48 billion litres of water saved in the last 7 years due to reduced pesticide usage • Total net saving of ₹ 40,000 million for the farmer (@ ₹ 3,125/hectare) on additional pesticide cost
SIZE OF PRIZE	• 15 million m^3 /year of water savings on cotton cultivation acreage • 80% reduction in environmentally harmful pesticides (20,000 MT) • National cotton production can double to produce 30 million bales/year resulting in additional income of ₹ 690,000 million/year
HOW ACHIEVED	• 500 lts/hectare of water was used earlier to spray pesticide – fresh water can be saved by using Bt Cotton • Genetic technology within the cotton seed provides effective pest management • Additional investment for farmer: ₹ 750/hectare (1% of his total revenue)

Improved Water Management for Paddy Cultivation (Direct Seeding of Rice)

PepsiCo India

Direct Seeding in progress

40 days Direct Seeding crop

120 days old crop

Amit Kumar Bose
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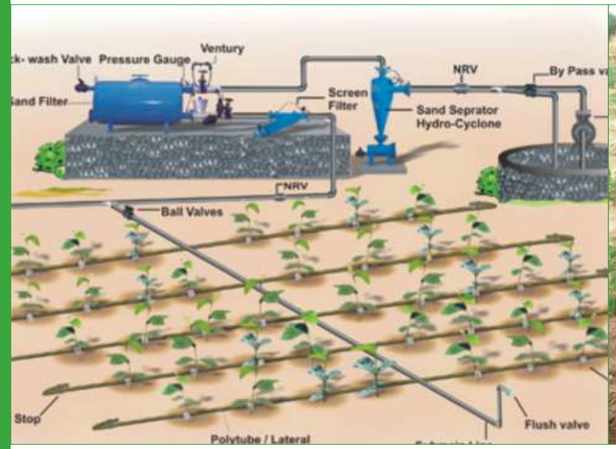
Mob: +91 98100 33077

OBJECTIVE	Sustainable farming technique in Paddy cultivation
RESULTS	• Implemented in 6,500 acres in Punjab, Rajasthan, Karnataka, Tamil Nadu and Puducherry • 5.3 million m^3/year of water saved (@ 0.9 million litres/acre) • Total farmer cultivation cost reduction of ₹ 9.75 million (@ ₹ 1,500/acre) • Methane emission reduction by 75% - GHG reduced by 6,500 metric tons (@ 1 metric ton/acre) • Trials on multiple varieties show similar results in Direct Seeding of Rice as with traditional cultivation
SIZE OF PRIZE	• National water saving of about 95 billion m^3/year and income generation of ₹ 150 billion/year • The potential is to replicate the technique in 100 million acres of land with 30% of water savings. This will also result in reduction of 100 million metric tons of Carbon equivalent greenhouse gases (@ 1 metric ton per acre)
HOW ACHIEVED	• Seeds are sown directly in fields without raising in the nursery • Tractor driven Direct Seeding machine developed and used • New molecules for weed treatment identified and used • Farmers given free access to seeding machines and guided by field teams • Research on water usage and GHG emission reduction developed in partnership with IRRI and IARI • Developing expenditure: One time expenditure by PepsiCo India of ₹ 100 million (Over a period of 5 yrs on R&D, Direct Seeding machine, seeds, farmer training, information dissemination etc.)

Public Private Community Partnership for Sustainable Agriculture through Improved Water Efficiency

Hindustan Coca-Cola Beverages Pvt. Ltd.



Drip irrigation design

Farmer in his field

Praveen Aggarwal
paggarwal@apac.ko.com
Ph: (0124) 2348041

OBJECTIVE

Minimize usage of groundwater, build community awareness on conservation and introduce water-efficient agriculture by popularizing drip irrigation in Kaladera, Jaipur

RESULTS

- Over 0.1 million m^3 groundwater conserved/year
- Nearly 50% groundwater saving in irrigation
- 71% water saving by adhering to drip irrigation
- Increased farm yield and income by over 40%
- 90 ha of land brought under drip irrigation

SIZE OF PRIZE

1 million m^3 of water savings
(Extrapolated to 1,000 ha of land in the same district)

HOW ACHIEVED

- Multistakeholder Partnership: Coca-Cola, Netafim, Krishi Vigyan Kendra, Gram Panchayat, Community, Govt. of Rajasthan
- Coca-Cola: Facilitation, coordination with stakeholders and providing funds
- Netafim: Technical partner for installation of drip irrigation system and undertaking O&M for 3 years
- Krishi Vigyan Kendra: Identification of farmers, technological assistance, monitoring and propagating best practices
- Gram Panchayat: Mobilizing support of the farmers
- Govt. of Rajasthan: Subsidy to farmers for installing drip irrigation system
- Community: Farmers bore the capital cost and 200 farmers adopted the practice
- Total cost: ₹ 20 million

Improved Water Use Efficiency through Adoption of Drip Irrigation for Sugarcane Cultivation

Bannari Amman Sugars Ltd., Erode District, Tamil Nadu

Drip irrigation device

Sugarcane under drip irrigation

Dr. S. V. Balasubramaniam
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Ph: (0422) 230227/2300859

E. Manivel
manivel@bannari.co.in
Ph: (04295) 220363

OBJECTIVE	Improved water use efficiency through drip irrigation system for sugarcane cultivation at Erode district, Tamil Nadu
RESULTS	• 2,708 hectares of land brought under drip irrigation • Drip irrigation systems saved 50% of water used • Fertigation through drip system direct to root zone, led to 25% saving of fertilizers • Cost of cultivation reduced by about ₹ 8,520/hectare in operations like weeding, interculture and irrigation • 7.3 million m^3/year of water saved in sugarcane cultivation
SIZE OF PRIZE	2.7 billion m^3 of water savings in sugarcane cultivation (Extrapolated for 1 million ha, which is 25% of total land under sugarcane cultivation in India)
HOW ACHIEVED	• Project implemented in partnership with farmers • Suitable land/soil identified with farmers for drip irrigation practices • Micro irrigation company was assigned the task of implementing the project • BASL helped the farmers in getting the government subsidy • Total cost of project: ₹ 89.4 million shared by Govt. (33%), BASL (15%) and farmers (52%)

Improved Ground Water Recharge through Watershed Program

Bannari Amman Sugars Ltd., Erode District, Tamil Nadu

Rain Water Harvesting structures

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Ph: (0422) 230227/2300859

E. Manivel
manivel@bannari.co.in
Ph: (04295) 220363

OBJECTIVE

Ground water recharge through watershed program at Erode district, Tamil Nadu

RESULTS

- 16 water harvesting structures constructed benefiting 680 farmers
- An average of 6 to 9 meters of water level increased in wells in the adjoining areas
- 3,079 acres of land have come under irrigation additionally
- 1 million m^3/year of water harvested
- Due to the increased water table, the farmers are able to cultivate crops in two seasons

SIZE OF PRIZE

On a conservative estimate, 100 similar locations exist in Tamil Nadu, where identical efforts can help in water harvesting of 100 million m^3/year

HOW ACHIEVED

- Project implemented in PPCP mode with BASL, Govt. and farming community
- Rain Water Harvesting structures are maintained by the water users association
- The O&M expenses of the structures are met through auction of silt deposited ensuring the project sustainability (innovation)
- The silt which is fertile is sold to nearby farmers
- Control of soil erosion through planting of trees on bunds
- Total cost of the project: ₹ 12.4 million shared by Govt. (70%), BASL (27%) and farmers (2%)

Rural Water Supply & Sanitation

WaterCom Best Practices

Participatory Watershed Management in Villages of Rajasthan

ITC Rural Development Trust, Rajasthan

Water harvesting structure in Bhilwara district

Jayant Kumar
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Ph: (0141) 2379958

OBJECTIVE

Improving the livelihood of villagers and eco restoration through participatory watershed management in Bhilwara district, Rajasthan

