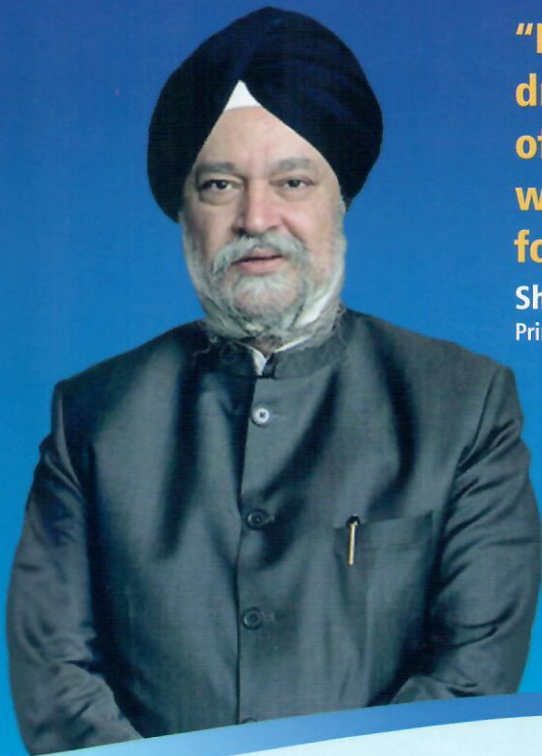


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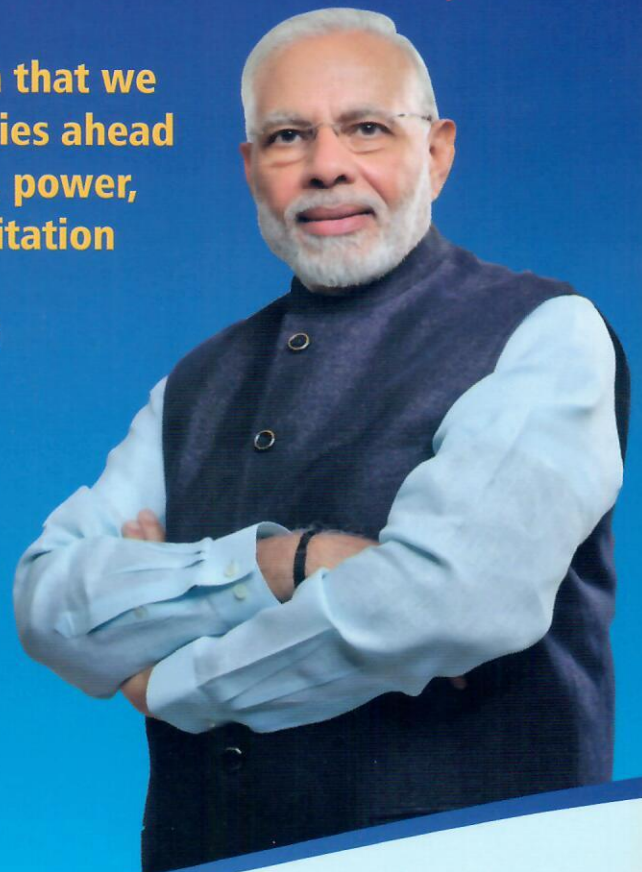
Vol 01/ Issue 03/ June 2019

MEMBERS COPY



"Much of India that we dream of still lies ahead of us: housing, power, water and sanitation for all....."

Shri Narendra Modi
Prime Minister of India



"With the recent urban flooding and natural disasters, plumbing becomes an important subject and industry organisations like IPA have an important role to play collectively with the government".

Shri Hardip Singh Puri

*Minister of State (Independent Charge)
of the Ministry of Housing and Urban Affairs;
Minister of State (Independent Charge)
of the Ministry of Civil Aviation; and
Minister of State in the Ministry of Commerce and Industry*



**TO SAVE 130 CRORE LITRES OF
WATER IN 2019 @ 1 LITRE/PERSON/YEAR**



OFFICIAL JOURNAL OF THE INDIAN PLUMBING ASSOCIATION

**ZERO
DISCHARGE**
Educational Campus

ZERO DISCHARGE Educational Campus

Sagar School, Tijara, Rajasthan

Visit Report by IPA under 'I Save Water' Mission on 1st May 2019

Author : Mr. M.K. Gupta

Co-Author : Ms. Monika Gautam

Sagar School, one of the most prestigious co-educational boarding institutes based on CBSE curriculum is located about 110km from NCR near the Aravali Hills range in Tijara, Alwar District, Rajasthan.

