7.1.3 Facilities in the institution for the management of degradable and non-degradable waste

Index Page

Waste management system

The V. G. Shivdare College campus has waste management system. It covers the solid waste management, liquid waste management, biomedical waste management, E-waste management, waste recycling system, hazardous chemicals waste management.

a) Solid Waste Management

Based on pre-audit survey, main source of solid waste that can be recycled and reduced at source are classified as follows-

Garden / Horticulture waste	**Paper (mostly from office)**	**Biomedical / Laboratory waste**	**Plastic Waste**	**Canteen**
Mainly of plant materials from campus and is variable in quantity according to season	Mostly obtained during admission and day-to-day office work.	Culture media from laboratories.	The damaged plastic pipes of water and drainage. Wrapping materials of various parcels, goods etc.,	Leftover food, non-edible parts of vegetables etc.

The college has dust bins for waste collection, it has separate dust bins for biodegradable and non-biodegradable waste. The non-biodegradable waste is directly handover to waste collection system of Solapur Municipal Corporation (SMC) for its further process. The biodegradable waste is retained by the college for the vermicomposting process.

Vermicomposting - Solid biodegradable waste generated in college campus and college canteen is recycled in 'Vermicomposting Unit'. The vermicomposting unit is established in college in March 2015 and is working from that day. The college utilizes most successfully the vermicomposting unit.

The unit involves-

1. Waste collection – biodegradable solid waste is collected.
2. Rough estimation of solid waste generated (average for month): 60-70 kg/month.
3. Manually pulverization of waste.

4. Half Composting of waste: Decomposing culture is used to reduce time for composting from 1 year to 45 days.
5. Vermiculture Bed: Half compost is then transferred into vermicompost bed. College use earthworm species *Eudrilus Eugenie* for composting as it gives fine quality vermicompost containing higher percentage of NPK compared to other species of earthwaorm. This step requires two months for completing vermicomposting. The final vermicompost is used for gardening within college campus. The vermiwash produced during this process is used for spraying herbs & shrubs in college campus as it offers protection against pests and is also rich in NPK, hence it is called as TONIC for plants.

Paper Waste Management:

The paper waste generated in the college from day-to-day work in office section, during admission period is reused effectively. Some of the important recommendations with regard to reducing use of papers at source and after printing are as follows-

i. Always proof read documents before printing.
ii. Set double-sided printing as a default (take help of IT dept.) and always take double sided print.
iii. Decrease the length of documents we print, reduce paper margins on documents to decrease the document length (decreasing the number of pages used to print- saves paper, money and valuable natural resources)
iv. Use one-sided-paper in the laboratory or office for taking rough notes or carrying out rough calculations rather than using new paper to reduce paper use.
v. Avoid printing emails, provide electronic copies of all agendas and presentations
vi. Eliminate unnecessary paper handouts (office meetings and events)
vii. Reuse packaging material (where possible)
viii. Eliminate all personal printers and utilize a shared, networked print environment only.

These suggestions are displayed in computer laboratory and office and staff is made aware with these suggestions during meetings.

b) Liquid Waste Management

The liquid waste is generated in college campus is mainly from laboratory and latrine etc. The non hazardous laboratory liquid waste is discarded in basin sink which is connected to drainage system of SMC. The waste generated in latrine is also connected with SMC drainage system with proper closed pipeline. Further this waste via drainage system goes to SMC treatment plant.

c) Biomedical / Laboratory Waste Management

Waste culture media from bioscience laboratory and biotechnology laboratory properly autoclaved at 15 psi, 121^0 C for 30 minutes in container, then 5% dettol is added to that. The whole content is diluted with water and drain out into the sink with running tap water.

The other waste generated in laboratories such as used needles, syringes, lancet, cotton, surgical gloves, mask, tissue material etc. is collected in separate biomedical waste collection in college campus. Then this waste is handover to the waste collection system of SMC for its further disposal with all necessary precaution.

d) E-Waste Management

Pre-audit survey was performed to analyze the E-waste generated in college campus. The E-waste generated within the campus are computer spare parts, CDs, DVDs, Electrical cords and cables, light bulbs and tubes, write off instruments etc. The college at its best level tries to reduce and reuse the E-waste generation within campus. But, still some amount of E-waste is generated within the campus. The dead computers can have still useful spare parts in it, college collects these parts and reuse them as on requirements. College reutilizes changed electrical cables and cords whenever possible. To reduce the use of CDs and DVDs within campus, the college uses pendrive and external hard-drive for data storage. All remaining E-waste which is not possible to be reused within campus is handed over to SMC waste collection system.

e) Waste Recycling System

The college tries recycling system for various waste generated within campus so as to reduce the load on environment and save money as well. Some of the recycling processes are as below:

Water Recycling –

In laboratories while collecting distilled water, the cooling system generates waste water. At the same time during some practicals where reflux system requires, it also produced waste water from cooling system. This type of water is collected in container and can be used for washing purposes in laboratory.