RESULTS

- 508 ha of catchment land and 185 ha of pasture land developed
- 0.3 million m^3 harvested through 33 harvesting structures
- Generated employment opportunities for 90,000 people in the last 3 years resulting in total income of ₹ 0.81 million
- 1,700 ha of land treated under watershed

SIZE OF PRIZE

- ₹ 20 million worth of employment generation and 0.5 million m^3 of water harvesting potential
- ₹ 30 million additional agricultural income by bringing additional land under irrigation and cultivation
  (Extrapolated to 5,000 ha of Bhilwara district)

HOW ACHIEVED

- The watershed project focuses on efficient water use, agri marketing and crop diversification
- Pasture land developed for fodder and fuel wood
- Water User Association and Self Help Groups (SHGs) formed
- 36 Self Help Groups linked to banks
- 1,100 households benefitted through improved agricultural practices
- Capacity building watershed training programs and market linkage to farmers provided through existing networks of ITC's e-choupals
- Cost of the project: ₹ 60 million
- Cost sharing: 40 : 40 : 20 (Govt., Industry and Community)

Effective Management of Land and Water for Improving Water Availability

Hindalco Industries, Renukoot, UP

Before and after construction of water irrigation channel and wells

Manoj Kumar Sinha
manoj.k.sinha@adityabirla.com
Ph: (05446) 252077-79

OBJECTIVE	Increase water availability in the selected 25 villages through optimal utilization of land and water in Renukoot, UP
RESULTS	• 749 ha of wasteland has been rendered productive through social forestry • 810 acres of land irrigated through 27 lift irrigation units • Adequate food availability for all 12 months in 25 villages • Additional income generated for 800 farmers - ₹ 23 million/year (@ ₹ 29,000 per farmer/year)
SIZE OF PRIZE	₹ 350 million/year of income generation in Sonbhadra district, UP (Extrapolated for 16,432 hectares of wasteland in Sonbhadra district, UP.)
HOW ACHIEVED	• Community awareness program on rain water conservation and better agriculture practices • Agricultural expert interaction with farmers for crop selection • Construction of water channels, irrigation wells, Rain Water Harvesting structures and ponds • Formation of water committees for maintaining resources and equipment • User charges: ₹ 15-20 per hour • Total investment: ₹ 0.68 million

Use of Bio-sand Filter for Providing Safe Drinking Water

Development Alternatives

Women collecting clean water from Jal-TARA water filter

M. Manoj Kumar
mkumar@devalt.org
Ph: (011) 26806172

OBJECTIVE

Access to safe drinking water through use of bio-sand filter for providing safe drinking water [Nirmal Neer through TARA filter] in 10 villages of Bundelkhand - a green technology enterprise

RESULTS

- Provides 3,500 litres of safe drinking water/day/unit
- Benefitting 2,000 families in 10 villages
- Assured income for 3 people @ ₹ 3,500/month/unit
- Installed 13 units (sand filters) in 10 villages

SIZE OF PRIZE

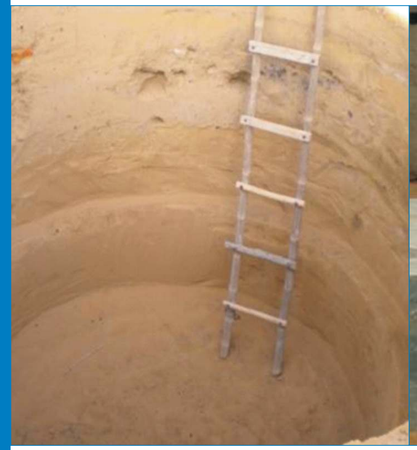
Potential of 32.8 million m^3/year of drinking water supply
(Extrapolated for 15 million population in Bundelkhand region)

HOW ACHIEVED

- Developed slow sand filter through in-house R&D
- Works on the gravity flow, no requirement of electricity or chemicals
- Reduces turbidity from 50 NTU to less than 10 NTU
- Removes Coliform bacteria from 25-100 MPN per 100 ml to nil
- Reduces excessive iron to permissible limit of 0.3 mg /litre
- Life expectancy of the filter: 15 years
- Water sold at ₹ 1.50/12 litres
- Enterprise models for individual entrepreneur, community owned and managed have been developed
- Developed partnership with Arghyam and Indian Business Alliance on Water
- One time capital investment: ₹ 75,000
- Payback period: 18 months

Providing Safe Drinking Water through Rain Water Harvesting in Rural Rajasthan

Safe Water Network



Household cisterns

Community cisterns

Better health
and more school days

Ravindra Sewak
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Mob: +91 98185 45678

OBJECTIVE

To introduce improvements in design, water quality and funding models to create a sustainable and scalable safe water solution for water-stressed communities

RESULTS

- 900 new household 'kunds' (Rain Water Harvesting cisterns) constructed, each with 15 m^3 capacity
- Restored 40 community 'kunds' (cistern capacity 40 m^3 to 400 m^3)
- Benefitted more than 10,000 people across 40 villages in Churu, Rajasthan
- Time saved in fetching water enables higher school attendance and livelihoods
- Health and socio-economic impacts through improved quality/access to safe water

SIZE OF PRIZE

8.6 million m^3/year of drinking water harvested through Rain Water Harvesting
(Extrapolated for drinking water supply to 1,00,000 villages in India)

HOW ACHIEVED

- Loans for households through micro finance
- Scalability through low-cost 'kunds' (RWH cisterns) with improved design
- Improved water quality testing to establish water source and treatment needs
- Trained masons in 40 villages
- Storage cost: Approximately ₹ 1.5/litre
- Investment: ₹ 30 million for 40 villages invested over 2 years

Enhancing Access to Safe Drinking Water in Villages through Public Private Community Partnership (Paniharan Pariyojna)

Jal Bhagirathi Foundation

Before - women collecting water from long distances

After - household outlets for water collection

Kanupriya Harish
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Ph: (0291) 2751556

OBJECTIVE	To enhance access to safe drinking water and livelihood for the water-scarce desert communities in Rajasthan
RESULTS	• Improved health with considerable reduction in occurrence of water-borne diseases thereby increasing productive days • More than 2,500 people access safe drinking water for 15 paisa per litre • 4 women entrepreneurs earn upto ₹ 4,000 per month just spending 3 to 4 hours per day
SIZE OF PRIZE	Potential of generating income of ₹ 8 million/year for women in Marwar region, Rajasthan (Extrapolated for 10% of villages in Marwar region)
HOW ACHIEVED	• Established community owned Reverse Osmosis plant in Pachpadra, Barmer district with Public Private Community Partnership (PPCP) • Filters raw water of 4,500 ppm to potable water of less than 300 ppm • Established household outlets owned and managed by women from Self Help Groups for effective delivery system • Partners: M/s Environze Global Ltd., Jal Bhagirathi Foundation, Gram Panchayat, Govt. of Rajasthan • Supported by UNDP, Italian Development Cooperation, Ripple Effect Project of Acumen Fund and IDEO

Providing Safe Drinking Water in Villages of Andhra Pradesh through Safe Water Stations

Safe Water Network, Nizampalli Village, Andhra Pradesh

Safe water station

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rsewak@safewaternetwork.org
Mob: +91 98185 45678

OBJECTIVE	Develop, implement and validate potential of scalable, low-cost "safe water stations" to ensure affordable, safe drinking water to the rural community in India
RESULTS	40,000 people have access to safe drinking water
SIZE OF PRIZE	Potential to provide safe drinking water to 300 million rural people in India
HOW ACHIEVED	• Loans for safe water stations through micro finance and/or through grants • RO plant is set up to treat fluoride contaminated water • Community purchase water at a cost of ₹ 4 for 20 litres • RO plant is managed by community through water user associations • Funding from PepsiCo Foundation and Navajbai Ratan Tata Trust • Guidance for quality control program by PepsiCo India • The project will be replicated in 15 villages benefitting over 4,000 people • Investment: ₹ 15 million for 15 villages invested over 3 years

