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CaseStudy

Moving towards zero waste: Lessons for India from sustainable waste management in Swedish Universities

In this article, **Harveen Kaur**, an Environment Consultant, discusses the best practices followed by Stockholm University with regard to waste management in campus and why it is a role model to various universities in developing countries like India. The article outlines how Universities in India can take a leaf out of the Stockholm University's experience in manage their waste in the campus on similar lines.



Harveen Kaur, Environment Consultant

Stockholm University has a very good system in place for management of various categories of waste and this makes it a role model university to various universities in developing countries like India. Stockholm University in the capital of Sweden is characterised by its openness, innovation and collaboration. Stockholm University was founded in 1878 with the ambition to reinvent higher education in Sweden. From the beginning, close contact with the wider world as well as the active exchange of knowledge and experience have been integral to this vision. With a global perspective and through partnerships with others, Stockholm University contributes to the development of knowledge. Education and research within human science and science in the international frontline, as well as interdisciplinary work, make this possible.

Waste Management at Stockholm University

The University produces an average of 900 tonnes of waste every year. However, all the waste is recycled into energy or new raw material. Stockholm University aims to improve the sorting of waste. At University recycling stations everything from end-of-life computer to plastic bags can be dropped. There are also recycling stations for students and other visitors, where they can leave their containers and recyclable paper.

The waste management procedures of University should be followed by all employees, students, and others working in the Frescati, Kräftriket, and Sveaplan campuses for Office activities and laboratory activities as shown in Fig 2. Other campuses are subject to local waste management procedures (Waste management & Sustainable Campus at Stockholm University).

Waste management guidelines in Stockholm University

The waste administration strategies in SU provides direction about how waste ought to be taken care of and covers all waste produced in the university campus. The methods are partitioned into two sections, office waste and lab waste, and dependent on recent enactments in Sweden for waste management. The procedures

are updated based on revisions to the enactments. These methods are adopted from Uppsala University's waste management policies but are modified as per activities of Stockholm University. The methods have been developed in collaboration with the University's waste contractors, veterinary specialists, biosafety experts, radiation protection expert, safety engineer, environmental coordinator and a working group of representatives from various departments and the administration as well as the City of Stockholm's Environment and Health Administration and Stockholm Vatten AB (Stockholms Universitet Waste Management Procedures).

Issues probed

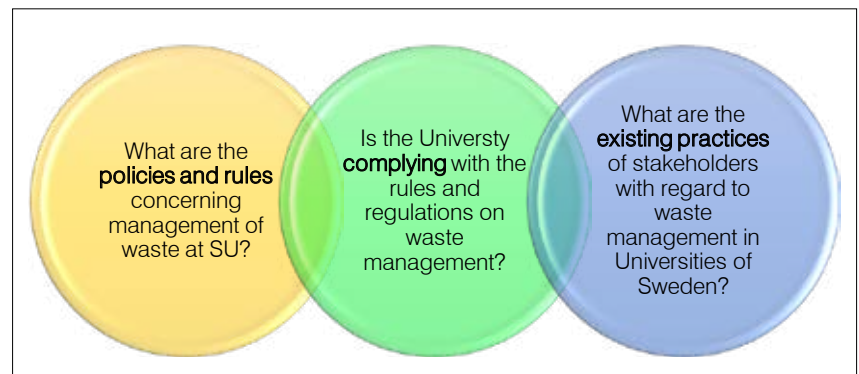


Fig 1: Stockholm University campus



Source: University website

Responsibility of different stakeholders

Everybody working and studying at various campuses and departments of Frescati, Kräftriket and Sveaplan at Stockholm University need to take after the University's policy for the waste administration. Departments are also responsible for managing waste as per current enactments and directions issued by the University. The Department of Purchasing and Logistics is responsible for the procurement of waste and has a coordinating responsibility for waste management.

The University's waste contractual workers for waste incharge of the waste administration centres. They are accountable for data, signage and the accumulation and furthermore and expulsion of perilous waste (Stockholms Universitet Waste Management Procedures).

The University is in-charge of industrial waste and hazardous waste. As an administrator, the University is required to guarantee that all waste produced through its activities is discarded in a safe and ecologically remedial way. Waste is reused, reprocessed, pulverized or discarded in landfills. The temporary workers procured by university manage and handle industrial waste and hazardous waste (Stockholms University Waste Management Procedures).

Classification of Household waste and industrial waste

The waste generated through various activities of Stockholm University is classified as either household waste, industrial waste or hazardous waste. Household waste is the waste that winds up in the wastebaskets in offices, lunch rooms and kitchenettes. It also includes waste produced in common areas, i.e. students and visitors waste. Akademiska Hus is in-charge of the transfer of a Household waste unit, and it is their waste contractor that collects household waste.