The Entrance to the Campus

The Sagar School recognizes the importance of supporting all its students in gaining the most appropriate higher education that would lead them on to future success. Founded by Late Dr V. Sagar and run by Sagar Shiksha Sansthan, the school is situated on a campus of about 160 acres that was designed by Mani Chowfla Architects.



Fig 2 - Master Plan of the Campus



Aerial View of the Campus

The environment of the school was meant to reflect its focus on a holistic learning experience for all the students. Amongst its state of the art infrastructure and other facilities, the campus is self sustainable especially from public health engineering point of view as there are no existing external facilities/ systems available for the source or for disposal of services.

With meticulous planning and proper operation and maintenance of the environmental and plumbing services the School is enjoying full fledged positive and fruitful effects even after so many years. It has continuous, reliable and good quality water for each user as per prescribed standards for various applications and has proper waste water disposal system from each unit. The treated water generated from the STP is reused 100% in the campus.

The campus is planned in such a way that the entire runoff from the rains in the campus and surrounding areas is collected in the campus and is reused through a network of Swales, Dams & Rainwater Harvesting Pits.

For energy saving, the hot water is generated through a solar system in the campus. The system is planned in such a way so as to have minimum energy requirements for the campus by use of natural terrain for flow by locating Sewage Treatment Plant at the lowest site level.

Safety in the campus is very important for which a reliable firefighting system has been provided as per statutory requirements. Proper, easy operation and maintenance system which can be controlled centrally are installed as per requirements with the latest automation techniques.

The plumbing services provided in the campus are as follows:

Water Supply System

The source of water is groundwater which is being obtained through a sufficient number of tubewells at different locations on the campus. A total of six tube wells exist at site. Out of which two tube wells are used to meet the domestic water demand. The remaining four tubewells are used for horticulture water demand and for the swimming pool make up line.

Sufficient storages have been provided in the form of both underground and overhead tanks for minimum one-day storage capacity. The water collected through tubewells is treated in the water treatment plant. At the water treatment plant, treatment of raw water is done using a pressure sand filter and softener and finally the treated water is stored in the domestic water tank. From the domestic water tank, domestic water is re-lifted to the overhead tank for gravity supply to all user points.

The distribution system for different uses is metered at various strategic locations and proper record is being maintained between the supply, treatment and reuse.

Sewage system

The system provided for all the various buildings and units of the campus is the two-stack system (two pipe system) as recommended in the code of practice for soil and waste pipes above ground. The sewerage system is based on the conventional water carriage system, in

which soil and domestic waste generated by individual building/ units is collected into a collection chamber through soil and waste piping system. Then the domestic sewage is conveyed from branch lines to nearest sub-lateral to lateral and then to the main line, which finally carries the entire sewage by gravity to one disposal point for further treatment. The entire domestic sewage is being treated in a scientific manner through a properly planned sewage treatment plant. The object is to achieve the stabilizing of decomposable organic matters present in sewage so as to get effluent and sludge having characteristics within the acceptable limit. This treated effluent obtained from the STP is being recycled and re-utilized for various purposes to help in maintaining the ecological balance by maintaining nutrient and water cycle. The whole system is designed on the Biological Treatment process of extended aeration, and is pollution free and as per the guidelines of the related regulatory authorities and conforms to the requirements of the Environmental Protection Acts.

Storm water drainage system

The rainwater drainage system was designed after study of the site conditions and considering the following factors:

- The pattern of slopes of terrain of site
- The existing conditions of site and surrounding
- The final levels and patterns of different type of roads

Rainwater from houses/units and other built-up areas are transmitted through branch drains, along the access roads, into nearest lateral drains and then into main drains of main roads, which ultimately takes the storm water to the final disposal points outside the site. Maximum rainwater harvesting is being done at the campus through sufficient rainy-wells at selected locations which catches the run-off and allows the water to recharge the underground aquifer of site area, so that ecological balance is maintained.



Dams and Catchment Areas for Collection of Storm Water Run Off

Hot Water System

In view of the fact mentioned above the hot water system for the complex was designed as two distinct systems. The centralized system for all the hostels has been designed with a hot water boiler and solar panel back up and the individual system for the staff houses, guest house and hospital has been designed with geyser and solar panel back up.

Swimming Pool

A swimming pool is also provided on the campus. The pool is about 350 cu mt capacity and has a seating pavilion around it for more than 400 spectators. Swimming constitutes one of the daily, compulsory sport activities for the students and operates throughout the year. It has a bank of approx 300 solar panels working efficiently since installation in 2004 and hot water to the swimming pool is being maintained comfortably to the range of 22–24°C without any electrical backup and has thus saved lakhs of rupees in energy which is a substantial portion of the electrical cost. To maintain the heat loss, the pool has a unique covering feature which is wheeled in place and stretched across the pool to maintain the temperature.