Sustainable Supply of Water in Villages of Rajasthan

A. L. Paper House, Sanganer, Rajasthan

Constructed water harvesting structure before rainfall

Runoff collected after rainfall

Abul Hassan
abul@alpaperhouse.com/info@alpaperhouse.com
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OBJECTIVE	Maintain sustainable supply of ground/surface water to factories and rural communities living around the factory in Sanganer, Rajasthan
RESULTS	• 35,000 m^3/year of water harvested through five water harvesting structures • Around 2,000 people benefited • 6,000 livestock get water through harvesting structures
SIZE OF PRIZE	35 million m^3/year of water savings (Extrapolated to 1,000 companies implementing rain water harvesting)
HOW ACHIEVED	• Formation of seven Water User Groups (WUGs) to manage water resources • Training WUGs and NGOs for designing and implementing watershed plans • Mobilised community for implementing the project • Design and construct Rain Water Harvesting structures in factories and surrounding areas • Partners: IKEA, Advit Foundation, A. L. Paper House • Cost of the project: ₹ 4.5 million

Developing Ponds in Low Lying Areas for Rain Water Harvesting

Birla Corporation Ltd., Satna, Madhya Pradesh

Rain Water Harvesting pond

Rajesh Kakkar
kakkar@satnacement.com
Ph: (07672) 412460

OBJECTIVE	Construction of Nai Basti Pond (Stop Dam) for Rain Water Harvesting in Satna, Madhya Pradesh
RESULTS	• Project is beneficial for nearby slum dwellers • Increase in groundwater table in the area • Water harvesting potential of around 10,000 m^3/year
SIZE OF PRIZE	0.5 million m^3/year of Rain Water Harvesting potential (Extrapolated to cement plants located in rural and dry areas. Among 170 cement plants in India, at least 50 plants are located in the states of Andhra Pradesh, Rajasthan and Madhya Pradesh.)
HOW ACHIEVED	• Construction of pond in naturally low lying areas • Type of pond: Storage-cum-percolation • Construction material: Earthen • Capacity: 10,000 m^3 • Project cost: ₹ 0.5 million

Recharge of Groundwater through Community Check Dams

PepsiCo India, Aurangabad District, Maharashtra

Check dam during construction

Check dam in Paithan

Annie Kishen
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Ph: (0124) 2880699

OBJECTIVE	Recharge of groundwater through community check dams in Paithan, Aurangabad district, Maharashtra
RESULTS	• 13 check dams constructed harvesting 1.2 million m^3/ year of water • 100 recharge wells constructed harvesting 0.1 million m^3/ year of water • 12,000 people benefited • Farmers take two crops per year
SIZE OF PRIZE	Potential of harvesting 1.2 billion m^3/ year of rain water (Extrapolated to 1,000 potential sites in India)
HOW ACHIEVED	• Project implemented in partnership with Alternative Development Initiatives (ADI) • Gram Panchayat and community involved in the design and construction of check dam • Organized farmer training program and exposure visits to fields for understanding better agronomic practices • Desilting of ponds done through community participation • Water User Group formed to maintain the check dams

Water Conservation using Twin-Pit System Toilets

Sulabh International

Twin-pit pour-flush toilet - a model

P-type trap

Dr. Bindeshwar Pathak
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Mob: +91 98113 83937

OBJECTIVE

To reduce water consumption by replacing conventional toilets with twin-pit toilet system in independent houses and eliminate open defecation in India

RESULTS

- Constructed 1.2 million individual household toilets, resulting in 7 million m^3 of water saving
- 1.5 million scavengers rehabilitated

SIZE OF PRIZE

5.84 million m^3/year of water savings
(Extrapolated to 1 million people living in mega cities in India)

HOW ACHIEVED

- Earlier conventional toilets were using 10-12 litres per flush with 40 mm water seal
- Constructed twin-pit toilets where pits are used alternately
- In individual toilets, when the first pit fills up, the excreta is switched over to another one
- After two years, human excreta gets converted into manure in contact with earth at the bottom and also holes in the wall
- The toilets are fitted with P-type trap of 20 mm water seal which requires only 1-1.5 litres per flush saving 8 litres per flush
- The twin-pit toilet system could be used for individual houses and public toilet facilities
- The cost for each twin-pit toilet ranges from ₹ 675 to ₹ 50,000

Provide Access to Water for School Children through Rain Water Harvesting (Ripple Effect)

Coca-Cola India Ltd.

Training program for school children on Rain Water Harvesting

Praveen Aggarwal
paggarwal@apac.ko.com
Ph: (0124) 2348041

OBJECTIVE

To provide access to water for school children through Rain Water Harvesting (RWH) in India through Public Private Partnership

RESULTS

- Improved water management, hygiene and sanitation in select communities
- Over 10,000 m^3 of water conserved through Rain Water Harvesting
- Improved access to drinking water to over 50,000 people
- Trained 300 teachers on promoting Rain Water Harvesting

SIZE OF PRIZE

Potential to cover 1 million school children in the country

HOW ACHIEVED

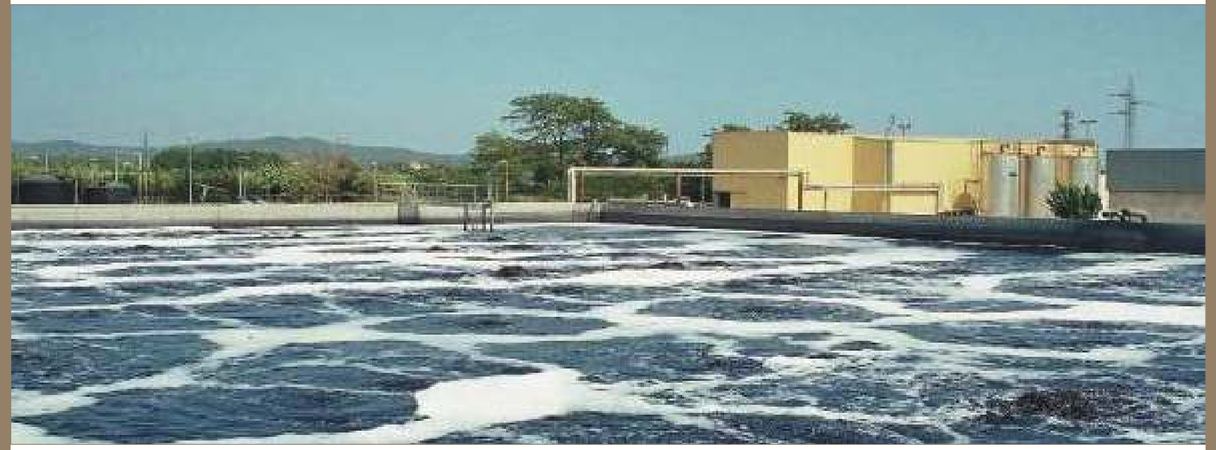
- Project implemented in partnership with UN-Habitat and Coca-Cola India Ltd.
- Promoted augmentation of the source through pilot demonstration of Rooftop Rain Water Harvesting (RWH) system in schools
- Project implementation involved the following activities:
  - Organized stakeholders' consultations with Principals, teachers and representatives of parent–teacher associations for developing project implementation plan
  - Identification of 16 schools in four project cities
  - Developed site-specific design for construction of Rain Water Harvesting system
  - Developed training manual on O&M of RWH system
  - Total cost of the project: ₹ 5,625,000 shared by UN-Habitat, Coca-Cola India and Lake Conservation Authority (LCA) of Madhya Pradesh

Municipality

WaterCom Best Practices

Zero Liquid Discharge in Tannery Clusters through Common Effluent Treatment Plant

IL&FS Ltd., Ambur and Vaniyambadi, Tamil Nadu



Common effluent treatment plant

Sameer Vyas
md@ilfswater.com
Ph: (044) 43443333

OBJECTIVE

Implementation of effluent recycling for leather industries in Ambur and Vaniyambadi, Tamil Nadu