Culture Media Recycling –

In laboratories from microbial growth, plant tissue culture the culture media is used. After one time use usually it is discarded by standard operating procedure. The college has taken initiation and recycling the culture media. After one time use the culture media is properly sterilized and this media again used in laboratories.

Laboratory Chemical Recycling –

For each experiment the lab assistant prepares the required chemicals in proper concentration. After experimental work the remaining solution is not discarded immediately instead it is considered for its shelf-life, storage properties and then stored for future use. This chemical if needed for any other experiment, it will be used.

Cartridge Refilling -

The printers have expensive cartridges, just after one use if we thrown out ink cartridges it will impact on the environment. Toner refilling saves money, and protect the environment in the process. Thus the college has adopted the toner cartridge refilling system for all its printers and Xerox machine.

Computer Parts Recycling -

Computers have different components made of plastics, metals and a great deal of other materials that can be recycled. If dumped into landfills, many of these materials are hazardous to the environment. From damaged computers college collects the useful spare parts which are still working in good condition. These spare parts are used whenever needed for any other computers.

Library Books -

The college library has good number of books, which are regularly used by students and staff. Due to this there is wear and tear of books. The library prefers booking and repair of these books so, that instead of writing off these books it can be recycled and reused. Due to change in syllabus, some of the books are no longer in use. In this condition, librarian sorts

these books and takes review with changed syllabus and informs students about the common content within old book and new syllabus, so still these books can be in use.

Plastic Recycling -

Dumping the plastic in landfill threatens the environment. The college has started to project to students to work on plastic recycling. At pilot level students had completed their project to produce fuel from plastic waste. In future, the college will work to bring this success from lab to land level.

Battery Recycling -

Batteries are composed of several chemicals that are both poisonous to the environment and human beings, and should not be dumped. Whenever college purchases new batteries to replace old batteries in campus, it buys new batteries by selling its old batteries to merchant and sufficient amount will be deducted from billing. This will helps to reduce the cost of batteries and the merchant can recycle these batteries.

Food waste recycling -

The waste food produced in college canteen is transferred to compositing unit.

