Towards A Waste Neutral College Campus: Case Study of Indraprastha College for Women, University of Delhi

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Abstract: Waste management refers to collection, transportation, monitoring, disposal or recycling of waste. The present paper provides a brief account of waste management practices adopted by Indraprastha College for Women, University of Delhi. Effective waste management at the institutional level is an important contribution towards sustainable development. The present paper uses key respondent data and personal observations to understand the dynamics of waste generation and waste management practices adopted by the institution. Highlighting the various outcomes and benefits of waste management at an institutional level, this research communication emphasises the importance of waste management in educational institutions. The paper shows how waste management is not only an important social responsibility of the institution but also goes a long way in promoting environmental consciousness among the students.

Keywords: educational institutions, IP College, recycling, sustainability, waste management.

Waste management has become an increasing problem in the world today and efforts to reduce waste are wanting. At the same time, there is little consensus on what constitutes Zero Waste and the waste management sector requires considerable research inputs (Pietzsch et al., 2017). Waste is managed, most often, to get resources from it and to avoid its adverse effect on human health and on the environment. With the rise in environmental degradation, there has been a shift in the focus from productivity to sustainability. Waste is not something that should be discarded or disposed of with no regard for future use. It can be a valuable resource if managed properly, through innovative policies and practices. The Sustainable Development Goals (SDGs) cannot be met unless waste management is treated as a priority. We can achieve the SDGs much more effectively only when we recognise waste management as a powerful driver of sustainable development. The practice of waste management must be made sustainable, such that it is economically viable, socially acceptable and environmentally beneficial. Waste materials can be characterised by their nature, components and quality. These distinct factors help determine the best waste management practice that may be adopted. The present paper uses key respondent data and personal observations to understand the dynamics of waste generation and provides a brief account of waste management practices adopted by Indraprastha College for Women (IP College), University of Delhi.

IP College is a higher education institution (HEI) located in Civil Lines, Delhi (India) with a combined, floating student and staff population of over 3,500 individuals. The IP College community generates waste at various levels and of various kinds. IP College, through its Eco Club, has taken up various initiatives towards making the College a Waste Neutral Campus. The College has worked to Reduce, Reuse and Recycle all the biodegradable waste that it generates which mainly includes paper waste, garden/ leaf waste, and food waste. Additionally, the College treats its electronic waste responsibly, and has ensured proper disposal, reform and recycling of the same.

An educational institution uses paper at various levels of functioning. The administrative office, the library, the hostel, and the teaching-learning activities are all generators of paper waste. In 2012, IP College made an agreement with a local NGO operational since 2009, which works on the model of collecting waste paper from institutions and recycles them into notepads and printer

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reams. The notepads and printer reams are then given to the institution from where the paper waste is collected. The various steps taken towards adopting and putting this system in place included: 1) Collection: Various paper waste collection sites, in the form of clearly marked and easily accessible large carton boxes were placed across the campus, 2) Education and awareness: Students and staff were continually made aware of the collection sites, and of the possibility and benefits of paper recycling, 3) Segregation: Waste paper which was collected was segregated into three categories - Office grade paper (printer waste), Newspaper and Magazines and Mixed (small, loose papers), and 4) Pick up and exchange: Partner NGO was to be invited to pick up the collected paper waste twice a year in exchange for notepads and printer reams. The key features of the agreement with the local NGO included, 1) Pick and drop services of material from/ to the College premises at no cost to the College, 2) Customized notepads, with college name and logo, 3) Safe shredding of confidential data, and 4) Minimal use of water, electricity and bleaching component during recycling.

Another use of paper waste that has been innovated is the recycling of paper for making College memorabilia. For this, an agreement was made with a Gurugram (India) based organisation in 2017. The key features of this agreement included, 1) Pick and drop services of material from/to the College premises at no cost to the College, 2) Minimum 500 kg of waste paper to be given to the organisation, 3) Recycling points to be awarded that can be redeemed with the provided catalogue of items called Exchange Card, 4) List of catalogue included Pens, Pen stands, Rims, Photo frames, Slip pads, Notebooks, Envelopes, Files, File covers, Paper bags, Bookmarks, Calendars, Slip boxes and Paper bins, and 5) The aforementioned products were customized with College name and logo.

In addition to paper, management of garden waste is another big challenge in lush green college campuses like IP College. Garden waste is any organic material that results from gardening activities or the natural growth or lifecycle of trees, shrubs, plants or lawns. Leaf litter, garden cuttings, branches from tree clippings, twigs, dead plants, etc. can be classified as garden waste. Leaf litter forms a large part of the garden waste, since it is generated on a daily basis. The Eco Club of IP College undertook Garden waste composting for addressing this problem.

