KEMENTERIAN
ALAM SEKITAR DAN AIR
Ministry of Environment and Water

JABATAN ALAM SEKITAR MALAYSIA

Laporan Tahunan 2019 Annual Report

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Department of Environment, Malaysia

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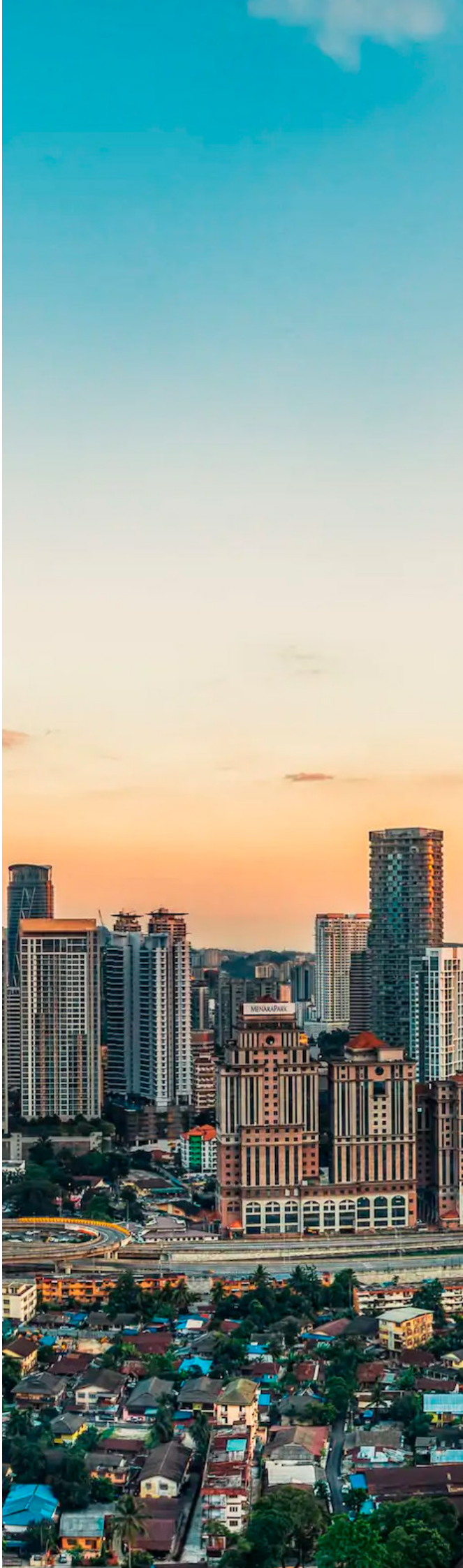


KANDUNGAN
CONTENT

SINGKATAN
ABBREVIATIONS

ADB	Bank Pembangunan Asia	Asian Development Bank
AEY	Tahun Alam Sekitar ASEAN	ASEAN Environment Year
AKAS	Akta Kualiti Alam Sekeliling	Environmental Quality Act
AMME	Mesyuarat Menteri-Menteri ASEAN Mengenai Alam Sekitar	ASEAN Ministerial Meeting on the Environment
ASEAN	Pertubuhan Negara-Negara Asia Tenggara	Association of South East Asian Nations
ASOEN	Pegawai Kanan Alam Sekitar ASEAN	ASEAN Senior Officials on the Environment
AWASI	Area Watch and Sanction Inspection	Area Watch and Sanction Inspection
BT	Buangan Terjadual	Scheduled Wastes
BIMP	Brunei–Indonesia–Malaysia-Filipina	Brunei–Indonesia–Malaysia-Philippines
BOD	Keperluan Oksigen Biokimia	Biochemical Oxygen Demand
BPO	Bahan Pemusnah Ozon	Ozone Depleting Substances
CA	Udara Bersih	Clean Air
CETDEM	Pusat bagi Alam Sekitar, Teknologi dan Pembangunan Malaysia	Centre For Environmental, Technology and Development Malaysia
CFC	Kloroflourokarbon	Chlorofluorocarbon
CICM	Majlis Industri Kimia Malaysia	Chemical Industries Council of Malaysia
CMC	Pusat Pengurusan Pantai	Coastal Management Centre
COBSEA	Badan Penyelaras Mengenai Laut Asia Timur	Co-ordinating Body for the Seas of East Asia
COD	Keperluan Oksigen Kimia	Chemical Oxygen Demand
CPO	Kelapa Sawit Mentah	Crude Plam Oil
DB	Desibel	Decibel (s)
DOE	Jabatan Alam Sekitar	Department of Environment
DOKUMAS	Sistem Pengurusan Dokumen	Document Managment System
EAGA	Kawasan Pertumbuhan ASEAN Timur	East ASEAN Growth Area
E.COLI	Escherichia coli	Escherichia coli
EEZ	Zon Ekonomi Eksklusif	Exclusive Economic Zone
EIA	Penilaian Kesan Kepada Alam Sekeliling	Environmental Impact Assessment
EPSM	Persatuan Perlindungan Alam Sekitar Malaysia	Environment Protection Society of Malaysia
EPU	Unit Perancang Ekonomi	Economic Planning Unit
EQC	Majlis Kualiti Alam Sekeliling	Environmental Quality Council
EQR	Laporan Kualiti Alam Sekeliling	Environmental Quality Report
ESCAP	Pesuruhjaya Ekonomi & Sosial Asia Pasifik	Economic & Social Commission for Asia and the Pacific
EIMAS	Institut Alam Sekitar Malaysia	Environment Institute of Malaysia
EXCO	Ahli Mesyuarat Kerajaan Negeri	Executive Councillors
FMM	Persatuan Pekilang-Pekilang Malaysia	Federation of Malaysian Manufacturers
FOMCA	Persatuan Pertubuhan Penguna-Pengguna Malaysia	Federation of Malaysian Consumer's Association
FRIM	Institut Penyelidikan Hutan Malaysia	Forest Research Institute of Malaysia

FRTM	Gabungan Persatuan-Persatuan Perdagangan Getah Malaysia	Federation of Rubber Trade Association of Malaysia
GEF	Kemudahan Alam Sekitar Global	Global Environment Facility
GIS	Sistem Maklumat Geografik	Geographical Information System
HCFC	Hidro Klorofluorokarbon	Hydro Chlorofluorocarbon
ICZM	Pengurusan Zon Pantai Bersepadu	Integrated Coastal Zone Management
HSU	Unit Asap Hartridge	Hartridge Smoke Unit
IDHL	Institut Diplomasi & Hal Ehwal Luar	Institute of Diplomacy & Foreign Relations
IKAN	Indeks Kualiti Air Negara	National Water Quality Index
IMO	Organisasi Maritim Antarabangsa	International Maritime Organisation
INFOTERRA	Sistem Rujukan Antarabangsa Untuk Sumber-Sumber Maklumat Mengenai Alam Sekitar	International Referral System for Sources of Environmental Information
INTAN	Institut Tadbiran Awam Negara	National Institute of Public Administration
IPCS	Program Antarabangsa mengenai Keselamatan Bahan Kimia	International Programme on Chemical Safety
IRPTC	Pendaftaran Antarabangsa bagi Bahan Kimia yang Berpotensi Berbahaya	International Register of Potentially Toxic Chemicals
ISIS	Institut Kajian Strategik dan Antarabangsa	Institute of Strategic and International Studies
JICA	Agensi Kerjasama Antarabangsa Jepun	Japan International Co-operation Agency
JPA	Jabatan Perkhidmatan Awam	Public Service Department
JPS	Jabatan Pengairan dan Saliran Malaysia	Department of Irrigation and Drainage Malaysia
MOSTI	Kementerian Sains, Teknologi & Inovasi	Ministry of Science, Technology and Innovation
KEEP	Kumbahan & Efluen Perindustrian	Sewage & Industrial Effluents
KKSM	Kilang Kelapa Sawit Mentah	Crude Palm Oil Mill
MAC	Penyaman Udara Kenderaan	Mobile Air Conditioning
MACRES	Pusat Remote Sensing Malaysia	Malaysian Remote Sensing Agency
MASM	Minggu Alam Sekitar Malaysia	Malaysia Environment Week
MEXCOE	Menteri dan Ahli Majlis Mesyuarat Kerajaan Negeri yang Bertanggungjawab ke atas Alam Sekitar	Ministers and State Executive Councillors Responsible for Environmental Matters
MICCI	Dewan Perdagangan dan Industri Antarabangsa Malaysia	Malaysian International Chamber of Commerce and Industry
MIER	Institut Penyelidikan Ekonomi Malaysia	Malaysian Institute of Economic Research
MINT	Institut Teknologi Nuklear Malaysia	Malaysia Institute of Nuclear Technology
MMVAA	Persatuan Pemasang Kenderaan Bermotor Malaysia	Malaysian Motor Vehicle Assemblers' Association
MNS	Persatuan Pencinta Alam Malaysia	Malaysian Nature Society
MITI	Kementerian Perdagangan Antarabangsa Dan Industri	Ministry of International Trade and Industry
MPOA	Pertubuhan Kelapa Sawit Malaysia	Malaysian Palm Oil Association
MOA	Kementerian Pertanian	Ministry of Agriculture
MOH	Kementerian Kesihatan	Ministry of Health
MOHR	Kementerian Pembangunan Sumber Manusia	Ministry of Human Resources
MOT	Kementerian Pengangkutan	Ministry of Transport
MOU	Memorandum Persefahaman	Memorandum of Understanding

MRPC	Majlis Pengeluar-Pengeluar Getah Malaysia	Malaysia Rubber Products Manufacturers' Council
MSJCE	Jawatankuasa Bersama Malaysia-Singapura Mengenai Alam Sekitar	Malaysia – Singapore Joint Committee on the Environment
NGO	Pertubuhan Bukan Kerajaan	Non-Governmental Organisation
NRE	Kementerian Sumber Asli Dan Alam Sekitar	Ministry of Natural Resources and Environment
NH3N	Amoniakal Nitrogen	Ammoniacal Nitrogen
OECD	Pertubuhan Kerjasama Ekonomi dan Pembangunan	Organisation for Economic Co-operation and Development
PEMSEA	Pertubuhan Kerjasama Alam Sekitar bagi Laut Asia Timur	Partnership in Environmental Management for the Seas of East Asia
PIC	Kebenaran Maklumat Awal	Prior Informed Consent
POMA	Persatuan Pekilang-Pekilang Minyak Kelapa Sawit Malaysia	Palm Oil Millers' Association
PORIM	Institut Penyelidikan Minyak Kelapa Sawit	Palm Oil Research Institute of Malaysia
RM	Ringgit Malaysia	Malaysian Ringgit
RRIM	Institut Penyelidikan Getah Malaysia	Rubber Research Institute of Malaysia
SBC	Urusetia Konvensyen BASEL	Secretariat for BASEL Convention
SIDA	Agensi Pembangunan Antarabangsa Sweden	Swedish International Development Agency
SIRIM	Institut Standard dan Penyelidikan Industri Malaysia	Standards Industrial Research Institute of Malaysia
UB	Udara Bersih	Clean Air
UKM	Universiti Kebangsaan Malaysia	National University of Malaysia
UM	Universiti Malaya	University of Malaya
UNCED	Persidangan Bangsa-Bangsa Bersatu Mengenai Alam Sekitar dan Pembangunan	United Nations Conference on Environment and Development
UNDP	Program Pembangunan Bangsa-Bangsa Bersatu	United Nations Development Programme
UNEP	Program Alam Sekitar Bangsa-Bangsa Bersatu	United Nations Environment Programme
UNITEN	Universiti Tenaga Malaysia	University of Tenaga Malaysia
UPE	Unit Perancang Ekonomi	Economic Planning Unit
UPM	Universiti Putra Malaysia	University of Putra Malaysia
USM	Universiti Sains Malaysia	University of Science Malaysia
Y.B.	Yang Berhormat	The Honourable
PDRM	Polis Diraja Malaysia	Royal Malaysian Police
VOCS	Kandungan Organik Meruap	Volatile Organic Compounds
WQR	Wilayah Kualiti Air	Water Quality Region

PRAKATA
FOREWORD

Jabatan Alam Sekitar (JAS) dengan sukacitanya membentangkan Laporan Tahunan 2019 yang merangkumi pencapaian dan pelaksanaan program pada tahun tersebut.

The Department of Environment (DOE) gladly presents the 2019 Annual Report which provides an account of its achievements and program implementations in that year.

JAS meneruskan mandat yang diberi untuk mentadbir Akta Kualiti Alam Sekeliling 1974, selari dengan visi Jabatan ini, "Pemuliharaan Alam Sekiar Untuk Kesejahteraan Rakyat" dan misi "Memastikan Pembangunan Lestari di dalam Proses Memajukan Negara".

DOE continues to pursue its mandate to administer the Environmental Quality Act (EQA) 1974, in line with the department's vision, "Environmental Conservation for the Well-being of the People" and mission "To ensure Sustainable Development in the Process of Nation Building".

Penekanan yang berterusan diberi di dalam mencegah dan mengawal pencemaran air, pencemaran udara dan pengurusan buangan terjadual. Pemeriksaan ke atas punca-punca pencemaran telah dipertingkatkan dan dimantapkan. Pencemar-pencemar juga telah dikenakan tindakan undang-undang yang tegas.

Continued emphasis is given to the prevention and control of water pollution, air pollution and scheduled waste management. Inspections on pollution sources have been intensified and improved. Strict legal actions were also taken against environmental offenders.

Penilaian Kesan Kepada Alam Sekeliling (EIA) masih menjadi strategi asas pencegahan yang dikuatkuasakan oleh Jabatan ini melalui Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kesan Kepada Alam Sekeliling) 2015 bagi mengurangkan kesan kepada alam sekeliling dari projek pembangunan. Sejumlah 353 laporan EIA telah diterima dan diproses oleh JAS pada tahun 2019. Daripada bilangan ini, sebanyak 313 laporan EIA di bawah Jadual Pertama perintah tersebut telah diproses di pejabat JAS Negeri dan 40 laporan EIA di bawah Jadual Kedua telah diproses di Ibu Pejabat JAS yang perlu melibatkan pameran dan ulasan awam.

Environmental Impact Assessment (EIA) continued to be the main preventive strategy enforced by the department through the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015 to mitigate all environmental impacts from development projects. A total of 353 EIA reports were received and processed by the DOE in 2019. Of these, 313 EIA reports processed by the DOE State Offices were subjected to the First Schedule of this Order while another 40 EIA reports processed by the DOE Headquarters were subjected to the Second Schedule of the EIA Order which requires public display and comments.

JAS juga turut melaksanakan program-program dan aktiviti-aktiviti kesedaran dan pendidikan alam sekitar serta penyebaran maklumat untuk pelbagai peringkat masyarakat sebagai usaha berterusan dan

DOE continued to implement its awareness and environmental education programmes and activities to disseminate information to various levels of the society as an effort and long-term measure towards building a caring

bersama dalam membangunkan masyarakat yang mesra alam di negara ini. Perlindungan alam sekitar melalui amalan-amalan mesra alam seharusnya menjadi sebahagian daripada aktiviti seharian kita.

Saya ingin mengambil kesempatan ini untuk merakamkan penghargaan kepada semua pihak yang telah memberikan sokongan dan komitmen mereka kepada JAS dalam melaksanakan tugas murni untuk alam sekitar yang lestari, sihat dan kualiti hidup yang lebih baik.

and environmentally friendly society in the country. Protecting environment by adopting environmentally friendly practices should be part of our daily activities.

I would like to take this opportunity to express my appreciation to everyone who has provided invaluable support and commitment to the department in carrying out duties for a sustainable, healthy and an enhanced quality of life.

"**Alam Sekitar, Tanggungjawab Bersama**
Environment, Our Shared Responsibility."

NORLIN BINTI JAAFAR
Ketua Pengarah Jabatan Alam Sekitar
Director-General, Department of Environment

VISI/VISION

Pemuliharaan Alam Sekitar Untuk Kesejahteraan Rakyat/
Environmental Conservation For The Well -being Of The People

MISI/MISSION

Memastikan Pembangunan Lestari Di dalam Proses Memajukan Negara/
To Ensure Sustainable Development In The Process Of Nation Building

STRATEGI/ STRATEGIES

- **Integrasi Faktor Alam Sekitar Dalam Perancangan Pembangunan/**
- **Integration Of Environmental Factors In Development Planning**

- **Pencegahan Dan Kawalan Pencemaran/**
- **Pollution Prevention And Control**

- **Promosi Pendidikan Dan Kesedaran Alam Sekitar/**
- **Promotion Of Environmental Education And Awareness**

- **Kerjasama Dan Hubungan Dua Hala, Serantau Dan Antarabangsa/**
- **Bilateral, Regional And International Cooperation**

- **Penyertaan Awam Dalam Pengurusan Alam Sekitar/**
- **Public Participation In Environmental Management**

- **Kerjasama Antara Agensi Dan Persekutuan Negeri/**
- **Inter-Agency And Federal State Cooperation**

- **Pembangunan Lestari Melalui Pemuliharaan Sumber Semulajadi/**
- **Sustainable Development Through Conservation Of Resources**

BAB 1
CHAPTER 1

MAJLIS KUALITI ALAM SEKELILING (EQC)
ENVIRONMENTAL QUALITY COUNCIL (EQC)

MAJLIS KUALITI ALAM SEKELILING (EQC)
ENVIRONMENTAL QUALITY COUNCIL (EQC)

Dalam tahun 2019, Majlis Kualiti Alam Sekeliling (EQC) telah bermesyuarat sebanyak 2 kali seperti berikut:

i. Mesyuarat EQC Bilangan Ke-126 telah diadakan pada 23 Julai 2019.

ii. Mesyuarat EQC Bilangan Ke-127 telah diadakan pada 18 Oktober 2019

Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC) telah melantik YBhg. Dato' Dr Nadzri bin Yahaya sebagai Pengerusi Majlis Kualiti Alam Sekeliling (EQC) untuk penggal ke-16 yang berkuatkuasa pada 1 Jun 2019. Beliau merupakan mantan Timbalan Ketua Setiausaha (Sumber Asli) Kementerian Sumber Asli dan Alam Sekitar, Timbalan Ketua Setiausaha (Tenaga dan Teknologi Hijau) dan Ketua Pengarah Jabatan Pengurusan Sisa Pepejal Negara.

Pelantikan ahli Majlis ini adalah selama tiga (3) tahun bermula pada 1 Jun 2019 sehingga 31 Mei 2022. Senarai ahli-ahli EQC penggal ke-16 adalah seperti di **Jadual 1.**

In 2019, the Environmental Quality Council (EQC) had 2 meetings, which was held as follows:

i. The 126th EQC meeting, which was held on 23rd July 2019

ii. The 127th EQC meeting, which was held on 18th October 2019.

The Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) appointed YBhg. Dato' Dr. Nadzri bin Yahaya as the new EQC Chairman for the 16th term effective June 1st, 2019. YBhg. Dato' was the Deputy Secretary General (Natural Resources) of the Ministry of Natural Resources and Environment, Deputy Secretary General (Energy and Green Technology) of the Ministry of Energy, Green Technology and Water and Director General of the National Solid Waste Management Department.

