



Global Cement and Concrete  
Association

**22 March 2021**

## **A Tale to Remember: Growing Water Positive**



**Collectively, GCCA India Member Companies are now  
Four times water positive!**

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## Introduction

With a growing focus on sustainable development and judicious resource consumption across the world, water management has evolved as a major challenge in global sustainability initiatives. Water is a basic part of the manufacturing, supply and utilization of products and services. Vulnerabilities and dilemmas related to water utilization influence pretty much every organization. Without improvements in water management and use, the world could confront a usable water supply gap of 40% by 2030.

Cement is a hygroscopic material which mixes with water and other aggregates to produce concrete. The strength and durability of concrete make it one of the most useful materials developed by man and plays a significant role in national growth through green buildings, urban resilience and development of sustainable cities and communities.

Water conservation has been at the forefront of sustainability initiatives by GCCA India member companies. Being conscious of the importance of water resources in operational geographies and its impact on a large number of stakeholders, sustainable interventions are inclusive of efforts both within and outside the operating boundaries.

The multidimensional approach includes rainwater harvesting, restoring water bodies, construction of wells/check-dams, converting worked-out mines into water bodies, promoting low water-intensive crop farming and drip irrigation implementation by member companies in and around the communities in which they operate. These interventions are spread on a holistic level are designed to offset industry water footprint and grow water positive.

## Water Conservation & Harvesting Within Premises

Responsible consumption of water resources focuses on beneficial reduction in water loss, use of resources, avoiding damage to water quality and improving water management practices that curtail its use or enhance the beneficial use of water. Within industrial premises, focus is on optimising consumption, groundwater recharge, recycling and reuse and rainwater harvesting.

The following table depicts, water credit<sup>[1]</sup> collectively by member companies within the premises through various facility interventions in 2019-20.

**Table 1: Net water credit within premises for GCCA India member companies (2019-20)**

Groundwater Recharge (million cubic metre)	Water recycled/reused (million cubic metre)	Rainwater harvested (million cubic metre)	Net water credited (million cubic metre)
92.43	6.41	78.46	177.3

[1] Water Credit is the summation of volume of recycled / reused water, harvested rainwater, groundwater recharge quantities and water saving through different water conservation initiatives

## Optimising Water Consumption

Though cement manufacturing is not a water-intensive process and is phasing out wet process kilns to pave way for more efficient dry process kilns, it still requires water in the captive power plant, cooling applications, and dust suppression. The cement industry implemented concentrated efforts for better water management practices and aims to contribute towards water-positive interventions.

The first stage in going sustainable is judicious use, and this has been very well understood and addressed by Indian cement industries through reducing water consumption at various points. Prudent water management involves an active commitment to reduce water consumption with an emphasis on freshwater sources. Initiatives include process optimization and upgradation to water efficient technologies along with water metering and monitoring systems.

The net freshwater withdrawal of GCCA India member companies stood at 49.98 million cubic metre in 2019 and over the years, the best efforts were put in to reduce water consumption during production and other processes. In 2019, ACC Limited reduced specific freshwater consumption by 31%<sup>[2]</sup> in cement operations, as compared to 2015 baseline.

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**At Ras mines in Rajasthan, Shree Cement earlier used water tanker for sprinkling water for dust suppression resulted in around 300 cubic metre/day of water consumption. Installation of automatic water sprinklers helped them to save 98 cubic metre/day and thus reducing overall water consumption.**

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Similar initiatives were taken up by all member companies across operations which added to optimizing water consumption. Though there is minimal reduction in net water consumption due to increased cement production over the years, the specific freshwater consumption (water consumption in cubic metre/ton of cement) has shown a sharp decrease.

## Recycle and Reuse

The environmental degradation resulting from the excessive extraction and shortage of resource, has emphasized on the need for a responsible water consumption practices and there is a growing interest in the process industries to reduce both freshwater consumption and wastewater generation. With the current pace of development in the sector, demand for the raw materials will grow in the coming years. Water is one of the largest natural resource consumed by humans. Only 2.5% of total water is available as a fresh water, interventions to recycle and reuse wastewater within the system and reduce withdrawal of freshwater is need of the hour.

