

FOOD WASTE MANAGEMENT DEVELOPMENT PLAN FOR INDUSTRY, COMMERCIAL AND INSTITUTION SECTOR (2016-2026)

INTRODUCTION

According to a study conducted by the National Solid Waste Management Department (JPSPN) in 2012, food waste is among the highest waste generated in Malaysia approximately about 31% to 45% of the total volume waste generated every day. Of these, the household sector generates about 44.5% and ICI (Industrial, Commercial, and Institution) sector generates about 31.4%.

Besides, the decomposition of food waste in landfills is the main source of the emission of greenhouse gas (GHG) from waste management sector in Malaysia. According to a report from Ministry of Natural Resources and Environment (NRE) with United Nations Framework Convention on Climate Change (UNFCCC), waste management sector contributes 12% from total emission of GHG in Malaysia. Meanwhile, landfills is the main source the emission of methane gas (47%) which is the main agent in depletion of ozone layer, which 21 times more potent than carbon dioxide.

Food Waste Management Development Plan for Industry, Commercial and Institution Sector (2016-2026) [FWMDP ICI] is one of the steps taken by the Department in order to achieve an efficient and effective food waste management. FWMDP ICI is developed in line with Solid

Waste Management Policy (2016) and Strategic Plan of National Solid Waste Management Department (2016-2020). This FWMDP ICI is formulated with the implementation of 6 key strategies and 31 action plans and performance target from 2016 to 2020.

The objectives of FWMDP ICI are as follows:

- (i) to provide specific strategies towards effective food waste management in every stage from the waste generation to the waste disposal, with the emphasizing on particularly the responsibility of the waste generator as well as other stakeholders; and
- (ii) As supporting documents to achieve Malaysia's goal of achieving a 40% reduction in carbon emissions by 2020, in line with the National Solid Waste Management Policy (2006) that emphasize on a comprehensive, cost-effective, sustainable and conservation of public health as well as the waste hierarchy via 3R (i.e. reduce, reuse and recycle).

The importance of effective food waste management are as follows:

Importance	Details
Global	<ul style="list-style-type: none"> ✓ GHG reduction from decomposition of food waste especially from methane gas at landfills; ✓ Reduction of the impact towards global issues such as <i>Global Warming, Climate Change, Ozone Depletion</i> and others.

Importance	Details
Environment	<ul style="list-style-type: none"> ✓ Reduction in pollution impact from leachate such as soil, water and underground water pollution; ✓ Avoidance of pungent odors and other environment problems.
Social	<ul style="list-style-type: none"> ✓ Avoidance of disease from insects and pest.
Economy	<ul style="list-style-type: none"> ✓ Save the maintenance cost of landfills; ✓ Save the cost to extend the landfills lifespan; ✓ Save the total cost that result in reduction of waste generation.

SCOPE AND TARGET

Food Waste Management Development Plan for Industry, Commercial and Institution Sector (FWMDP ICI) focuses on controlled solid waste as defined in Act 672. This FWMDP ICI focuses on three (3) main sectors of food waste generator which are:

Table 1 : Main Sectors

Sector	Sample Target
Commercial	<ul style="list-style-type: none"> ✓ Restaurant; food courts; shopping malls; hypermarkets; wet markets; night markets ✓ Hotels / resorts / guest house ✓ Aviation/airlines company

Sector	Sample Target
Institution	<ul style="list-style-type: none"> ✓ Government Offices, Public Premises ✓ Schools; Colleges; Universities ✓ Hospitals; Hostels; Government Quarters
Industry	<ul style="list-style-type: none"> ✓ Food industries; beverages industries, food warehouses ✓ Livestock / animal feed manufacturers ✓ Central kitchen for chain-outlets and franchise companies

Note : Food waste from household is excluded from FWMDP ICI since its inclusion as part of solid waste reduction via separation at source (2+1) policy and program.

As a medium target, FWMDP ICI is set to be carried out by 2020, while long-term target is set at year 2026 onwards.

The FWMDP ICI focuses on four (4) categories of food waste:

Table 2 : Food Waste Categories

Kitchen waste	Waste generated from the process of food preparation, in raw form (including roots of vegetables, fruit skins, egg shells, fish intestines etc.)
Food residues	Waste generated or leftover from food consumption or manufacturing processes, in cooked form (including soybean husks, chicken bones, fish

	heads, and unconsumed food).
Expired / contaminated food	Waste generated due to expiry or over shelf life and unsafe for consumption (refers to expired canned food, moldy bread and rotten fruits).
Wasted food	Food that is still in good quality and edible, in both raw and cooked form, but becomes waste unnecessarily due to unwanted or wastage (including imperfect or misshaped fruits and vegetables, unconsumed food from functions).