The appointment of EQC members for the 16th term was made for the three (3) years period, starting from 1st Jun 2019 to 31st May 2022 period. The list of EQC members for the 16th term is as shown in **Table 1.**

Mesyuarat telah membincangkan dan memperakukan beberapa cadangan yang dikemukakan untuk pertimbangan. Antara kertas kerja yang dibentangkan dalam tahun 2019 adalah seperti berikut:

The council deliberated and endorsed matters presented during the meetings. In 2019, amongst the papers brought to their attention were as follows:

Perbincangan EQC Ke-126

1. Pelaksanaan Sesi Dan Cadangan Penggubalan Perintah Kualiti Alam Sekeliling (Pembayaran Ses)(Buangan Terjadual) 20xx – JAS

2. Pengelasan Coal Tar Daripada Proses Pyrolysis Sebagai Buangan Terjadual – JAS

3. Pemakaian Standard Kualiti Air Marin Malaysia – JAS

126th EQC Discussion

1. The Implementation Of Ses And Proposed Draft Of Environmental Session (Ses) (Scheduled Wastes) Order 20xx – DOE

2. Classification Of Coal Tar From Pyrolysis Process As Scheduled Wastes – DOE

3. Implementation Of Malaysian Marine Water Quality Standards–DOE

4. Status Terkini Penggubalan Akta Perlindungan Alam Sekitar – JAS

5. Perintah Kualiti Alam Sekeliling (Penilaian Kesan Kepada Alam Sekeliling) – JAS

6. Pematuhan Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014 Selepas Tarikh Kuatkuasa – JAS

Perbincangan EQC Ke-127

1. Hala Tuju Pengimportan Dan Pemprosesan Plastik Kitar Semula – JAS

2. Pengimportan Mixed Metal Scrap Bercampur Buangan Terjadual – JAS

3. Langkah Pencegahan Pembakaran Terbuka dan Jerebu Dengan Menggunakan Teknologi Terkini -Global Environment Centre (GEC)

4. Pelaksanaan Program Pengawasan Kualiti Alam Sekitar (Environmental Quality Monitoring Programme, EQMP) – JAS

5. Pematuhan Industri kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014 – JAS

4. Current Status of The Drafts of The New Environmental Quality Act – DOE

5. Environmental Quality (Environmental Impact Assessment) Order – DOE

6. Status Of Compliance On Environmental Quality (Clean Air) Regulations 2014 – DOE

127th EQC Discussion

1. Way Forward on The Importation And Processing of Recycle Plastic Wastes– Department of Environment

2. Importation of Mixed Metal Scrap and Scheduled Wastes – DOE

3. The Use of Technology to Prevent Open Burning and Haze – Global Environment Centre (GEC)

4. Implementation of Environmental Quality Monitoring Programme – DOE

5. Status of Compliance on Environmental Quality (Clean Air) Regulations 2014 – DOE

Ahli Mesyuarat Majlis Kualiti Alam Sekitar
Member of The Environment Quality Council Meeting

Jadual 1: Senarai Ahli Majlis Kualiti Alam Sekeliling (EQC) Penggal Ke-16 (1 Jun 2019 Hingga 31 Mei 2022)

Table 1 : List of Environment Quality Council Members 16th Term (1st June 2019 to 31st May 2022)

BIL./NO.	PERWAKILAN/ DELEGATION	NAMA AHLI/ MEMBER NAME
1	Pengerusi EQC/ EQC Chairman	YBhg. Dato' Dr Nadzri Bin Yahaya
2	Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim/ Ministry of Energy, Science, Technology, Environment and Climate Change	Ketua Setiausaha, Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim/ Head Secretary, Ministry of Energy, Science, Technology, Environment and Climate Change
3	Kementerian Air, Tanah dan Sumber Asli/ Ministry of Water, Land and Natural Resources	Setiausaha, Bahagian Pengurusan Biodiversiti dan Perhutanan, Kementerian Air, Tanah dan Sumber Asli/ Secretary, Biodiversity and Forestry Management Division, Ministry of Water, Land and Natural Resources
4	Kementerian Perdagangan Antarabangsa dan Industri/ Ministry of International Trade and Industry	Timbalan Ketua Setiausaha (Industri), Kementerian Perdagangan Antarabangsa dan Industri/ Deputy Secretary General (Industry), Ministry of International Trade and Industry
5	Kementerian Perdagangan Dalam Negeri Koperasi dan Kepenggunaan/ Ministry of Domestic Trade and Consumer Affairs	Pengarah, Bahagian Penyelidikan dan Dasar Kepenggunaan, Kementerian Perdagangan Dalam Negeri dan Hal Ehwal Pengguna/ Director, Research and Consumer Policy Division, Ministry of Domestic Trade and Consumer Affairs
6	Kementerian Pertanian dan Industri Makanan/ Ministry of Agriculture and Food Industries	Setiausaha Bahagian, Bahagian Dasar dan Perancangan Strategik, Kementerian Pertanian dan Industri Makanan/ Division Secretary, Policy and Strategic Planning Division, Ministry of Agriculture and Food Industries
7	Kementerian Sumber Manusia/ Ministry of Human Resources	Pengarah, Jabatan Keselamatan dan Kesihatan Pekerjaan (JKKP) Negeri Selangor, Kementerian Sumber Manusia/ Director, Selangor State Department of Occupational Safety and Health (DOSH), Ministry of Human Resources
8	Kementerian Pengangkutan/ Ministry of Transport	Timbalan Ketua Setiausaha (Dasar), Kementerian Pengangkutan/ Deputy Secretary General (Policy), Ministry of Transport
9	Kementerian Perumahan dan Kerajaan Tempatan/ Ministry of Housing and Local Government	Ketua Pengarah, Jabatan Pengurusan Sisa Pepejal Negara, Kementerian Perumahan dan Kerajaan Tempatan/ Head Director, National Solid Waste Management Department, Ministry of Housing and Local Government
10	Kementerian Kesihatan Malaysia/ Ministry of Health Malaysia	Timbalan Pengarah, Cawangan Regulatori, Bahagian Perkhidmatan Kejuruteraan, Kementerian Kesihatan Malaysia/ Deputy Director of, Regulatory Branch, Engineering Services Division, Ministry of Health Malaysia

Jadual 1: Senarai Ahli Majlis Kualiti Alam Sekeliling (EQC) Penggal Ke-16 (1 Jun 2019 Hingga 31 Mei 2022)

Table 1 : List of Environment Quality Council Members 16th Term (1st June 2019 to 31st May 2022)

BIL./NO.	PERWAKILAN/ DELEGATION	NAMA AHLI/ MEMBER NAME
11	Kerajaan Negeri Sabah/ Sabah State Government	Setiausaha Tetap Kementerian Pelancongan, Kebudayaan Dan Alam Sekitar Sabah/ Permanent Secretary of the Sabah Ministry of Tourism, Culture and Environment Ahli Ganti: Alternate Members: Pengarah Jabatan Perlindungan Alam Sekitar Sabah/ Director of Sabah Department of Environmental Protection
12	Kerajaan Negeri Sarawak/ Sarawak State Government	Setiausaha Tetap, Kementerian Pembangunan Bandar dan Sumber Asli Sarawak/ Permanent Secretary, Ministry of Urban Development and Natural Resources Sarawak Ahli Ganti:/ Alternate Members: Kontroller, Lembaga Sumber Asli dan Alam Sekitar, Sarawak/ Controller,Natural Resources and Environment Board, Sarawak
13	Wakil Industri Petroleum/ Representative from The Petroleum Industry	Puan Ungku Haslina Bt. Ungku Mohamed Tahir, Ketua Jabatan Alam Sekitar & Prestasi Sosial, PETRONAS/ Principal of Environment PETRONAS Ahli Ganti: Alternate Members: Encik Mohd Azhar bin Ab Shatar, Ketua Jabatan Alam Sekitar & Prestasi Sosial, PETRONAS/ Principal of Environment PETRONAS
14	Wakil Industri Kelapa Sawit/ The Palm Oil Industry Representative	Encik Johari Meor Ngah, Persatuan Minyak Sawit Malaysia/ Malaysian Palm Oil Association Ahli Ganti:/ Alternate Members: Encik Johari Salleh, Persatuan Minyak Sawit Malaysia/ Malaysian Palm Oil Association
15	Wakil Persekutuan Pekilang-Pekilang Malaysia (FMM)/ Representative from Federation of Malaysian Manufacturers	YBhg. Dato' Hj. Mizanur Rahman Ghani, Ahli Majlis dan Pengerusi FMM Environmental Management Committee/ Council Member and Chairman of FMM Environment Management Committee Ahli Ganti:/ Alternate Members: Encik K.N. Gobinathan, Timbalan Pengerusi FMM Environmental Management Committee. Ahli Majlis dan Pengerusi Jawatankuasa Pengurusan Alam Sekitar (FMM)/ Deputy Chairman of FMM Environment Management Committee. Council Member and Chairman of FMM Environment Management Committee

Jadual 1: Senarai Ahli Majlis Kualiti Alam Sekeliling (EQC) Penggal Ke-16 (1 Jun 2019 Hingga 31 Mei 2022)

Table 1 : List of Environment Quality Council Members 16th Term (1st June 2019 to 31st May 2022)

BIL./NO.	PERWAKILAN/ DELEGATION	NAMA AHLI/ MEMBER NAME
16	Wakil Industri Getah/ Representative from The Rubber Industry	Encik Lim Sum Teck, Naib Presiden, Persatuan Pengilang Produk Getah Malaysia/ Vice President Malaysian Rubber Products Manufacturer Association (MRPMA) Ahli Ganti: Alternate Members: Encik Chin Hon Meng Naib Presiden, Persatuan Pengilang Produk Getah Malaysia/ Vice President, Malaysian Rubber Products Manufacturer Association (MRPMA)
17	Wakil Kakitangan Akademik/ Representative from the Academic Staff	YBhg. Prof. Emeritus Dato' Dr. Ibrahim Komoo, Rakan Sejawat, Institut Persekitaran dan Pembangunan (LESTARI), Universiti Kebangsaan Malaysia/ Principal Fellow, Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia Ahli Ganti: Alternate Members: Akan dimaklumkan kelak oleh Universiti Kebangsaan Malaysia/ Will be informed later by Universiti Kebangsaan Malaysia
18	Wakil Pertubuhan Yang Berpengalaman Mengenai Alam Sekitar/ Representative from registered Societies knowledgeable and having interest in matters pertaining to the environment	Puan Meenakshi Raman Presiden, Sahabat Alam Malaysia/ President Sahabat Alam Malaysia Ahli Ganti: Alternate Members: Theivanai Amarthalingam Penasihat Undang-Undang Sahabat Alam Malaysia/ Legal Adviser, Sahabat Alam Malaysia
19	Wakil Pertubuhan Yang Berpengalaman Mengenai Alam Sekitar/ Representative from the registered organization knowledgeable in matters pertaining to the environment	Puan Saradambal Srinivasan Ketua Dasar, Dana Hidupan Liar Dunia Program Terestrial Semenanjung Malaysia/ Policy Lead, Peninsular Malaysia Terrestrial Programme World Wildlife Fund Ahli Ganti: Alternate Members: Akan dimaklumkan kelak oleh World Wildlife Fund/ Will be informed later by World Wildlife Fund

BAB 2
CHAPTER 2

PENGURUSAN SUMBER MANUSIA DAN KEWANGAN
HUMAN RESOURCES AND FINANCIAL MANAGEMENT

PENGURUSAN SUMBER MANUSIA DAN KEWANGAN
HUMAN RESOURCES AND FINANCIAL MANAGEMENT

KURSUS PEMANTAPAN SINERGISTIK BERKUMPULAN JAS

KEM KENABOI, JELEBU, NEGERI SEMBILAN, 23 HINGGA 25 OKTOBER 2019

OBJEKTIF

i. Membina kecemerlangan di dalam diri ahli-ahli organisasi;

ii. Menjalankan tanggungjawab kerja dengan professional;

iii. Kakitangan lebih semangat dalam melaksanakan tanggungjawab dan amanah dalam pekerjaan;

iv. Kakitangan yang terlibat sedar sikap toleransi perlu dalam menjayakan sesuatu yang telah dipertanggungjawabkan; dan

v. Merapatkan hubungan antara kakitangan, sekaligus memupuk semangat kerjasama secara berkumpulan.

PESERTA

Empat puluh (40) orang pemandu-pemandu jabatan dan pegawai yang diberi kebenaran memandu

WORK CULTURE ENHANCEMENT COURSE FOR DOE

KEM KENABOI, JELEBU, NEGERI SEMBILAN, 23rd TO 25th OCTOBER 2019

OBJECTIVES

i. Building a reputation of excellence among members of the organisation;

ii. Performing job responsibilities professionally;

iii. Employees are more enthusiastic in performing their job responsibilities with honour;

iv. The employees are aware that the tolerance attitude is important to succeed in fulfilling their job responsibilities; and

v. Establishing a closer relationship among staff, while fostering team spirit.

PARTICIPANTS

Fourty (40) staff consisting of department drivers and authorized drivers

Peserta Kursus Pemantapan Sinergistik Berkumpulan JAS Kem Kenaboi di Jelebu, Negeri Sembilan
Participants of Work Culture Enchancement Course for DOE at Kem Kenaboi, Jelebu, Negeri Sembilan

KURSUS PEMANTAPAN BUDAYA KERJA BAHAGIAN PENTADBIRAN DAN KEWANGAN

PUSAT LATIHAN KEMAS, BUKIT TOK BENG, KUALA TERENGGANU,
7 HINGGA 9 NOVEMBER 2019

OBJEKTIF

i. Meningkatkan penghayatan peserta tentang konsep dan kepentingan budaya kerja berpasukan cemerlang serta peranan-peranan peserta dalam membina sebuah organisasi yang cemerlang;

ii. Meningkatkan kefahaman peserta tentang konsep dan kepentingan paradigma cemerlang dalam membina sebuah pasukan/ organisasi yang mantap serta kaedah berkesan melakukan anjakan paradigma;

iii. Meningkatkan kefahaman serta penghayatan peserta tentang konsep, kepentingan serta kaedah-kaedah meningkatkan semangat kekitaan dalam pasukan;

iv. Meningkatkan pengetahuan peserta dalam konsep konflik dan kaedah-kaedah menangani sebarang konflik dengan berkesan;

v. Meningkatkan kefahaman peserta tentang konsep masalah serta menyelesaikan masalah secara berpasukan; dan

vi. Meningkatkan kesedaran peserta tentang kepentingan budaya menghargai serta kaedah-kaedah berkesan dalam memupuk budaya ini.

PESERTA

Tiga puluh lima (35) orang pelbagai gred di Bahagian Pentadbiran dan Kewangan

WORK CULTURE ENHANCEMENT COURSE FOR ADMINISTRATION AND FINANCE DIVISION'S STAFF

KEMAS TRAINING CENTRE, BUKIT TOK BENG, KUALA TERENGGANU,
7th TO 9th NOVEMBER 2019

OBJECTIVES

i. To enhance the participants' appreciation on the concept and importance of teamwork and the participants' role in building a successful organisation;

ii. To enhance the participants' understanding on the concept and importance of an excellent paradigm in building a strong team/organisation and the methods of excelling in the paradigm shift;

iii. To enhance the participants' understanding and appreciation of team work and the methods of enhancing team spirit;

iv. To enhance the participants' knowledge on the concept of conflicts and methods of resolving the conflicts effectively;

v. To enhance the participants' understanding on the concept of problems and how to solve the problems as a team; and

vi. To increase the participants' awareness on the importance of cultural appreciation and effective ways of fostering that culture.

PARTICIPANTS

Thirty-five (35) participants of different grades from Administration and Finance Division

Peserta Kursus Pemantapan Budaya Kerja Bahagian Pentadbiran Dan Kewangan di Pusat Latihan Kemas, Bukit Tok Beng, Kuala Terengganu
Participants of Work Culture Enhancement Course for Administration and Finance Division's Staff at Kemas Training Centre, Bukit Tok Beng, Kuala Terengganu

90.10%

Pengisian jawatan di JAS sehingga 31.12.2019 / Occupancy of DOE as 31st December 2019

Perjawatan: 1,545/
Position: 1,545

Pengisian: 1,392 /
Occupancy: 1,392

Kekosongan: 153 /
Vacancy: 153

100%

Peratusan Pegawai Menghadiri Kursus Bagi Tahun 2019 / Percentage of officers attending courses for the year 2019

1,381 pegawai hadir tujuh (7) hari dan lebih kursus bagi tahun 2019 /
1,381 of DOE staff attending courses for seven (7) days or more in 2019

111 orang/employees

Penerima Anugerah Perkhidmatan Cemerlang (APC) 2019 / Recipients of Excellent Service Award (APC) 2019

Majlis APC dijadualkan pada 27 Februari 2020 /
The event was held on 27th February 2020

PECAHAN PEGAWAI MENGIKUT JANTINA/ BREAKDOWN OF OFFICERS BY GENDER	
Lelaki/ Male	778
Perempuan/ Female	614

PECAHAN PERJAWATAN/ BREAKDOWN OF POSITION	
Pegawai Teknikal/ Technical Officer	1,133
Pegawai Gunasama/Kader/ Non-Technical Officer	412

PERBELANJAAN PEMBANGUNAN JAS 2019

JAS telah menerima sejumlah RM72,886,580.00 peruntukan pembangunan bagi tahun 2019. Daripada RM72.8 juta ini, sebanyak 14 projek pembangunan telah selesai dilaksanakan dengan prestasi perbelanjaan sebanyak 99.21%.

DEVELOPMENT EXPENDITURE OF DOE IN 2019

DOE has received an allocation of RM72,886,580.00 for development expenditure in 2019. Based on this RM72.8 mil, DOE has accomplished 14 development projects with the expenditure up to 99.21%.

PERUNTUKAN 2019 / BUDGET ALLOCATION IN 2019

RM72,886,580.00

PERBELANJAAN 2019 / EXPENDITURE IN 2019

RM72,311,550.38

ANGGARAN BELANJA MENGURUS 2019

Anggaran Belanja Mengurus yang telah diluluskan bagi tahun 2019 adalah sebanyak RM115,697,200.00 Manakala, Peruntukan Dipinda sehingga 31 Disember 2019 adalah sebanyak RM127,904,200.00. Maklumat Anggaran Belanja Mengurus Tahun 2019 Mengikut Objek Am adalah seperti **Jadual 2.1**.

ESTIMATED OPERATING EXPENDITURE 2019

Approved Estimated Operating Expenditure for 2019 is RM115,697,200.00. Meanwhile, Budget Amendment as at 31st December 2019 is RM127,904,200.00. Details of Estimated Operating Expenditure 2019 is as shown in **Table 2.1**.

Jadual 2.1: Anggaran Belanja Mengurus 2019 Mengikut Objek Am Maklumat
Table 2.1: Details of Estimated Operating Expenditure 2019

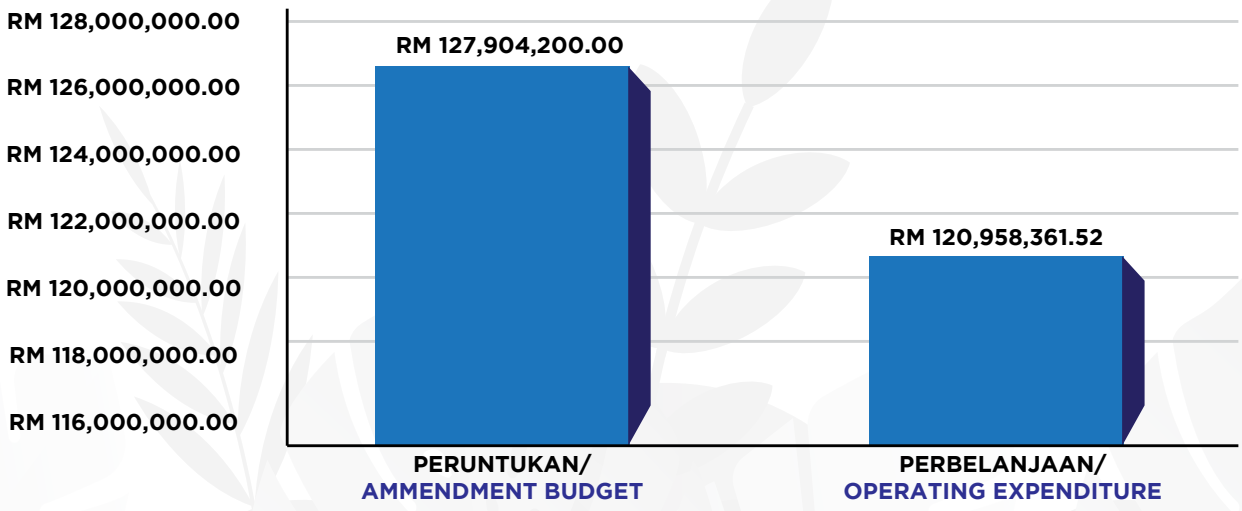
OBJEK AM/ GENERAL OBJECT	PERIHAL OBJEK AM/ DESCRIPTION OF OBJEK AM	PERUNTUKAN DILULUSKAN (RM)/ APPROVED BUDGET	PERUNTUKAN DIPINDA (RM)/ BUDGET AMENDMENT
10000	Emolumen/ Emoluments	89,877,300.00	89,877,300.00
20000	Perkhidmatan dan Bekalan/ Services and Supplies	24,999,600.00	25,538,100.00
30000	Aset/ Assets	-	11,268,500.00
40000	Pemberian dan Kenaan Bayaran Tetap/ Grants and fixed Charges	820,300.00	1,220,300.00
JUMLAH KESELURUHAN / TOTAL		**115,697,200.00**	**127,904,200.00**

PERBELANJAAN MENGURUS 2019

JAS telah membelanjakan sebanyak RM120,958,361.52 iaitu sebanyak 94.57% daripada Peruntukan Dipinda. Maklumat Perbelanjaan Mengurus Tahun 2019 adalah seperti di **Rajah 2.1**.

OPERATING EXPENDITURE 2019

DOE spent RM120,958,361.52 which is 94.57% of the Budget Amendment. Details of Operating Expenditure 2019 is shown in **Figure 2.1**.



Rajah 2.1: Maklumat Perbelanjaan Mengurus 2019
Figure 2.1 : Operating Expenditure 2019

BAB 3
CHAPTER 3

PENILAIAN KESAN KEPADA ALAM SEKELILING (EIA) DAN INPUT KEPADA PERANCANGAN PEMBANGUNAN

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND INPUT FOR DEVELOPMENT

PENILAIAN KESAN KEPADA ALAM SEKELILING (EIA) DAN INPUT KEPADA PERANCANGAN PEMBANGUNAN
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND INPUT FOR DEVELOPMENT

EIA merupakan satu alat perancangan untuk mencegah, mengelakkan dan mengurangkan kesan-kesan kepada alam sekitar akibat aktiviti pembangunan. Laporan EIA yang baik boleh membantu untuk mengelakkan kos perbelanjaan yang tidak sepatutnya bagi membaikpulih kerosakan alam sekitar akibat daripada elemen penting yang terlepas pandang semasa dalam peringkat perancangan.

EIA adalah kajian untuk mengenal pasti, meramal, menilai dan memberi maklumat mengenai kesan-kesan kepada alam sekeliling bagi sesuatu cadangan projek dan memperincikan langkah-langkah tebatan sebelum projek berkenaan diluluskan dan dilaksanakan.

EIA is essentially a planning tool for preventing, avoiding, and reducing the environmental impacts due to development activities. A good EIA report helps to avoid unnecessary costs in rehabilitating a damaged environment due to unheeded significant elements during the planning stage.

EIA is a study to identify, predict, evaluate, and communicate information about the impacts of a proposed project on the environment and to detail out the mitigating measures prior to project approval and implementation.

DIALOG AWAM BERSAMA JAS BERKAITAN PENGUKUHAN PROSEDUR PENILAIAN KESAN ALAM SEKELILING (EIA)
PUBLIC DIALOGUE ON THE STRENGTHENING OF ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURE WITH DOE

Satu sesi dialog awam anjuran JAS berkaitan pengukuhan prosedur EIA telah diadakan pada 29 Januari 2019, bertempat di Dewan Baiduri, Wisma Sumber Asli, Wilayah Persekutuan Putarajaya. Dialog awam ini diadakan bertujuan untuk mendapatkan cadangan dan pandangan daripada pemegang taruh-pemegang taruh berkaitan pengukuhan prosedur EIA. Sesi dialog awam ini telah dipengerusikan oleh YBhg. Dr Nagulendran Kangayatkarasu, Timbalan Ketua Setiausaha (Perancangan dan Pengkormesialan), Kementerian Tenaga, Sains, Teknologi, Alam Sekitar & Perubahan Iklim (MESTECC) sebagai moderator, manakala ahli panelnya terdiri daripada YBhg Dato' Dr. Ahmad Kamarulnajuib Che Ibrahim, Ketua Pengarah Alam Sekitar dan Puan Rohimah Ayub, Pengarah Bahagian Penilaian, JAS.

A public dialogue session organised by the DOE on strengthening the EIA procedure was held on 29th January 2019 at Dewan Baiduri, Wisma Sumber Asli, Wilayah Persekutuan Putrajaya. The public dialogue was held to seek advice and views from stakeholders on strengthening the EIA procedure. This public dialogue session was chaired by YBhg. Dr Nagulendran Kangayatkarasu, Deputy Secretary General (Planning and Commercialisation), Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), who was the moderator, while the panel consisted of YBhg. Dato' Dr. Ahmad Kamarulnajuib Che Ibrahim, Director General of Environment and Mrs. Rohimah Ayub, Director of Assessment Division, DOE.

