

WASTE MANAGEMENT MANUAL OF THE PANGASINAN STATE UNIVERSITY

CHAPTER 1. INTRODUCTION

1.1. Rationale

Environmental protection, conservation, and management have been pressing issues for the last decades. The environment has been changing and the changes are detrimental to human, and animals living in the planet.

Two of the top issues concerning environment are waste disposal and pollutions aside from public health land management, over population, loss of biodiversity, water scarcity and water pollution, deforestation, ecosystems and endangered species, and climate change.

Waste disposal is one of the biggest problems affecting the Philippines. According to Asian Development Bank (2019), there are about 35,000 tons of municipal solid wastes being generated in the Philippines every day. A sizable portion of the wastes generated are burned, and buried that contributes to pollution and environmental degradation.

The identified issues and concerns need to be properly addressed for the welfare of man and all other species living in the planet.

The Pangasina State University, with its nine campuses and 2 graduate schools, is home to more than 15,000 students, and almost a thousand faculty and staff. With the population size, a large volume of wastes are generated every day. PSU must find ways to properly manage the generated wastes and even minimized, if not totally eliminate its production.

1.2. VMGO

University Vision.

An ASEAN Premier State University by 2020.

University Mission.

The Pangasinan State University, through instruction, research, extension and production, commits to develop highly principled, morally upright, innovative and globally competent individuals

capable of meeting the needs of industry, public service and civil society.

University Guiding Philosophy

The Pangasinan State University's leadership adheres to the Filipino educational philosophy that education is geared towards better citizenship and livelihood and the United Nation's declaration that EDUCATION IS FOR ALL giving ACCESS to quality education.

University Core Values

The core values of the University are Accountability and Transparency, Credibility and Integrity, Competence and Commitment to Achieve, Excellence in Service Delivery, Social and Environmental Responsiveness and Spirituality (ACCESS).

1.3. Purpose of the Manual

The preparation of the Manual on Waste Management is mainly to assist the personnel involved in managing the waste generated in the component campuses of the University

The purpose of the Manual is to create:

- An understanding that waste management is part of Global issues and concerns;
- An awareness of need for competent management of waste in the University;
- An understanding of various systems available for collection, transportation, recycling, resource recovery and disposals;
- An approach to preparing waste management plans in the light of the potential problems and issues which may become apparent during project development; and
- To provide operational guidelines for the efficient municipal solid waste management systems.

CHAPTER 2: PRINCIPLES OF WASTE MANAGEMENT

2.1 Introduction

Waste management involves the (1) development of insight on the impact of waste generation, collection, transportation, and disposal methods adopted by the community on the environment and (2) the adoption of new methods to reduce the impacts.

2.2 Waste Generation in the University

The consumption of products results in the formation of waste. In addition, cleaning, laboratory experiments, and repair and maintenance are some of the measures that produce waste in the University.

2.3 Impact of Waste Disposal

When wastes are disposed off land or in open dump sites, this would result to:

- (a) ground water contamination by the leachate generated by the waste dump
- (b) surface water contamination by the run-off from the waste dump
- (c) bad odour, pests, rodents and wind-blown litter in and around the waste dump
- (d) generation of inflammable gas (e.g. methane) within the waste dump
- (e) bird menace above the waste dump which affects flight of aircraft
- (f) fires within the waste dump
- (g) erosion and stability problems relating to slopes of the waste dump
- (h) epidemics through stray animals
- (i) acidity to surrounding soil and
- (j) release of green house gas

Improper disposal, and throwing of waste anywhere would result to:

- (a) Pollution
- (b) Environmental degradation.
- (c) Clogging of canals that would result to flooding
- (d) Death of animals what accidentally ate the waste.

2.3 Objective of Waste Management

The objective of waste management in the University is to reduce the quantity of waste disposed off on land by recovery of materials and energy from waste.

