

**SHIVAJI COLLEGE**  
(University of Delhi)

<b>ENVIRONMENT AUDIT REPORT 2019-20</b>
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Audit conducted by: - Department of Environmental Studies

**Introduction**

Academic institutions such as colleges and universities have wide-ranging impacts, both negative and positive on the areas adjoining them. Typical activities pursued by colleges may produce multiple adverse environmental impacts. But colleges are also in a unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions. Shivaji College expresses its commitment towards environmental sustainability in many ways.

The college has taken a number of pro-environmental positive steps to moderate its environmental impact. However, specific areas remain in which substantial improvements could be made. This report serves to highlight Shivaji college's many accomplishments, and to make recommendations for improving the college's environmental sustainability. The college conducts the internal audit, including green audit (the one related to diversity of flora and fauna) on time to time basis and strives to maintain eco-friendly atmosphere in the campus.

We focused on six main indicators, covering an extremely wide range of environmental impacts. For each indicator, we establish a benchmark to evaluate overall performance.

We hope that this report will provide an accurate snapshot of Shivaji College's environmental impact at this point in time, and that it would aid the College in prioritising positive steps it can take to improve overall sustainability. We intend this document to be revisited periodically and updated, in a time bound manner.

Following broad best practices and initiatives have been taken up by the college towards achieving environmental sustainability:

1. Environmentally sound management of solid waste including horticultural and wet canteen waste.
2. Pilot-scale paper recycling unit.
3. Rainwater harvesting unit.
4. Sewage (waste-water) treatment plant.
5. Energy efficiency and renewable energy.
6. Computer hardware and other e-waste management.

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# **Indicator-Benchmark-Performance criteria**

Indicator	Environmentally sound management of solid waste generated
Benchmark	Most of the biodegradable component of the solid waste generated to be converted into value-added product
Performance	<ul style="list-style-type: none"> <li>- The college generates varied quantities of solid wastes, which includes: recyclable wastes, horticulture wastes, wet canteen wastes, and e-waste etc.</li> <li>- In order to manage biodegradable component of the solid waste generated, the college installed a fully automated (PLC based) compost making unit in 2018.</li> <li>- The installed capacity was 25 kg of input waste, which converted the same into compost (5 kg) per batch in 24 hr on continuous operation.</li> <li>- Due to some intrinsic problems in the machine, the same was decommissioned.</li> <li>- The college has initiated the process of purchasing a composting unit with a capacity to process 25-30 kg of biodegradable waste per day through a curing system.</li> <li>- The specifications were uploaded on the GeM portal. Technical bids received were analysed and approved for evaluation of financial bids (document enclosed).</li> <li>- The composting machine could convert almost all the biodegradable waste generated in the college into a value added product such as compost and it could be used in maintaining college garden.</li> </ul>
Recommendations	<ul style="list-style-type: none"> <li>- Apart from making compost from the curing system other methods of composting to be also considered such as <i>Vermicomposting</i>.</li> <li>- A full time person (man power) handling the process to be deployed.</li> </ul>

Indicator	Reducing the quantum of paper waste generated
Benchmark	Generation of value added products from recycling of paper waste generated
Performance	<ul style="list-style-type: none"> <li>- In order to manage a large quantity of paper waste (such as assignments, test papers, drawing sheets etc) a pilot scale paper recycling unit (PRU) has been established in the college with the initial support from the Government of NCT of Delhi.</li> </ul>

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	<ul style="list-style-type: none"> <li>- It can process maximum of 5 kg of paper waste in a single batch.</li> <li>- The waste paper is shredded manually into smaller pieces. It is then mixed with some chemicals in a rotary hydro pulper for making pulp. The pulp produced is blotted into sheets through a univat. The sheet is pressed in a press machine and made to dry.</li> <li>- The final product made is a blotting paper that can be moulded into making office files, folders and also used in wet laboratory work.</li> </ul>
Recommendations	<ul style="list-style-type: none"> <li>- The installed capacity is very small and can be increased to at-least 20 kg/ batch.</li> <li>- A better pressing machine to be installed to make the final paper thinner than its present thickness.</li> <li>- A full time person (man power) handling the process to be deployed.</li> </ul>

