

## FIRST BEST PRACTICE

### ECO-FRIENDLY STEPS

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Windrow Composting: Stabilization of Municipal Solid Waste (MSW) in Chandigarh for “Sustainable Zero Waste Future”

### **Description of the Best Practice:**

To highlight best organic waste management strategy for co-composting of food, green and fruit waste to achieve carbon foot print benefits. The institutional framework and SOP for monitoring are;

(i) Segregation: The segregation at source present major challenge, as composite culture is dumped in landfills which results in

Green-house gases (GHGs) emission. It also hampers the composting process. The segregation textured into wet and dry waste at source using blue and green dustbins and the inventory prepared day wise and the wet waste added to windrow plant.

(ii) The sites used for the collaborative work are:

**(a) Judicial Academy, Sector-43, Chandigarh**

**(b) Post Graduate Government College, Sector-1, Panchkula**

The secondary institute provide platform for the extension lectures and workshop to impart knowledge to students stepping into the world of science with a view to manage the solid waste in the community and helps society to get rid of backlog of solid waste and unscientific landfills

(iii) **Society/Citizen Engagements:** In order to create mass awareness about the negative effects solid waste and single use plastic and plastic items, the ‘No Plastic Day’ is celebrated on every Saturday in all education institutes of Chandigarh, and Virtual Rally was organised on July 3, 2021, in which fifty thousand stakeholders from all streams (students, faculty, gardeners, workers) participated and are administered oath regarding segregation at source and application of 3 Rs; Refuse, Reduce and Reuse, to mitigate their effects of ecosystem. Various competitions (Poster making, slogan and essay writing) were organized to achieve community outreach.

(iv) **Capacity Building/Training Initiative:** In order to create mass awareness, the girl students were trained in the solid waste management (SWM) field. For this the institute is running UGC sponsored certificate course on floriculture and landscaping to inculcate the field knowledge of the topic, Solid Waste Management (SWM).

(v) **Transparency (3rd Party Verification):** The present project has global implications, as solid waste management is the global problem. The social target to free community of waste and maintain eco-balance. The project started in year 2019 and in the first phase, the single stage windrow composting done and in second phase the two stage composting in which mechanical-manual technologies blend to compost the municipal solid waste. The project won the United Nation Sustainability Development Award (SDG) Action Award 2020, for the work done regarding managing solid waste in Covid-19 era. The organic compost generated from municipal solid waste saved 564 quintals organic Farm Yard Manure (Since inception), mitigating the 346 metric ton carbon prints through micro-positive pressure generation in windrows, which decreases release of Green House Gases (GHGs). The college and with its two reproducible institutes are bulk waste generator; generating in total 300 kg solid waste per day. The waste generated compost is used in the agronomic and floriculture practices making the campus fully organic.

(vi) **Sustainable Solution:** The present work is entirely different to earlier works as in present studies the intrinsic physico-chemical parameters (temperature, moisture content, pH, electrical conductivity and C/N ratio) are standardized to make waste generated organic compost feasible to floriculture and landscaping operations. The present work has devised two strategies: (i) Single stage windrow composting (SSC) (ii) Two stage windrow composting (TSC), to highlight best organic waste management strategies to achieve co-composting of food, fruit and green waste using aerobic windrow composting to reduce their volume and mass and achieve carbon footprint benefits. Both the strategies are easy to replicate and economical. The society people can handle it at household level as blue print to technique generated and its scalability checked at two secondary institutes till now.

(vii) **Credibility of the Solution:**

The study provided credibility and solution to million ton global problem of solid waste with generation of end product organic compost and carbon foot print benefits.

**The problem solved due to the bioconversion are:**

- Unscientific land filling; India ranked third globally after US and China in landfill GHGs.
- The need of market is the organic compost, to have more yield and protect human race from bio-magnification of pesticides and weedicides and saved farm yard manure (FYM) is used in Agriculture fields and in Biogas Plant.
- The micro-climate of campus, got moderate (1.5OC less), as reduction in landfills and dumping sites, reduce the emission of greenhouse gases (GHGs). The mitigation of GHG prevent global warming and organoleptic composting protect society from nuisance of odour and landfill being breeding ground to mosquitoes .

(vii) The implementation of the strategy is cost saving and a

economical technique and does not requires any specific financing mechanism.

**How is technology Leveraged?:**

(i) The present investigation provide better insight on the feasibility, applicability and reproducibility of the single stage windrow composting and two stage composting technology to ensure the efficiency and effectiveness of TSC in producing bio-fertilizer. The two-stage composting (TSC) is used an alternative process in solid waste management and this new technology can reduce the composting time, land area and GHG emission

(ii) Municipal Solid Waste (MSW) Generated: Every region in this global is generating dry waste (grass, leaves) and wet waste (Vegetable and fruit peelings) in bulk and their dispensing and management is the global problem and in the present study aimed at converting waste into organic compost with C:N ratio 30:1, which is best for agronomic practices

(iii) The organic compost generated increased yield of agronomic and floriculture crops and in this era of increasing population, the both aspects helped in the development of nation

(iv) In the study, The blue prints are prepared regarding the standardizing the temperature, humidity, C:N ratio in single stage and two stage composting and these blue prints are replicated with ease irrespective of area and country.