RESULTS

- Recovery of 85% of water for reuse in process by user industry
- Reduction in water consumption and improved groundwater availability
- 7,000 m^3/day wastewater treated

SIZE OF PRIZE

21 million m^3/year of water savings
(Extrapolated to 10% of tannery clusters, treating and reusing wastewater)

HOW ACHIEVED

- 7,000 m^3/day wastewater recycled
- Treatment process installed at Common Effluent Treatment Plant (CETP) includes:
  - Membrane Bio Reactor (MBR) based pre treatment
  - Followed by two stage RO process
  - Wastewater evaporated for salt recovery
- Treated water supplied to industries
- Investment: About ₹ 970 million

Zero Liquid Discharge in Textile Clusters through Common Effluent Treatment Plant

IL&FS Ltd., Tirupur, Tamil Nadu

Common effluent treatment plant

Sameer Vyas
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OBJECTIVE

Implementation of Common Effluent Treatment Plant on ZLD basis for over 230 textile dyeing and bleaching units in Tirupur, Tamil Nadu, to eliminate environmental pollution being caused by industrial effluent discharge

RESULTS

- Recovery of 85% of water for reuse in process by user industry
- Recovery of salt for reuse process by user industry
- Reduced sludge generation resulting in lower solid waste
- About 53,000 m^3/day of textile effluent being treated

SIZE OF PRIZE

160 million m^3/year of water savings
(Extrapolated to 10 textile clusters in India)

HOW ACHIEVED

- 53,000 m^3/day of effluent generated
- Treatment process installed at Common Effluent Treatment Plant (CETP) includes:
  - Pre treatment followed by two stage RO process
  - Recovered water used for process
  - RO reject evaporated for salt recovery
- Process chosen based on extensive technology search and cost optimization for the selected process
- Investment: ₹ 4,500 million

Drinking Water Supply and Sewage Network through Public Private Partnership (PPP)

IL&FS Ltd., Tirupur, Tamil Nadu

Drinking water treatment plant

Sameer Vyas
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Ph: (044) 43443333

OBJECTIVE

Construction of facilities to provide reliable and quality water supply from Cauvery river and construction of sewage network for the industries and households in Tirupur Local Planning Area (TLPA)

RESULTS

- Developed a network to extract 185,000 m^3/day of water from Cauvery, treated and supplied to households and industries
- Reduced environmental pollution by integral collection, treatment and disposal of sewage of 30,000 m^3/day
- Generated employment for about 0.2 million people
- Over 1.5 million people covered, along with 700 industrial units
- Sanitation facilities in 100 slums

SIZE OF PRIZE

800 million m^3/year of water savings
(Extrapolated to wastewater generated by 900 Class I and Class II cities)

HOW ACHIEVED

- In 1990, due to acute urban infrastructure problems, the people of Tirupur and the Tirupur Exporters Association (TEA) asked the government to improve the basic infrastructure of the area
- An MoU was signed between the Govt. of Tamil Nadu, IL&FS and Tirupur Exporters Association for development of the project
- First water and sanitation project in the country implemented on a Public Private Partnership
- New Tirupur Area Development Corporation Ltd. (NTADCL) was established as a Special Purpose Vehicle (SPV) for project implementation
- Developed a network for extraction of 185 MLD water from Cauvery, to treat it and supply to Tirupur town planning area for industrial and domestic consumption
- Developed a network for collecting and treating the sewage water from industries and households of the Tirupur town planning area
- Reduced environmental pollution by integral collection, treatment and disposal of sewage of 30 MLD through sewage system covering 60% of the Tirupur town population
- Financing from banks, financial institutions, equity investors including FDI
- Cost of the project: ₹ 10.23 million

Water Resource Management in Coimbatore

Siruthuli, Coimbatore, Tamil Nadu

Work in progress - Nandangarai check dam

Roadside Rain Water Harvesting structure

Ariel view of Nandangarai check dam

Mylswami
siruthuli@yahoo.com
Ph: (0422) 4333301

OBJECTIVE	Address water problems of the Coimbatore region through better water resource management
RESULTS	• 7 tanks desilted, resulting in 60,000 m^3 of water storage • 15,000 m^3 capacity check dam constructed • 150 Rain Water Harvesting structures constructed • 600 open wells recharged through check dams
SIZE OF PRIZE	6 million m^3/year of water savings (Extrapolated to 100 locations in Tamil Nadu)

HOW ACHIEVED	• Siruthuli formed by the corporates of Coimbatore to solve common water problems of the region
	• Water resource management through
	  • Desilting of water bodies
	  • Restoration of river through check dams, and watershed management
	  • Roadside Rain Water Harvesting structures created
	• Partnered with District Rural Development Agency (DRDA), Coimbatore and Central Ground Water Board (CGWB)

Saving Energy and Water by Adopting 24x7 Water Supply Concept

Maharashtra Jeevan Pradhikaran

Water treatment plant

V. R. Kalyankar
cemjppn@rediffmail.com
Ph: (020) 26127866

OBJECTIVE

Energy and water conservation by adopting 24x7 water supply system at Malkapur, Satara, Maharashtra

RESULTS

- 330,000 KWH/year energy saved on account of stoppage of pumps
- 480 tons/year of CO_2 emission reduced
- 15, 300 m^3/year groundwater pumping avoided
- 24x7 water supply for 4,000 households

SIZE OF PRIZE

Potential of 38 million m^3/year of groundwater savings
(Extrapolated to 246 municipalities with similar issues in Maharashtra)

HOW ACHIEVED

- Earlier drinking water was supplied through bore wells (private and panchayat owned)
- 24x7 water supply system introduced to pump water from nearby river (River Koyna)
- To avoid leaks and reduce pressure loss, High Density Polyethylene (HDPE) and Medium Density Polyethylene (MDPE) pipes and fittings were used
- Telescopic rates for water usage fixed (with higher rates for higher consumption) to encourage water conservation
- 100% water supply points metered
- Awareness in use of water through mahila melas and door-to-door campaigns
- Total capital investment: ₹ 119 million (90% borne by state and 10% by consumers)
- Scheme self sustaining with ₹ 6.0 million annual revenue and O&M expenses of ₹ 5.50 million/year

Building

WaterCom Best Practices

Natural Treatment of Wastewater (Root Zone Treatment)

Aquamall Water Solutions Ltd., Dehradun, Uttarakhand

Plants (Canna, Cyperus, Colocasia) grown for Root Zone Treatment

Dr. S K Sankar
sankarsk@eureka.forbes.co.in
Mob: +91 9368069700

Dr. Ajit
ajit.naturalsolutions@gmail.com
Mob: +91 9870423023

OBJECTIVE

Reuse of sewage water for irrigation purposes at Aquamall Water Solutions Ltd., Dehradun, Uttarakhand

RESULTS

- 7 m^3/day of wastewater is treated naturally through living bodies (plants) and reused for irrigation purposes
- The treatment area gives a picturesque garden-like appearance
- No sludge generation

SIZE OF PRIZE

3 million m^3/year of water savings
[Extrapolated to 5% of new buildings (commercial and retail) coming up in India]

HOW ACHIEVED

- Wastewater generated from the facility diverted to underground septic tank
- Anaerobic treatment in the septic tank
- Treated water sent to Root Zone Treatment System
- Root Zone Treatment System consists of a lined pond filled with coarse filter media, microbes and plants (Canna, Cyperus, Colocasia, Plumeria, Pisonia, Banana etc.)
- These plants grow in wastewater and form an association with the bacteria to give an effective sewage treatment
- Installation cost: ₹ 450,000
- Average area required is 3-4 sq mts for 1 m^3/day of wastewater