2.4 Principles of Waste Management in the University

Waste Management in the University involves the application of principle of Integrated Waste Management (IWM). IWM is the application of suitable techniques, technologies and management programs covering all types of wastes from all sources to (a) reduce the volume of generated waste and (b) effectively manage waste produced after waste reduction.

2.4.1 Waste Reduction

Waste reduction (or prevention) is the preferred approach to waste management because waste that never gets created doesn't have waste management costs. Waste reduction can be done by reducing unnecessary use of packaging from manufactured and purchased products and produce. Waste reduction also helps conserve resources for future generations and contributes to a cleaner environment.

2.4.2 Effective Waste Management

Effective waste management is essential to ensure health, welfare and safety of man and other living species. Waste management must be safe and safeguard public health by preventing the spread of diseases and accidents. Moreover, waste management must be environmentally and economically sustainable.

For waste management to be environmentally and economically sustainable, it must reduce, as much as possible, the environmental impacts and must be operated at a cost acceptable to the University. Waste management must deal with all types of waste from all sources and must include one or more of the following options:

- (a) Waste collection and transportation.
- (b) Resource recovery through sorting and recycling i.e. recovery of materials (such as paper, glass, metals) etc. through separation.
- (c) Resource recovery through waste processing i.e. recovery of materials (such as compost) or recovery of energy through biological, thermal or other processes.
- (d) Waste transformation (without recovery of resources) i.e. reduction of volume, toxicity or other physical/chemical properties of waste to make it suitable for final disposal.
- (e) Disposal on land i.e. environmentally safe and sustainable disposal in landfills.

2.5 Functional Elements of the University Waste Management

The activities associated with the management of wastes in the University from the point of generation to final disposal can be grouped into the six

functional elements: (a) waste generation; (b) waste handling and sorting, storage, and processing at the source; (c) collection; (d) sorting, processing and transformation; (e) transfer and transport; and (f) disposal.

2.5.1 Waste Generation: Waste generation encompasses activities in which materials are identified as no longer being of value (in their present form) and are either thrown away or gathered together for disposal. Waste generation is, at present, an activity that is not very controllable. In the future, however, more control is likely to be exercised over the generation of wastes. Reduction of waste at source, although not controlled by solid waste managers, is now included in system evaluations as a method of limiting the quantity of waste generated.

2.5.2 Waste Handling, Sorting, Storage, and Processing at the Source: The second of the six functional elements in the waste management system is waste handling, sorting, storage, and processing at the source. Waste handling and sorting involves the activities associated with management of wastes until they are placed in storage containers for collection. Handling also encompasses the movement of loaded containers to the point of collection. Sorting of waste components is an important step in the handling and storage of solid waste at the source. For example, the best place to separate waste materials for reuse and recycling is at the source of generation. Households are becoming more aware of the importance of separating newspaper and cardboard, bottles/glass, kitchen wastes and ferrous and non-ferrous materials.

2.5.3 Collection: The functional element of collection, includes not only the gathering of wastes and recyclable materials, but also the transport of these materials, after collection, to the location where the collection vehicle is emptied. This location may be a materials processing facility, a transfer station, or a landfill disposal site.

2.5.4 Sorting, Processing and Transformation of Solid Waste: The sorting, processing and transformation of solid waste materials is the fourth of the functional elements. The recovery of sorted materials, processing of solid waste and transformation of solid waste that occurs primarily in locations away from the source of waste generation are encompassed by this functional element. Sorting of commingled (mixed) wastes usually occurs at a materials recovery facility, transfer stations, combustion facilities, and disposal sites. Sorting often includes the separation of bulky items, separation of waste components by size using screens, manual separation of waste components, and separation of metal and non-metals.

Waste processing is undertaken to recover conversion products and energy. The organic fraction of Solid Waste (SW) can be transformed by a variety of biological and thermal processes if available. The most commonly used biological transformation process is aerobic composting. The most commonly used thermal transformation process is incineration.