UI GreenMetric Questionnaire

University : West Sumatra Maritime Polytechnic
Country : Indonesia
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[3] Waste (WS)

[3.8] Organic Waste Treatment (WS.3)

SAMPLE

Example of Organic Waste Treatment (West Sumatra Maritime Polytechnic)

Description:

The lush environment at the West Sumatra Maritime Polytechnic generates various types of waste from day-to-day activities, primarily in the form of organic waste. This organic waste consists mainly of leaves that have fallen from the trees thriving around the campus. In addition, daily activities in the canteen also contribute a significant volume of organic waste from the cadets' food leftovers. Key sectors such as the catering unit also play a role in generating organic waste both before and after the cooking process.

The first step towards effective waste management on campus begins with full awareness at the disposal stage. At the West Sumatra Maritime Polytechnic, waste is sorted by type, which facilitates the processing. Thanks to the provision of well-organised waste bins, organic and inorganic waste are no longer mixed together. This rigorous sorting system is key to the success of the waste recycling chain in subsequent stages.

The implementation of this sorting system has become a collective habit, consistently practised by the entire campus community without exception. From cadets and lecturers to the wider academic community, everyone demonstrates a high level of commitment by always disposing of waste in the bins corresponding to its category.

This widespread awareness has been fostered through the internalisation of a distinctive discipline that is deeply ingrained in daily life within the campus community. Consequently, the total compliance of the entire academic community ensures that the upstream sorting process runs extremely efficiently, forming a solid foundation for the success of subsequent waste treatment programmes.

Creativity in waste management on this campus is embodied in biological innovations that utilise natural decomposing organisms. Through a controlled ecosystem, the campus has adopted technology based on black soldier fly larvae, more commonly known as maggots. These maggots are used to process the cadets' food waste. This biological decomposition process takes place very quickly, as the larvae are capable of consuming large quantities of organic waste every day.

As a tangible demonstration of their environmental awareness, students routinely take their food scraps from the dining hall directly to the maggot rearing area every day. This active participation creates an intensive and sustainable organic waste management system on campus, where every individual contributes directly to breaking the cycle of solid waste accumulation.

This process begins with preparing a special container or biopond as a breeding site. Next, organic kitchen waste is placed in the container to serve as the main food source. This structured initial step is vital to ensure that the decomposition process proceeds optimally. Once the feed medium is ready, Black Soldier Fly (BSF) eggs are carefully placed on top of the waste pile. These eggs will eventually hatch, and the larvae will immediately begin feeding on the organic waste available in their surroundings. The larvae are then reared and allowed to grow to maturity in a controlled biopond environment. After 15 to 20 days, the maggots have reached their maximum size and are ready for harvest.

Every day, the food waste that serves as a source of sustenance for these maggots is not simply discarded, but is monitored with great care and managed hygienically. Consistent and scheduled feed management ensures that every inch of organic waste is broken down completely without causing unpleasant odours on the campus. Thanks to this careful and attentive treatment, this mini-ecosystem operates optimally to produce premium, nutrient-rich larvae. This green innovation is tangible proof of how small, daily acts of care can transform domestic waste into a valuable resource.

The success of this ecosystem relies on structured management, particularly through regular monitoring of maggot development. To ensure the decomposition process runs optimally, strict monitoring is carried out of temperature, humidity and larval growth rates so that the black soldier fly's life cycle remains healthy and productive. The positive impact of this consistent monitoring has enabled the university not only to significantly reduce the volume of waste, but also to successfully create an ideal educational model for waste management for the entire academic community.

The life cycle of these maggots does not merely involve consuming food waste, but also creates promising new economic value. Larvae that have reached optimal growth thanks to the nutrients from the students' food waste are then harvested as high-quality livestock feed. The by-products of the decomposition process carried out by this larval colony are not wasted either, as they are immediately converted into highly fertile compost. This method demonstrates that environmental sustainability in a maritime setting can be achieved in line with the zero-waste concept.

The integration of using larvae as a protein-rich feed and decomposition residues as organic fertiliser demonstrates that this system implements the principles of the circular economy highly effectively. Through this approach, the university has succeeded in transforming what was once considered an environmental burden into a new resource with high market value. The economic benefits generated from the sale of these commodities can then be reallocated to support the operations and development of waste management facilities. Furthermore, this success serves as tangible proof that the maritime sector is capable of adopting self-sufficient green technology without relying on external parties. Ultimately, this entire process reaffirms that the concept of zero waste is no longer merely an academic theory, but a reality that delivers both financial and ecological benefits.

The West Sumatra Maritime Polytechnic has introduced a brilliant innovation in environmental conservation through a modern organic waste processing system. The campus has launched an innovative technology called the HSSEC Composter, a state-of-the-art system specifically designed to produce high-quality compost. This facility harnesses the vast potential of the piles of dry leaves and grass clippings found around the campus grounds. Through the application of this technology, plant waste that was previously scattered about has now been successfully transformed into a highly valuable product.

Every dry leaf and scrap of grass cleared by staff is immediately transported to the integrated innovation site. It is in this dedicated area that all this organic material undergoes a series of intensive degradation and processing stages. The university is fully committed to optimising every gram of waste so that it can be utilised to the maximum extent possible, leaving nothing behind. This approach ensures that green spaces not only produce waste, but also serve as the source of a productive recycling cycle.

To speed up this self-sustaining cycle, the collected organic material is first shredded into small pieces to increase the surface area available for contact with the decomposing bacteria. Once shredded, the material is mixed with a bioactivator or microbial starter (such as EM4) and livestock manure to trigger the hot fermentation process. This mixture is then piled up and turned regularly every 2–3 days to ensure a steady supply of oxygen and to keep the temperature within the pile stable at optimal conditions.