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**At JK Cement, various water conservation efforts are implemented to produce more cement & power with less water. Investment in water conservation measures has improved the water positivity and reduced the risk of water crises. Best available technologies and team efforts have reduced the dependency on ground water. Water positivity efforts are development of rainwater harvesting structures, use of treated city & own sewage water, converting wet to dry systems, installation of waste heat recovery systems (stopped water used for flue gases quenching and now heat is used to produce green power without use of fuel), arresting leakages and behavioral improvement for judicious use of water.**

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[2] Integrated Report. ACC Limited, 2019.

Prioritising on this, Sewage Treatment Plant (STP), Effluent Treatment Plant (ETP), and Zero Liquid Discharge (ZLD) systems are implemented for effective re-utilisation of waste water by cement industries. Figure 1 shows Net water withdrawn and recycled by GCCA India member companies in 2019-20. 13% of the net water withdrawn was recycled and reused for different processes. The waste water is treated in STP and ETP coupled with RO plants and used for dust suppression, gardening, and other purposes. The water used in plants for industrial cooling is also recycled through cooling towers, water ponds and tanks.

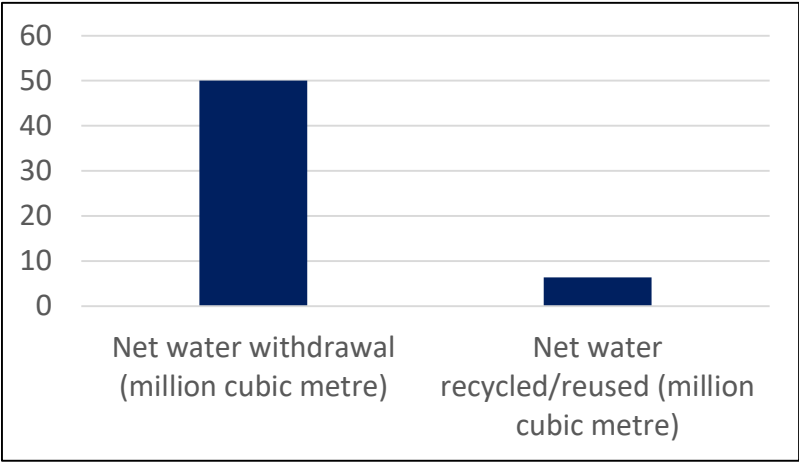


Figure 1: Water withdrawn and recycled by GCCA India member companies in million cubic metre (2019-20)

### Achieving Zero Liquid Discharge

Owing to rising water demand, reuse and recycle of wastewater become a growing trend and cement industry is no exception. Apart from minimising the impact of wastewater discharges on environment, reuse & recycling also alleviates the pressure on ecosystem caused by freshwater withdrawal. Recycling reallocates effluent from a waste that potentially harms environment to an additional resource to achieve water sustainability.

Stricter regulations, high cost of effluent disposal and increased public environmental awareness are acting as drivers for industries to go Zero Liquid Discharge (ZLD). Through removing all liquid waste from a system, ZLD focuses on reducing waste water, increasing reuse of water and reducing dependencies on local water sources. ZLD systems employ advanced wastewater/desalination treatment technologies to purify and recycle virtually all of the wastewater produced.

All 128 production plants under GCCA India member companies are Zero Liquid Discharge, reaffirming the commitment to judicious resource use and creating zero negative impact on water sources.

### Rainwater Harvesting

Water being one of the resources where there exists no alternate source and conventional sources like rivers, wells and ponds are inadequate to fulfil water demand due to unbalanced rainfall, rainwater harvesting presents a new water source. A prudent water management comprises an active commitment to build rainwater harvesting structures.

Rainwater harvesting helps utilities reduce peak demands during summer months. While rainwater can be a perfect primary water source for many uses and situations, it is also a great backup water supply for emergency situations.

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Ambuja Cements Limited believes in giving back more than it takes. Through its CSR arm, Ambuja Cement Foundation (ACF), works extensively in the company's neighborhoods to manage water resources through conservation and harvesting. ACF's multidimensional approach included setting up Roof Rain Water Harvesting Structures (RRWHS), enhancement of water sources by installing percolation wells and check dams, farming low water intensive crops, and creation of a potable water distribution system. This helped Ambuja Cement to become eight times water positive for the year 2019 as assured through third-party verification.

