

## 1. INTRODUCTION

*This publication was based on the outcome of the Annual Economic Survey conducted in 2022. It displays environmental protection expenditure statistics for the reference year 2021. Environmental Protection Expenditure Survey was canvassed annually starting from 2008. However, in 2011 and 2016, this survey was covered under the Economic Census. No survey was conducted in 2017 (reference year 2016).*

## 2. OBJECTIVE

*The objective of the survey was to collect statistics regarding establishments that have environmental protection expenditure covering capital and operating expenditure by activity, media and type of expenditure.*

## 3. LEGAL AUTHORITY

*This survey was conducted under the provisions of the **Statistics Act 1965 (Revised-1989)**. Section 5 under this Act, requires any operating establishment in Malaysia to furnish the correct information or their best estimate to the Department. Accordingly, the Act stipulates that the contents of the individual returns received are confidential and only aggregated figures are published.*

## 4. SCOPE AND COVERAGE

*This survey covered establishments in the following sectors:*

- i. agriculture;*
- ii. mining & quarrying;*
- iii. manufacturing;*
- iv. electricity, gas, steam & air conditioning supply;*
- v. water supply; sewerage, waste management & remediation activities;*
- vi. construction;*
- vii. transportation & storage;*
- viii. accommodation;*
- ix. food & beverage service activities;*
- x. information & communication;*
- xi. real estate activities;*
- xii. professional, scientific & technical activities;*

- xiii. education;
- xiv. human health & social work activities.
- xv. arts, entertainment & recreation;
- xvi. administrative & support service activities; and
- xvii. other service activities.

*The coverage of industry refers to Malaysia Standard Classification (MSIC) 2008 Ver. 1.0.*

## **5. POPULATION**

*All establishments encompass of 460 industries at five digits based on Malaysia Standard Industrial Classification 2008 Ver. 1.0.*

## **6. SAMPLING FRAME**

*From the identified population, sampling frame are covered 13,027 active establishments.*

## **7. SAMPLING DESIGN**

*Sampling design of the survey is a one-stage stratified random sampling. Categories of sector have been classified as stratum and the establishment as the sampling unit.*

*Each stratum (industry) has been set up to four substratum to ensure the distributed sample takes into account the economic characteristics of the industry. The main substratum is heterogeneous covered in full coverage. Where as, the others homogenous substratum was sampled.*

*Major substratum include large-scale establishments that have significant revenue streams in the coverage industry while for second and fourth sub-sectors based on small and medium enterprise (SME) categories.*

## 8. SAMPLE SIZE

The main statistics used to estimate the sample size is the total environmental expenditure. The method of determining the sample size is according to the percentage contribution of the environmental expenditure to the domain of analysis (2D/1D) for the Environmental Protection Expenditure Survey.

The optimal sample size for this survey was 5,832 establishments. The large establishments were fully covered, while the establishments for the second to fourth substrates were randomly selected according to a systematic sampling method.

## 9. WEIGHT

Weighted analysis is done using sampling weight to ensure that the selected sample can reflect population survey. The weights required are the sampling design weight and non-response weight.

The sampling design weight for the establishment at stratum  $h$  is as follows:

$$W_h = \frac{N_h}{n_h}, \quad h = 1, \dots, 4$$

Where;

$N_h$  = Total population of substratum  $h$ ; and

$n_h$  = Total sample of substratum  $h$

Non response weight at substratum  $h$  as below:

$$NRW_h = \frac{1}{\frac{n_h}{n_h}}, \quad h = 1, \dots, 4$$

Where;

$n_h$  = Numbers of response sample size for substratum  $h$

$n_h$  = Numbers of sample size for substratum  $h$

*The method of calculating the sampling design weight after the survey (adjusted weight) on substratum  $h$  as below:*

$$W'_h = W_h \times NRW_h, \quad h=1, \dots, 4$$

*Where;*

$W_h$  = Sampling design weight at substratum  $h$

$NRW_h$  = Non response weight at substratum  $h$

## 10. METHOD OF DATA COLLECTION

*This survey was generally conducted through three methods of data collection, namely, online method through the e-AES portal; data collection via e-mail, post, fax and telephone; and face-to-face data collection.*

## 11. REPORTING UNIT

*The reporting unit used in the survey was **establishment**. An establishment is defined as an economic unit that engaged in one activity, under a single legal entity and operating in a single physical location. Each establishment was assigned to an industry classification based on its principal activity.*