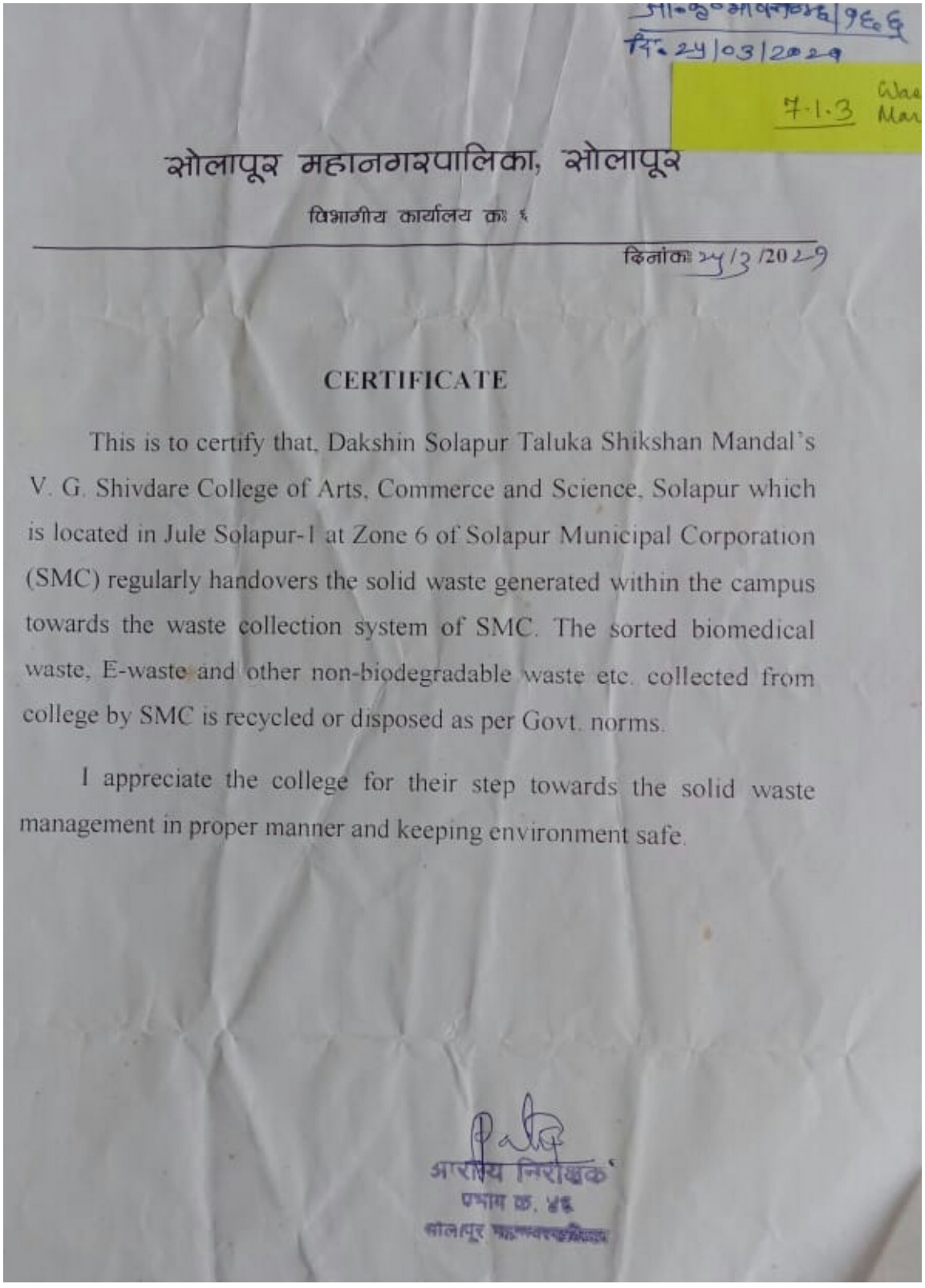
f) Hazardous Chemical Waste Management

The hazardous chemicals wastes are produced in laboratories during practicals, if these chemicals are dumped in soil as it is; it can disturb the soil properties. To avoid these problems the hazardous chemicals must be treated before its disposal. The common problem is associated with hazardous chemical in our college is its pH. The pH of these chemicals is neutralized by acid or base and then the non-reactive chemicals are dumped at hazardous chemical waste dumping site at college campus.

Vermicompost unit

Waste water recycling system

Letter from Solapur Municipal Corporation regarding biomedical waste, E-waste and other non-biodegradable waste disposal.



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दिनांक 24/3/2029

CERTIFICATE

This is to certify that, Dakshin Solapur Taluka Shikshan Mandal's V. G. Shivdare College of Arts, Commerce and Science, Solapur which is located in Jule Solapur-1 at Zone 6 of Solapur Municipal Corporation (SMC) regularly handovers the solid waste generated within the campus towards the waste collection system of SMC. The sorted biomedical waste, E-waste and other non-biodegradable waste etc. collected from college by SMC is recycled or disposed as per Govt. norms.

I appreciate the college for their step towards the solid waste management in proper manner and keeping environment safe.

आरोग्य निरीक्षक
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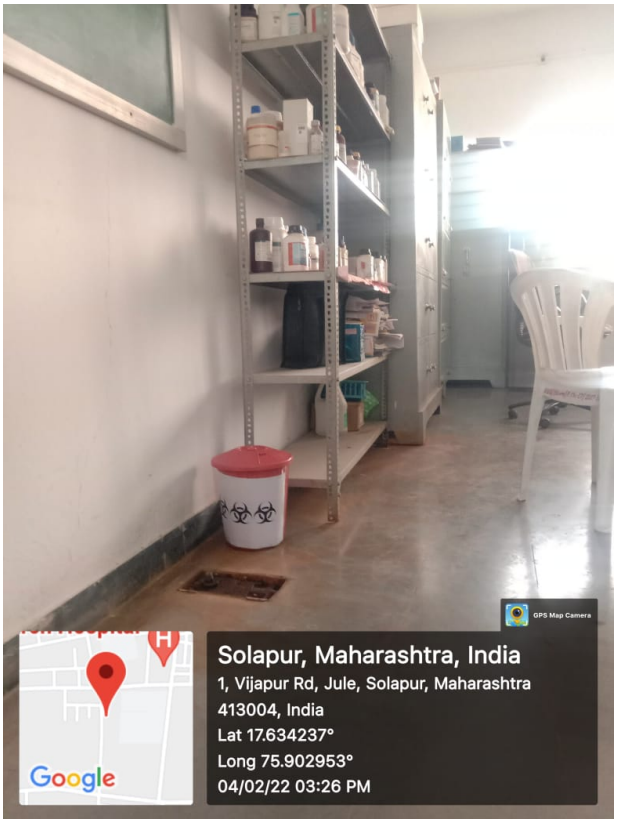
Biomedical waste collection:



Hazardous chemical waste management

E-waste collection