Piping & Panels Used for Solar Plant



Banner at Event

The campus was visited by the IPA Members to enlighten the school students about the Public Health services provided in the campus and generating awareness about the importance of saving water.

The vision of this visit was to spread awareness among students that **"Water is Life".**

The leakages and wastage that generally get ignored, if taken care of, can result in huge savings.



IPADC Members

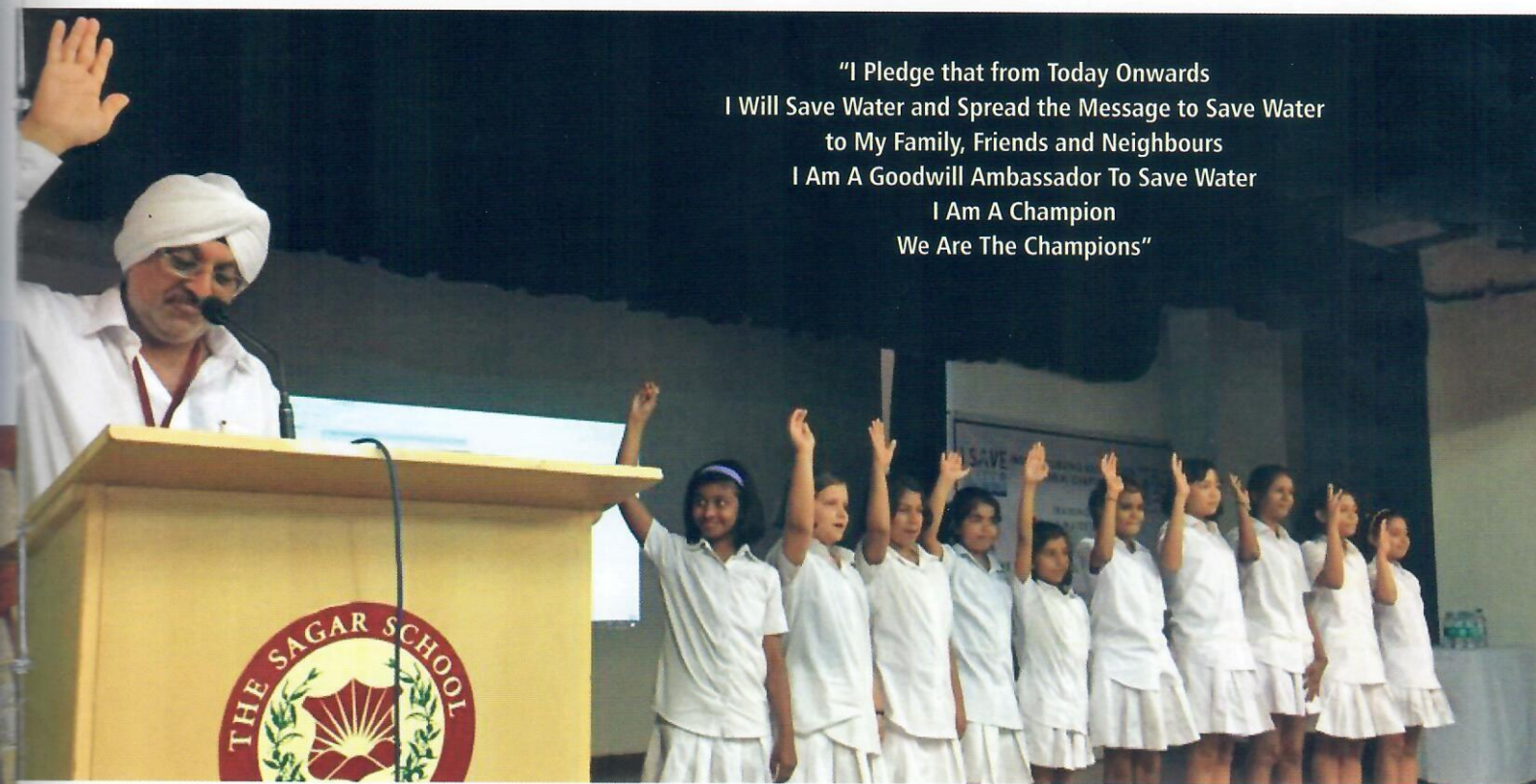
The IPA members who joined the journey of awareness to Sagar School on 1st May, 2019 were Mr. Gurmit Singh, Mr. M.K Gupta, Ms Meena Mani (Architect), Mr. Vinay Gupta, Mr. Sandeep Goel, Mr. B.P. Gupta, Mr. Manish Jain, Mr. Nikhil Jain, Mr. H.K. Khilnani, Mr. Vishal Kakkar, Mr. Sushant Sinha, Mr. A.K. Pandey, Mr. S.K. Duggal, Mr Manoj Dhar, Mr. P. Bala Subramanian and Ms. Monika Gautam.