Sesi dialog awam telah dihadiri 307 orang peserta yang terdiri daripada:

i. 96 orang awam;

ii. 10 Badan Bukan Kerajaan (NGO);

iii. 100 jururunding EIA;

iv. 14 ahli akademik daripada universiti;

v. 19 penggerak projek; dan

vi. 68 wakil daripada pelbagai agensi kerajaan.

The public dialogue session was attended by 307 participants consisting of:

i. 96 publics;

ii. 10 Non-Governmental Organisations (NGOs);

iii. 100 EIA consultants;

iv. 14 academics from higher education institutions;

v. 19 project proponents; and

vi. 68 representatives from various government agencies.

Hasil daripada dialog awam ini, pelbagai cadangan dan pandangan telah diterima daripada pemegang taruh iaitu berkaitan dasar, prosedur dan libat urus pemegang taruh. Kesemua cadangan yang diterima telah dikaji dan telah diambilkira dalam pengukuhan prosedur EIA di Malaysia.

As a result of this public dialogue, various suggestions and views have been received from the stakeholders regarding the policies, procedures, and stakeholder engagements. All the suggestions received have been reviewed and taken into account in strengthening the EIA procedure in Malaysia.

Dialog Awam Pengukuhan Prosedur EIA yang Telah dihadiri oleh Ramai Peserta dari Pelbagai Latar Belakang
Public Dialogue on The Strengthening of EIA Procedures which was Attended by Participants from Various Backgrounds

LAPORAN EIA
EIA REPORTS

Sejumlah 353 laporan EIA telah diterima dan diproses oleh JAS pada tahun 2019 **(Rajah 3.1)**. Ia terdiri daripada 313 (89%) laporan bagi aktiviti yang tertakluk dalam Jadual Pertama, Perintah Kualiti Alam Sekelililng (Aktiviti Yang Ditetapkan) (Penilaian Kesan Kepada Alam Sekeliling) 2015, dan 40 (11%) laporan bagi aktiviti yang tertakluk dalam Jadual Kedua perintah tersebut.

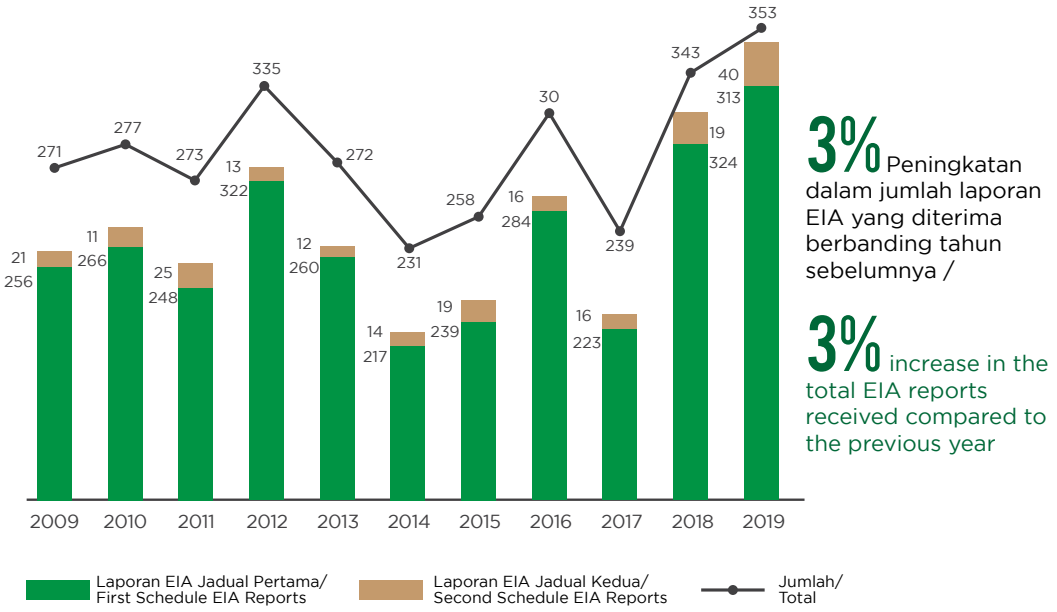
A total of 353 EIA reports were received and processed by DOE in 2019 **(Figure 3.1)**. They comprised 313 (89%) reports of activities that are specified in the First Schedule of Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015, and 40 (11%) reports of activities that are subjected to the Second Schedule of the order.

Selangor menerima bilangan laporan EIA tertinggi pada tahun 2019 iaitu sebanyak 67 (19%), Pahang 55 (16%), dan Kelantan 42 (12%) **(Rajah 3.2).**

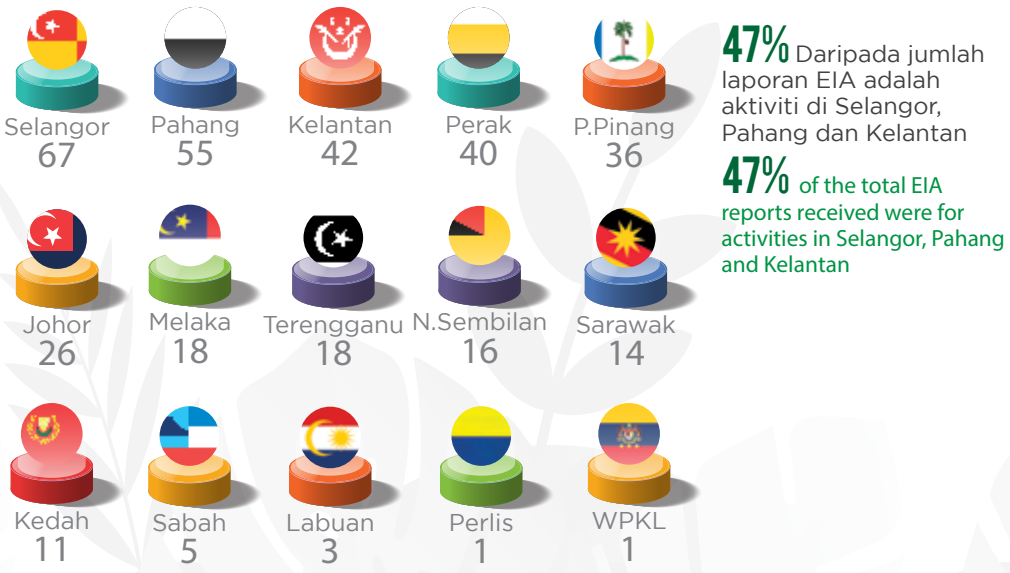
Laporan EIA bagi aktiviti berkaitan pengolahan dan pelupusan buangan merupakan yang paling banyak diterima pada tahun 2019 iaitu 95 (27%), perhutanan 65 (18%), dan industri 45 (13%) **(Rajah 3.3)**.

Selangor received the highest number of EIA reports in 2019 with 67 (19%) reports, followed by Pahang with 55 (16%) reports and Kelantan with 42 (12%) **(Figure 3.2)**.

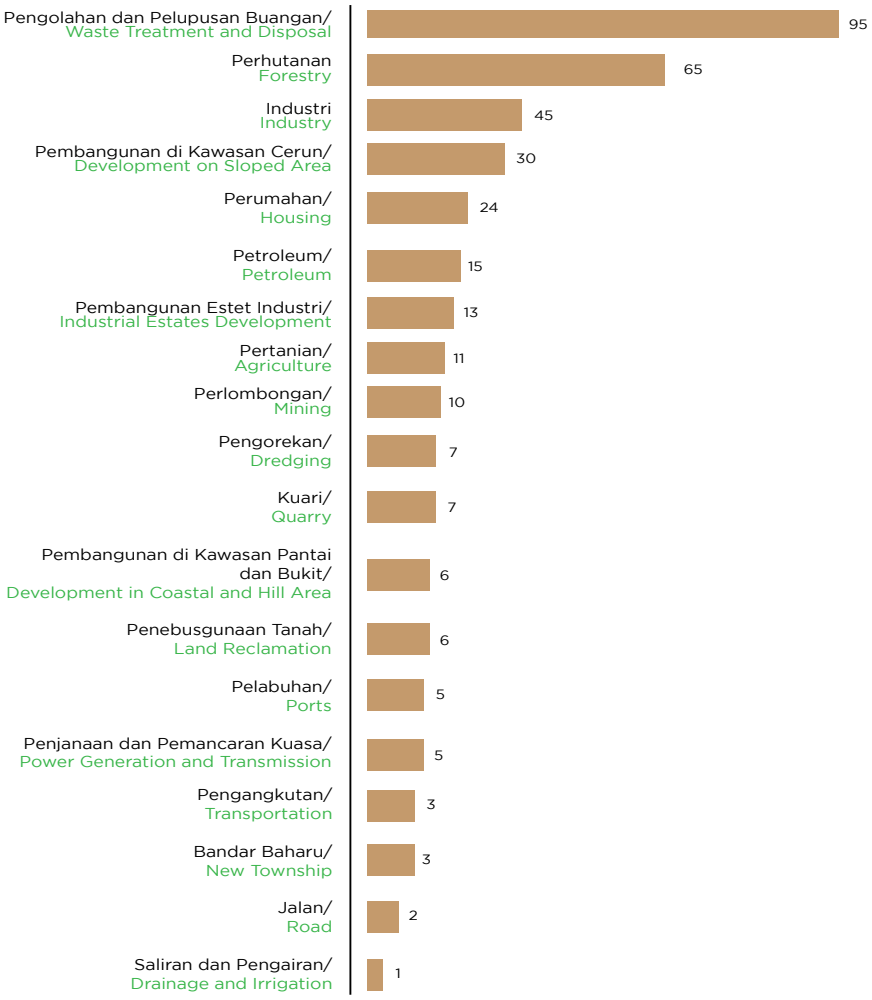
The EIA reports for activities related to waste treatment and disposal were the most received in the year 2019 with 95 (27%), forestry 65 (18%) and industries 45 (13%) **(Figure 3.3)**.



Rajah 3.1 Bilangan Laporan EIA yang Diterima Mengikut Tahun
Figure 3.1 The Number of EIA Reports Received by Years



Rajah 3.2 Bilangan Laporan EIA yang Diterima Mengikut Negeri 2019
Figure 3.2 The Number of EIA Reports Received by State 2019

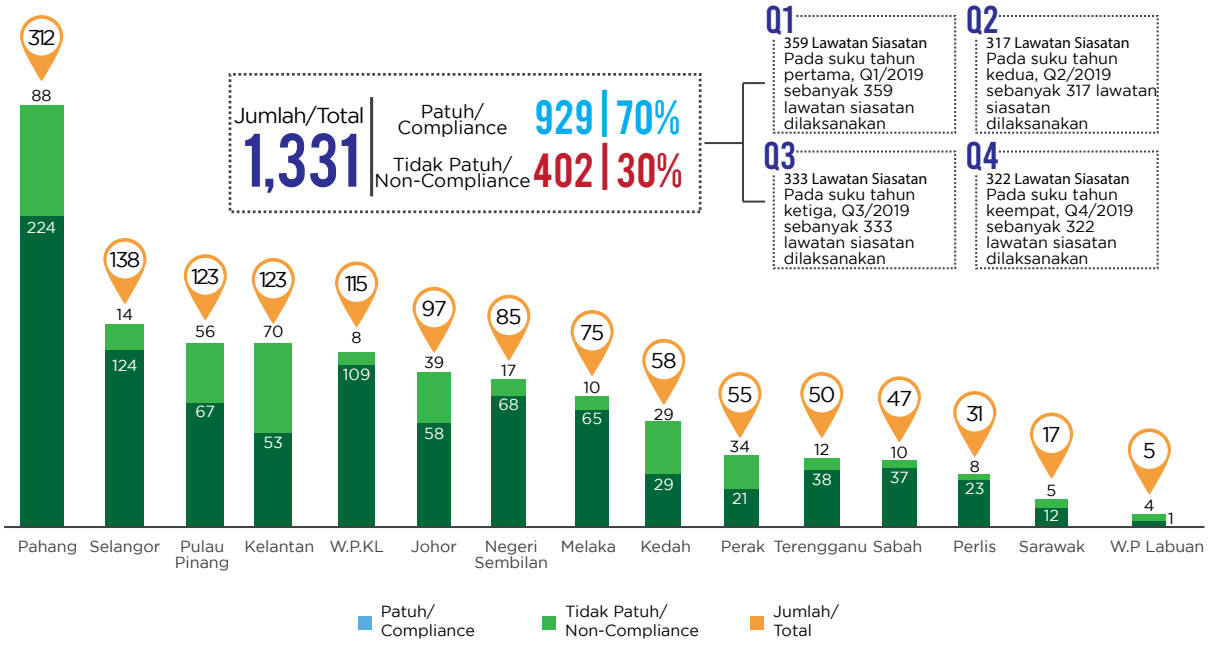


Rajah 3.3 Bilangan Laporan EIA yang Diterima Mengikut Aktiviti 2019
Figure 3.3 The Number of EIA Reports Received by Activity 2019

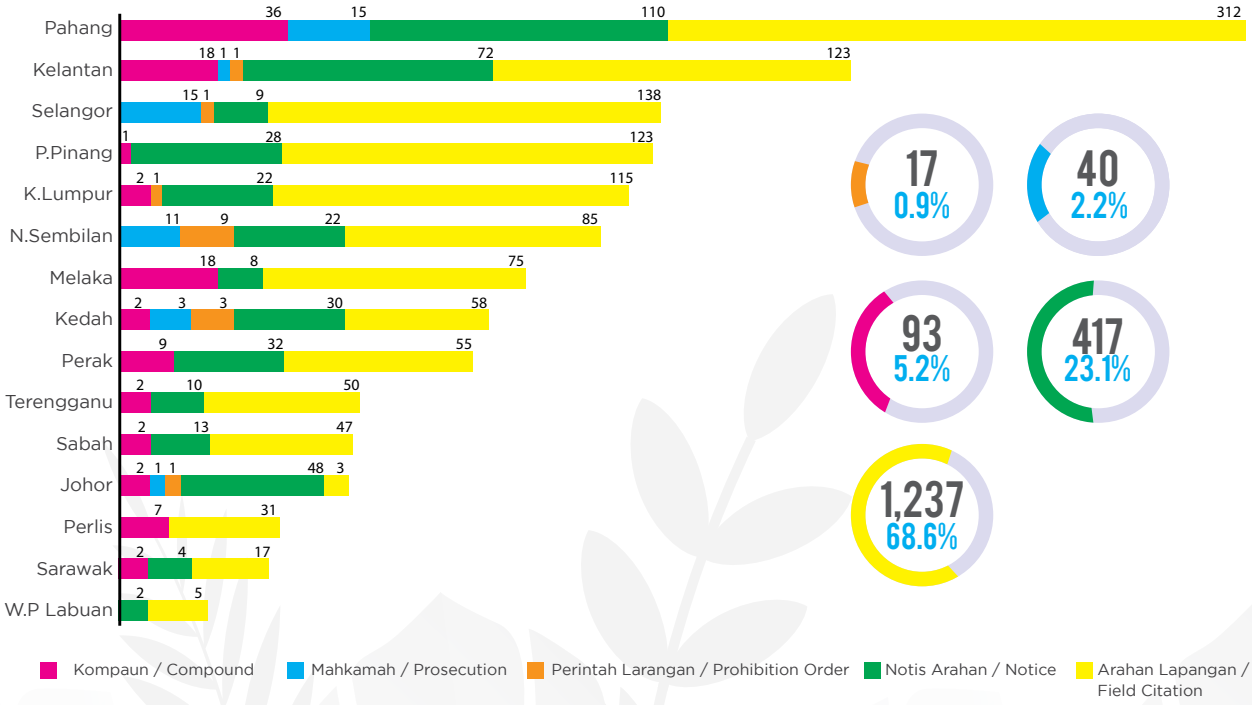
SIASATAN PENGUATKUASAAN PROJEK EIA
EIA ENFORCEMENT INVESTIGATIONS

Sejumlah 1,331 siasatan penguatkuasaan telah dijalankan pada tahun 2019 untuk mengenalpasti status pembangunan dan pematuhan projek-projek EIA **(Rajah 3.4)**. Sejumlah 929 (70%) daripada siasatan tersebut menunjukkan pematuhan terhadap syarat kelulusan EIA manakala 402 (30%) adalah tidak patuh**.** Hasil daripada siasatan tersebut juga, sejumlah 1,237 arahan lapangan, 417 notis arahan, 93 kompaun telah dikeluarkan manakala 40 kes telah didakwa di mahkamah kerana tidak mematuhi syarat-syarat kelulusan EIA. Selain itu, sebanyak 17 perintah larangan (PL/ PBK) di bawah Seksyen 34AA, Akta Kualiti Alam Sekeliling 1974 juga telah dikeluarkan **(Rajah 3.5)**.

A total of 1,331 enforcement inspections on EIA projects were conducted in 2019 to examine the project development status and compliance to EIA approval conditions **(Figure 3.4)**. A sum of 929 (70%) of the inspections demonstrated compliance to EIA approval conditions while 402 (30%) were non-compliant. The enforcement inspections have also indicated 1,237 field citations, 417 notices, 93 compounds issued, and 40 cases that were charged in court for not complying with the terms of the EIA approval. In the meantime, 17 prohibition orders under Section 34AA, Environmental Quality Act 1974 had been issued **(Figure 3.5)**.



Rajah 3.4: Bilangan Lawatan Penguatkuasaan EIA 2019
Figure 3.4: The Number of EIA Enforcement Inspection 2019



Rajah 3.5: Tindakan Susulan Penguatkuasaan EIA 2019
Figure 3.5: Follow Up Action of EIA Enforcement Investigations 2019

SKIM PENDAFTARAN JURURUNDING EIA
EIA CONSULTANTS REGISTRATION SCHEME

Skim Pendaftaran Jururunding EIA yang baru telah mula diperkenalkan pada 1 Jun 2007. Pendaftaran Jururunding EIA ini telah menjadi satu keperluan undang-undang di bawah Akta Kualiti Alam Sekeliling 1974 (Pindaan 2012) yang mewajibkan semua jururunding EIA untuk berdaftar dengan JAS sebelum menjalankan kajian EIA.

Pendaftaran adalah terbuka kepada individu dan dikategorikan kepada tiga (3) kategori iaitu Jururunding EIA, Jururunding Subjek, dan Pembantu Jururunding.

Pemohon boleh mengemukakan permohonan untuk didaftarkan di bawah kategori yang bersesuaian dengan kelayakan akademik, kepakaran dan pengalaman mereka.

Tempoh sah pendaftaran bagi Jururunding EIA adalah selama tiga (3) tahun. Pendaftaran hendaklah diperbaharui setelah tamat tempoh yang ditetapkan.

Pemohon yang ingin berdaftar di bawah Skim Pendaftaran Jururunding EIA perlu merujuk kepada keperluan yang telah digariskan dalam EIA Consultant Registration Scheme Guidance Document.

Individu yang telah didaftarkan di dalam Skim ini akan disenaraikan dan dipaparkan di dalam laman web JAS untuk rujukan pihak yang berkepentingan.

Sebanyak 178 permohonan telah diterima pada tahun 2019 di mana hanya 136 layak untuk didaftarkan. Sehingga 31 Disember 2019, sejumlah 1,369 individu telah berdaftar di bawah Skim Pendaftaran Jururunding EIA, dimana 435 orang adalah Jururunding EIA, 389 orang Jururunding Subjek dan 545 orang adalah Pembantu Jururunding **(Jadual 3.1)**.

The new EIA Consultant Registration Scheme was introduced on 1st June 2007. This registration of EIA consultants has become a legal requirement under the Environmental Quality Act 1974 (Amendment 2012), which requires all EIA consultants to be registered with DOE prior to carrying out any EIA studies.

Registration is open for individuals and divided into three (3) categories, namely EIA Consultant, Subject Consultant, and Assistant Consultant.

Applicants may apply for registration under any category appropriate to their academic qualification, expertise, and experience.

The validity period for registered EIA consultants is three (3) years. Renewal is required at the end of the validity period to remain active.

Any applicant who wish to be registered under the EIA Consultant Registration Scheme may refer to the EIA Consultant Registration Scheme Guidance Document.

Individuals who are registered in the Scheme will be listed and published on the website for stakeholders' reference.

A total of 178 applications were received in 2019 where only 136 were qualified to be registered. As of 31st December 2019, DOE has registered 1,369 individuals under the EIA Consultant Registration Scheme, where 435 are EIA Consultants, 389 are Subject Consultants, and 545 are Assistant Consultants **(Table 3.1)**.

Jadual 3.1: Jumlah Permohonan Yang Diluluskan Bagi 2019
Table 3.1: Number Of Applications Approved in 2019

KATEGORI/ CATEGORY	JUMLAH DILULUSKAN/ NO. OF APPROVED	PERATUSAN (%) / PERCENTAGE(%)
Jururunding EIA/ EIA Consultant	82	60
Jururunding Subjek/ Subject Consultant	35	26
Pembantu Jururunding/ Assistant Consultant	19	14
Jumlah/ Total	**136**	**100**

AUDIT ALAM SEKELILING ENVIRONMENTAL AUDIT

Sebagaimana peruntukan Seksyen 33A, Akta Kualiti Alam Sekeliling 1974, Ketua Pengarah boleh mengarahkan pemunya atau penduduk mana-mana premis untuk melaksanakan audit alam sekeliling dan mengemukakan Laporan Audit Alam Sekeliling mengikut kaedah yang ditetapkan.

As a provision of Section 33A of the Environmental Quality Act 1974, the Director General may require the owner or occupier of any premises to conduct an environmental audit and submit the Environmental Audit Report according to the procedure stated.

Audit alam sekeliling bagi aktiviti pembangunan yang tertakluk di bawah Perintah Kualiti Alam Sekeliling (Penilaian Kesan Kepada Alam Sekeliling) (Aktiviti Yang DItetapkan) 2015 dilaksanakan bertujuan memastikan pematuhan kepada syarat-syarat EIA yang diluluskan dan seterusnya memastikan pematuhan kepada AKAS 1974.

The environmental audit for prescribed activities subjected to the Environmental Quality (Environmental Impact Assessment) (Prescribed Activity) Order 2015 is conducted to ensure compliance with the EIA condition approval and subsequently compliance with EQA 1974.