Harvesting and Use of Rain Water in Commercial Building

Wipro Ltd., Bengaluru, Karnataka

Groundwater recharge pit

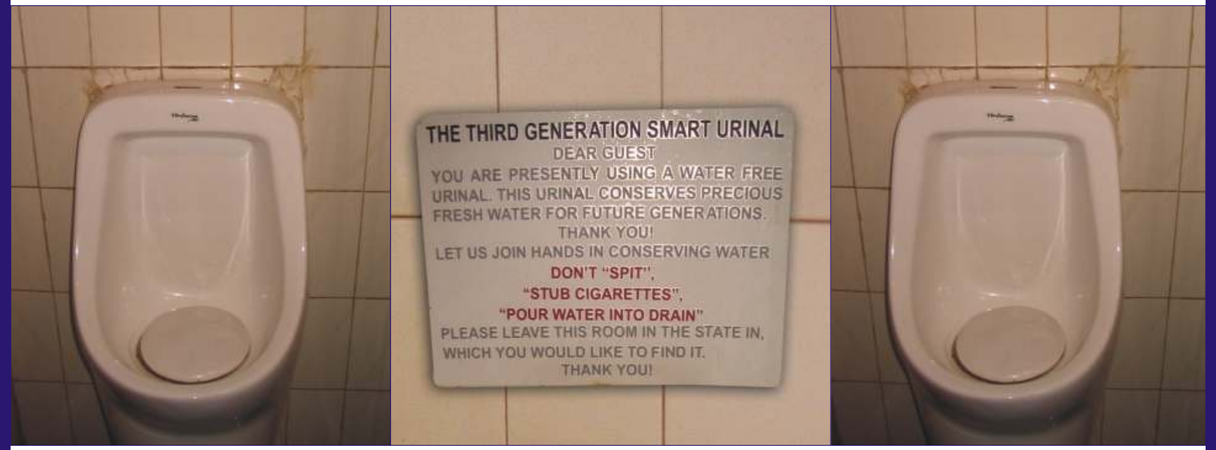
Rain Water Harvesting sump

Parameswaran Balasubramanian
parameswaran.balasubramanian@wipro.com
Mob: +91 98455 16893

OBJECTIVE	Use of harvested rain water for cooling tower, gardening, flushing and recharging groundwater at Wipro Ltd., Bengaluru, Karnataka
RESULTS	• 7,000 m^3/year of water harvested • ₹ 0.2 million of cost savings on fresh water
SIZE OF PRIZE	40 million m^3/year of water harvesting potential in IT parks (Extrapolated to 10% of existing and new IT parks)
HOW ACHIEVED	• Rain water harvested from rooftops and storm water drains • Three underground sumps of 100 m^3 capacity made for storing the rain water • Harvested water is filtered and used for cooling tower make up, gardening, flushing and groundwater recharge • Recharge pits and trenches have been made all over the campus for groundwater recharge • Investment: ₹ 0.27 million

Waterless Urinals in Men's Washroom

Paharpur Business Centre & Software Technology Incubator Park, New Delhi



Waterless urinals

Vikas Makkar
vmakkar@pbcnet.com
Ph: (011) 26207171

OBJECTIVE	Installation of waterless urinals in men's washroom at Paharpur Business Centre and Software Technology Incubator Park, New Delhi
RESULTS	Water savings of 0.75 m^3/day
SIZE OF PRIZE	1.0 million m^3/year of water savings (Extrapolated to 10% of installations of men's urinals in the country)
HOW ACHIEVED	• Installed 14 waterless urinals • Cost of waterless urinal: ₹ 5,000 • Ideal for new installations • Incremental investment/urinal is ₹ 2,000

Water Efficient Taps in Industrial Canteen

Ashok Leyland, Hosur, Karnataka

Foam type water tap

Foam type water taps installed in canteen

Chandrasekar P. S.
Chandrasekar.PS@ashokleyland.com
Ph: (04344) 407538

OBJECTIVE	Use of foam type water taps for reducing the water consumption in dining halls and all high consumption shops in Ashok Leyland, Hosur, Karnataka
RESULTS	• Water savings of 11,100 m^3/year • Savings of ₹ 0.2 million/year
SIZE OF PRIZE	0.7 million m^3/year of water savings (Extrapolated for 10% of industrial canteens in the country)
HOW ACHIEVED	• Installed foam type water taps with conventional taps • Installed 150 taps in the canteen • Investment: ₹ 150,000 • Cost savings: ₹ 215,000 • Payback period: 8 months

Eliminate Water Consumption in Gents' Urinals

PVR Cinemas

Waterless urinals with bio blocks

Bio-cleaner 'Blu Away'

Deepa Menon
deepa.menon@pvrnest.org
Mob: +91 98113 00540

Pramod Arora
pramod.arora@pvrcinemas.com
Ph: (0124) 4708100

OBJECTIVE	To use bio blocks to eliminate water use in gents' urinals across PVR Cinemas
RESULTS	• Water saving of about 101 m^3/year/urinal • Reduced wastewater generation and water pumping cost
SIZE OF PRIZE	Potential of 10 million m^3/year of water savings (Scale up applicable to all buildings, shopping malls, restaurants, hotels and commercial establishments)
HOW ACHIEVED	• Bio-cleaner called 'Blue Away' used in cleaning the urinal • Simplest process is to just place bio blocks in urinals and avoid water for flushing • Cost of a bio block: ₹ 20/block/urinal • Bio-cleaning solution at a cost of ₹ 18,000/year for improving the quality of bio block

Industry

WaterCom Best Practices

Rooftop Rain Water Harvesting System in Industry

Saint Gobain, Chennai, Tamil Nadu

Water reservoir for storing rain water

Gladson Baskaran
gladson.baskaran@saint-gobain.com
Ph: (044) 27160801

OBJECTIVE	Collection of rooftop rain water in a reservoir
RESULTS	• Water harvested: 1,50,000 m^3/year • Fresh water cost savings of ₹ 5 million/year
SIZE OF PRIZE	150 million m^3/year water harvesting potential (Extrapolated to 1,000 manufacturing companies having a similar rooftop area)
HOW ACHIEVED	• Total rooftop area available for harvesting is 1,20,000 m^2 • Average annual rainfall is 1,200 mm • Runoff coefficient is 0.9 • Investment: ₹ 20 million • Payback period: 48 months

Use of Air-Cooled Condensers in Thermal Power Plants

Aban Power Ltd., Tamil Nadu

Air-cooled condenser

P. S. Mathew
mathew.ps@lancogroup.com
Ph: (0435) 2451231/2451232

OBJECTIVE	Eliminate fresh water consumption using air-cooled condensers in place of conventional cooling towers
RESULTS	• Water savings of 2 million m^3/year • Saving of ₹ 63 million/year • Reduction in water consumption by 2.4 m^3/MW
SIZE OF PRIZE	188 million m^3/year of water savings [Based on 70% of the CPPs in India (14,000 MW) which operate with wet cooling towers]
HOW ACHIEVED	• Installed air-cooled condensers in place of conventional cooling towers • Cost of the project: ₹ 150 million • Annual cost saving: ₹ 64 million • Payback period: 28 months

Use of STP Treated Water in Cooling Tower

Larsen & Toubro, Powai Campus, Mumbai

Sewage Treatment Plant

Manish Shah
ShahMC@pgm.ltindia.com
Mob: +91 98338 38601

OBJECTIVE	Use of water treated from Sewage Treatment Plant (STP) for cooling towers
RESULTS	• 3800 m^3/year of fresh water saved • ₹ 0.6 million/year of cost saving
SIZE OF PRIZE	1 million m^3/year of water savings (Extrapolated for 10% of new buildings in the country)
HOW ACHIEVED	• Installed STP to treat sewage @ 500 m^3/day • Treated water mixed with lake water • Installed softener to reduce hardness • Investment: ₹ 0.5 million • Annual saving: ₹ 0.6 million