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Stringent plans are developed and implemented by member companies to utilize full rainwater harvesting potential and reduce dependency on groundwater and other freshwater sources. 44% of net water recharged within premises was credited through rainwater harvesting.

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When a new integrated plant was commissioned in 2015 by Orient Cement at Chittapur, they ensured it is equipped with its own rainwater harvesting reservoir. With dimensions of 8 Hectare and capacity of 0.56 million cubic metre, the reservoir supplies the site with water for industrial and domestic use, thus not exploiting the water sources in the area or depleting ground water table. With an aggregate 3.2 million cubic metre rainwater harvesting potential developed, which is more than annual water withdrawn, it is channelised towards community water initiatives.

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Water is an important natural capital available to each one of us as an individual or collectively as a group, society, private or public sector. Being an asset, it is possible to derive a monetary value. Businesses must intervene to make efforts for water conservation through irrigation system improvements, own efficiency improvements, rainwater harvesting and awareness generation campaigns.

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Over the four years' time period (2014-2018), Dalmia Cement (Bharat) Limited had credited nearly 40 million cubic metre of water through rainwater harvesting inside and outside of the company premises, recycling of wastewater and facilitation of drip irrigation. The overall value creation through this measure is about 4,800 million INR to the Natural Capital. The water positive initiative at Dalmia Cement (Bharat) Limited has further strengthened to a movement level within the organization. It has already ahead of its 2020 target to become 5 times water positive. The Natural Capital valuation of water use in India is nearly INR 120/cubic<sup>[3]</sup> metre of water which translates to 0.12 INR/litre of water. The next targets of the group is to become 20 times water positive by 2025.

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The HeidelbergCement India Limited commitment to water positivity is demonstrated by remaining net water positive for seventh consecutive year. The water reservoirs created by them have been recharging the ground water reserves and has improved the water table in the vicinity.

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[3] Natural Capital Risk Exposure of the Financial Sector in India, (<http://www.emergingmarketsdialogue.org/wp-content/uploads/2018/02/resources.pdf>) page 31

## Water Conservation & Harvesting Outside Cement Plants

A fundamental component to water conservation strategy is engaging with the communities and ensuring participation and support. Thus, working hand in hand with local communities to plan, implement and manage projects, to harvest rainwater, promote reuse and ensure all year-round water availability for farmers, families and communities is necessary.

Outside plant premises, focus is on groundwater recharge, rainwater harvesting and promoting judicious water use through drip and sprinkler irrigation system. The table shows net water credit through community engagement and participation for GCCA India member companies in 2019-20.

**Table 2: Net water credit outside premises (2019-20)**

Groundwater Recharge (million cubic metre)	Water captured through rainwater harvesting (million cubic metre)	Other water credits (million cubic metre)	Net water credited (million cubic metre)
5.47	7.54	17.68	30.69

## Community Rainwater Harvesting

Water needs arise both outside and inside the plant. With a dedication to give back to the communities and to secure water supplies without risking the local water systems, and a longer sustainable goal, where there is enough for everyone's need, community water interventions has a long way to go.

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**At Ambuja Cements Limited, the water resource management programs have grown in length and breadth considering the local needs across locations where water continues to remain a critical priority for communities as well as business. Along with community rooftop Rainwater Harvesting System (RHS) at customers end grew by more than 300% in 2019 as compared to the previous year.**

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Along with fulfilling water requirements, this will reduce stress on local water bodies and help in biodiversity development. The prolonged approach for water management by Shree Cement focuses on water conservation initiatives in and around the plant boundaries by constructing water harvesting structures and includes increased depth of water pit in mines for improved water carrying capacity. With 30.6 million cubic metre of water credited collectively by GCCA India member companies outside premises in 2019, 24% was captured through rainwater harvesting.