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Fig 2: waste management procedures for various activities



 <p>Office activities</p> <ul style="list-style-type: none"> • Batteries • Electrical And Electronic Products • Glass Containers (Coloured And Clear) • Household Waste • Refrigerators And Freezers • Food Waste And Compostable Waste • Light Sources • Metals • Furniture • Plastic • Paper for recycling • Separable waste • Toner cassettes and inkcartridges • Wood • Corrugated cardboards 	 <p>Laboratory activities</p> <ul style="list-style-type: none"> • Animal Products and by-products • Antibiotics • Biological agents (bacteria, viruses, etc.) • Genetically Modified Microorganisms – GMMs (Not GMOs) • Genetically Modified Organisms – GMOs (not GMMs) • Human by-products (blood, tissues and cell cultures) • Chemicals • Laboratory Glass • Narcotics, Narcotic Chemicals/Precursors • Radioactive waste • Sharps
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Fig 3: Waste disposal bin in common area



Source: www.humangeo.su.se

Fig 4: Waste disposal bins in storage area



Source: www.thelocal.se

Source separation options for students

Students and other visitors do source isolation of their waste. The computer rooms and some workshop rooms possess Boxes for paper recycling. Two other waste administration centres are there where source partition of different sorts of waste is done namely one South Building between House C and House D on floor 3 and Arrhenius Laboratory, Building A on floor 2. Source partition of furniture is likewise accessible at various places in the South Building and in the University Library. There likewise sorting of plastic, paper, metal and glass holders, waste paper, daily papers, refundable PET containers and aluminium jars can be done.

Table 2: The types of waste disposed and handled at Stockholm University

S. No.	Household waste	Industrial waste	Hazardous waste
1.	Household, Compostable and Food waste	Glass containers	Animal products
2.		Laboratory glass	Antibiotics
3.		Laboratory plastic	Batteries
4.		Metals	Biological agents
5.		Furniture	Electric waste
6.		Plastic	GMMs
7.		Paper for recycling	GMOs
8.		Separable waste	Human by-products
9.		Stretch-wrap and shrinkwrap (pallet packaging)	Chemicals
10.		Wood	Refrigerators and freezers
11.		Toner cassettes	Light sources
12.		Corrugated cardboard and paper containers/packaging	Narcotics/narcotic chemicals
13.			Radioactive waste
14.			Sharps

Source: Stockholms Universitet Waste Management Procedures

Deposit of Waste at the Waste Management Centres

The University has various waste administration centres for storage of source-segregated waste. Quite far, the waste administration centres are adjusted to the source-partition needs of close-by activities. Storing anything at a waste administration centre that is not source segregated is not allowed. Leaving anything standing on the floor or in any container is also not permissible. This also makes work of people working in waste centre challenging as they have to manage everything. The University departments are required to go through Waste management

procedures for disposal of specific kind of waste time to time so that disposal is done in proper manner. If required information can be taken from Information Section. While disposal of massive waste, for example, old furniture, electrical equipment, a collection order has to arrange this is chargeable. It is mandatory to label packaging container of hazardous waste.

Apart from this other requirement include:

- Record keeping of hazardous waste Under Section 55 of the Waste Ordinance
- Dangerous goods must be sepa-


rated, marked, packaged and transported in accordance with the Act (SFS 2006:263) and the Ordinance (SFS 2006:311) on the Transport of Dangerous Goods by Road and the Regulations (MSBFS 2011:1)

- Spills and clean-ups of hazardous substances
- Signing of Certificate for the deposit of electrical laboratory equipment having no harmful components
- Marking of hazardous waste with labels
- Packaging of waste material

The details are required to be provided through Department's invoicing process. All categories of waste are explained based on following headings for easy handling, management and disposal by University in the waste management manual of University:

- Classification/separation
- Collection/handling
- Marking/labelling
- Storage at waste management centre
- Hand-over/transport
- Final disposal
- Specific legislation

Conclusion

Such best practices can help in the creation of a sustainable model for the management of waste in Indian institutions and universities. There is no system in place for Universities in India at present for management of waste menace. Although some colleges under Delhi University have started complying with some of the waste management policies notified by the government, still the scenario is devastating. The road map to zero waste in India is still under construction. 

(Harveen Kaur is a Doctoral Research Scholar from University of Delhi)

The views in the article of the author are personal. For suggestions email at feedback@infraline.com

Fig 5: Waste management audit



Fig 6: Waste Sorting



Source: Stockholm University Waste Audit, 2011