Indicator	Rainwater harvesting facility
Benchmark	All rooftop rain water and other rain and storm water to be collected and recharged into the ground or in an underground tank for further recycling
Performance	<ul style="list-style-type: none"> <li>- The college has an existing rain water harvesting system installed in college garden two (near main gate).</li> <li>- It is actually a recharging point meant to collect rainwater from roof tops and storm water generating from old premises.</li> <li>- A filtration device (sand and gravel filter) is placed inside the facility to filter the rain water.</li> <li>- The new academic block of the college has a dedicated roof top rain water harvesting facility with an underground tank (5m x 3m x 4m) installed with a desilting chamber (2m x 1.5m x 1m) that can store around 60 KL of roof top water connected via catch basin through network of pipes.</li> <li>- The facility would be functional once the new academic block becomes functional.</li> </ul>
Recommendations	<ul style="list-style-type: none"> <li>- It has been observed that the slope of gardens one and two has been changed over a period of time, this has led to reduced water flow into the recharge facility. The slope needs to be reworked.</li> <li>- The filtration unit needs to be cleaned on a regular basis especially before monsoon season.</li> <li>- A roof top rain water harvesting system (tank) of suitable capacity to be installed for the</li> </ul>

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	old building for recycling of water in gardens for horticulture purpose.
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Indicator	Sewage (waste-water) treatment facility
Benchmark	Most of the institutional sewage generated to be treated and recycled and reused for non-potable purposes.
Performance	<ul style="list-style-type: none"> <li>- All the sewage generating from the old academic block is directly connected with municipal draining system.</li> <li>- New academic block has a dedicated sewage treatment facility (plant) with an installed capacity of 130 KLD.</li> <li>- The facility would be functional once the academic block is functional.</li> </ul>
Recommendations	<ul style="list-style-type: none"> <li>- The treated waste water may be re used for non-potable and horticultural purposes.</li> </ul>

Indicator	Energy efficiency and renewable energy
Benchmark	To make the college campus more energy efficient and shifting to renewable energy sources.
Performance	<ul style="list-style-type: none"> <li>- The college has 6 BEE five star rated AC.</li> <li>- The college has 11 BEE three star rated AC.</li> <li>- The college has 32 BEE two star rated AC.</li> <li>- The college has mix of LED and CFL tube lights.</li> <li>- All the high capacity halogen lamps are energy efficient LED type (8 - 100 W and 6 - 50 W.</li> <li>- The college has a solar facility with an installed capacity of 75 KWp, installed on the roof top.</li> <li>- The solar facility exports more than 1000 units per month back to the Northern Grid of the country.</li> <li>- This leads to marginal reduction in the electricity bill.</li> </ul>
Recommendations	<ul style="list-style-type: none"> <li>- Any new electrical equipment purchased to be BEE five star rated/ energy efficient.</li> <li>- The installed solar capacity could be expanded to the remaining roof top area.</li> <li>- The college has the potential to generate more renewable energy which could be tapped by expanding the existing solar panel.</li> </ul>

Indicator	Computer hardware and other e-waste management
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Benchmark	Minimization of e-waste generation and environmentally sound management of e-waste
Performance	<ul style="list-style-type: none"> <li>- The college generates minimum quantity of e-waste.</li> <li>- Any e-waste generated is managed as per Government of India notified E-waste (Management and Handling) Rules, 2016 by handing over such waste to registered e-waste handlers and recyclers.</li> </ul>
Recommendations	<ul style="list-style-type: none"> <li>- Extensive awareness campaigns on management of e-waste to be conducted.</li> <li>- College may collaborate with NGOs specialised in handling e-waste.</li> </ul>

### Acknowledgement

A large number of people helped us in our efforts to gather the information presented in this audit report. We would like to thank and appreciate them all.

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