Audit alam sekeliling ini merupakan Audit Pihak Ketiga yang perlu dilaksanakan oleh Juruaudit yang berdaftar dengan Skim Pendaftaran Juruaudit Alam Sekitar, JAS.

The environmental audit is a third-party audit that is conducted by auditors registered with the Environmental Auditor Registration Scheme under DOE.

JAS hanya menerima laporan-laporan audit pematuhan yang disediakan oleh Juruaudit Alam Sekitar yang berdaftar dengan JAS sahaja.

DOE only accepts compliance audit reports provided by the Environmental Auditors registered with the department.

Individu yang didaftarkan telah memenuhi kriteria Skim Pendaftaran Juruaudit Alam Sekitar yang ditetapkan oleh Jabatan. Skim pendaftaran ini bertujuan memastikan individu yang layak sahaja dibenarkan menjalankan audit alam sekeliling dan

Registered individuals have fulfilled the criteria specified by the Department stated in Environmental Auditors Registration Scheme. This registration scheme is intended to ensure that only eligible individuals are allowed to conduct environmental audits and to ensure

memastikan pelaksanaan audit dan pelaporan audit alam sekeliling mengikut prosedur dan garis panduan yang ditetapkan.

the performance of audit and reporting of environmental audits in accordance with established procedures and guidelines

Senarai nama Juruaudit yang berdaftar dipamerkan di dalam laman web JAS untuk rujukan pihak berkepentingan.

List of the Environmental Auditor registered is published on the DOE website for the stakeholders' reference.

Demi memastikan ketelusan dalam Laporan Audit, Juruaudit perlu mematuhi Manual Panduan Audit Alam Sekitar di mana, dapatan audit perlu dikemukakan oleh juruaudit dalam tempoh satu (1) dari tarikh audit manakala Laporan Audit perlu dikemukakan dalam tempoh 14 hari dari tarikh audit dilaksanakan.

In order to ensure transparency in the Audit Report, the Auditors must comply with the Environmental Audit Manual, whereby the audit findings must be submitted by the auditor within one (1) day from the date of the audit while the Audit Report must be submitted within 14 days from the date of the audit.

Sehingga 31 Disember 2019, sebanyak 108 orang individu telah didaftarkan sebagai Juruaudit Alam Sekitar. Bagi tahun 2019, sebanyak tujuh (7) permohonan baharu telah diterima dan kesemuanya telah didaftarkan sebagai Juruaudit Alam Sekitar manakala bagi permohonan pembaharuan, pihak jabatan telah menerima 10 permohonan dan lapan (8) permohonan telah diluluskan **(Jadual 3.2)**.

As of 31st December 2019, a total of 108 individuals have been registered as Environmental Auditors. For 2019, a total of seven (7) new applications were processed and all of them have been successfully registered as Environmental Auditor while for the renewal application, the department received 10 applications and eight (8) applications have been approved **(Table 3.2)**.

Pada tahun 2019, sebanyak 628 Laporan Audit Alam Sekeliling telah diterima oleh Jabatan **(Rajah 3.6)**. Selangor menunjukkan jumlah pelaksanaan audit alam sekeliling tertinggi iaitu 190 audit, Johor (94) dan Pahang (68). Lain-lain negeri menunjukkan penerimaan Laporan Audit Alam Sekeliling antara tiga (3) sehingga 45 laporan.

For 2019, a total of 628 Environmental Audit Reports were received by the department **(Figure 3.6)**. According to the figure, Selangor showed the highest number of environmental audits conducted (190), Johor (94) and Pahang (68). For other states, the Environmental Audit Reports received were within three (3) to 45 reports.

Berdasarkan Laporan Audit yang diterima, terdapat beberapa penemuan menunjukkan kegagalan dilakukan oleh Penggerak Projek dan menyalahi AKAS 1974. Antara penemuan tersebut adalah kegagalan pemasangan Best Practicable Means (BMP) yang sempurna, kegagalan mengemukakan laporan status pembangunan projek dan juga tidak mengemukakan Environmental Management Plan yang terkini untuk kelulusan Jabatan.

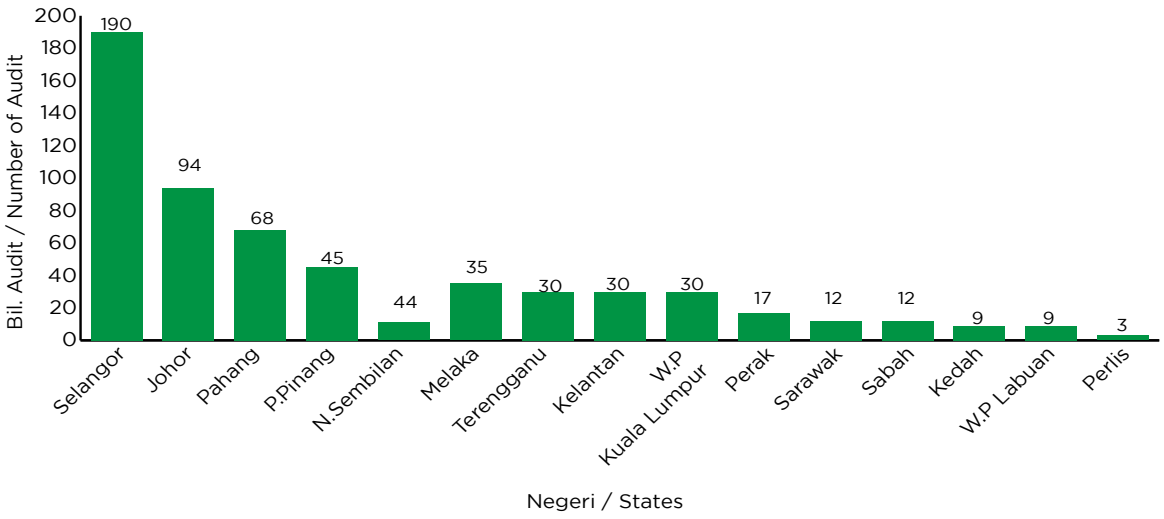
Based on the audit reports received, some of the finding indicated that there are still failures done by Project Proponents, which contravened the EQA 1974. Some of the findings denoted failure to install proper Best Practicable Means (BPM), failure to submit the project development status report, and not submitting the updated Environmental Management Plan for approval.

Pelaksanaan audit ini merupakan salah satu langkah pencegahan tidak langsung yang sangat digalakkan untuk dilaksanakan bagi memastikan keperluan alam sekitar dipatuhi dan seterusnya membantu pembangunan yang lebih lestari.

Audit implementation is one of the preventive measures to ensure that environmental requirements are in compliance with related acts and requirements, and thus contribute towards sustainable development.

Jadual 3.2: Bilangan Permohonan Juruaudit Alam Sekitar Yang Diluluskan 2019
Table 3.2: Number Of Approved Environmental Auditor Applications In 2019

JENIS PERMOHONAN/ TYPES OF APPLICANT	JUMLAH PERMOHONAN/ NO. OF APPLICANTS	JUMLAH LULUS/ NO. OF APPLICATIONS APPROVED	PERATUSAN LULUS/ PERCENTAGE APPROVED
Baharu/ New	7	7	100%
Pembaharuan/ Renewal	10	8	80%



Rajah 3.6: Bilangan Audit Alam Sekeliling bagi Aktiviti EIA 2019
Figure 3.6: Number of Environmental Audit for EIA Activities 2019

KURSUS INDUKSI UNTUK JURUAUDIT ALAM SEKITAR
INDUCTION COURSE FOR ENVIRONMENTAL AUDITOR

Bermula dari tahun 2010, semua juruaudit alam sekitar yang berdaftar dikehendaki menghadiri Kursus Induksi wajib bagi Juruaudit Alam Sekitar dan lulus penilaian yang berkenaan sebagai syarat untuk memperbaharui pendaftaran mereka.

Tujuan kursus ini adalah untuk memberikan penerangan terperinci kepada semua Juruaudit Alam Sekitar tentang keperluan-keperluan pentadbiran dan teknikal semasa menjalankan audit alam sekitar, meningkatkan pemahaman terhadap undang-undang dan peraturan Akta Kualiti Alam Sekeliling, 1974 dan konvensyen yang berkaitan serta memberi panduan untuk pelaporan audit alam sekeliling mengikut format yang ditetapkan oleh JAS.

Starting from 2010, all registered environmental auditors are required to attend a compulsory Induction Course for Environmental Auditors and pass the relevant assessments as a condition for renewing their registration.

The objectives of the course are to guide the registered Environmental Auditors to undertake environmental audits in a manner that meets DOE requirements and audit procedures, to give better understanding on DOE legal requirements (Environmental Quality Act 1974) as well as other related conventions and to guide the environmental auditors to prepare Environmental Audit Reports in a format specified by DOE.

Pada tahun 2019, kursus induksi untuk Juruaudit Alam Sekitar telah diadakan pada 29 Julai hingga 1 Ogos 2019 di Hotel Bangi-Putrajaya, Bangi, Selangor.

In 2019, the Induction Course for Environmental Auditors was held on 29th July to 1st August 2019 at Hotel Bangi-Putrajaya, Bangi, Selangor.

PEMBANGUNAN PROFESIONAL BERTERUSAN (CPD)
CONTINUOUS PROFESSIONAL DEVELOPMENT (CPD)

Keperluan bagi Pembangunan Profesional Berterusan telah diwajibkan di bawah Skim Pendaftaran Juruaudit Alam Sekitar, dimana juruaudit berdaftar perlu mengumpul jumlah jam latihan yang tertentu bagi membolehkan mereka memperbaharui pendaftaran.

The requirement for Continuous Professional Development (CPD) has been included under the Environmental Auditor Registration Scheme whereby the registered auditors are required to obtain a certain number of training or CPD hours to enable them to renew their registration.

Mana-mana penyedia latihan boleh memohon kepada pihak Institut Alam Sekitar Malaysia (EiMAS) bagi mendapatkan jam kredit. Maklumat berkenaan program-program ini kemudiannya disebarkan kepada semua juruaudit berdaftar.

Course organizers or course providers may apply to the Environment Institute of Malaysia (EiMAS) to obtain CPD hours for their programmes. Information about the programmes are disseminated to all registered auditors.

SESI LIBAT URUS BAGI PEMAKAIAN ENVIRONMENTAL ESSENTIALS FOR SITING OF INDUSTRIES IN MALAYSIA (EESIM) BERSAMA PEMEGANG TARUH
ENGAGEMENT SESSION FOR ENVIRONMENTAL ESSENTIALS FOR SITING OF INDUSTRIES IN MALAYSIA (EESIM) WITH STAKEHOLDERS

EESIM telah diterbitkan pada tahun 2017. Ianya mengambilkira impak-impak alam sekitar yang perlu dikaji berdasarkan kepada jenis aktiviti pembangunan industri yang dicadangkan melalui keperluan aplikasi teknologi dan alat kawalan pencemaran yang berkesan dalam memastikan kesesuaian tapak cadangan pembangunan.

EESIM was published in 2017. It considers the environmental impacts that need to be studied based on the types of industrial development activities proposed through the application of effective technology and pollution control tools in ensuring the suitability of the proposed development site.

Panduan ini akan dapat membantu Kerajaan Persekutuan, Kerajaan Negeri, Pihak Berkuasa Tempatan, dan JAS dalam merancang dan menentukan kawasan pembangunan dan penempatan dan industri yang dicadangkan.

This guidance will assist the Federal and State Government, Local Authorities, and DOE in planning and determining the proposed development and placement areas of the industry.

Sehubungan itu, panduan ini perlu digunapakai dalam membuat penilaian tapak cadangan projek dengan menyelaras dan memperkenalkan keperluan aspek terkini alam sekitar ke arah pematuhan kendiri

In this regard, this guidance should be used in evaluating the project proposal site by coordinating and introducing the latest environmental aspect requirements towards guided self-regulation in line with the concept

terpimpin atau guided self-regulation selaras dengan konsep pembangunan mampan.

Sehingga kini, JAS masih meneruskan sesi libat urus bagi penerangan pemakaian EESIM ini dari semasa ke semasa kepada pelbagai pemegang taruh yang terlibat dengan penggunaan EESIM. Pada tahun 2019, sebanyak lima (5) sesi libat urus pemakaian EESIM telah dilaksanakan iaitu kepada Kementerian Pembangunan Usahawan dan Industri (MIED) Sarawak, Jawatankuasa Teknikal Perancang Negeri Melaka, Jawatankuasa Perancang Negeri Pahang, Agensi Kerajaan Negeri Johor dan Agensi Kerajaan Negeri Perak.

of sustainable development.

To this day, DOE continues to conduct engagement sessions in describing the application of EESIM from time to time to various stakeholders involved in the use of EESIM. In 2019, five (5) engagement sessions of EESIM implementation were conducted with the Sarawak Ministry of Industrial and Entrepreneur Development (MIED), Melaka Planning Technical Committee, Pahang State Planning Committee, Johor State Government Agencies, and Perak State Government Agencies.

PERMOHONAN KELULUSAN MENJALANKAN AKTIVITI EKPLORASI DI DALAM KAWASAN ZON EKONOMI EKSKLUSIF (ZEE)
APPLICATIONS FOR APPROVAL OF EXPLORATION ACTIVITIES IN THE EXCLUSIVE ECONOMIC ZONE (EEZ)

Eksplorasi minyak dan gas amat penting kepada pembangunan negara di mana ianya merupakan salah satu Program Transfomasi Ekonomi, di bawah peluang perniagaan yang dikenalpasti dalam Bidang Utama Ekonomi Negara (NKEA).

Kebanyakkan lokasi medan eksplorasi minyak dan gas ini adalah di ZEE. Kelulusan bagi projek petroleum di kawasan ini adalah di bawah Jawatankuasa Menimbang Dan Meluluskan Permohonan Di Bawah Seksyen 21(1) dan Seksyen 22 Akta Zon Ekonomi Eksklusif 1984, iaitu di bawah Akta Zon Ekonomi Eksklusif 1984 (Akta 311). Jawatankuasa ini diselaraskan oleh pihak Kementerian Kementerian Perdagangan Dalam Negeri dan Hal Ehwal Pengguna (KPDNHEP) sebagai pihak Urusetia.

JAS merupakan salah satu agensi yang memberi input di dalam mempertimbangkan kelulusan permohonan di bawah Jawatankuasa ini yang berperanan menilai sesuatu permohonan untuk kerja-kerja membina, mengendali atau menggunakan mana-mana pulau, pepasangan atau struktur buatan, pemasangan kabel serta talian paip di ZEE.

The exploration of oil and gas is crucial to the development of the country, which is one of the Economic Transformation Programmes (ETP) under the business opportunities identified in the National Key Economic Area (NKEA).

Most of these oil and gas exploration field locations are in the EEZ. Approval for petroleum projects in the EEZ area is subjected to the committee to consider and approve under Section 21 (1) and Section 22 of the Exclusive Economic Zone Act 1984, which is under the Exclusive Economic Zone Act 1984 (Act 311). The committee is co-ordinated by the Ministry of Domestic Trade and Consumer Affairs (KPDNHEP) as the Secretariat.

DOE is one of the agencies that provide input in considering the approval of applications under this Committee with the decision-making process of evaluating any application regarding the construction, to operate or use any island, installation or man-made structure, cable installation and pipeline in the EEZ.

Pengurusan permohonan JKZEE ditambah baik dengan penyelarasan antara agensi, komitmen agensi berkaitan dan pengunaan teknologi semasa dalam meningkatkan kecekapan dalam menguruskan permohonan aktiviti cari gali di ZEE.

Pada tahun 2019, JAS telah menerima sebanyak 44 permohonan pembangunan di dalam kawasan ZEE ini yang telah dinilai oleh JAS Negeri yang berkaitan. Permohonan yang paling tinggi diterima oleh JAS Sarawak iaitu sebanyak 34 permohonan.

JKZEE application management is enhanced with inter-agency coordination, commitment from agencies involved and the use of current technologies to improve the efficiency in managing the applications for the EEZ excavation activities.

In 2019, DOE has received a total of 44 development applications in the EEZ area which had been assessed by the involving DOE state office. DOE Sarawak received the highest number of applications with 34 applications.

INPUT ALAM SEKITAR KEPADA PERANCANGAN PEMBANGUNAN
ENVIRONMENTAL INPUT FOR DEVELOPMENT PLANNING

Pada tahun 2019, sejumlah 10,395 input alam sekitar telah diberikan oleh Pejabat JAS Negeri kepada penggerak projek, Kerajaan Negeri, Pihak Berkuasa Tempatan, Pejabat Tanah serta serta agensi-agensi lain yang berkaitan.

Input teknikal yang diberikan ini adalah penting bagi memastikan keperluan perundangan alam sekitar dipatuhi dan aspek alam sekitar diberikan pertimbangan yang sewajarnya di dalam proses membuat keputusan.

Di peringkat Ibu Pejabat JAS, input alam sekitar turut diberikan kepada agensi seperti Kementerian Perumahan dan Kerajaan Tempatan (KPKT), Malaysian Investment Development Authority (MIDA), Kementerian Perdagangan Dalam Negeri dan Hal-Ehwal Pengguna (KPDNHEP) dan Kementerian Air, Tanah dan Sumber Asli (KATS) mengenai penyelarasan perancangan pembangunan, pelaburan industri dari dalam dan luar negara, pelan tempatan, kajian rancangan fizikal negara, kajian kawasan sensitif alam sekitar, pembukaan medan minyak, aktiviti di kawasan tanah tinggi dan sebagainya.

In 2019, a total of 10,395 environmental input had been given by the DOE state offices to the project developers, State Governments, Local Authorities and Land Offices, as well as other relevant agencies.

This technical environmental inputs provided were crucial in ensuring legal requirements of the environment are complied with and environmental aspects were given due consideration in the decision-making process.

At the DOE Headquarters level, environmental inputs are also provided to relevant agencies such as the Ministry of Housing and Local Government, Malaysian Investment Development Authority (MIDA), Ministry of Domestic Trade and Consumer Affairs, and Ministry of Water, Land and Natural Resources in relation to development planning coordination, local plans, national physical plan study, foreign and local industrial investment, environmentally sensitive area study, oil and gas field development, development activities in the highlands, and others.

PEMBERITAHUAN DAN KELULUSAN BERTULIS
WRITTEN NOTIFICATION AND APPROVAL

Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan) 2009 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian), 2009 menghendaki supaya pihak premis mengemukakan pemberitahuan bertulis kepada Ketua Pengarah Alam Sekitar sebelum pembinaan sistem pengolahan kumbahan/ efluen perindustrian.

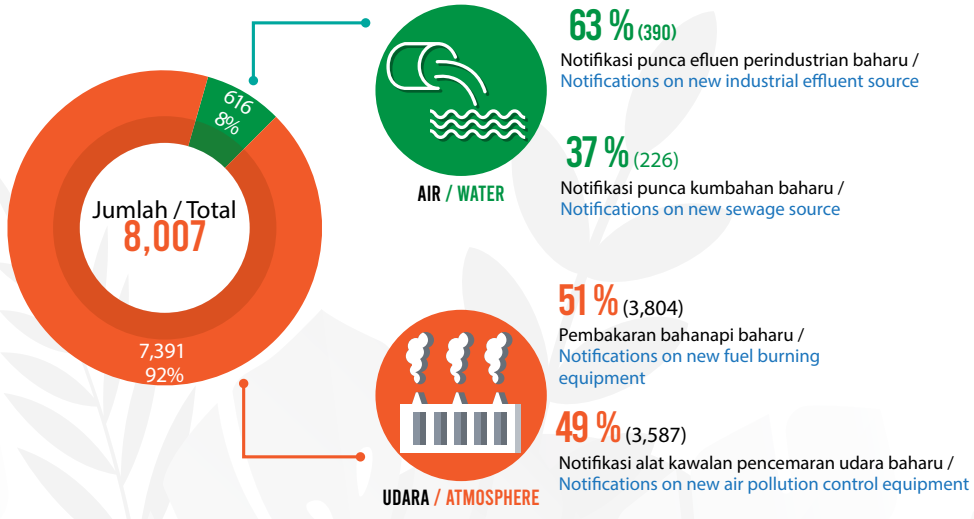
The Environmental Quality (Sewage) Regulations 2009 and Environmental Quality (Industrial Effluents) Regulations 2009 require the written notifications to be submitted to the Director General of Environmental Quality before the constructions of sewage / industrial effluent treatment system.

Manakala Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014 menghendaki supaya Kelulusan Bertulis diperolehi terlebih dahulu daripada Ketua Pengarah Alam Sekitar sebelum pemasangan alat pembakaran bahan api dan cerobong.

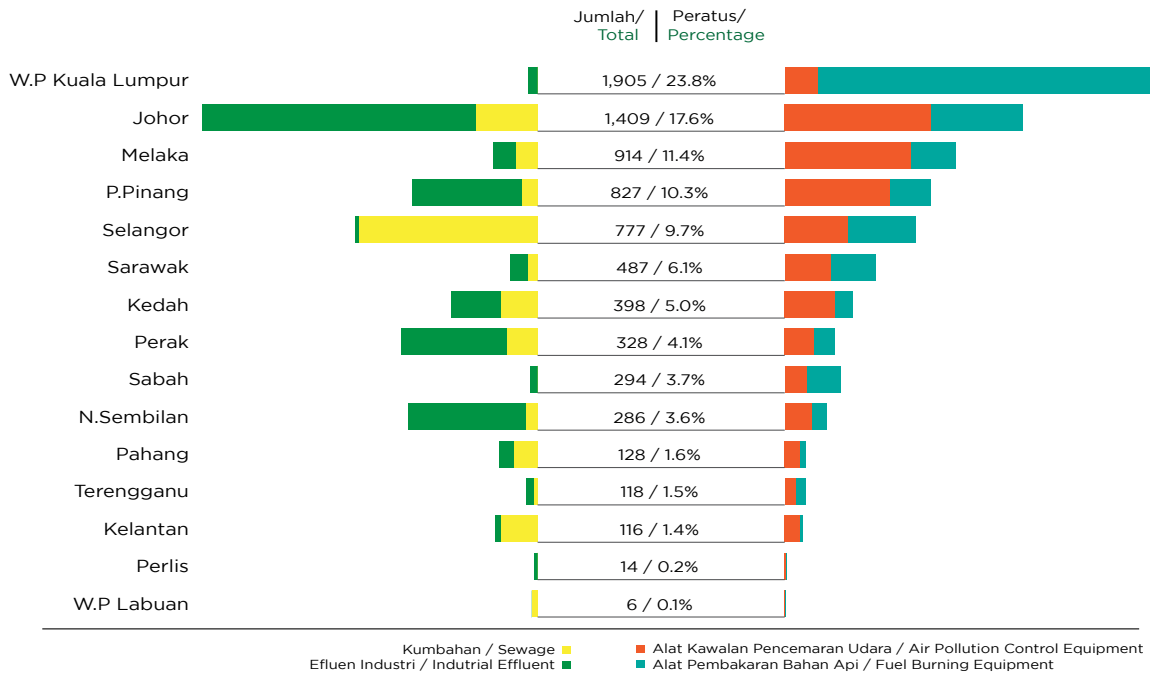
Meanwhile, the Environmental Quality (Clean Air) Regulations 2014 requires prior written approval to be obtained from the Director General of Environment before the installation of fuel burning equipment and chimney.