Reuse of De-inking and Coating Effluent in Paper Mills

ITC Kovai, Tamil Nadu

Water treatment plant

Clarifier

R. Nandha Kumaar
r.nandhakumaar@itc.in
Mob: +91 99944 07404

OBJECTIVE	Reuse of De-inking and Coating effluent for process applications
RESULTS	• 1,70,000 m^3/annum of effluent water is treated and reused in De-inking and Coating process • Cost saving of ₹ 1.2 million/year • Recovered fiber is also reused in the system
SIZE OF PRIZE	8 million m^3/year of fresh water savings (Extrapolated to 50% out of 126 large/medium waste paper based mills @ 500 m^3/day/mill across the country)
HOW ACHIEVED	• Earlier De-inking and Coating effluent was drained. Now mixed effluent is pumped into flash mixer • Treated using a newly installed clarification system for De-inking and Coating plant effluent with Poly Aluminium Chloride as flocculator • TSS reduction from 3,500 ppm to less than 200 ppm • Turbidity reduction from 2,500 NTU to less than 250 NTU • Investment: ₹ 2 million • Payback period: 20 months

Reuse of Filtrate Wastewater from Thickening Stock and Tertiary Screen Rejects in Paper Mills

ITC Kovai, Tamil Nadu

Hydra screen

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r.nandhakumaar@itc.in
Mob: +91 99944 07404

OBJECTIVE	Reuse of filtrate wastewater from thickening stock and tertiary screen rejects
RESULTS	• 79,000 m^3/year of effluent water is reused in place of fresh water • Recovered stock (fiber) consistency increased from 2.5% to 20%
SIZE OF PRIZE	4 million m^3/year of fresh water savings (Extrapolated to 50% out of 126 large/medium waste paper based mills @ 240 m^3/day per mill across the country)
HOW ACHIEVED	• Earlier vibrating screens and side hill screens were used with output sludge consistency of only 2-2.5% with negligible water recovery • Replaced it with two hydra screens consisting of screw conveyor enclosed by a screen to avoid jamming of sludge • The consistency of the rejects increased from 2% to 20% which increased the filtrate quantity by 10 m^3/hr • Investment: ₹ 1.2 million • Payback period: 26 months

Increase in Condensate Recovery

Essar Steel Ltd., Hazira, Gujarat

Condensate recovery pump

Alkesh Mendpara
alkesh.mendpara@essar.com
Ph: (0261) 6603820

OBJECTIVE	Reuse of condensate for make up to feed water in cold rolling mill section
RESULTS	• Saving 25,000 m^3/year of fresh water which is 0.3% of total fresh water consumed • Saving of natural gas, 7.35 sm^3/m^3 of condensate recovery for preheating boiler feed water
SIZE OF PRIZE	1.5 million m^3 /year of fresh water saving potential (Extrapolated to the Indian iron and steel industry for 0.3% of total water consumption of 516,600 m^3/year)
HOW ACHIEVED	• Earlier condensate was drained or sent to effluent treatment plant • By installing condensate recovery pumps, water recovered and used for make up to feed water • Investment: ₹ 0.75 million • Saving: ₹ 1 million/year @ ₹ 42/m^3 of soft water cost • Payback period: 9 months

Recycle of Filter Backwash Water Using Tube Settler

ITC Ltd., Munger, Bihar

Tube Settlers

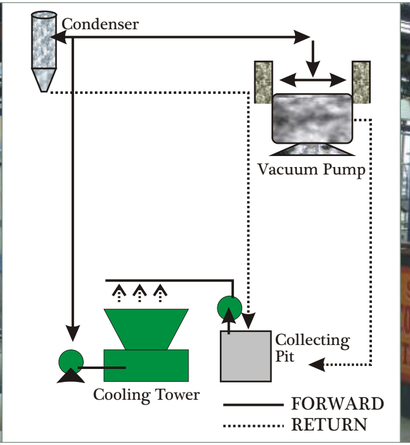
Balkrishna Arora
balkrishna.arora@itc.in
Mob: +91 99340 13367

OBJECTIVE	Reuse of filter backwash water from pretreatment section
RESULTS	• Water savings of 10,950 m^3/year • Complete saving of fresh water for backwash and recycled to raw water storage tank
SIZE OF PRIZE	4 billion m^3/year of fresh water saving potential (Extrapolated to industrial fresh water consumption of 40 billion m^3/day and a saving potential of 10% towards fresh water used in backwash)
HOW ACHIEVED	• Earlier backwash water taken to effluent treatment plant • Installed tube settler plant for removal of total suspended solids and recycled back to raw water storage tank thereby reducing the fresh water intake • Total cost of the project: ₹ 0.45 million • Cost of water: ₹ 1.00/m^3 • Payback period: 18 months

Reuse of Cooling Water from Jet Condenser and Vacuum Pump

ITC, Bhadrachalam, Andhra Pradesh

Cooling tower



Diagramatical representation of the re-circulating process

Vacuum pump

G. Srinivasan
srinivasan.ganesan@itc.in
Ph: (08746) 242330-40

OBJECTIVE	Reuse of jet condenser and vacuum pump water by re-circulating through cooling tower
RESULTS	• Water savings of 0.2 million m^3/year • Cost savings of ₹ 0.5 million/year
SIZE OF PRIZE	6 million m^3/year of water savings across the paper industry (Extrapolated to several large-sized paper mills in India)
HOW ACHIEVED	• Earlier fresh water was used for cooling vapours from compact disc filters in jet condenser and vacuum pump • This water was drained • A cooling tower was installed to recycle the water from jet condenser and vacuum pump • Investment: ₹ 0.2 million • Payback period: 5 months

Reuse of Process Wastewater in Metal Treatment Section

ThyssenKrupp Electrical Steel Pvt. Ltd., Nashik, Maharashtra

Wastewater treatment plant

Water before and after treatment

Vinayak Salunke
vinayak.salunke@thyssenkrupp.com
Ph: (02553) 2255182

OBJECTIVE	Reduce fresh water consumption by treating and reusing wastewater generated at the metal treatment section
RESULTS	• Saving of 65,000 m^3/year of fresh water from total water consumption of 900 m^3/day • Cost savings of ₹ 2,50,000/year
SIZE OF PRIZE	6 million m^3/year of water savings (Extrapolated to 100 similar plants having metal treatment sections)
HOW ACHIEVED	• Nearly 210 m^3/day of alkaline wastewater treated through neutralisation, addition of settling agent, clariflocculation and passing through a sand and carbon filter and softener • 175 m^3/day of soft water recovered and reused • Investment: ₹ 0.2 million • Net annual saving: ₹ 0.25 million • Payback period: 10 months

Effective Recovery and Use of Condensate from Chilled Water Coils of Air Handling Units

IndoRama Synthetics Ltd., Nagpur, Maharashtra

Air Handling Units

Vinod B. Thaokar
vinod.thaokar@indorama-ind.com
Ph: (07104) 663651,663673

OBJECTIVE	Effective recovery and use of condensate from chilled water coils of Air Handling Units (AHUs)
RESULTS	• Water savings of 42,000 m^3/year • Cost savings of ₹ 1 million/year
SIZE OF PRIZE	40 million m^3/year of water savings (Extrapolation based on 1,000 similar systems across the country)
HOW ACHIEVED	• Chilled water coils generate huge amount of condensate • Previously it was drained • Now condensate collected, treated using side stream filter for removal of suspended solids and diverted to cooling towers for make up