The management of garden waste in IP College was carried out through the following two ways. The first method chosen was that of installing Leaf Composting Bins. The practice of leaf composting is a process of creating dark, rich, earthy matter that is prepared through recycling of garden waste including leaves, garden cuttings, dead plants etc., with occasional help of natural supplementary nutritious components. Since most trees are deep-rooted, they absorb minerals from deep in the soil and a good portion of these minerals go into the leaves. Composting these leaves helps in returning these nutrients to the same soil so as to maintain the nutrient cycling. After careful research and the process of due diligence, vertical composing bins were purchased in April 2015. Six leaf composters were installed in the College campus and the resulting manure was utilized for the purpose of gardening activities on the campus. The College gardeners collected fallen leaves on a daily basis and emptied the same in the Leaf Composting Bins. The Bins were watered twice a week and natural microbes were added to help accelerate the process. The leaves turned into manure in approximately 4-6 months. The vertical composting bins have been working for over two years with appreciable results. These bins are designed to enable harvesting the manure through an opening on the lower side of the bins.

The second method of managing garden waste has been the setting up of a composting pit. A pit, approx. 4 feet deep, was dug near the College nursery for this purpose. The objective of the pit was to break down dead plants and plant parts and convert them into manure. No chemicals or supplementary nutrients were added to the compost pit. The process was accelerated during monsoon or during rainfall events, when worms and other organisms made their way to the pit and helped in speeding up the decomposition process, also making the compost nutrient rich.

IP College also houses a canteen for students from which considerable food/ kitchen waste is generated. Food Waste refers to uneaten food and food preparation waste which is produced at almost all stages of cooking food. Food Waste is organic and can be biodegraded through composting. Since it is rich in nutrition, the compost generated can be used to fertilize the soil. By redistributing nutrients and high microbial populations, compost reduces water runoff and soil erosion by enhancing rainfall penetration, which has been shown to reduce the loss of sediment, nutrients, and pesticide losses to streams by 75-95%. The exercise of recycling Food Waste is called Food Composting. IP College installed food composters in the campus in June 2015. A pair of food composters was installed near the College canteen. The food composter drums are weather protected and are made of UV stabilized plastic. They can handle

approximately 18 kg of food waste per day. The process of use is fairly simple and it is operated in IP College campus through community participation. The IP College canteen, on an average, produces approx. 10 - 15 kg of food waste on a daily basis. The waste is collected in designated dustbins, and at the end of each day, added to the composting drums. Coco-peat is added to absorb moisture and aids in keeping the foul smell away. Food waste is high in water content; therefore care is taken to extract the leachate daily. The drums are fitted with a small tap at the bottom for this purpose. Microbes are added to aid the process of decomposing. The Compost/ Manure can be harvested from the small door on the lower end of the frame.

The College also took an initiative to responsibly manage its electronic waste. Electronic waste or E-Waste refers to discarded electronic equipment such as computers, entertainment devices, mobile phones, pen drives etc. A rapid change in technology has resulted in a fast-growing surplus of electronic waste. IP College entered into an agreement with a Delhi based organisation for recycling and safe disposal of the E-Waste generated from the College campus. The organisation agreed to collect the E-Waste from the College campus for further recycling. A collection bin was made available to the College community so this waste can be properly collected and sent away for further processing.

Waste management is one of the most important environmental aspects to be considered within educational institutions (Sales et al., 2006). Setting up an integrated waste management system in particular, is one of the greatest challenges for higher education institutes (Vega et al., 2008; Zhang et al., 2011) as well as for pre-university educational institutes (Getlinger et al., 1996; Marlette and Templeton, 2005). Consistent and accessible recycling infrastructure must be in place and be done with minimum inconvenience. Institutions of learning and higher education are important spaces to translate principles of environment education and sustainability into practice. Pro-environment initiatives such as these contribute significantly towards the much needed shift towards education for sustainable development (Singh, 2017).

Some salient learning and observations in the process of working towards a Waste Neutral/ Zero Waste campus at IP College are as follows: 1) Easy accessibility and visibility: All collection sites and equipment employed in the process of waste management have been placed in public spaces around the College. This facilitates easy access and identification by the College community. For instance, the food composters have been placed in the open area outside the canteen, thereby helping in familiarizing all students with the initiative. 2) Minimum interference/ inconvenience: Utmost care has been taken that the initiatives do not interfere with the functioning of the institution. The administration or academic structures have not been disturbed in any way. 3) Increased awareness: The activities of proper waste disposal, segregation and treatment have contributed to the increased level of environmental awareness and consciousness in the College community. It has been observed that many faculty members of the College have started composting food waste at home, students are careful with waste creation and disposal and the support staff is effectively contributing to segregation. 4) Community building: Since all levels of College community are participating and are involved in the processes of waste management, it has helped in creating a shared sense of purpose and activity. The students interact with the support staff on a regular basis and work as a team to ensure proper functioning. 5) Economic Benefits: The notepads and reams procured in exchange of waste paper are used by staff, students and the administration. The manure harvested from the leaf composters and food composters is used in the College fields. These have significantly contributed to the reduction in money spent on stationery and manure purchased by the College. 6) Environmental Benefits: In addition to the many indirect environmental benefits, the most significant, directly observable benefits are - almost negligible waste output/ transportation of waste that is sent outside the College and no burning of leaf litter.

Effective waste management at the institutional level is an important contribution towards sustainable development. It is not only an important social responsibility of the institute but also goes a long way in promoting environment consciousness and sustainability. Further research and action in the area of Waste Management is sure to pave a way towards greater environmental awareness, responsibility and sustainability.

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