Pada tahun 2019, JAS telah menerima sejumlah 8,007 pemberitahuan bertulis bagi punca yang melibatkan pelepasan efluen dan pelepasan ke udara. Sebanyak 190 daripada jumlah tersebut adalah bagi pembinaan loji pengolahan kumbahan, 314 pemberitahuan bertulis untuk sumber baharu atau diubah pelepasan efluen perindustrian atau efluen bercampur dan 2,713 permohonan bagi pemasangan alat kawalan pencemaran udara. Tambahan itu, JAS juga telah memproses sebanyak 3,474 permohonan bagi kelulusan bertulis untuk pemasangan alat pembakaran bahan api seperti dandang dan alat janakuasa **(Rajah 3.7** dan **Rajah 3.8)**.

In 2019, DOE has received a total of 8,007 written notifications from sources which produce effluent discharge and air emission. 190 from the written notifications were for the construction of effluent treatment plants, 314 written notifications for new or altered sources of discharges of industrial effluents or mixed effluents, and 2,713 applications for the installation of air pollution control equipment. In addition, DOE processed a total of 3,474 applications for written approval for the installation of fuel burning equipment such as boilers and generator sets **(Figure 3.7** and **Figure 3.8)**.



Rajah 3.7: Bilangan Notifikasi bagi Pelepasan Kumbahan, Efluen Perindustrian, Alat Pembakaran Bahan Api, dan Alat Kawalan Pencemaran Udara, 2019
Figure 3.7: The Number of Notification for Sewage Discharge, Industrial Effluent, Fuel Burning Equipment and Air Pollution Control Equipment, 2019



Rajah 3.8: Bilangan Notifikasi bagi Pelepasan Kumbahan, Efluen Perindustrian, Alat Pembakaran Bahan Api, dan Alat Kawalan Pencemaran Udara Mengikut Negeri, 2019
Figure 3.8: The Number of Notification for Sewage Discharge, Industrial Effluent, Fuel Burning Equipment, and Air Pollution Control Equipment By State, 2019

PROJEK PEMBANGUNAN DI BAWAH RANCANGAN MALAYSIA KE-11
DEVELOPMENT PROJECT UNDER THE 11th MALAYSIA PLAN

Di bawah Rancangan Malaysia Ke-11, JAS telah melaksanakan Projek Pemantapan Kelestarian Alam Sekitar bermula tahun 2016 dan berakhir pada 2020. Projek ini adalah untuk memantap dan memperkasakan Pelaksanaan Prosedur EIA di Malaysia di bawah Akta Kualiti Alam Sekeliling 1974 melalui Pembentukan Garis Panduan Alam Sekitar selaras dengan Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kesan Kepada Alam Sekeliling) 2015.

Penerbitan garis panduan ini bertujuan membantu pihak penggerak projek, perunding serta pemegang-pemegang taruh berkaitan dalam memahami keperluan-keperluan semasa dalam penyediaan laporan EIA dari segi aspek skop yang berkaitan, impak alam sekitar, teknologi, rekabentuk, kawalan pencemaran dan pengurusan alam alam sekitar.

Under the 11th Malaysia Plan, DOE has implemented the Environmental Sustainability Project beginning from 2016 until 2020. This project is to strengthen and empower the implementation of EIA procedures in Malaysia under the Environmental Quality Act 1974 through the Establishment of Environmental Guidelines in accordance with the Environmental Quality (Assigned Activities) (Environmental Impact Assessment) 2015.

The publication of these guidelines are intended to assist project proponents, consultants, and relevant stakeholders in understanding the current requirements in preparing the EIA reports in terms of related scoping, environmental impact, technology, design, pollution control, and environmental management.

Sepanjang Rancangan Malaysia Ke-11, sejumlah 32 Garis Panduan EIA disediakan. Daripada jumlah tersebut, 25 garis panduan telah diterbitkan, manakala tujuh (7) garis panduan dalam penyediaan berakhir sehingga 2020. **Rajah 3.9** di bawah menunjukkan pelaksanaan projek bagi tempoh 2016 sehingga 2020.

Throughout the 11th Malaysia Plan, a total of 32 EIA guidelines for specific activities were prepared. 25 guidelines have been published, while seven (7) guidelines are still in the preparing process throughout 2020. **Figure 3.9** shows the implementation of the project from 2016 until 2020.

Rajah 3.9: Status Pembentukan Garis Panduan Berkaitan Laporan EIA di Bawah Rancangan Malaysia Ke-11
Figure 3.9 : Establishment of Guidelines for Preparing the EIA Report Under the 11th Malaysia Plan

BAB 4
CHAPTER 4

PENGAWASAN DAN PENGUATKUASAAN

MONITORING AND ENFORCEMENT

PENGAWASAN KUALITI AIR MARIN KEBANGSAAN
NATIONAL MARINE WATER QUALITY MONITORING

Program Pengawasan Kualiti Air Marin Kebangsaan telah dimulakan di Semenanjung Malaysia untuk pantai dan muara sungai pada tahun 1978 dan diperkembangkan ke Sabah dan Sarawak pada tahun 1985 dan untuk pulau bermula pada 1998. Stesen-stesen pengawasan air marin diwujudkan di pantai, muara sungai dan pulau bagi memantau status kualiti air marin berdasarkan kepada kegunaannya seperti habitat marin sensitif, perikanan (termasuk marikultur), industri, aktiviti komersial dan kawasan kediaman pesisir pantai, muara sungai dan rekreasi.

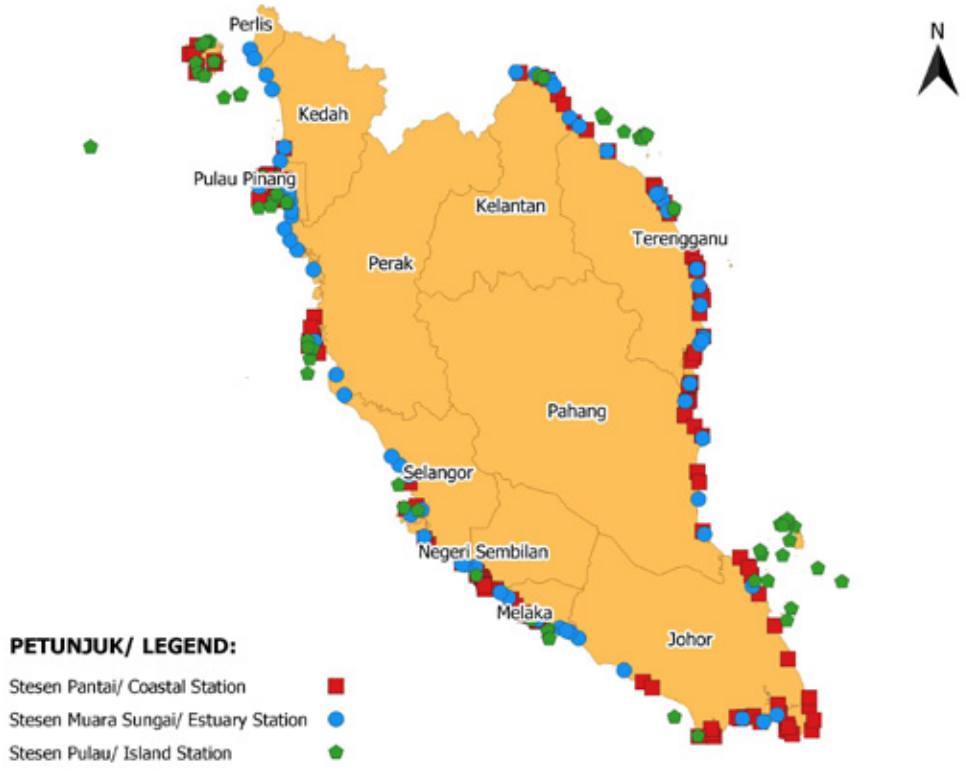
Pada tahun 2019, terdapat 368 stesen pengawasan pantai dan muara sungai di seluruh Malaysia termasuklah Perlis dua (2) stesen, Kedah 27, Pulau Pinang 33, Perak 19, Selangor 19, Negeri Sembilan 17, Melaka 23, Johor 43, Pahang 36, Terengganu 40, Kelantan 14, Sarawak 40, Sabah 43, dan W.P Labuan 12 **(Rajah 4.1(a), Rajah 4.1 (b)** dan **(Jadual 4.1)**.

Pengukuran parameter-parameter fizikal kualiti air marin dibuat secara in-situ seperti suhu, pH, konduktiviti, kemasinan, oksigen terlarut dan kekeruhan manakala 23 parameter yang dianalisis di makmal pula adalah seperti jumlah pepejal terampai, Escherichia coli (E. coli), nitrat, fosfat, jumlah karbon organik, minyak dan gris, logam berat termasuklah Merkuri (Hg), Kadmium (Cd), Kromium (Cr), Kuprum (Cu), Plumbum (Pb), Arsenik (As) dan Tributytin (TBT) serta Triphenyltin (TPT) **(Jadual 4.2)**. Percontohan bebola tar di pantai juga dilaksanakan.

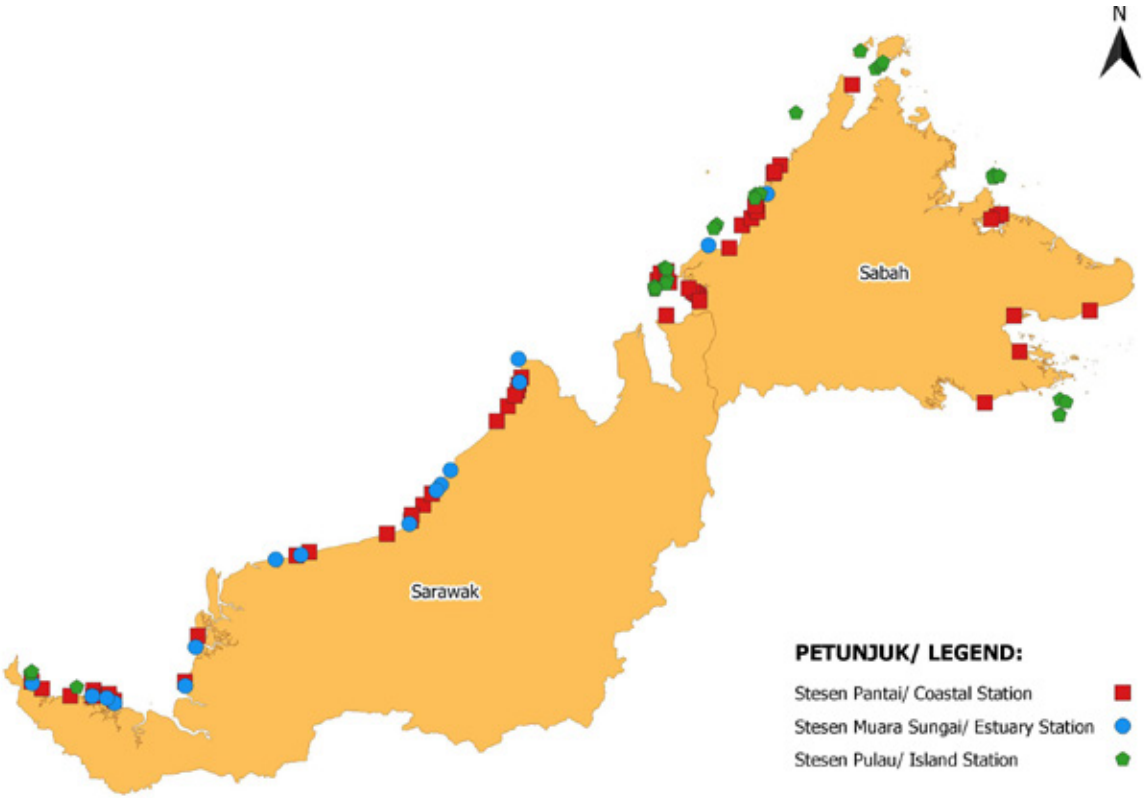
Marine Water Quality Monitoring was established in Peninsular Malaysia for coastal bodies and estuaries in 1978. It was later extended to cover Sabah and Sarawak in 1985 and islands in 1998. The monitoring stations were created at coastal, estuaries and island areas to monitor marine water quality status with respect to their beneficial uses such as sensitive marine habitats, fisheries (including mariculture), industry, commercial activities and coastal settlements, estuaries and recreation.

In 2019, a total of 368 coastal and estuaries monitoring stations were set up throughout Malaysia, which include two (2) stations in Perlis, 27 in Kedah, 33 in Pulau Pinang, 19 in Perak, 19 in Selangor, 17 in Negeri Sembilan, 23 in Melaka, 43 in Johor, 36 in Pahang, 40 in Terengganu, 14 in Kelantan, 40 in Sarawak, 43 in Sabah, and 12 in Federal Territory (FT) of Labuan **(Figure 4.1(a), Figure 4.1 (b)** and **(Table 4.1)**.

Marine water quality monitoring includes measurement of in-situ parameters such as temperature, pH, conductivity, salinity, dissolved oxygen, and turbidity. Meanwhile, laboratory analysis involves 23 other parameters, namely total suspended solids, Escherichia coli (E. coli), nitrate, phosphate, total organic carbon, oil and grease, heavy metals including Mercury (Hg), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Arsenic (As), and Tributyltin (TBT) as well as Triphenyltin (TPT) **(Table 4.2)**. Tarball sampling on beaches was also conducted.



Rajah 4.1 (a): Taburan Stesen Pengawasan Kualiti Air Marin di Semenanjung Malaysia, 2019
Figure 4.1 (a): Distribution of Marine Water Quality Monitoring Stations in Peninsular Malaysia, 2019



Rajah 4.1 (b): Taburan Stesen Pengawasan Kualiti Air Marin Sabah, Sarawak dan W.P. Labuan, 2019
Figure 4.1 (b): Distribution of Marine Water Quality Monitoring Stations in Sabah, Sarawak and W.P. Labuan, 2019

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Perlis	2	Kuala/ Estuary	Kuala Sungai Perlis	6401901	MMRE001	6.400070	100.119000
			Kuala Sungai Baru	6201902	MMRE002	6.332420	100.150000
Kedah	9	Pantai/ Coastal	Pantai Merdeka	5603905	MMKC001	5.669760	100.369000
			Langkawi Island Resort	6399914	MMKC002	6.296690	99.861000
			Pantai Kok	6397922	MMKC003	6.366070	99.679100
			Pantai Kuah	6398925	MMKC004	6.313553	99.851419
			Pantai Pasir Tengkorak	6499701	MMKC005	6.431230	99.726100
			Pantai Teluk Burau	6396923	MMKC006	6.363910	99.668500
			Pantai Teluk Nibong	6497915	MMKC007	6.360220	99.702200
			Pantai Tengah	6297903	MMKC008	6.279750	99.727500
			Pantai Beras Basah*	NA	MMKC009	6.230860	99.718000
	4	Kuala/ Estuary	Kuala Kedah	6102908	MMKE001	6.104820	100.282000
			Kuala Jerlun	6302925	MMKE002	6.210500	100.238000
			Kuala Segantang Garam*	NA	MMKE003	5.678690	100.373000
			Kuala Sungai Muda*	NA	MMKE004	5.577350	100.341000
	14	Pulau/ Island	Singa Besar	7KR01	MMKR001	6.226040	99.735400
			Dayang Bunting	7KR02	MMKR002	6.207250	99.780300
			Dayang Bunting 2*	NA	MMKR003	6.203111	99.781489
			Pulau Perak	7KP01	MMRP001	5.681450	98.936000
			Payar	7KM03	MMKM001	6.063530	100.042000
			Kaca	7KM04	MMKM002	6.071720	100.052000
			Segantang	7KM06	MMKM003	6.043530	99.926100
			Pantai Kuah	7KD07	MMKD001	6.308810	99.851100
			Pantai Chenang	7KD09	MMKD002	6.302670	99.716600
			Tanjung Rhu	7KD010	MMKD003	6.456810	99.821800
			Teluk Ewa	7KD08	MMKD004	6.434250	99.755000
			Pasir*	NA	MMKP001	6.453500	99.794900
			Gasing*	NA	MMKP002	6.454130	99.790200
			Dangli*	NA	MMKP003	6.447370	99.777600