*Each branch of a multi-branch organisation at a different location was conceptually treated as a different establishment. The establishment was requested to give separate returns for each activity in terms of value. However, if in practice, the accounts were centrally kept such that it was not possible to obtain separate data for each individual unit or branch. That entity or enterprise was treated as a single reporting unit and allowed to submit a consolidated questionnaire covering all units or branches.*

## 12. SURVEY YEAR

*Survey year refers to the year in which a survey was conducted.*

### 13. REFERENCE YEAR

*The reference year of this survey was the calendar year 2021. Establishments whose accounting year differed from the calendar year were requested to report according to the accounting year or financial year covering at least six months in the reference year.*

### 14. CONCEPTS AND DEFINITIONS

#### 14.1 Environmental protection expenditure<sup>1</sup>

*This expenditure refers to all capital expenses and operating & repair expenditures incurred by businesses in order to comply with environmental regulations, conventions or voluntary agreements. They consist of expenditures for:*

- a. Expenditure for pollution management covered environmental monitoring; site reclamation & decommissioning; pollution abatement & control and pollution prevention;*
- b. Protection of wildlife & habitat;*
- c. Environmental assessment and charges;*
- d. Waste management; and*
- e. Other environmental protection expenditure include programme and training, awareness campaigns, courses and donation.*

#### 14.2 Capital expenditure

*Environmental capital expenditure involved installment, construction, re-construction, continuation, recovery, adjustment or modernisations related to capital form of equipments and tools, where the main purposes are to collect, treat, observe and control, reduce, prevent, or eliminate pollution or environmental degradation that resulted from establishments' activities. This expenditure does not include any provisions for future environmental liability.*

<sup>1</sup> Concepts and definitions are based on the *Environmental Expenditure Statistics: Industry Data Collection Handbook 2005* by the Eurostat, *Environmental Protection Expenditures in the Business Sector* published by the Statistics Canada and CEPA 2000

### 14.3 Operating expenditure

*Environmental operating expenditure includes labour cost; rental; uses of materials & energy; maintenance and repair; and where the main purposes are to collect, treat, observe and control, reduce, prevent, or eliminate pollution or environmental degradation that resulted from establishments' activities. It includes internal costs (including operating cost and maintenance of environmental protection equipment and environmental charges), cost of services provided by external entities, charges for wastewater treatment and waste collection; control system cost, monitoring, lab researches, management and others.*

### 14.4 Environmental media<sup>2</sup>

*Environmental media refers to abiotic components of the natural environment, namely, air, water and land. Environmental media covered by Environmental Protection Expenditure Survey were air, surface water, soil and groundwater and noise, vibration and radiation.*

### 14.5 Expenditure for pollution management by activity

#### a. Environmental monitoring

*A systematic approach to observing, studying and monitoring the environment. It involves collection of samples and specimens from air, water and land to determine whether any physical or biological factors gives negative impact on natural ecosystem and habitat. This expenditure refers to costs related to equipments, labour and services spent to comply with regulations and convention to monitor contaminants released by establishments. Example: Install monitoring tools (CEMS) and P.H meter.*

<sup>2</sup> Concepts and definitions are based on the Glossary of Statistical Terms by the Organisation for Economic Co-operation and Development (OECD)

**b. Site reclamation & decommissioning**

*Site reclamation aims to rehabilitate site to stable condition that approximates to the original condition. Site decommissioning is a process of removal of structure and project's facilities after establishments stop their operations. This is needed to remove chemical or harmful substances to the environment to make the industrial site more safe and aesthetic. This expenditure involved recovery and cleaning activities for environmental damages caused by establishments. Excludes penalties/compounds imposed due to environmental damages or any liability to the environment in the future. Example: Recovery of landfill for recreational park.*

**c. Pollution abatement & control**

*These activities aimed in reducing or eliminating pollution or disturbance arises from waste production or uses of goods and services. This expenditure covers cost of equipments/ facilities installed to restrain or reduce the release of contaminants. Example: Installation of smoke chimney, wastewater treatment plant and noise boundary wall.*

**d. Pollution prevention**

*Pollution prevention activities include modification of production methods, technologies, operation processes, equipments (or part thereof) which is designed to prevent or minimize pollution at source level, thereby reducing the environmental impact associated with the end-pipe pollution discharge. Expenditure includes purchases of technologies and equipments that reduces or eliminates pollution and waste at the source instead of at the end-of-pipe or stack before the pollution or waste is created. Example: The use of silencer for generator and use of green-technology equipment.*