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**UltraTech Cement Limited, with a commitment to grow four times water positive by 2021, leaves no stone unturned in their efforts and this is depicted in developing rainwater harvesting at used mines and implementation of integrated watershed projects at Tadipatri & Rajashree Cement locations.**

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## Source Vulnerability Assessment

Exponential population growth and rapid industrialisation has led to rapid exhaustion of water sources and depletion in ground water. A study conducted by American Geophysical Union on Global Assessment of groundwater revealed that in recent decades, the rate of extraction of ground water has more than doubled. For sustaining the existing water sources and to ensure desired quality and quantity in the long way, conducting a Source Vulnerability Assessment (SVA) helps.

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**During 2019-20, JSW Cement at its Nandyal Plant carried out extensive water resource evaluation study by using WATSCAN of its operations and surrounding area with complete mapping of watershed management. They implemented majority of the recommendations from the study which covered, efficiency improvement, water audit for operations, rainwater harvesting, watershed management, aquifer studies, recharge networks (check-dams, harvesting ponds), micro irrigation systems, farm ponds, drainage system etc.**

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SVA aims to identify and assess potential risks that may jeopardize sufficient water availability of desired quality. These risks are assessed from a wide range of angles such as physical, environmental, social, political, economic, regulatory and consumer's perception.

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**Following a well-defined water stewardship policy, UltraTech Cement Limited has a structured risk management approach to identify and manage risks related to water availability and quantity. Employing tools like GeoSust and Aqueduct they analyse the risks related to water availability for each of the locations. Apart from Generic Water Situation Assessment, Local Source Vulnerability Assessment which are site specific are also carried out by UltraTech Cement Limited through International Crop Research Institute for the semi-arid tropics (ICRISAT).**

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Along with safeguarding future business, SVA will help implement a cost-effective sustainable water management system. Following the assessment, a Source Water Protection Plan (SWPP) is developed which includes physical interventions, water management plans and partnerships.

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**ACC Limited employed India Water Tool (IWT) for initial evaluation, a detailed assessment had been carried out at ACC Limited- Wadi plant also through ICRISAT. Following the assessment, Water Risk Mitigation Plans (WRMP) are prepared which aims to identify and reduce risks to water procurement for manufacturing operations.**

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For a prudent water management plan, a vulnerability assessment is conducted, which is based on current water supplies, growth projections, available internal and external water sources and neighboring activities. The SVA identifies and quantifies risk comprising physical, environmental, social, political, economic, regulatory and consumer's perception. The SVA helps companies to develop a sustainable action plan towards achieving water positivity.

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## Collective Contribution by GCCA India Member Companies

With freshwater becoming increasingly scarce and an unprecedented stress on existing sources, GCCA India member companies have identified and acted upon to the cause of sustainable water use. Water scarcity can manifest as business risk in future, which can be addressed only through a comprehensive water management strategy.

**Table 3: Net water credit and debit <sup>[4]</sup> for GCCA India member companies (2019-20)**

Net water withdrawal/debit (million cubic metre)	Net water credit in premises (million cubic metre)	Net water credit outside premises (million cubic metre)	Total water credited (million cubic metre)	Water balance index <sup>[5]</sup>
49.99	177.29	30.69	207.98	4.16

Through all facility and material intervention in achieving water positivity both within and outside premises, collectively the member companies are four times water positive. Furthermore, a shift in focus towards the following at organisation level will contribute to growing water positive:

- Strengthening water conservation activities and infrastructure building outside the plant premises with community and NGO participation
- Periodical vulnerability assessments to identify and mitigate threats and develop an action plan for the long run
- Establishing water harvesting, recharge and other facilities to the full potential of the organisation

## Conclusion and Way Forward

With limited resource availability and ever-increasing need, water resources require a well-structured plan for judicious use and minimal wastage. It is essential to take into account the geographical, climatic and other physical features while devising an exhaustive water management plan.

Working on holistic sustainable development, growing water positive will have a huge participation in achieving Sustainability Development Goals along while also ensuring equitable resource distribution and consumption. Sustained efforts to achieve higher Water Positivity (Water Balance Index) can contribute to multiple environmental and social goals and reaffirm commitment to sustainable growth.

[4] Water debit denotes the total volume of water consumed or withdrawn

[5] Water Balance Index, also known as Water Positivity is defined as 'the ratio of water credit over water debit'

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