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Pulau Pinang	17	Pantai/ Coastal	Gertak Sanggul	5201919	MMPC001	5.277320	100.194000
			Kawasan Perindustrian Bayan Lepas 1	5303932	MMPC002	5.309510	100.301000
			Pantai Bersih	5403906	MMPC003	5.441670	100.378000
			Pantai Miami	5502901	MMPC004	5.479230	100.268000
			Pantai Pasir Panjang	5201938	MMPC005	5.297220	100.183000
			Batu Feringgi (Casuarina)	5402904	MMPC006	5.469440	100.242000
			Luar Pantai Teluk Bahang	5402930	MMPC007	5.462000	100.213000
			Persiaran Gurney	5403902	MMPC008	5.437300	100.313000
			Rumah Pam Baru Perai	5304927	MMPC009	5.354170	100.387000
			Rumah Pam Lama Perai	5303926	MMPC010	5.334450	100.310000
			Selat PP Selatan (Jelutong)	5303911	MMPC011	5.391080	100.329000
			Tanjung Bungah	5402937	MMPC012	5.467420	100.281000
			Teluk Tempoyak	5202923	MMPC013	5.468560	100.294000
			Batu Maung	5202901	MMPC014	5.287831	100.292314
			Pantai Sungai Batu Ferringhi 3*	NA	MMPC015	5.480744	100.253394
			Pantai Sungai Batu Ferringhi 2*	NA	MMPC016	5.477190	100.249000
			Pantai Sungai Batu Ferringhi 1*	NA	MMPC017	5.472800	100.244000
	7	Kuala/ Estuary	Kuala Sungai Jawi	5204901	MMPE001	5.280560	100.417000
			Kuala Sungai Juru	5303904	MMPE002	5.338890	100.406000
			Kuala Sungai Kerian	5104901	MMPE003	5.170340	100.424000
			Kuala Sungai Pinang	5403934	MMPE004	5.400000	100.335000
			Kuala Sungai Perai	5303908	MMPE005	5.383330	100.367000
			Kuala Sungai Tengah	5204935	MMPE006	5.211390	100.425000
			Kuala Sungai Pinang (Balik Pulau)	5202929	MMPE007	5.391550	100.186000
	9	Pulau/ Island	Tanjung Tokong*	NA	MMPP001	5.456290	100.315000
			Batu Maung	7PD01	MMPD001	5.285240	100.292000
			Padang Kota	7PD04	MMPD002	5.419210	100.346000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Pulau Pinang	9	Pulau/ Island	Teluk Bahang	7PD03	MMPD003	5.460830	100.214000
			Aman	7PR05	MMPR001	5.267430	100.394000
			Jerejak	7PR06	MMPR002	5.333330	100.317000
			Kendi	7PR07	MMPR003	5.230380	100.182000
			Rimau	7PR08	MMPR004	5.244150	100.273000
			Gedong	7PR09	MMPR005	5.273460	100.390000
Perak	8	Pantai/ Coastal	Pantai Pasir Bogak	4205908	MMAC001	4.211760	100.551000
			Pantai Teluk Dalam	4205928	MMAC002	4.250000	100.556000
			Pantai Teluk Batik	4205932	MMAC003	4.187320	100.606000
			Pantai Tanjung Batu	4406927	MMAC004	4.426590	100.595000
			Pantai Teluk Rubiah*	NA	MMAC005	4.160160	100.622000
			Pantai Damai Laut*	NA	MMAC006	4.264120	100.589000
			Pantai Teluk Senangin*	NA	MMAC007	4.293870	100.582000
			Pantai Pasir Panjang	4205924	MMAC008	4.347970	100.568000
	6	Kuala/ Estuary	Kuala Sungai Manjung	4205930	MMAE001	4.248410	100.594000
			Kuala Sungai Gula	4906926	MMAE002	4.922690	100.467000
			Kuala Sungai Kurau	4994919	MMAE003	4.994810	100.415000
			Kuala Sungai Tanjung Piandang	5003921	MMAE004	5.076610	100.374000
			Kuala Sungai Sepetang	4806925	MMAE005	4.775600	100.588000
			Kuala Sungai Perak	4007901	MMAE006	4.000020	100.756000
	5	Pulau/ Island	Pantai Teluk Gedong	7AR01	MMAR001	4.194210	100.581000
			Pantai Puteri Dewi	7AR02	MMAR002	4.253140	100.544000
			Pangkor Laut	7AR03	MMAR003	4.201590	100.547000
			Sembilan	7AR04	MMAR004	4.008530	100.544000
			Tukun Perak	7AP05	MMAP001	4.116890	100.561000
Selangor	6	Pantai/ Coastal	Pantai Bagan Lalang	2616927	MMBC001	2.605400	101.687000
			Pantai Morib	2712902	MMBC002	2.750000	101.439000
			Selat Pulau Babi	3012929	MMBC003	3.007660	101.273000
			Selat Klang Utara	3013908	MMBC004	3.028180	101.351000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Selangor	10	Kuala/ Estuary	Pantai Remis*	NA	MMBC005	3.200730	101.302000
			Pantai Klanang*	NA	MMBC006	2.789270	101.409000
			Kuala Sungai Sepang	2517922	MMBE001	2.595750	101.713000
			Kuala Sungai Sepang (Kecil)	2612928	MMBE002	2.609870	101.685000
			Kuala Sungai Sepang (Kawalan)	2616926	MMBE003	2.597490	101.690000
			Kuala Sungai Langat (Jugra)	2814925	MMBE004	2.802400	101.407000
			Kuala Sungai Klang	3013909	MMBE005	3.001910	101.389000
			Kuala Sungai Langat (Lumut)	2913903	MMBE006	2.966800	101.309000
			Kuala Sungai Buloh	3212930	MMBE007	3.255040	101.300000
			Kuala Sungai Selangor	3312915	MMBE008	3.333330	101.225000
			Kuala Sungai Tengi	3311931	MMBE009	3.396180	101.167000
			Kuala Sungai Bernam	3808924	MMBE010	3.850000	100.817000
	3	Pulau/ Island	Ketam	7BR01	MMBR001	3.018000	101.258000
			Angsa	7BR02	MMBR002	3.185560	101.219000
			Lumut	7BR03	MMBR003	2.998500	101.362000
Negeri Sembilan	14	Pantai/ Coastal	Bagan Pinang	2518915	MMNC001	2.508230	101.828000
			Telok Sinting	2419908	MMNC002	2.415220	101.941000
			Port Dickson Bandar	2517907	MMNC003	2.520010	101.798000
			Port Dickson Batu 4	2518937	MMNC004	2.499710	101.837000
			Port Dickson Batu 5	2418906	MMNC005	2.495850	101.838000
			Port Dickson Batu 6	2418916	MMNC006	2.480790	101.847000
			Port Dickson Batu 7	2418905	MMNC007	2.461230	101.851000
			Port Dickson Batu 8	2418912	MMNC008	2.454150	101.854000
			Port Dickson Batu 10	2418914	MMNC009	2.417060	101.856000
			Port Dickson Janakuasa TNB	2517909	MMNC010	2.542370	101.798000
			Telok Pelanduk	2419917	MMNC011	2.416630	101.892000
			Pantai Cermin	2416918	MMNC012	2.414990	101.861000
			Pantai Teluk Kemang*	NA	MMNC013	2.447770	101.854000
			Pantai Seri Purnama*	NA	MMNC014	2.443130	101.855000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Negeri Sembilan	2	Kuala/ Estuary	Kuala Sungai Linggi	2319901	MMNE001	2.391010	101.973000
			Kuala Sungai Lukut	2517910	MMNE002	2.578020	101.788000
	1	Pulau/ Island	Arang	7NP01	MMNP001	2.516470	101.795000
Melaka	9	Pantai/ Coastal	Pantai Rombang	2221916	MMMC001	2.227280	102.148000
			Pantai Kundur	2221908	MMMC002	2.243190	102.140000
			Pantai Tanjung Bidara	2320909	MMMC003	2.290750	102.088000
			Teluk Gong	2320902	MMMC004	2.339830	102.056000
			Pulau Melaka Point A1	2121915	MMMC005	2.179920	102.243000
			Pulau Melaka Point A2	2121915	MMMC006	2.176440	102.252000
			Pulau Melaka Point B1	2121916	MMMC007	2.183320	102.248000
			Pulau Melaka Point B2	2121916	MMMC008	2.181300	102.255000
			Pantai Klebang	-	MMMC009	2.216070	102.191000
	8	Kuala/ Estuary	Kuala Sungai Melaka	2123903	MMME001	2.185720	102.242000
			Kuala Sungai Sri Melaka	2121914	MMME002	2.206470	102.198000
			Kuala Sungai Merlimau	2124912	MMME003	2.126890	102.414000
			Kuala Sungai Kesang	2186905	MMME004	2.098140	102.489000
			Kuala Sungai Sebatu	2186904	MMME005	2.107530	102.462000
			Kuala Sungai Melaka 2*	NA	MMME006	2.186872	102.243231
			Kuala Sungai Baru*	NA	MMME007	2.352440	102.033000
			Kuala Sungai Lereh	2221922	MMME008	2.220030	102.176000
	6	Pulau/ Island	Upeh (Point A)	7MR02	MMMR001	2.194890	102.205000
			Upeh (Point B)	7MR02	MMMR002	2.189750	102.203000
			Besar (Point A)	7MR01	MMMR003	2.116690	102.332000
			Besar (Point B)	7MR01	MMMR004	2.106720	102.322000
			Undan (Point A)	7MP03	MMMR005	2.048940	102.332000
			Undan (Point B)	7MP03	MMMR006	2.047280	102.335000
Johor	29	Pantai/ Coastal	Tanjung Bin	1336975	MMJC001	1.324560	103.557000
			Pelabuhan Tanjung Pelepas	1438943	MMJC002	1.353610	103.543000
			Hadapan Jabatan Laut	1438918	MMJC003	1.382750	103.535000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Johor	29	Pantai/ Coastal	Pantai Stulang Laut	1437951	MMJC004	1.467220	103.779000
			Jeti Teluk Jawa	1438918	MMJC005	1.473540	103.848000
			Pelabuhan Pasir Gudang	1428939	MMJC006	1.432550	103.899000
			Hadapan HSAJB	1437920	MMJC007	1.456440	103.746000
			Pantai Lido	1437921	MMJC008	1.465560	103.725000
			Pantai Teluk Mahkota	1841911	MMJC009	1.897810	104.105000
			Pantai Tanjung Leman	2140694	MMJC010	2.145280	104.007000
			Pantai Sri Pantai	2339960	MMJC011	2.379170	103.889000
			Tanjung Merak	1441968	MMJC012	1.362750	104.110000
			Tanjung Pengelih	1441967	MMJC013	1.370750	104.089000
			Pantai Tanjong Stapa	1341961	MMJC014	1.342500	104.136000
			Pantai Teluk Gorek	2538958	MMJC015	2.582500	103.805000
			Pantai Air Papan	2538959	MMJC016	2.518060	103.833000
			Jeti Kukup	1334925	MMJC017	1.325000	103.441000
			Pasir Gogok	1441966	MMJC018	1.417440	104.100000
			Tanjung Buai	1340973	MMJC019	1.496690	104.045000
			Pantai Desaru	1542914	MMJC020	1.546670	104.261000
			Tanjung Sepang	1443969	MMJC021	1.391920	104.108000
			Tanjung Penyusup	1444920	MMJC022	1.370250	104.280000
			Pantai Sungai Lurus	1730962	MMJC023	1.728330	103.029000
			Punggur	1531974	MMJC024	1.684720	103.098000
			Pantai Penyabung*	NA	MMJC025	2.648740	103.750000
			Tanjung Resang*	NA	MMJC026	2.573970	103.817000
			Tanjung Balau*	NA	MMJC027	1.612690	104.261000
			Batu Layar*	NA	MMJC028	1.446110	104.296000
			Tanjung Sengat*	NA	MMJC029	1.560730	104.030000
	6	Kuala/ Estuary	Kuala Sungai Segget	1437919	MMJE001	1.455830	103.766000
			Kuala Sungai Kim-Kim	1439965	MMJE002	1.435140	103.924000
			Kuala Sungai Johor	1440916	MMJE003	1.484440	104.023000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Johor	6	Kuala/ Estuary	Kuala Sungai Batu Pahat	1729930	MMJE004	1.814510	102.890000
			Kuala Sungai Muar	2024932	MMJE005	2.052120	102.552000
			Kuala Sungai Mersing	2438905	MMJE006	2.436810	103.842000
	8	Pulau/ Island	Setindan	7JR01	MMJR001	2.476640	103.858000
			Babi Tengah	7JR02	MMJR002	2.475490	103.955000
			Dayang	7JM03	MMJM001	2.470220	104.504000
			Nanga Besar	7JM08	MMJM002	2.270640	104.129000
			Sibu Tengah	7JM11	MMJM003	2.181920	104.096000
			Pemanggil	7JM15	MMJM004	2.569080	104.326000
			Kukup	7JP17	MMJP001	1.328310	103.437000
			Pisang	7JP18	MMJP002	1.468280	103.263000
Pahang	22	Pantai/ Coastal	Pantai Cherating (Club Med A)	4133903 (A)	MMCC001	4.141970	103.409000
			Pantai Cherating (Club Med B)	4133903 (B)	MMCC002	4.127860	103.406000
			Pantai Cherating (Legend A)	4133942 (A)	MMCC003	4.111670	103.386000
			Pantai Cherating (Legend B)	4133942 (B)	MMCC004	4.104610	103.386000
			Pantai Muhibbah Balok A	3933901 (A)	MMCC005	3.941630	103.385000
			Pantai Muhibbah Balok B	3933901 (B)	MMCC006	3.923530	103.375000
			Pantai Batu Hitam A	3833915 (A)	MMCC007	3.890310	103.369000
			Pantai Batu Hitam B	3833915 (B)	MMCC008	3.886000	103.368000
			Pantai Berserah A	3933941 (A)	MMCC009	3.882280	103.368000
			Pantai Berserah B	3933941 (B)	MMCC010	3.876000	103.369000
			Pantai Teluk Cempedak A	3833910 (A)	MMCC011	3.816670	103.374000
			Pantai Teluk Cempedak B	3833910 (B)	MMCC012	3.810190	103.374000
			Pantai Teluk Gelora A	3833909 (A)	MMCC013	3.803030	103.364000
			Pantai Teluk Gelora B	3833909 (B)	MMCC014	3.802780	103.351000
			Pantai Sepat A	3737915	MMCC015	3.701500	103.339000
			Pantai Sepat B	3633916	MMCC016	3.698860	103.340000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Pahang	22	Pantai/ Coastal	Pantai Legenda A	3534943 (A)	MMCC017	3.617980	103.413000
			Pantai Legenda B	3534943 (B)	MMCC018	3.550290	103.467000
			Pantai Kuala Api-Api	3235917	MMCC019	3.281190	103.433000
			Pantai Tanjung Batu	3334915	MMCC020	3.205030	103.447000
			Pantai Chendor*	NA	MMCC021	4.164190	103.414000
			Pantai Lanjut*	NA	MMCC022	2.843780	103.472000
	5	Kuala/ Estuary	Kuala Kuantan*	NA	MMCE001	3.804820	103.343000
			Kuala Rompin Kecil*	NA	MMCE002	2.822180	103.485000
			Kuala Pahang*	NA	MMCE003	3.530440	103.472000
			Kuala Nenasi*	NA	MMCE004	3.080990	103.441000
			Kuala Sungai Balok*	NA	MMCE005	3.934920	103.377000
	9	Pulau/ Island	Tioman (Teluk Salang)	7CM01	MMCM001	2.775000	104.117000
			Tioman (Kg. Nipah)	7CM01	MMCM002	2.876370	104.152000
			Tulai	7CM05	MMCM003	2.905320	104.107000
			Labas	7CM07	MMCM004	2.895060	104.047000
			Cebeh	7CM04	MMCM005	2.930180	104.099000
			Sepui	7CM08	MMCM006	2.885980	104.067000
			Sembilang	7CM08	MMCM007	2.670060	103.910000
			Seri Buat	7CM03	MMCM008	2.700190	103.898000
			Tokong Bahara	7CM09	MMCM009	2.664240	104.065000
Terengganu	16	Pantai/ Coastal	Pantai Batu Buruk	5331935	MMTC001	5.326540	103.156000
			Pantai Bukit Keluang	5825903	MMTC002	5.806760	102.610000
			Pantai Chendering	5231934	MMTC003	5.271040	103.189000
			Pantai Rantau Abang	4833917	MMTC004	4.872370	103.393000
			KIPC Utara	4634954	MMTC005	4.612850	103.452000
			KIPC Tengah	4534955	MMTC006	4.582270	103.466000
			KIPC Selatan	4534956	MMTC007	4.553600	103.477000
			Pantai Rhu 10*	NA	MMTC008	5.650110	102.774000
			Pantai Tok Jembal*	NA	MMTC009	5.400420	103.107000
			Pantai Kelului*	NA	MMTC010	5.190430	103.226000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Terengganu	16	Pantai/ Coastal	Pantai Teluk Ketapang*	NA	MMTC011	5.384920	103.118000
			Pantai Kuala Abang*	NA	MMTC012	4.827430	103.420000
			Pantai Teluk Kalong*	NA	MMTC013	4.283330	103.478000
			Pantai Sura*	NA	MMTC014	4.770190	103.424000
			Pantai Tanjung Bidara*	NA	MMTC015	4.785060	103.438000
			Pantai Kemasik*	NA	MMTC016	4.455950	103.449000
	13	Kuala/ Estuary	Kuala Sungai Besut	5825902	MMTE001	5.834110	102.558000
			Kuala Sungai Dungun	4734918	MMTE002	4.781080	103.428000
			Kuala Sungai Ibai	5231949	MMTE003	5.288990	103.176000
			Kuala Sungai Kerteh	4534922	MMTE004	4.514410	103.456000
			Kuala Sungai Marang	5232911	MMTE005	5.209440	103.214000
			Kuala Sungai Paka	4634920	MMTE006	4.655000	103.444000
			Kuala Sungai Setiu	5627953	MMTE007	5.651890	102.764000
			Kuala Sungai Terengganu	5331907	MMTE008	5.339790	103.152000
			Kuala Sungai Kemaman/ Chukai	4234929	MMTE009	4.226370	103.447000
			Tioxide Utara (Kg. Bukit Kuang, Kijal)	4234950	MMTE010	4.278310	103.479000
			Tioxide Tengah (Pupuk Semangat, Kijal)	4234951	MMTE011	4.270500	103.478000
			Tioxide Selatan (KSB, T. Kalong)	4234952	MMTE012	4.251140	103.466000
			Pulau Duyung	5231908	MMTE013	5.334890	103.129000
	11	Pulau/ Island	Gemia	7TR01	MMTR001	5.231060	103.261000
			Perhentian Besar (South)	7TM04	MMTM001	5.894480	102.736000
			Perhentian Besar (West)	7TM05	MMTM002	5.889310	102.751000
			Perhentian Kecil	7TM06	MMTM003	5.917920	102.725000
			Redang (North)	7TM06	MMTM004	5.775610	103.037000
			Redang (South)	7TM08	MMTM005	5.752530	103.003000
			Lang Tengah	7TM11	MMTM006	5.792470	102.890000
			Pinang	7TM12	MMTM007	5.747970	103.003000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
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NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Terengganu			Ekor Tebu	7TM13	MMTM008	5.740440	103.029000
			Lima	7TM14	MMTM009	5.769860	103.059000
			Kapas	7TP16	MMTM010	5.216970	103.260000
Kelantan	6	Pantai/ Coastal	Pantai Seri Tujuh	6221910	MMDC001	6.228040	102.117000
			Pantai Cahaya Bulan	6122903	MMDC002	6.196460	102.277000
			Pantai Sabak	6123909	MMDC003	6.179620	102.322000
			Pantai Irama Bachok	6024908	MMDC004	6.066860	102.400000
			Pantai Bisikan Bayu	5825905	MMDC005	5.862590	102.518000
			Pantai Melawi*	NA	MMDC006	5.994650	102.441000
		Kuala/ Estuary	Kuala Sungai Golok	6220911	MMDE001	6.232860	102.090000
			Kuala Sungai Kelantan	6222901	MMDE002	6.216850	102.237000
			Kuala Sungai Pengkalan Chepa	6223912	MMDE003	6.185740	102.303000
			Kuala Sungai Pengkalan Datu	6123913	MMDE004	6.169280	102.344000
			Kuala Sungai Kemasin	5824914	MMDE005	6.130060	102.371000
			Kuala Sungai Semerak*	NA	MMDE006	5.897340	102.486000
	2	Pulau/ Island	Panjang	7DP01	MMDP001	6.207000	102.258000
			Kundur	7DP02	MMDP002	6.189460	102.292000
Sarawak	23	Pantai/ Coastal	Pantai Sematan	1898902	MMQC001	1.827220	109.775000
			Pantai Pandan	1824918	MMQC002	1.765530	109.865000
			Pantai Pasir Putih	1604910	MMQC003	1.661530	110.487000
			Pantai Bako	1704906	MMQC004	1.718060	110.442000
			Pantai Damai	1702904	MMQC005	1.750260	110.308000
			Pantai Tanjung Kembang	1810923	MMQC006	1.824440	111.096000
			Pantai Harmoni Mukah	2920921	MMQC007	2.909720	112.056000
			Pantai Tanjung Batu	3132602	MMQC008	3.210640	113.043000
			Pantai Likau	3230915	MMQC009	3.344260	113.148000
			Pantai Emas	3331903	MMQC010	3.441060	113.224000
			Pantai Piasau	4539918	MMQC011	4.437870	113.994000
			Pantai Brighton	4449917	MMQC012	4.378780	113.970000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Sarawak	23	Pantai/ Coastal	Pantai Esplaned	4339920	MMQC013	4.324580	113.961000
			Pantai Beraya	4238921	MMQC014	4.192480	113.877000
			Pantai Bungai	4137922	MMQC015	4.064570	113.782000
			Pantai Belawai	2212913	MMQC016	2.220940	111.208000
			Pantai Mukah*	NA	MMQC017	2.939740	112.167000
			Tanjung Kidurong*	NA	MMQC018	3.256010	113.049000
			Pasir Pandak*	NA	MMQC019	1.698830	110.301000
			Rambungan*	NA	MMQC020	1.703260	110.108000
			Sri Tanjung Lawas*	NA	MMQC021	4.971620	115.242000
			Pantai Luak*	NA	MMQC022	4.284270	113.938000
			Pasir Panjang*	NA	MMQC023	3.095930	112.836000
	14	Kuala/ Estuary	Kuala Sungai Semantan	1898901	MMQE001	1.811530	109.781000
			Kuala Sungai Sarawak	1604907	MMQE002	1.641030	110.490000
			Kuala Sungai Bako	1704905	MMQE003	1.683060	110.423000
			Kuala Sungai Santubong	1702903	MMQE004	1.701270	110.297000
			Kuala Batang Krian (Kabong)	1710922	MMQE005	1.788890	111.099000
			Kuala Batang Rejang	2111909	MMQE006	2.122780	111.189000
			Kuala Mukah	2920920	MMQE007	2.914660	112.095000
			Kuala Batang Kemena	3130911	MMQE008	3.181500	113.029000
			Kuala Tanjung Similajau	3431903	MMQE009	3.517920	113.301000
			Kuala Sungai Panipah	3332904	MMQE010	3.469670	113.261000
			Kuala Pantai Nyalau	3431903	MMQE011	3.642830	113.383000
			Kuala Sungai Baram	4539919	MMQE012	4.597000	113.969000
			Kuala Sungai Miri	4349915	MMQE013	4.399320	113.978000
			Kuala Sungai Trusan*	NA	MMQE014	2.875530	111.878000
	3	Pulau/ Island	Satang	7QP01	MMQP001	1.777660	110.165000
			Talang-Talang Kecil	7QP02	MMQP002	1.893470	109.767000
			Talang-Talang Besar	7QP03	MMQP003	1.911030	109.777000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Sabah	24	Pantai/ Coastal	Pantai Teluk Brunei 1	5053901	MMSC001	5.145790	115.520000
			Pantai Teluk Brunei 2	5053902	MMSC002	5.117980	115.528000
			Pantai Teluk Brunei 3	5053903	MMSC003	5.161070	115.496000
			Pantai Teluk Brunei 4	5053904	MMSC004	5.175850	115.472000
			Pantai Teluk Brunei 5	5053905	MMSC005	5.203520	115.435000
			Pantai Teluk Brunei 6	5053906	MMSC006	5.094190	115.527000
			Borneo Golf Seawater	5355901	MMSC007	5.550000	115.784000
			Pantai Manis Papar	5555901	MMSC008	5.744250	115.893000
			Pantai Melinsung	5565902	MMSC009	5.804740	115.975000
			Pantai Tanjung Aru (Roll Skating)	5656902	MMSC010	5.933020	116.017000
			Pantai Tanjung Aru (No. 3)	5656903	MMSC011	5.888760	116.015000
			Pantai Lok Kawi	5656904	MMSC012	5.860130	116.027000
			Pantai Dalit Tuaran	6161901	MMSC013	6.188750	116.166000
			Mangrove Paradise	6161902	MMSC014	6.258570	116.221000
			Pantai Sabandar	6161903	MMSC015	6.203530	116.175000
			Pantai Bak-Bak Kudat	6665901	MMSC016	6.945650	116.842000
			Pasir Putih Sandakan	5580901	MMSC017	5.824230	118.086000
			Pantai TLDM	5580902	MMSC018	5.838960	118.127000
			Pantai Batu Sapi	5580903	MMSC019	5.795120	118.040000
			Pantai Ulu Tungku	5085901	MMSC020	5.012930	118.890000
			Pantai Sarina Kunak	4481901	MMSC021	4.661390	118.284000
			Pantai Kg. Lamak	4581902	MMSC022	4.969972	118.236731
			Pantai Tinagat	4473901	MMSC023	4.222780	117.984000
			Pantai Tanjung Aru (Rest Lido)	5656901	MMSC024	5.910840	116.008000
	2	Kuala/ Estuary	Kuala Penyu	5453901	MMSE001	5.572730	115.605000
			Muara Sungai Inanam	5050905	MMSE002	6.012720	116.110000
	17	Pulau/ Island	Gaya	7SR01	MMSR001	6.013460	116.051000
			Mabul	7SR03	MMSR002	4.248770	118.633000
			Sipadan (N)	7SR04	MMSR003	4.117660	118.628000

Jadual 4.1: Stesen Pengawasan Kualiti Air Marin Kebangsaan, 2019
Table 4.1: National Marine Water Quality Monitoring Stations, 2019