In the 25 plus years of its existence, Sagar School is a shining example of the topic of sustainability – it has remained sustainable in exactly the way it was originally designed with zero discharge of water.

The beautifully designed campus was planned with large green grounds and open spaces under the directions of Architect Stein's office along with MKG Consultants on master planning of water conservation.

Mr. M.K. Gupta, Chairman IPA (Delhi Chapter), gave a brief introduction on IPA's earnest mission to save water, which was fleshed out with details and methods adopted on saving and conservation of water in the campus. Mr. M. K. Gupta explained the concepts and details of plumbing and water supply services in the campus as originally planned for the students and staff.

On May 1, 2019, Mr. Gurmeet Singh was joined by Architect Ms. Meena Mani from the Stein Mani Chowfla office (who designed the campus). Both of them carved out time from their busy schedules to join the students and faculty on an all-important 'I Save Water' mission. Mr. Gurmit Singh, IPA National President, also appreciated the efforts of the staff to maintain the environment and ecology of the campus.



Mr. Gurmit Singh (National President, IPA) Taking Pledge to Save Water with Students of Sagar School

Recited out loud like a chant, this was the pledge taken by students of Sagar School in Alwar, the words resonating on the campus as they repeated the pledge after the Mr. Gurmit Singh (National President – IPA) delivered an inspiring message to the students on the importance of saving water as he underlined the threats we face due global warming.

Mr. Sandeep Goel (NEC Member, IPA) further spoke on the guidelines of saving water through habitual and

easily adopted habits for water conservation on a daily basis. Small steps can lead to great changes was the underlying principle while giving the presentation on 'I Save Water'. The water saving tips, that could be employed daily, were given to students and faculty of the school to save water. These included habits like turning off the sink faucet while scrubbing dishes and pots, growing plants that require less water, installing new toilets that use less than 1.6 gallons (7.5 litres) per flush, using a broom instead of a hose etc.

The students were given information about aerators and faucets (low flow fixtures) and their use in daily life that could save huge amount of water. The aerators were given to students and faculty staff.

- Typical wash basin tap with normal aerator has a flow of 8-10 liters/min. one gets PCAs from 2.5 liters/min. Minimum saving possible: 6 LPM



IPA DC members with Vinay Gupta (National Treasurer, IPA) explaining Low Flow Fixtures and Aerators

- Typical Kitchen Sink tap with normal aerator has a flow of 8-10 liters/min. One gets PCAs from 4 liters/min. Minimum saving possible: 5 LPM

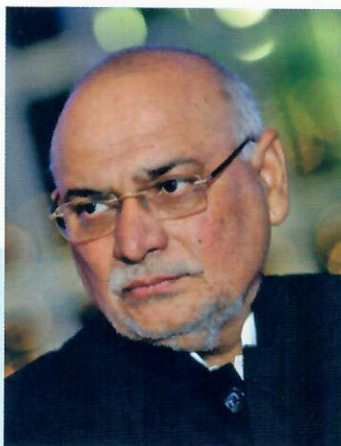
Thus the yearly saving for 2 faucets is 51,100 liters of water. In terms of electricity used for pumping this amount of water is Rs 6,400 – this amount is saved per year per apartment. An approximate 681 kg of CO₂ emission is saved per year per apartment.



School Students in the Auditorium

Dr. Bisht, Director of Sagar School expressed his gratitude to IPA for its efforts, emphasizing the usefulness of the event and how it was most informative. Members of the school staff reiterated this by speaking of the great thrill they had all felt in learning about both - the importance of water and the methods to conserve it.

The day wrapped up with an enjoyable lunch at the campus dining hall, the IPA team was assured that the pledge would be honored to save water by the students and the faculty staff.



Mr. M.K. Gupta
Managing Director - MKG Consultants



Ms. Monika Gautam, B. Tech in Environmental Engineering, is a Member of IPA-Delhi Chapter. She has been working as an Engineer in M/s MKG Consultants since 2016.