Use of Air-Cooled Condensers and Plate Heat Exchangers for Water Saving

JK Tyre & Industries Ltd., Kankroli, Rajasthan

Earlier System

Present System

Cooling tower

Air-cooled condensers

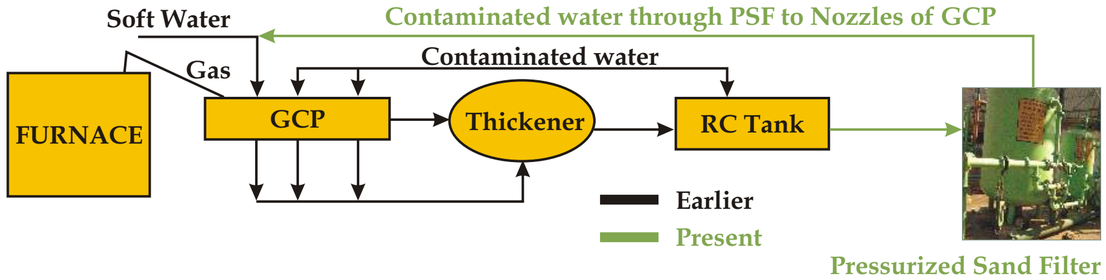
Plate heat exchanger

D R Pai
drpai@ktp.jkmail.com
Mob: +91 97999 99904

OBJECTIVE	Installation of air-cooled condensers and plate heat exchangers instead of conventional cooling towers
RESULTS	• Water savings of 17,400 m^3/year • Cost savings of ₹ 0.3 million/year
SIZE OF PRIZE	35 million m^3/year of water savings (Extrapolation based on 2,000 similar applications in process industry)
HOW ACHIEVED	• Earlier wet cooling towers were used • Replaced with dry cooling towers (air-cooled condensers) • 100% elimination of fresh water • Installed plate heat exchanger for recovery of process heat • Investment: ₹ 1.5 million • Payback period: 60 months

Reuse of Gas Cleaning Plant Water to Reduce the Use of Soft Water

Hospet Steels, Koppal, Karnataka



Process of glass cleaning plant

Shailesh B Burde
sbburde@hospetsteels.com
Ph: (08539) 286603-05

OBJECTIVE	Reuse of Gas Cleaning Plant (GCP) water by re-circulating to reduce the consumption of soft water
RESULTS	• Water savings of 0.1 million m^3/year • Cost savings of ₹ 0.4 million/year
SIZE OF PRIZE	2 million m^3/year of water saving potential (Extrapolated for 20 similar applications across the country)
HOW ACHIEVED	• Earlier 280 m^3/day of wastewater drained from GCP re-circulation system. Equivalent amount of soft water was used as make up • Now part of the GCP re-circulation water is processed through pressure sand filter and reused • This avoids fresh water make up • Investment: ₹ 0.55 million • Payback period: 17 months

Replacing Underground Piping Network with Overhead System

Hindustan National Glass & Industries, Nashik, Maharashtra

Overhead water circulation system

Pravin Agarwal
pagarwal@hngil.com
Mob: +91 98509 72471

OBJECTIVE	Reducing transportation losses by design and installation of new overhead water circulation system
RESULTS	• Water savings of 0.1 million m^3/year • Cost savings upto ₹ 1.2 million/year
SIZE OF PRIZE	100 million m^3/year of water savings (Extrapolated to 1,000 manufacturing facilities)
HOW ACHIEVED	• Earlier 75% of piping network was underground, causing undetectable leakages • After thorough inspection of the network, new overhead piping network laid within 6 months • Water connection to the network started in overhead piping during annual shut down • Investment: ₹ 0.2 million • Payback period: 2 months

Reuse of Wastewater for Cullet Washing

Hindustan National Glass & Industries, Nashik, Maharashtra

Wastewater tanks used for cullet washing

Pravin Agarwal
pagarwal@hngil.com
Mob: +91 98509 72471

OBJECTIVE	Utilization of cooling tower blow down and reuse of drainwater for cullet washing to reduce requirement of fresh water
RESULTS	• Savings of 50,000 m^3/year • Cost savings of ₹ 0.5 million/year
SIZE OF PRIZE	1 million m^3/year of water savings (Extrapolated to 20 glass manufacturing units across the country)
HOW ACHIEVED	• Earlier cooling tower blow down water was drained • Now blow down water used for washing cullet in a perforated circular drum • Wastewater from the drum is reused by treating with manual filter and alum • Investment: ₹ 0.2 million • Payback period: 5 months

Reducing the Make up to Cooling Tower and Reducing the Load by Installing Heat Recovery System for Compressed Air

JK Tyre & Industries Ltd., Kankroli, Rajasthan

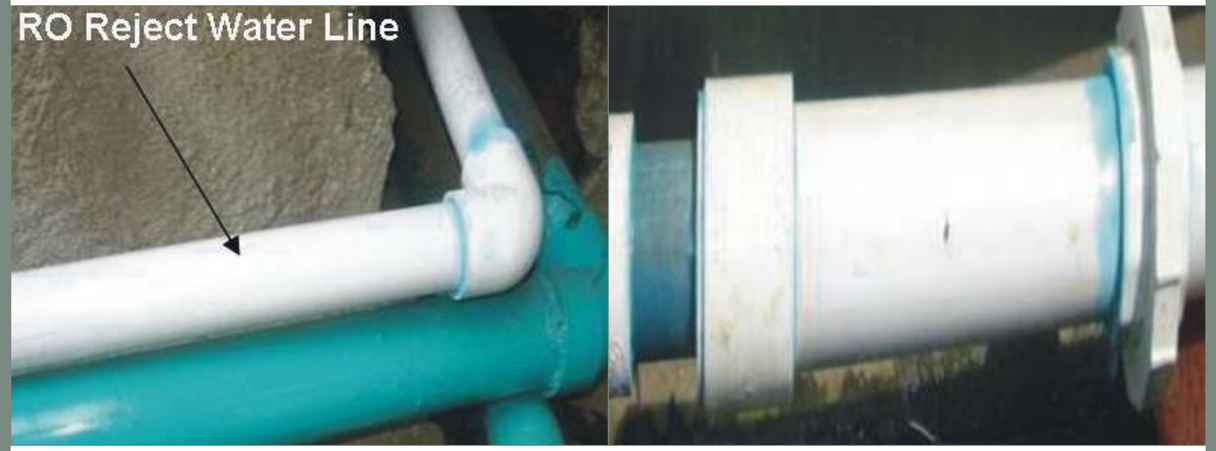
Compressor house

D R Pai
drpai@ktp.jkmail.com
Mob: +91 97999 99904

OBJECTIVE	Elimination of water evaporation loss in cooling towers
RESULTS	• Water saved: 3,500m^3 million litres/year • Cost savings of ₹ 0.5 million/year • Energy savings of ₹ 13.5 million/year
SIZE OF PRIZE	70 million m^3/year of water savings (Similar potential exists for nearly 2,000 installations)
HOW ACHIEVED	• Recovered heat of compression by passing boiler feed water instead of rejecting the heat to the cooling towers • Investment: ₹ 15 million • Payback period: 12 months

Utilization of Reverse Osmosis (RO) Plant Reject Water for Toilet Flushing

Sterlite Industries, Silvassa, Dadra and Nagar Haveli



RO reject water line

Sameer Gupta
sameer.gupta@vedanta.co.in
Ph: (0260) 6612301

OBJECTIVE	Reverse Osmosis (RO) plant reject water to be used for toilet flushing
RESULTS	• Water savings of 3,650 m^3/year • Money savings of ₹ 0.2 million/year
SIZE OF PRIZE	4 million m^3/year of water savings (Extrapolated to 1,000 RO applications all over the country)
HOW ACHIEVED	• Earlier RO reject water drained • Simple piping arrangement along with a small pump made for diverting the water for toilet flushing • Investment: ₹ 15,000 • Payback period: 1 month

Installation of Reverse Osmosis (RO) System for Reuse of Effluent

Cipla Ltd., Patalganga, Maharashtra

Reverse Osmosis plant

Anjani Kumar
anjanikumar@cipla.com
Ph: (02192) 304300

OBJECTIVE	Reuse of plant effluent using Reverse Osmosis (RO) system
RESULTS	• Water savings of 25,000 m^3/year • Cost savings of 0.7 million/year
SIZE OF PRIZE	3 million m^3/year of water savings (Extrapolated to 100 similar pharmaceutical manufacturing units across the country)
HOW ACHIEVED	• Earlier all effluents sent to CETP for treatment • Installed RO combined with existing double effect evaporator system for handling the reject • The treated effluent used for utilities • Investment: ₹ 5 million • Payback period: 89 months