NEGERI/ STATE	BIL. STESEN/ NO. OF STATION	KLASIFIKASI STESEN/ STATION CLASSIFICATION	KAWASAN/ AREA	NOMBOR STESEN LAMA/ OLD STATION NUMBER	NOMBOR STESEN BARU/ NEW STATION NUMBER	LOKASI/ LOCATION	
						LATITUD/ LATITUDE	LONGITUD/ LONGITUDE
Sabah	17	Pulau/ Island	Sipadan (W)	7SR05	MMSR004	4.114170	118.626000
			Manukan	7SM09	MMSR005	5.973350	116.005000
			Tiga	7SR10	MMSR006	5.716610	115.651000
			Kapalai	7SR12	MMSR007	4.227460	118.684000
			Molleangan Besar	7SR14	MMSR008	7.082230	117.044000
			Banggi (South)	7SR15	MMSR009	7.111690	117.088000
			Banggi (East)	7SR20	MMSR010	7.136970	117.107000
			Balambangan	7SR16	MMSR011	7.232010	116.913000
			Mantanani Besar	7SR21	MMSR012	6.704930	116.358000
			Sapi	7SM08	MMSM001	6.007270	116.010000
			Kalampunian Besar	7SM11	MMSM002	5.748210	115.676000
			Selingan	7SP17	MMSP001	6.175350	118.059000
			Gulisan	7SP18	MMSP002	6.149570	118.056000
			Bakungan Kecil	7SP19	MMSP003	6.163910	118.109000
W.P. Labuan	5	Pantai/ Coastal	Pulau Papan	5151905	MMLC001	5.254900	115.268000
			Kiamsam	5151906	MMLC002	5.255260	115.175000
			Sungai Pagar	5151907	MMLC003	5.273410	115.167000
			Layang-Layangan	5251902	MMLC004	5.334220	115.193000
			Tanjung Aru	5251903	MMLC005	5.350600	115.244000
	7	Pulau/ Island	Kuraman	7LM05	MMLM001	5.218750	115.140000
			Rusukan Besar	7LM07	MMLM002	5.190000	115.142000
			Rusukan Kecil	7LM06	MMLM003	5.201780	115.148000
			Pohon Batu	7LD01	MMLD001	5.380530	115.229000
			Water Front	7LD02	MMLD002	5.272750	115.249000
			LubukTemiang	7LD03	MMLD003	5.371870	115.248000
			Ranca-Ranca	7LD04	MMLD004	5.241920	115.240000

Nota/Note:
*(Stesen baru/ New Station)
NA (Tidak Berkenaan/ Not Available)

Pantai/Coastal : 188
Muara Sungai/Estuary : 85
Pulau/Island : 95

Jumlah/Total : 368

Jadual 4.2: Parameter Kualiti Air Marin, 2019
Table 4.2: Marine Water Quality Parameters, 2019

BIL./ NO.	PARAMETER/ PARAMETERS	KOD/CODE	UNIT/ UNIT
PENGUKURAN IN-SITU/ IN-SITU MEASUREMENTS			
1	Oksigen Terlarut/ Dissolved Oxygen	DO	mg/l
2	pH	pH	-
3	Kemasinan/ Salinity	Sal	ppt
4	Suhu/ Temperature	Temp	°C
5	Kekeruhan/ Turbidity	Turb	NTU
6	Konduktiviti/ Conductivity	Cond	mS/cm
PENGUKURAN MAKMAL/ LABORATORY MEASUREMENT			
1	Jumlah Pepejal Terampai/ Total Suspended Solid	TSS	mg/l
2	Minyak dan Gris/ Oil and Grease	O&G	mg/l
3	Bebola Tar/ Tarball	Tar	g/100m
4	Merkuri/ Mercury	Hg	µg/l
5	Kadmium/ Cadmium	Cd	µg/l
6	Kromium/ Chromium	Cr^{6+}	µg/l
7	Kuprum/ Copper	Cu	µg/l
8	Arsenik/ Arsenic	As	µg/l
9	Plumbum/ Lead	Pb	µg/l
10	Zink/ Zinc	Zn	µg/l
11	Sianida/ Cyanide	CN	µg/l
12	Ammonia Tidak Terion/ Unionized Ammonia	NH_3	µg/l
13	Amoniakal Nitrogen/ Ammoniacal Nitrogen	NH_3-N	µg/l
14	Nitrit/ Nitrite	NO_2	µg/l
15	Nitrat/ Nitrate	NO_3	µg/l
16	Fosfat/ Phosphate	PO_4	µg/l
17	Fenol/ Phenol	Phenol	µg/l
18	Tributiltin/ Tributyltin	TBT	µg/l
19	Total Coliform	TC	MPN/100
20	Faecal Coliform	FC	MPN/100
21	Escherichia coli	E.coli	MPN/100
22	Entrococci	-	MPN/100
23	Polycylic Aromatic Hydrocarbons	PAHs	µg/l

MESYUARAT KERJA SEMAKAN SEMULA PROSEDUR TETAP OPERASI UNTUK PENGAWASAN KUALITI AIR MARIN DAN DRAF MODUL LATIHAN BERKAITAN STANDAD DAN INDEKS KUALITI AIR MARIN MALAYSIA PADA 25 HINGGA 27 JUN 2019

Bahagian Air dan Marin, JAS telah mengadakan Mesyuarat Kerja Semakan Semula Prosedur Tetap Operasi (PTO) untuk Pengawasan Kualiti Air Marin dan Draf Modul Latihan berkaitan Standad dan Indeks Kualiti Air Marin Malaysia pada 25 hingga 27 Jun 2019, bertempat di Klana Beach Resort, Port Dickson, Negeri Sembilan.

Mesyuarat kerja ini melibatkan wakil-wakil pegawai JAS Negeri/EiMAS dan Syarikat Pakar Scieno Transwater Sdn Bhd bagi mengemaskini dan memantapkan PTO untuk Pengawasan Kualiti Air Marin bagi kegunaan Jabatan dan menyediakan modul latihan ke arah pembangunan modal insan pegawai-pegawai JAS khususnya dalam bidang pengawasan kualiti air marin.

WORKING MEETING ON REVIEW OF STANDARD OPERATING PROCEDURE FOR MARINE WATER QUALITY MONITORING AND DRAFTING TRAINING MODULE RELATED TO MALAYSIAN MARINE WATER QUALITY STANDARD AND INDEX ON 25th TO 27th JUNE 2009

The Marine and Water Division of DOE Headquarters has organised a working meeting to review the Standard Operating Procedure (SOP) to monitor marine water quality and to draft a training module related to the Malaysian Marine Water Quality Standard and Index between 25th to 27th June, 2019 at Klana Beach Resort, Port Dickson, Negeri Sembilan.

The working meeting involved DOE/EiMAS representatives from various state offices and a company called Pakar Scieno Transwater Sdn Bhd, who worked together to update and improve the SOP for marine water quality monitoring and to develop the training module to enhance the human resource capacity of DOE officers especially with regards to marine water quality monitoring.

Peserta Mesyuarat Kerja Semakan Semula Prosedur Tetap Operasi (PTO) untuk Pengawasan Kualiti Air Marin dan Draf Modul Latihan berkaitan Standad dan Indeks Kualiti Air Marin Malaysia pada 25 Hingga 27 Jun 2019, bertempat di Klana Beach Resort, Port Dickson, Negeri Sembilan

Working Meeting participants on Review of Standard Operating Procedure (SOP) for Marine Water Quality Monitoring and Drafting of Training Module related to Malaysian Marine Water Quality Standard and Index from 25th to 27th June 2019 at Klana Beach Resort, Port Dickson, Negeri Sembilan.

Jadual 4.3: Mesyuarat Kerja Semakan Semula Prosedur Tetep Operasi Pengawasan Kualiti Air Marin
Table 4.3: Working Meeting on Review of Standard Operating Procedure for Marine Water Quality Monitoring

BIL/ NO.	MESYUARAT/ MEETING	TARIKH/ DATE	ANJURAN/ ORGANIZE
1.	Mesyuarat Hala Tuju, Pembangunan dan Pengoperasian Modul Selat Johor (SOJ) dalam Sistem Pengawasan Kualiti Alam Sekitar/ Meeting on The Way Forward, Development and Operational Module of Straits of Johore (SOJ) in the Environmental Quality Monitoring System	13 Februari 2019/ 13th February 2019	Seksyen Perlindungan Air Marin/ Marine Water Protection Section
2.	Mesyuarat Penyelarasan Projek GEF Berkaitan dengan Pengurusan Sumber Akuatik/ Meeting on GEF Project Coordination related to Aquatic Resource Management	5 April 2019/ 5th April 2019	Jabatan Perikanan Malaysia/ Marine Water Protection Section
3.	Mesyuarat Kerja Semakan Semula Prosedur Tetap Operasi (SOP) untuk Pengawasan Kualiti Air Marin dan Draf Modul Latihan Standad dan Indeks Kualiti Air Marin Malaysia./ Working Meeting on Review of Standard Operating Procedure (SOP) for Marine Water Quality and Drafting Training Module related to Malaysian Marine Water Quality Standard dan Index	25 – 27 Jun 2019/ 25th – 27th June 2019	Seksyen Perlindungan Air Marin/ Marine Water Protection Section
4.	Mesyuarat Draf Prosedur Tetap Operasi (SOP) untuk Pengawasan Kualiti Air Marin di Selat Johor (SOJ)/ Meeting on Drafting of Standard Operating Procedure (SOP) for `Joint Seawater Monitoring of Strait of Johore (SOJ)'	26 Julai 2019/ 26th July 2019	Seksyen Perlindungan Air Marin/ Marine Water Protection Section
5.	Mesyuarat Pemantapan Prosedur Tetap Operasi (SOP) untuk Pengawasan Kualiti Air Marin di Selat Johor (SOJ)/ Meeting on Strengthening the Standard Operating Procedure (SOP) for Joint Seawater Monitoring at Strait of Johor (SOJ)	29 Julai 2019/ 29th July 2019	Seksyen Perlindungan Air Marin/ Marine Water Protection Section
6.	Mesyuarat `Proposed Outlined of The Proposed Guidelines for The Joint Seawater Monitoring Programme at The Straits of Johor (SOJ)/ Meeting on the `Proposed Outlined of The Proposed Guidelines for The Joint Seawater Monitoring Programme at The Straits of Johor (SOJ)'	3 Oktober 2019/ 3rd October 2019	Seksyen Perlindungan Air Marin Marine Water Protection Section
7.	Mesyuarat Kerja bagi Membincangkan Format Pelaporan Bulanan dan Tahunan/ Working Meeting to discuss the Format of the Annual and Monthly Report	11 Oktober 2019/ 11th October 2019	Seksyen Perlindungan Air Marin/ Marine Water Protection Section
8.	Mesyuarat Ke-12 Jawatankuasa Teknikal Marin MYGDI (JTMM)/ The 12th Meeting of MYGDI Marine Technical Committee (JTMM)	24 Oktober 2019/ 24th October 2019	Pusat Hidrografi Negara/ National Hydrography Centre
9.	Mesyuarat Membincangkan Pengoperasian Komponen Marin dan Sungai dalam Program Pengawasan Kualiti Alam Sekitar (EQMP)/ Meeting to discuss the Operational of Marine and River Component in the Environmental Quality Monitoring Programme (EQMP)	20 November 2019/ 20th November 2019	Seksyen Perlindungan Air Marin/ Marine Water Protection Section

PENGAWASAN KUALITI AIR SUNGAI
RIVER WATER QUALITY MONITORING

JAS meneruskan program pemantauan kualiti sungai pada 2019 untuk menentukan status kualiti air sungai dan untuk mengesan perubahan dalam kualiti air sungai. Sampel air dikumpulkan dari stesen yang ditetapkan untuk in-situ dan analisis makmal bagi menentukan ciri fizikal-kimia dan biologinya.

Indeks Kualiti Air (IKA) digunakan untuk menunjukkan tahap pencemaran dan kesesuaian yang sesuai dari segi penggunaan air mengikut Standard Kualiti Air Negara (NWQS). IKA dikira berasaskan enam (6) parameter iaitu Oksigen Terlarut (DO), Permintaan Oksigen Biokimia (BOD), Permintaan Oksigen Kimia (COD), Ammoniacal Nitrogen (NH_3-N), Pepejal Terampai (SS) dan pH.

Pada 2019, kualiti air sungai dinilai berdasarkan sejumlah 8,118 sampel yang diambil dari sejumlah 1,353 stesen pemantauan manual yang merangkumi 672 sungai di seluruh Negara seperti dalam **Jadual 4.4**. Sejumlah lima puluh lima (55) stesen daripada rangkaian stesen pengawasan kualiti air sungai tersebut adalah khusus bagi memantau kualiti air sungai di hulu muka sauk yang terpilih seperti dalam **Jadual 4.5**. Persampelan kualiti air sungai dijalankan secara berjadual dan mengikut kekerapan yang telah ditetapkan (6 kali setahun). Parameter-parameter kualiti air yang diukur merangkumi parameter fizikal, kimia dan biological seperti **Jadual 4.6**.

DOE continues the river water quality monitoring programme in 2019 to determine the status of river water quality and to detect changes in river water quality. Water samples were collected from designated stations for in-situ and laboratory analysis to determine its physical-chemical and biological characteristics.

The Water Quality Index (WQI) is used to indicate the level of pollution and the corresponding suitability in terms of water uses according to the National Water Quality Standards for Malaysia (NWQS). The WQI is computed based on six (6) main parameters which are Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammoniacal Nitrogen (NH_3-N), Suspended Solid (SS) and pH.

In 2019, river water quality was assessed based on a total of 8,118 samples taken from a total of 1,353 manual monitoring stations covering 672 rivers in Malaysia as shown in **Table 4.4**. Fifty-five (55) stations from the network are specifically for the purpose of monitoring river water quality at upstream of selected water intakes for water supply facilities as listed in **Table 4.5**. River water samplings are carried out periodically (6 times a year) and were analysed and tested for a range of physical, chemical and biological parameters as shown in **Table 4.6**.

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Perlis	01	Perlis	15	Jarum	1	1RPLS006
				Jernih	2	1RPLS005
				Jernih		1RPLS004
				Ngulang	1	1RPLS002
				Pelarit	1	1RPLS008
				Perlis	1	1RPLS001
				Wang Kelian	1	1RPLS009
				Terusan Mada	2	1RPLS010
				Terusan Mada		1RPLS011
				Serai	1	1RPLS003
				Kok Mak	1	1RPLS007
				Korok	1	1RPLS013
				Arau	2	1RPLS012
				Arau		1RPLS014
				Korok	1	1RPLS015
Kedah	01PLA	Kisap	1	Kisap	1	1KKSP001
	01PLC	Melaka	7	Chenang	1	1KMLK006
				Melaka	3	1KMLK002
				Melaka		1KMLK003
				Melaka		1KMLK007
				Petang	1	1KMLK001
				Saga	1	1KMLK004
				Teluk Bujur	1	1KMLK005
		Kuah	1	Kuah	1	1KKUA001
	03	Kedah	18	Ahning	1	1KKDH011
				Changlun	1	1KKDH016
				Janing	1	1KKDH007
				Kedah	1	1KKDH001
				Napoh	1	1KKDH017
				Padang Terap	5	1KKDH002
				Padang Terap		1KKDH003
				Padang Terap		1KKDH004
				Padang Terap		1KKDH009
				Padang Terap		1KKDH012
				Pedu	1	1KKDH005
				Pendang	1	1KKDH008
				Sintok	1	1KKDH018
				Tekai	1	1KKDH006
				Temin	1	1KKDH010
				Terusan Lengkuas	1	1KKDH014
				Terusan Mada Selatan	1	1KKDH013
				Terusan Tengah	1	1KKDH015
	04	Merbok	10	Batu	1	1KMBK002

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Kedah	05	Muda	25	Bakar Arang	1	1KMBK008
				Bongkok	1	1KMBK003
				Bukit Merah	1	1KMBK006
				Bukit Nanas	1	1KMBK011
				Merbok	1	1KMBK001
				Petani	1	1KMBK007
				Tok Pawang	2	1KMBK004
				Tok Pawang		1KMBK005
				Tupah	1	1KMBK010
				Muda	12	1KMUD001
				Muda		1KMUD004
				Muda		1KMUD005
				Muda		1KMUD013
				Muda		1KMUD014
				Muda		1KMUD015
				Muda		1KMUD016
				Muda		1KMUD018
				Muda		1KMUD019
				Muda		1KMUD023
				Muda		1KMUD024
				Muda		1KMUD025
				Jerong	2	1KMUD002
				Jerong		1KMUD003
				Ketil	1	1KMUD006
				Sedim	2	1KMUD008
				Sedim		1KMUD017
				Karangan	1	1KMUD009
				Tawar	3	1KMUD010
				Tawar		1KMUD020
				Tawar		1KMUD007
				Pegang	1	1KMUD011
				Chepir	1	1KMUD012
				Korok	1	1KMUD026
				Gunung Inas	1	1KMUD021
	06P	Perai	26	Jarak	6	1KPRI018
				Jarak		1KPRI019
				Jarak		1KPRI024
P.Pinang				Jarak		1PPRI009
				Jarak		1PPRI011
				Jarak		1PPRI012
				Perai	2	1PPRI004
				Perai		1PPRI003
				Kubang Semang	1	1PPRI005
				Kereh	3	1PPRI006
				Kereh		1PPRI008
				Kereh		1PPRI024
Kedah				Keladi	1	1KPRI015

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
P.Pinang				Air Melintas	1	1PPRI007
Kedah				Kulim	5	1KPRI014
				Kulim		1KPRI016
Kedah				Kulim		1KPRI017
				Kulim		1KPRI023
				Kulim		1KPRI025
P.Pinang				Derhaka	1	1PPRI022
Kedah				Seluang Bawah	1	1KPRI020
				Seluang	2	1KPRI021
P.Pinang	06PP	Pinang	15	Seluang		1PPRI010
				Mas	1	1PPRI025
				Satu	2	1PPRI026
				Satu		1PPRI027
				Jelutung	2	1PPNG003
				Jelutung		1PPNG021
				Titi Kerawang	1	1PPNG004
				Air Itam	5	1PPNG006
				Air Itam		1PPNG010
				Air Itam		1PPNG015
				Air Itam		1PPNG016
				Air Itam		1PPNG017
				Pinang	1	1PPNG008
				Dondang	4	1PPNG011
				Dondang		1PPNG012
				Dondang		1PPNG013
				Dondang		1PPNG014
				Air Terjun	2	1PPNG018
				Air Terjun		1PPNG020
	06J	Juru	13	Ara	1	1PJRU006
				Juru	2	1PJRU001
				Juru		1PJRU012
				Kilang Ubi	5	1PJRU002
				Kilang Ubi		1PJRU003
				Kilang Ubi		1PJRU009
				Kilang Ubi		1PJRU010
				Kilang Ubi		1PJRU011
				Pasir	1	1PJRU004
				Permatang Rawa	2	1PJRU008
				Permatang Rawa		1PJRU013
				Rambai	2	1PJRU005
				Rambai		1PJRU007
	06K	Kluang	5	Kluang	1	1PKLU001
				Ara	2	1PKLU002
				Ara		1PKLU003
				Relau	1	1PKLU004
				Dua Besar	1	1PKLU005
	06T	Bayan Lepas	3	Nipah	1	1PBLS001

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
P.Pinang	07	Jawi	7	Bayan Lepas	2	1PBLS002
				Bayan Lepas		1PBLS003
				Chempedak	1	1PJWI003
				Jawi	1	1PJWI001
				Junjong	3	1PJWI002
				Junjong		1PJWI004
				Junjong		1PJWI006
				Machang Bubok	1	1PJWI007
				Tengah	1	1PJWI005
	08	Kerian	14	Kechil	2	1PKER002
				Kechil		1PKER005
Kedah				Kerian	6	1KKER001
P.Pinang				Kerian		1PKER003
				Kerian		1PKER004
				Kerian		1PKER006
				Kerian		1PKER009
				Kerian		1PKER014
Perak				Relau	2	1AKER011
				Relau		1AKER012
				Selama	1	1AKER016
				Lata Puteh	1	1AKER017
				Semang	1	1AKER013
P.Pinang				Serdang	1	1PKER007
Perak		Manjung	11	Manjong	2	1AMJG001
				Manjong		1AMJG002
				Raja Hitam	3	1AMJG003
				Raja Hitam		1AMJG005
				Raja Hitam		1AMJG008
				Derhaka	2	1AMJG004
				Derhaka		1AMJG006
				Deralik	2	1AMJG009
				Deralik		1AMJG010
				Wangi	2	1AMJG011
				Wangi		1AMJG012
	09	Kurau	8	Air Hitam	1	1AKRU007
				Terusan Besar Kanan	1	1AKRU008
				Ara	2	1AKRU001
				Ara		1AKRU006
				Kurau	4	1AKRU002
				Kurau		1AKRU003
				Kurau		1AKRU004
				Kurau		1AKRU005
	10	Sepetang	12	Tupai	1	1ASPT006
				Batu Tegoh	3	1ASPT009
				Batu Tegoh		1ASPT007
				Batu Tegoh		1ASPT012

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Perak	11	Temerloh	8	Air Terjun	1	1ASPT016
				Jebong Kanan	1	1ASPT004
				Jana	1	1ASPT013
				Lidin	1	1ASPT008
				Malai	2	1ASPT002
				Malai		1ASPT019
				Sepetang	2	1ASPT001
				Sepetang		1ASPT003
				Nyior	1	1ATMH008
				Wangi	1	1ATMH007
				Limau	1	1ATMH004
				Tanah Liat	2	1ATMH002
				Tanah Liat		1ATMH003
				Nyior	1	1ATMH009
				Trong	2	1ATMH005
				Trong		1ATMH006
		Bruas	7	Bruas	3	1ABRU001
				Bruas		1ABRU004
				Bruas		1ABRU005
				Dendang	1	1ABRU006
				Beruas	1	1ABRU007
				Rotan	2	1ABRU002
				Rotan		1ABRU003
	13	Perak	84	Batang Padang	3	1APRK003
				Batang Padang		1APRK006
				Batang Padang		1APRK009
				Berok	1	1APRK068
				Bidor	3	1APRK002
				Bidor		1APRK004
				Bidor		1APRK005
				Chenderiang	2	1APRK012
				Chenderiang		1APRK013
				Chepor	1	1APRK056
				Kati	1	1APRK046
				Ibol	1	1APRK066
				Kampar	3	1APRK031
				Kampar		1APRK032
				Kampar		1APRK080
				Kangsar	3	1APRK043
				Kangsar		1APRK044
				Kangsar		1APRK079
				Enggor	2	1APRK037
				Enggor		1APRK038
				Korbu	1	1APRK064
				Kerbau	1	1APRK078
				Kerdah	2	1APRK041
				Kerdah		1APRK053