**Impact of implementing the practice:**

Tangible and Intangible Benefits

The inference from this study is that in single stage windrow composting, 74% less CO<sub>2</sub> emission in comparison to landfill, whereas in two stage composting, the CO<sub>2</sub> emission is 88% less carbon footprints. This carbon mitigation would eventually become tradable carbon credits with carbon conscious projects. The project prevented 346.7 million tons of carbon dioxide emissions and generated 346 carbon credits, besides this, 564 quintals organic compost is saved annually. Fifty thousand (50,000) stakeholders mainly girls, are engaged and the study scalability replicated at two more institutes beside parent institute. The study bagged **United Nations (UN) Sustainable Development Goals (SDG) Action award** in Individual category ("Environment Sustainability for his study on Solid waste management (UNDP), an excellent community outreach in Covid-19 era).

### **How can the best practice be scaled/ replicated?:**

The major success of any projects fall in its reproducibility and scalability and presently, when the project extended for the society, its success is assessed at different sites and area is assessed. In this parameter, project is replicated at two institutes:

#### **(i) Judicial Academy, Sector-43, Chandigarh**

The Judicial Academy, which harbours, judges doing pre-entry training generate 30kg Solid waste per day. The windrow plant of 0.2 TPD (Tonnes per Day) is installed and the plant completes one year and in mid of second year and compost generated is used in this winter plantation (2020)

#### **(ii) Post Graduate Government College, Sector-1, Panchkula**

The plant of 0.4 TPD (400kg/day). was installed at college campus and the solid waste generated is converted in compost and used in seed beds and pots in floriculture operation in raising flowers.

The reproducibility of the project work is assessed with the collaborating work and collaboration not only helped the secondary institute but also helps the parent institute, as ground to assess the different windrow plants ranging from 0.2 TPD, 0.4 TPD and 0.5 TPD are installed and the variability of the layer (20cm, 25cm, 30cm), added sequentially is assessed at different plants and the compost produced are subjected to pH, Temperature, Moisture content and C:N ration are evaluated and the compost with 30cm sequential layering shows best results and in next time, only 30 cm layer of dry and wet waste is added, hence collaborative work saved resources and time to standardize the organic compost be used for floriculture, horticulture and Landscaping operations.

## Windrow Composting-Solid waste Management Third Party Verification

**Windrow system inaugurated at PGGCG**  
**CHANDIGARH:** The Windrow composting system was inaugurated at Post Graduate Government College for Girls (PGGCG), sector 11, here on Saturday. Windrow composting is prominently used in Indore and Bangalore. All food waste from the college food-service operations will be collected in windrow composting plant and compost will be generated. Principal Anita Kaushal stressed upon the restoration of environmental degradation.

**ਕਾਲਜ 'ਚ ਕੂੜਾ ਪ੍ਰਬੰਧਨ ਪਲਾਂਟ ਦਾ ਉਦਘਾਟਨ**  
 ਚੰਡੀਗੜ੍ਹ, 9 ਮਾਰਚ  
 ਇਥੋਂ ਦੇ ਪੋਸਟ ਗਰੈਜੂਏਟ ਸਰਕਾਰੀ ਕਾਲਜ ਫਾਰ ਗਰਲਜ਼ ਸੈਕਟਰ-11 ਵਿੱਚ ਅੱਜ ਸੋਲਿਡ ਵੇਸਟ ਮੈਨੇਜਮੈਂਟ ਪਲਾਂਟ ਦਾ ਉਦਘਾਟਨ ਕੀਤਾ ਗਿਆ। ਇਸ ਮੌਕੇ ਮੁੱਖ ਮਹਿਮਾਨ ਪ੍ਰਿੰਸੀਪਲ ਅਨੀਤਾ ਕੌਸ਼ਲ ਨੇ ਕਿਹਾ ਕਿ ਆਰਗੈਨਿਕ ਕੂੜੇ ਤੋਂ ਉਸ ਦਾ ਪ੍ਰਬੰਧਨ ਆਲਾਮੀ ਢੰਗ ਦਾ ਵਿਧਾ ਹੈ। ਉਨ੍ਹਾਂ ਕਿਹਾ ਕਿ ਚੰਡੀਗੜ੍ਹ ਵੀ ਕੂੜੇ ਦੇ ਪ੍ਰਬੰਧਨ ਦੀ ਸਮੱਸਿਆ ਨਾਲ ਜੂਝ ਰਿਹਾ ਹੈ ਤੇ ਕਾਲਜ ਵਲੋਂ ਕੂੜੇ ਦਾ ਪ੍ਰਬੰਧਨ ਕਰਨਾ ਆਪਣੇ ਆਪ ਵਿੱਚ ਮਿਸਾਲ ਹੈ। ਉਨ੍ਹਾਂ ਦੱਸਿਆ ਕਿ ਕੂੜੇ ਨੂੰ ਸੌਧ ਕੇ ਇਸ ਨੂੰ ਕਾਲਜ ਦੀ ਹੀ ਜ਼ਮੀਨ ਨੂੰ ਉਪਜਾਊ ਕਰਨ ਲਈ ਵਰਤਿਆ ਜਾਵੇਗਾ। ਉਨ੍ਹਾਂ ਪ੍ਰੋਗਰਾਮ ਕੋਆਰਡੀਨੇਟਰ ਡਾ. ਵਿਸ਼ਾਲ ਸ਼ਰਮਾ ਦੀ ਸਲਾਘਾ ਕੀਤੀ।