Through the application of this intensive aerobic method, the decomposition process can be significantly shortened, meaning the organic fertiliser is ready for harvest in just 2 to 3 weeks. Fully matured compost will have cooled down, no longer emit a pungent odour, and its texture will have changed to a dark, crumbly, soil-like consistency. This short turnaround time ensures that the supply of plant nutrients is always met without having to wait for months, thereby enabling the sustainability of the campus's green ecosystem to be maintained at a rapid pace.

The end result a nutrient-rich compost is then redistributed to enrich the entire plant ecosystem on campus. This strategic initiative creates a self-sustaining environmental cycle, in which what comes from nature is returned to nature. Organic waste, once regarded as a sanitation burden, is no longer needlessly discarded in landfill sites. This success brings tremendous mutual benefits, both in enhancing the aesthetic appeal of the campus and significantly reducing the cost of garden maintenance.

In conclusion, the implementation of HSSEC Composter technology on this innovation site serves as tangible evidence of a structured and sustainable approach to environmental stewardship. The transformation of leaf and grass waste into fertiliser that nourishes the campus's plants creates a highly beneficial green cycle. This innovation demonstrates that, with proper management, domestic waste can be transformed into an asset of

high ecological value. Ultimately, this programme has successfully cemented the campus's position as an institution that nurtures a maritime generation that is not only outstanding but also environmentally conscious and adaptable to the future.

The West Sumatra Maritime Polytechnic has also introduced a modern innovation in the form of an eco-friendly incinerator. This state-of-the-art facility has been specifically designed to optimise the management of organic waste on campus. Its primary focus is to tackle the build-up of garden waste such as leaves, grass and dry twigs. The introduction of this technology is tangible evidence of the campus's commitment to preserving the ecosystem.

The operation of this revolutionary device begins by igniting the main combustion chamber, which utilises the waste pile itself as its fuel source. Once the fire has grown and reached a high temperature, further organic waste is gradually fed into the combustion chamber. Within this chamber, an auxiliary component—a smart air blower system—works to supply a constant flow of oxygen to keep the fire burning steadily. This powerful airflow ensures that the combustion process is highly intensive, rapid and uniform, until the waste material is reduced to ash.

The key advantage of this green technology lies in the secondary chamber, which is specifically designed to trap combustion residues. The smoke and residual gases produced by the flames in the first chamber are channelled into this upper chamber, where the particles are re-burned by the extreme heat trapped within it. This advanced thermal decomposition process ensures that the only substance released through the chimney is clean, hot air, leaving absolutely no thick smoke behind that could pollute the surrounding environment. Through this environmentally friendly mechanism, the campus has successfully implemented a smart solution for clean and sustainable waste management.

Sinergi berbagai inovasi hijau ini membuktikan bahwa Politeknik Pelayaran Sumatera Barat telah sukses besar menangani seluruh masalah sampah organik secara tuntas. Transformasi limbah menjadi kompos dan pembakaran tanpa asap ini memberikan dampak nyata bagi kelestarian area kampus. Keberhasilan tersebut menciptakan standar baru yang jauh lebih bersih dalam pengelolaan ekosistem lokal.Langkah progresif ini mempertegas komitmen nyata seluruh warga kampus dalam menjaga keseimbangan alam sekitar. Melalui penerapan sistem *zero waste* yang konsisten, kelestarian lingkungan hidup di area institusi kini dapat terus terjaga dengan baik. Inovasi berkelanjutan ini menjadi bukti bahwa pengelolaan sampah yang tepat mampu menciptakan kawasan kampus yang jauh lebih hijau, asri, dan sehat.

The synergy of these various green innovations demonstrates that the West Sumatra Maritime Polytechnic has achieved great success in comprehensively addressing all organic waste issues. The transformation of waste into compost and smoke-free incineration has had a tangible impact on the sustainability of the campus area. This success has set a new, far cleaner standard for the management of the local ecosystem. This progressive step underscores the genuine commitment of the entire campus community to maintaining the balance of the surrounding natural environment. Through the consistent implementation of a zero-waste system, environmental sustainability within the institution's grounds can now be effectively maintained. These sustainable innovations demonstrate that proper waste management can create a campus environment that is far greener, more pleasant and healthier.

By integrating all the innovations already in place, the campus has successfully brought about a complete paradigm shift in organic waste management. Domestic waste, which was once a burden on sanitation services,

no longer ends up being wasted at landfill sites, but is instead successfully transformed into new products of high utility value. From the use of maggots as a high-protein feed, the conversion of plant residues into nutrient-rich compost, to the disposal of residues via an environmentally friendly incinerator, all these systems ensure that organic material is returned to the ecosystem in a beneficial form.

The existence of these flagship programmes is not a spur-of-the-moment initiative, but rather a long-standing commitment that has been in place and running for quite some time within the campus community. This long-term success is underpinned by active and consistent collaboration from the entire academic community, ranging from cleaning staff and students to the management team. All parties work hand in hand, playing their part in maintaining operational routines, carrying out daily monitoring, and continuously evaluating the system to improve the efficiency of these green innovations over time.

Ultimately, the success of this integrated waste management system stands as tangible proof of the campus's concrete commitment to preserving and creating a green, clean and healthy environment. Through these revolutionary measures, the campus has not only reduced the negative impact of waste but has also succeeded in establishing a self-sustaining model of ecological education for future generations. This consistent innovation reaffirms the institution's position as a pioneer in the environmental movement, capable of harmonising the development of its facilities with the conservation of the surrounding natural environment.