OUTLINE OF THE STRATEGIES

This FWMDP ICI is to impose more responsibility to food waste generators with the implementation of six (6) main strategies and thirty-one (31) action plans. The target for implementation is from year 2016 to 2026. All strategies are integrated into four (4) phases of solid waste management which is generation of waste, collection and transportation of waste, treatment of waste and disposal of waste. The six strategies are as follows:

(1). Establishment of Database on Food Waste Management

The establishment of database includes the amount and types of food waste generated per day/month/year; existing storage and other on-site management practices; existing waste collector and disposal destinations; etc. The data determines how much food waste is generated currently, provides baseline information for proper planning.

The data submission by the waste generators shall be enforced by clauses stipulated in the “Food Waste Management Regulation”.

(2). Establishment of regulation on food waste recycling

Regulation on Food Waste Recycling needs to be established in order to enable more systematic and controlled food waste management. The regulation shall emphasize on the responsibilities of waste generators, including data reporting, segregation of food waste, food waste minimization and proper treatment / disposal, etc.

(3). Food Waste Minimization / Reduction at Source

Waste prevention is always the first priority following the waste hierarchy, to avoid waste generation at source as far as possible. Food waste minimization / reduction at source refers to the first “R” in the 3R concept. Reduction of total food waste generation saves overall waste handling costs to the waste generators and reduce amount of waste to landfills. The target for food waste reduction by year 2026 according to sectors is as below:

Table 3 : Food Waste Generator Sectors

Food Waste Generator Sectors	2011	2026
Restaurant; Food courts, Hypermarkets	100%	20%
Wet Markets; Night Markets	71%	10%
Hotel; Institution	93%	25%
Food and beverages Industries	63%	25%

(4). Enhancement of Food Waste Treatment at Source

Food waste treatment at source includes possible conversion of food waste into useful resources such as fertilizer or compost, generating electricity from food waste or making alternative fuel from food waste. The food waste treatment can be placed at the area which food waste is generated. The appropriate technology to be used is recommended based on successful case studies.

Table 4 : Food Waste Treatment Technology

Technology	Treatment options	Products
Composting	In-vessel composting machines, compost bins, other methods	Fertilizers / composts
Biogas	Anaerobic digester	Energy / Fertilizers
Thermal Treatment	Incinerators, carbonators	Energy / Fuel

(5). Establishment of Proper System for Food Waste Treatment

The establishment of proper system for food waste treatment, includes collection of food waste at premises of food waste generators, and also treatment of food waste at dedicated centralized treatment facilities. A scheduled collection system enables collection of segregated food waste from the premises of food waste generators. Centralized community treatment facilities at local level enables food waste generators who have limitations to implement treatment at source to participate in proper treatment of food waste.

(6). Recovery of Methane Gas from Landfills

The greenhouse gas emissions caused by food waste disposal at landfill sites can be minimized with proper management and effective recovery of landfill gas for energy production such as landfill gas to energy approach.

ROLES OF STAKEHOLDERS IN FOOD WASTE MANAGEMENT

According to FWMDP ICI framework, the roles of stakeholders are mentioned as follows:

(i). Policy Maker

In implementing FWMDP ICI, the drafting of policy and regulations should be more comprehensive in food waste management by interventions of proper guidelines and clear directions for all stakeholders. Certainly, the policy and regulations shall be served as complementary documents in achieving the overall goals of the food waste management according to Act 672. The roles of policy maker are as follows:

- (a) Enacting regulations on food waste recycling;
- (b) Providing guidelines for waste generators;
- (c) Establishing centralized food waste treatment facilities;
and
- (d) Providing incentives / subsidies for food waste treatment / disposal and energy recovery.

(ii). **Waste Generators**

This Plan emphasizes the responsibilities of the waste generators on the food waste that they have generated, with the principle of “Extended Producer Responsibility”, both in terms of roles and financial aspects. Therefore, food waste generators playing a crucial role to ensure an overall successful food waste management plan. Among the responsibilities of waste generators are as follows:

- (a) Reporting of data information (Baseline Information);
- (b) Using licensed waste contractors;
- (c) Segregation of food waste at source; and
- (d) Set reduction targets.

(iii). **Waste Collectors / Contractors**

Separated food waste must be collected by concessionaire or contractors via a scheduled food waste collection system as prescribed by local authority, collected from waste generator premises to nearest specific destination i.e. centralized food waste treatment facilities.

(iv). **Centralized Food Waste Treatment Facilities Operators**

Centralized food waste treatment facilities shall be logistically convenient and acceptable by the waste generators, with reasonable tipping fee if required. The facility plays important roles to properly treat the food waste received by turning it into useful resources such as composts, biogas, animal feed or other resources.

(v). **Landfill Operators**

For food wastes that are not treated at source or at any of the centralized food waste treatment facilities, proper disposal shall take place via effective energy recovery and sanitary landfill.

The roles stated emphasizes on “shared responsibility” concept where all stakeholders need to play their roles effectively in every tier of food waste management including the role of government as policy maker.