ENVIRONMENT SUSTAINABILITY (INDIVIDUAL)  
**DR. VISHAL**  
 STUDY ON SOLID WASTE MANAGEMENT

  
**JASPAL SINGH, IAS**  
 PRINCIPAL SECRETARY  
 DEPARTMENT OF PLANNING  
 Govt. OF PUNJAB

  
**VIKAS VERMA**  
 REGIONAL HEAD (NORTH)  
 UNDP



**United Nation Award(UN-SDG-2020)**

SEMI-FINALIST  
SKOCH ORDER OF MERIT



SEMI-FINALIST  
SKOCH ORDER OF MERIT

This is to certify that

**Post Graduate Government College For Girls, Chandigarh**  
**Windrow Composting: Solid Waste Management**

has qualified the Semi-Finals of SKOCH Award 2020

Sameer Kochhar, Chairman, SKOCH Group

30<sup>th</sup> July 2020



Mr Vishal Sharma  
Associate Professor  
Post Graduate Government College For Girls



**66 Skoch Semi-Finalist Order of Merit**



Confederation of Indian Industry

**8<sup>th</sup> CII National Award for  
Environmental Best Practices 2021**

*This is to certify that*

**Post Graduate Government College for Girls - 11, Chandigarh**

Project Title: **Study on Windrow Composting - An Aerobic Bio-conversion and  
Stabilization of Municipal Solid Waste (msw) in Chandigarh**

is a *" Innovative Environmental Project "*

*This is being given on completion of the National Competition for  
CII National Award for Environmental Best Practices  
held on 28 - 30 July 2021 over Virtual Platform.*

**K.S Venkatagiri**  
Executive Director  
CII - Godrej GBC

**Pradeep Bhargava**  
Chairman  
GreenCo & Environmental Council  
CII - Godrej GBC

**L.S Ganapati**  
Chairman  
CII Environmental Best Practices Award  
CII - Godrej GBC

**The project is awarded as Innovative Environment Project by Confederation of Indian Industry(CII) in their  
8<sup>th</sup> edition of National Awards on July20-30,2021**

## **SECOND BEST PRACTICE**

### **INSTITUTIONAL SOCIAL CONSCIOUSNESS AND RESPONSIVENESS DURING PANDEMIC**

The college aims at awareness generation on pertinent issues of concern and relevance and to sensitize the masses on questions that relate to them. The youth of today, especially the girls can play a more far-reaching role keeping in view their natural gifts of sensitivity, compassion and empathy. It is, therefore, the primary aim of the college not to merely shape and polish the academic skills of the students but to provide education coupled with co-curricular activities in a way that leads to their holistic development.

The current society is facing numerous concerns. The identification of the core areas that needed to be dealt with sincere attention was indeed an arduous task. These sensitive areas were hence identified to be dealt with so that their upcoming challenges can be nailed. The college caters to students from Chandigarh, Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand, Manipur etc. They can therefore serve as suitable means in this effort and make the implementation an ongoing process even after their college-terms.

The college has formed societies in the identified areas: Prakriti, Road Safety and Traffic Awareness, Drug-De addiction, Gender Equity, Health and Hygiene, Red Ribbon Club, Cancer Awareness, Blood Donation. The volunteers of these societies have been organising community-centric activities such as: rallies, human-chains, candle-marches, helmet rallies, anti-cracker and green Diwali drives. The volunteers performed *Nukkad Nataks* (street plays) at strategic locations so that a wide section of the society could be covered. The venue and time of the performance was so chosen that a maximum gathering could be sensitized. Interaction with citizens helped in collection of opinions/views/ideas/problems on sensitive issues. However, 2020-21 posed a challenge due to the Pandemic. There were frequent lockdowns and online teaching was the mode. This did not deter the spirit of institutional responsibility and the volunteers were engaged in mass awareness campaigns on concerns related to Covid-19. They made posters, wrote slogans, framed presentations and made videos to sensitise the community towards causes and prevention of Covid. These, especially the videos and ppts were widely circulated in the society so that people could become aware and follow Governmental guidelines, medical instructions and the SoPs. Most of these activities are undertaken in coordination with volunteers of NSS, as the college has eight units of NSS with 100 volunteers in each unit. It is notable that the students have developed organizational skills and communication skills after participating in such activities. They have also developed a sense of concern and responsibility towards society and identified their roles for awareness generation and sensitization.

The Day Care Centre established on the campus has increased the satisfaction levels of the staff as they do not need to feel concerned about their kids. Additionally, their kids are now in more congenial surroundings and can make and move about, play and enjoy with new friends.