#### **14.6 Protection of wildlife & habitat**

*These activities involved practices of protecting animal species and wild plants and conserving habitat for wildlife, especially on conservation-dependent species. Expenditure in compliance with laws and convention to protect wildlife and habitat from the outcome of establishment's operation/ activities. Example: Provide a specific route for wildlife (wildlife crossing) at the highway.*

#### **14.7 Environmental assessment expenditure**

*This refers to expenditure to evaluate environmental impact (EIA) of establishment's programs/activities including related legal and consultation costs. Legal and audit fees in current operations and other cost incurred prior environmental certificates.*

#### **14.8 Environmental charges**

*Environmental charges are charges that needed to be paid for using of natural resources as well as for losses caused by environmental pollution. Example: Expenditure for permits, fees, fines, penalties or damage compensation paid by government agencies or individuals and other charges paid to regulatory body to allow operations to be carried out by establishments.*

#### **14.9 Waste management expenditure**

*This expenditure refers to cost incurred in activities and actions required to manage waste generated from production of products operations; begins from producing waste until final disposal. Includes collection, storage, transportation, treatment and disposal of waste along with monitoring and regulation.*

##### **a. Non-hazardous solid waste**

*Non-hazardous solid waste refers to any scrap material or unwanted surplus substance or rejected products arising from the application of any process and substance required to be disposed. Refer to Act 672-Solid Waste and Public Cleansing Management Act 2007.*



**b. Scheduled waste (solid/liquid)**

*Scheduled waste refers to toxic waste and/or hazardous waste, except pathogenic, quarantined and flammable which is included in the waste category listed in the First Schedule Environmental Quality Regulation (Scheduled Waste) 2005.*

**14.10 Other environmental expenditure**

*Other environmental expenditure includes environmental awareness campaign, courses, seminar and environmental workshop. Contribution to schools, universities and related agencies to carried out awareness activities to protect the environment such as Earth Day, Green Day, recycling programme, mangrove trees' planting and conservation programme at zoo or using rivers as a medium to monitor cleaning.*

*Collaboration with government and private agencies or the public to carry out cleaning of reserved forest and others. Excludes cleaning done in the establishments area.*

**14.11 Environmental certification**

**a. ISO 14001**

*An international standard environmental management. It provides a set of standard requirements for environmental management system (EMS). This also provides a framework for best practices of environmental management to aid the organisations to prevent pollution, reduce environmental impact, comply with environmental laws and develop businesses in a sustainable manner.*

### **b. Other international certification**

- **ISO 14004** provides guidance on the development, implementation, maintenance and improvement of environmental management system and their co-ordination with other management systems. The guidelines in this document are intended applicable to any organisation, regardless of size, type, location or maturity level. Although ISO 14004 guideline is aligned with ISO 14001 environmental management system model, it is not intended to meet the requirements of ISO 14001.
- **Forest Stewardship Council (FSC)** is a voluntary certification, which aims to ensure the forest products are being managed responsibly and beneficially to environment, social and economy. There are 2 types of certificates; forest management and chain-of-custody which involved the management of production for forest products all the way to the end user.
- **Roundtable on Sustainable Palm Oil (RSPO)** is a guarantee of sustainable palm oil production process and commodity production that does not bring any damage to the environment and harm to the community.

A set of environmental criteria and social that need to be complied by establishments to obtain Certified Sustainable Palm Oil (CSPO). It is to help in reducing the negative impact from oil palm plantations to the environment and communities around the producers of palm oil.

- **Malaysian Timber Certification Scheme (MTCS)** is a certificate issued by Malaysian Timber Certification Council (MTCC). It is a voluntary scheme that provides an independent assessment about practices on forest management, to ensure a sustainable management of forests and natural forests, as well as to meet the demand for certified timber products.

## 15. ANNUAL GROWTH RATE

The annual growth rate ( $r$ ) is calculated based on formula of:

$$r = \frac{Y_t - Y_0}{Y_0} \times 100$$

Where;

$Y_t$  = Value at current year

$Y_0$  = Value at previous year

$t$  = Number of years,  $Y_t - Y_0$

$r$  = Annual growth rate

## 16. SYMBOLS AND ABBREVIATIONS

The following symbols and notations have been used throughout the publication:

& and

% per cent

- nil

0 less than 0.5

0.0 less than 0.05

RM Ringgit Malaysia

W.P. Wilayah Persekutuan

e Estimate

## 17. ROUNDING

The sum of components may not add up to the totals in the tables presented in this publication due to rounding.