Use of Jet Spray System for Maintaining Relative Humidity over Tobacco Bins

ITC Saharanpur, Uttar Pradesh

Jet sprays

Gyanesh Pathak
gyanesh.pathak@itc.in
Ph: (0132) 2725111

OBJECTIVE	Use of jet spray system instead of traditional centrifugal systems
RESULTS	Water savings of 3,000 m^3/year
SIZE OF PRIZE	3 million m^3/year of water savings (Extrapolated to 1,000 manufacturing companies including tobacco and textile units requiring humidity control across the country)
HOW ACHIEVED	• Traditional centrifugal system to maintain relative humidity over tobacco bins • Earlier water sprayed manually • Jet sprays installed with compressed air and online relative humidity sensor • Water flow regulated using sensor • Investment: ₹ 5 million

Zero Discharge Plant in Petroleum Refineries

Chennai Petroleum Corporation Ltd., Chennai

Zero discharge plant

Reverse Osmosis and Ultra Filtration plant

C.K. Sandeep
ck.sandeep@ionexchange.co.in
Ph: (022) 30472025

OBJECTIVE	Conservation of fresh water and ensuring water security at Chennai Petroleum Corporation Ltd. refinery by treating and reusing the wastewater
RESULTS	• 1.4 million m^3/year of fresh water saved • ₹ 40 million/year saved on account of avoiding fresh water
SIZE OF PRIZE	14.6 million m^3/year of water savings equivalent to ₹ 720 million/year in refinery sector (Extrapolated for 18 refineries in India)

HOW ACHIEVED	• Installation of RO and UF combination for treating wastewater
	• Economics
	  • O&M costs at ₹ 19/m^3
	  • Capital and Interest Repayment: ₹ 14/m^3 (estimated)
	  • Fresh water cost: ₹ 60/m^3
	  • Net saving: ₹ 27/m^3
	  • Investment made: ₹ 105 million
	  • Payback period: 29 months

Installation of Membrane System for Reuse and Recycling of Wastewater

Ion Exchange Ltd., Ankleshwar, Gujarat

Reverse Osmosis plant

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OBJECTIVE	Efficient water management and reduction in effluent generation
RESULTS	• Reduced fresh water consumption from 1,065 m^3/day to 610 m^3/day by recycle and reuse method • Savings of ₹ 10 million/year
SIZE OF PRIZE	• 4 million m^3/year of fresh water savings • ₹ 240 million/year savings in fresh water cost (Extrapolated to 25 manufacturing units in Ankleshwar area)
HOW ACHIEVED	• Earlier 1,065 m^3/day fresh water consumed • Installed UF/RO system for treating 800 m^3/day of wastewater having COD 600 ppm and TDS 2,500 ppm • Permeate @ 455 m^3/day with TDS less than 20 ppm and COD 50 ppm recycled back to process in a closed loop • Fresh water saved: 455 m^3/day and net cost saved @ ₹ 58/m^3 after deducting cost to RO and ETP • Reject @ 250 m^3/day with COD 5,000 ppm sent to ETP for treatment • Investment: ₹ 3.5 million • Payback period: 4 months

Reuse of Cooling Tower Blow Down Water from Power Plant

Essar Steel Ltd., Surat, Gujarat

Pond for collecting cooling tower water

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OBJECTIVE

"Effluent to Affluent"– reuse of cooling tower blow down water from power plant for make up to clarifier

RESULTS

- Water savings of 1.5 million m^3/year
- Cost savings of ₹ 18 million/year
- Reduction in precipitation of deposits in cooling towers
- Frequency of maintenance of cooling tower reduced to once in a year

SIZE OF PRIZE

11 million m^3/year of fresh water savings
(Extrapolated to the existing 7 integrated iron and steel plants across the country with an estimated fresh water requirement for make up to clarifier @ 4,500 m^3/day for each plant)

HOW ACHIEVED

- Earlier soft water blow down at 4,500 m^3/day from cooling tower at pH 9.5 - 10.0 discharged into river as blow down after neutralizing with sulfuric acid
- Another stream of acidic water available from gas scrubbing and de-dusting is mixed with this alkaline cooling tower blow down in the clarifier instead of using fresh water for make up
- The clear overflow water of clarifier at pH 8.0 is devoid of 80% of Ca and Mg salts reducing the formation of scale and frequency of cleaning in cooling towers
- Investment: ₹ 5.5 million
- Payback period: 4 months

Reuse of Cooling Tower Blow Down Water for Irrigation and Gardening

Reliance Industries Ltd., Dahej, Gujarat

Cooling tower blow down water used for gardening

Tapping points for water

Girish Patil
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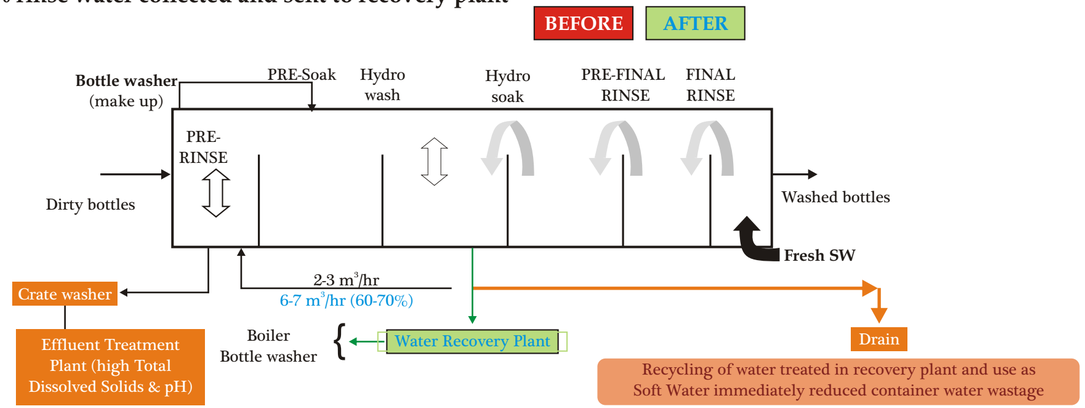
OBJECTIVE	To use cooling tower blow down water for irrigation and gardening
RESULTS	• 0.022 million m^3/year of water savings • ₹ 0.22 million/year of cost savings
SIZE OF PRIZE	25 million m^3/year of water savings (Extrapolated to 1,000 large-sized plants across the country)
HOW ACHIEVED	• Earlier fresh water was used for gardening • After lab tests, the cooling tower blow down water was found suitable for use in gardens • Suitable tapping points were provided for delivery of water • Investment: ₹ 0.1 million • Payback period: 5.5 months

Reuse of Rinse Water for Glass Bottle Washing

PepsiCo India, Roha, Maharashtra

60 -70% rinse water collected and sent to recovery plant



Diagrammatical representation of Glass Bottle Washing Unit

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OBJECTIVE

Reuse of final rinse water for glass bottle wash line

RESULTS

- 0.2 million m^3/year of water savings
- 0.6 million/year of cost savings

SIZE OF PRIZE

20 million m^3/year of water savings
(Extrapolated to 100 beverage manufacturing companies across the country)

HOW ACHIEVED

- Earlier rinse water drained away
- Make up was done daily @ 450 m^3/day
- Presently 60 - 70% rinse water collected and sent to recovery plant
- Fresh water make up reduced to 65 m^3/day
- Rinse water treated using weak acid cation combined with activated carbon filter sand filter, polishing unit and online UV and reused
- Investment: ₹ 0.2 million for online UV treatment
- Payback period: 4 months

WATERCOM

About the CII National Committee on Water (WaterCom)

The Confederation of Indian Industry (CII) is a non- government, not-for-profit, industry led and industry managed organization, playing a proactive role in India's development process.

"India@75: The Emerging Agenda", is a proactive initiative of CII to facilitate the acceleration in India's transformation into an economically vital, technologically innovative, socially and ethically vibrant global leader by year 2022.

In line with this national agenda, the CII National Committee on Water (WaterCom) catalyzes the move towards 'national water adequacy'. The initiatives of the committee includes sharing best practices, education & awareness, policy facilitation and recognizing & rewarding outstanding performances.