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Perak				Kinjang	1	1APRK055
				Kinta	9	1APRK019
				Kinta		1APRK022
				Kinta		1APRK024
				Kinta		1APRK025
				Kinta		1APRK033
				Kinta		1APRK034
				Kinta		1APRK057
				Kinta		1APRK058
				Kinta		1APRK063
				Kelah	2	1APRK014
				Kelah		1APRK015
				Jangka	2	1APRK016
				Jangka		1APRK017
				Kuang	1	1APRK042
				Guar	1	1APRK060
				Nyamok	1	1APRK052
				Pari	2	1APRK023
				Pari		1APRK028
				Pelus	2	1APRK039
				Pelus		1APRK040
				Perak	15	1APRK001
				Perak		1APRK018
				Perak		1APRK020
				Perak		1APRK045
				Perak		1APRK047
				Perak		1APRK048
				Perak		1APRK051
				Perak		1APRK065
				Perak		1APRK071
				Perak		1APRK072
				Perak		1APRK074
				Perak		1APRK082
				Perak		1APRK049
				Perak		1APRK069
				Perak		1APRK070
				Perak (Tasek Temenggor)	1	1APRK086
				Pinji	2	1APRK021
				Pinji		1APRK036
				Pulau	1	1APRK067
				Raia	2	1APRK030
				Raia		1APRK035
				Rui	2	1APRK084
				Rui		1APRK085
				Sauk	1	1APRK059
				Seluang	1	1APRK050

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Perak	14	Bernam	18	Serokai	2	1APRK026
				Serokai		1APRK027
				Sintang	1	1APRK054
				Sungkai	4	1APRK007
				Sungkai		1APRK008
				Sungkai		1APRK073
				Sungkai		1APRK075
				Sungkai Mati	2	1APRK010
				Sungkai Mati		1APRK011
				Tapah	1	1APRK076
				Teja	1	1APRK083
				Sungkai	1	1APRK062
				Tumboh	1	1APRK029
				Woh	1	1APRK061
				Bernam	8	1ABNM001
				Bernam		1ABNM002
				Bernam		1ABNM003
				Bernam		1ABNM004
				Bernam		1ABNM005
				Bernam		1ABNM006
Selangor				Bernam		2BBNM013
				Bernam		2BBNM016
				Dusun	1	2BBNM017
Perak				Slim	3	1ABNM007
				Slim		1ABNM008
				Trolak	3	1ABNM009
				Trolak		1ABNM010
				Trolak		1ABNM011
				Inki	1	1ABNM012
				Inki		1ABNM014
				Behrang	1	1ABNM016
				Slim	1	1ABNM015
Selangor	17	Buloh	6	Buloh	6	2BBLH001
				Buloh		2BBLH002
				Buloh		2BBLH003
				Buloh		2BBLH004
				Buloh		2BBLH005
				Buloh		2BBLH006
	20	Sepang	4	Sepang	3	2BSPG001
				Sepang		2BSPG002
				Sepang		2BSPG003
				Rambai	1	2BSPG004
	15	Tengi	4	Tengi	4	2BTGI001
				Tengi		2BTGI002
				Tengi		2BTGI003
				Tengi		2BTGI004

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Selangor	16	Selangor	1	Air Hitam	2	2BSEL002
				Air Hitam		2BSEL024
				Batang Kali	1	2BSEL003
				Guntong	1	2BSEL021
				Kerling	1	2BSEL006
				Kanching	1	2BSEL007
				Kundang	1	2BSEL012
				Rangkap	1	2BSEL016
				Rawang	1	2BSEL013
				Selangor	10	2BSEL001
				Selangor		2BSEL004
				Selangor		2BSEL005
				Selangor		2BSEL010
				Selangor		2BSEL011
				Selangor		2BSEL014
				Selangor		2BSEL015
				Selangor		2BSEL017
				Selangor		2BSEL018
				Selangor		2BSEL023
				Sembah	2	2BSEL009
				Sembah		2BSEL019
				Serendah	1	2BSEL008
	19	Langat	1	Anak Chuau	1	2BLGT039
				Chuau	2	2BLGT036
				Chuau		2BLGT037
				Limau Manis	1	2BLGT038
				Langat	9	2BLGT002
				Langat		2BLGT003
				Langat		2BLGT004
				Langat		2BLGT005
				Langat		2BLGT006
				Langat		2BLGT007
				Langat		2BLGT008
				Langat		2BLGT026
				Langat		2BLGT027
Negeri Sembilan				Batang Benar	2	3NLGT013
				Batang Benar		3NLGT021
				Beranang	1	3NLGT019
				Pajam	1	3NLGT020
				Batang Labu	2	3NLGT009
				Batang Labu		3NLGT025
				Batang Nilai	2	3NLGT023
				Batang Nilai		3NLGT024
				Buah	1	3NLGT022
				Jijan	1	3NLGT026

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Selangor				Semenyih	3	2BLGT010
				Semenyih		2BLGT011
				Semenyih		2BLGT012
				Rinching	2	2BLGT014
				Rinching		2BLGT015
				Balak	1	2BLGT025
				Sering	1	2BLGT034
				Batang Labu	6	2BLGT028
				Batang Labu		2BLGT030
				Batang Labu		2BLGT031
				Batang Labu		2BLGT032
				Batang Labu		2BLGT033
				Batang Labu		2BLGT035
WPKL	18	Klang	1	Air Busuk	1	2WKLG041
Selangor				Ampang	2	2BKLG032
				Ampang		2BKLG042
WPKL				Anak Air Batu	1	2WKLG047
Selangor				Batu	5	2BKLG007
				Batu		2BKLG036
				Batu		2BKLG028
WPKL				Batu		2WKLG056
				Batu		2WKLG061
				Belongkong	1	2WKLG040
				Bunus	3	2WKLG006
WPKL				Bunus		2WKLG039
				Bunus		2WKLG043
Selangor				Damansara	5	2BKLG008
				Damansara		2BKLG009
				Damansara		2BKLG017
				Damansara		2BKLG055
				Damansara		2BKLG067
				Gombak	5	2BKLG020
				Gombak		2BKLG027
WPKL				Gombak		2WKLG018
				Gombak		2WKLG026
				Gombak		2WKLG060
Selangor				Jinjang	4	2BKLG044
WPKL				Jinjang		2WKLG014
				Jinjang		2WKLG031
				Jinjang		2WKLG045
				Kerayong	4	2WKLG013
				Kerayong		2WKLG051
Selangor				Kerayong		2BKLG046
				Kerayong		2BKLG058
				Keroh	3	2BKLG030
WPKL				Keroh		2WKLG015

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Selangor				Keroh		2BKLG048
				Klang	13	2BKLG005
				Klang		2BKLG006
Selangor				Klang		2BKLG016
				Klang		2BKLG022
				Klang		2BKLG023
				Klang		2BKLG024
				Klang		2BKLG034
				Klang		2BKLG050
WPKL				Klang		2WKLG001
				Klang		2WKLG002
				Klang		2WKLG003
				Klang		2WKLG004
				Klang		2WKLG049
Selangor				Kuyoh	2	2BKLG011
WPKL				Kuyoh		2WKLG052
Selangor				Penchala	3	2BKLG019
				Penchala		2BKLG054
WPKL				Penchala		2WKLG010
Selangor				Pusu	1	2BKLG021
				Rasau	1	2BKLG003
				Rumput	1	2BKLG033
				Semelah	1	2BKLG025
WPKL				Toba	1	2WKLG037
				Utut	1	2WKLG038
Negeri Sembilan	21	Lukut	2	Lukut Besar	2	3NLKT001
				Lukut Besar		3NLKT002
		Linggi	29	Batang Penar	3	3NLGI021
				Batang Benar		3NLGI009
				Batang Benar		3NLGI020
				Empangan Terip	1	3NLGI027
				Batu Hampar	1	3NLGI023
				Kundor	1	3NLGI013
				Linggi	1	3NLGI001
				Senawang	1	3NLGI017
				Temiang Diversion	1	3NLGI019
				Pedas	2	3NLGI014
				Pedas		3NLGI010
				Linggi	7	3NLGI002
				Linggi		3NLGI003
				Linggi		3NLGI004
				Linggi		3NLGI005
				Linggi		3NLGI006
				Linggi		3NLGI040
				Linggi		3NLGI022

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Negeri Sembilan	21	Linggi	29	Kepayang	1	3NLGI007
				Ngoi Ngoi	1	3NLGI032
				Temiang	1	3NLGI033
				Simin	1	3NLGI015
				Rembau	1	3NLGI011
				Chembong Besar	1	3NLGI012
				Paroi	1	3NLGI018
				Kayu Ara	1	3NLGI016
Melaka				Simpang Ampat	1	3MLGI029
				Siput	2	3MLGI030
				Siput		3MLGI031
Negeri Sembilan	25	Muar	2	Jelai	1	3NMUA056
				Muar	1	3NMUA057
	35P	Pahang	1	Kenaboi	1	3NPHG007
Melaka	22	Baru	3	Baru	1	3MBAR001
				Tuang	1	3MBAR003
				Tuang	1	3MBAR002
		Melaka	31	Batang Melaka	3	3MMLK008
				Batang Melaka		3MMLK027
				Batang Melaka		3MMLK028
				Empangan Jus	1	3MMLK009
				Durian Tunggal	1	3MMLK011
Negeri Sembilan				Kemunting	1	3NMLK039
				Tampin	1	3NMLK038
				Dusun	1	3NMLK017
Melaka				Malim	1	3MMLK014
				Melaka	12	3MMLK007
				Melaka		3MMLK012
				Melaka		3MMLK013
				Melaka		3MMLK015
				Melaka		3MMLK021
				Melaka		3MMLK022
				Melaka		3MMLK023
				Melaka		3MMLK024
				Melaka		3MMLK025
				Melaka		3MMLK026
				Melaka		3MMLK032
				Melaka		3MMLK034
				Putat	2	3MMLK029
				Putat		3MMLK033
				Empangan Durian Tunggal	1	3MMLK030
				Keru	2	3MMLK031
Negeri Sembilan				Keru		3NMLK041

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Melaka	24	Kesang	1	Rembia	2	3MMLK035
				Rembia		3MMLK036
				Air Salak	1	3MMLK038
				Seri Melaka	1	3MMLK039
				Sg.udang	1	3MMLK037
				Chin-Chin	1	3MKSG006
				Chohong	2	3MKSG004
Melaka	24A	Merlimau	1	Chohong		3MKSG005
				Kesang	5	3MKSG001
				Kesang		3MKSG002
				Kesang		3MKSG003
				Kesang		3MKSG009
				Kesang		3MKSG008
				Empangan Asahan	1	3MKSG010
				Tangkak	1	3MKSG007
				Merlimau	5	3MMLU001
				Merlimau		3MMLU002
				Merlimau		3MMLU003
				Merlimau		3MMLU004
				Merlimau		3MMLU005
	23	Duyong	4	Duyong	2	3MDYG001
				Duyong		3MDYG002
				Ayer Panas	1	3MDYG003
				Gapam	1	3MDYG004
		Punggur	2	Punggur	2	3MPGR001
				Punggur		3MPGR002
Johor	25	Muar	56	Air Panas	1	3JMUA035
				Belemang	1	3JMUA051
				Gemas	2	3JMUA036
Negeri Sembilan				Gemas		3NMUA041
				Asahan	2	3NMUA043
				Asahan		3NMUA045
Johor				Jementah	1	3JMUA040
				Juasseh	3	3JMUA014
				Juasseh		3JMUA037
				Juasseh		3JMUA045
Negeri Sembilan				Ayer Kuning	1	3NMUA044
Johor				Labis	3	3JMUA011
				Labis		3JMUA012
				Labis		3JMUA015
				Meda	1	3JMUA034
				Merbudu	1	3JMUA030
				Merlimau	1	3JMUA020
				Muar	25	3JMUA017
				Muar		3JMUA019

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Johor				Muar		3JMUA022
				Muar		3JMUA026
				Muar		3JMUA027
				Muar		3JMUA028
				Muar		3JMUA029
				Muar		3JMUA031
				Muar		3JMUA033
				Muar		3JMUA039
Johor				Muar		3JMUA041
				Muar		3JMUA042
				Muar		3JMUA043
				Muar		3JMUA046
				Muar		3JMUA047
Negeri Sembilan				Muar		3NMUA042
				Muar		3NMUA046
				Muar		3NMUA047
				Muar		3NMUA048
				Muar		3NMUA049
				Muar		3NMUA050
				Muar		3NMUA051
				Muar		3NMUA052
				Muar		3NMUA053
				Muar		3NMUA055
Johor				P.mengkuang	1	3JMUA018
				Pagoh	1	3JMUA049
				Palong	2	3JMUA024
				Palong		3JMUA025
				Pendol	1	3JMUA050
				Sarang Buaya	1	3JMUA038
				Segamat	3	3JMUA016
				Segamat		3JMUA044
				Segamat		3JMUA048
				Senarut	1	3JMUA021
				Serom	1	3JMUA032
				Simpang Loi	1	3JMUA023
Negeri Sembilan				Jelai	1	3NMUA054
Johor	26	Batu Pahat	25	Tenang	1	3JMUA013
				Amran	1	3JBPT018
				Bantang	1	3JBPT020
				Batu Pahat	1	3JBPT001
				Bekok	6	3JBPT008
				Bekok		3JBPT005
				Bekok		3JBPT016
				Bekok		3JBPT017

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Johor	26	Batu Pahat	25	Bekok		3JBPT019
				Bekok		3JBPT023
				Berlian	1	3JBPT007
				Bekok	1	3JBPT022
				Chaah	2	3JBPT010
				Chaah		3JBPT011
				Merek	1	3JBPT009
				Merpo	1	3JBPT006
				Panchor	1	3JBPT025
				Semberong	2	3JBPT003
				Semberong		3JBPT004
	27A	Air Baloi	1	Semberong Dam	1	3JBPT021
				Simpang Kanan	2	3JBPT002
				Simpang Kanan		3JBPT013
				Simpang Kiri	3	3JBPT012
				Simpang Kiri		3JBPT014
				Simpang Kiri		3JBPT015
				Temehel	1	3JBPT024
				Air Baloi	3	3JABL001
				Air Baloi		3JABL002
				Air Baloi		3JABL003
	28	Segget	1	Segget	5	3JSGT001
				Segget		3JSGT002
				Segget		3JSGT003
				Segget		3JSGT004
				Segget		3JSGT005
	28D	Tebrau	1	Tebrau	1	3JTRU006
				Bala	1	3JTRU008
				Pandan	1	3JTRU007
				Plentong	1	3JTRU004
				Sebulung	1	3JTRU009
				Sengkuang	1	3JTRU011
				Tampoi	1	3JTRU010
				Tebrau	4	3JTRU001
				Tebrau		3JTRU002
				Tebrau		3JTRU003
				Tebrau		3JTRU005
	28F	Danga	1	Danga	2	3JDGA001
				Danga		3JDGA002
	28G	Rambah	1	Rambah	2	3JRBH001
				Rambah		3JRBH002
	29B	Kaw. Pasir Gudang	1	Perembi	1	3JPGD001
				Buluh	1	3JPGD002
	29B	Kaw. Pasir Gudang	1	Tukang Batu	1	3JPGD003

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Johor	29B	Kaw. Pasir Gudang	1	Latoh	1	3JPGD004
				Masai	1	3JPGD005
	27B	Benut	1	Benut	6	3JBNT001
				Benut		3JBNT002
				Benut		3JBNT003
				Benut		3JBNT004
				Benut		3JBNT005
				Benut		3JBNT006
				Machap Dam	1	3JBNT008
				Pinggan	1	3JBNT007
	28A	Pontian Besar	7	Air Hitam	1	3JPBS001
				Ayer Hitam	1	3JPBS005
				Pontian Besar	5	3JPBS002
	28B	Pontian Kecil	1	Pontian Besar		3JPBS003
				Pontian Besar		3JPBS004
				Pontian Besar		3JPBS006
				Pontian Besar		3JPBS007
				Pontian Kecil	2	3JPKC001
				Pontian Kecil		3JPKC002
	28C	Skudai	1	Melana	2	3JSKU008
				Melana		3JSKU009
				Skudai	9	3JSKU001
				Skudai		3JSKU002
				Skudai		3JSKU003
				Skudai		3JSKU004
				Skudai		3JSKU005
				Skudai		3JSKU006
				Skudai		3JSKU007
				Skudai		3JSKU010
				Skudai		3JSKU011
	28E	Kempas	1	Kempas	1	3JKPS001
				Anak Sg. Kempas	1	3JKPS002
	29C	Sanglang	1	Sanglang	1	3JSLG001
	29D	Pulai	1	Pulai	2	3JPLI001
				Pulai		3JPLI002
				Ulu Choh	1	3JPLI003
				Pontian Dam	1	3JPLI004
	31C	Kim-Kim	1	Kim-Kim	2	3JKIM001
				Kim-Kim		3JKIM002
	29	Johor	43	Anak Sg. Sayong	1	3JJHR023
				Belitong	1	3JJHR038
				Berangan	1	3JJHR013
				Bukit Besar	1	3JJHR007
				Anak Sg. Semanggar	1	3JJHR009

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Johor	30A	Sedili Besar	1	Chemangar	1	3JJHR019
				Johor	6	3JJHR011
				Johor		3JJHR014
				Johor		3JJHR015
				Johor		3JJHR040
				Johor		3JJHR041
				Johor		3JJHR042
				Layang	1	3JJHR001
				Layau Kiri	1	3JJHR017
				Lebam	1	3JJHR020
				Linggiu	1	3JJHR030
				Panti	1	3JJHR037
				Papan	1	3JJHR034
				Pelepah	4	3JJHR039
				Pelepah		3JJHR043
				Pelepah		3JJHR044
				Pelepah		3JJHR045
				Penggeli	2	3JJHR028
				Penggeli		3JJHR031
				Remis	1	3JJHR026
				Santi	1	3JJHR022
				Sayong	5	3JJHR024
				Sayong		3JJHR025
				Sayong		3JJHR027
				Sayong		3JJHR033
				Sayong		3JJHR032
				Sebol	1	3JJHR029
				Seluyut	1	3JJHR035
				Semangar	1	3JJHR008
				Semenchu	1	3JJHR018
				Sebina	1	3JJHR021
				Serai	1	3JJHR002
				Telor	1	3JJHR012
				Temon	1	3JJHR016
				Tiram	4	3JJHR003
				Tiram		3JJHR004
				Tiram		3JJHR005
				Tiram		3JJHR006
				Ambat	1	3JSBE005
				Dohol	1	3JSBE001
				Mupur	1	3JSBE009
				Sedili Besar	4	3JSBE002
				Sedili Besar		3JSBE006
				Sedili Besar		3JSBE008
				Sedili Besar		3JSBE011

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Johor	30A	Sedili Besar	1	Gambut	1	3JSBE007
				Ulu Sedili Besar	1	3JSBE004
				Anak Sg. Sedili Besar	2	3JSBE010
				Anak Sg. Sedili Besar		3JSBE003
	30B	Sedili Kechil	1	Anak Sedili Kechil	1	3JSKE005
				Bahan	2	3JSKE002
				Bahan		3JSKE004
				Sedili Kechil	3	3JSKE001
				Sedili Kechil		3JSKE003
				Sedili Kechil		3JSKE006
	30C	Paloi	1	Paloi	1	3JPAL001
	31A	Mersing	1	Mersing	3	3JMSG001
				Mersing		3JMSG002
				Mersing		3JMSG003
	31B	Jemaluang	1	Empangan Congok	1	3JMSG004
				Jemaluang	2	3JJML001
				Jemaluang		3JJML002
	32	Endau	29	Anak Sg. Sembrong	1	3JEND007
				Empangan Labong	1	3JEND027
				Endau	3	3JEND019
				Endau		3JEND022
				Endau		3JEND023
				Jasin	1	3JEND024
				Jebong	1	3JEND005
				Kahang	4	3JEND020
				Kahang		3JEND010
				Kahang		3JEND026
				Kahang		3JEND028
				Lenga	1	3JEND008
				Lenggor	2	3JEND009
				Lenggor		3JEND029
				Mamai	1	3JEND015
				Melatai	1	3JEND017
				Mengkibol	3	3JEND001
				Mengkibol		3JEND002
				Mengkibol		3JEND003
				Paloh	1	3JEND016
				Pamol	1	3JEND011
				Selai	1	3JEND025
				Semberong	5	3JEND004
				Semberong		3JEND006
				Semberong		3JEND012
				Semberong		3JEND018

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Johor	32	Endau	29	Semberong		3JEND021
				Singol	1	3JEND013
				Tamok	1	3JEND014
Pahang	35P	Pahang	143	T. Paya Bungor	1	4CPHG002
				Krau	1	4CPHG003
				Chini	1	4CPHG004
				Mentiga	3	4CPHG005
				Mentiga		4CPHG042
				Mentiga		4CPHG089
				Lepar	1	4CPHG006
				Pahang	26	4CPHG007
				Pahang		4CPHG010
				Pahang		4CPHG011
				Pahang		4CPHG012
				Pahang		4CPHG013
				Pahang		4CPHG021
				Pahang		4CPHG022
				Pahang		4CPHG023
				Pahang		4CPHG027
				Pahang		4CPHG054
				Pahang		4CPHG055
				Pahang		4CPHG124
				Pahang		4CPHG126
				Pahang		4CPHG127
				Pahang		4CPHG131
				Pahang		4CPHG137
				Pahang		4CPHG138
				Pahang		4CPHG139
				Pahang		4CPHG097
				Pahang		4CPHG100
				Pahang		4CPHG104
				Pahang		4CPHG111
				Pahang		4CPHG113
				Pahang		4CPHG141
				Pahang		4CPHG148
				Pahang		4CPHG150
				Berkapor	1	4CPHG008
				Jelai	3	4CPHG0130
				Jelai		4CPHG096
				Jelai		4CPHG125
				Kertam	1	4CPHG014
				Luit	1	4CPHG015
				Maran	1	4CPHG016
				Kundang	1	4CPHG018
				Bera	5	4CPHG019

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Pahang	35P	Pahang	143	Bera		4CPHG020
				Bera		4CPHG058
				Bera		4CPHG059
				Bera		4CPHG063
				Semantan	4	4CPHG025
				Semantan		4CPHG036
				Semantan		4CPHG061
				Semantan		4CPHG084
				Lipis	3	4CPHG029
				Lipis		4CPHG030
				Lipis		4CPHG035
				Telang	1	4CPHG032
				Koyan	1	4CPHG033
				Teras	2	4CPHG037
				Teras		4CPHG147
				Teranum	1	4CPHG038
				Bentong	6	4CPHG040
				Bentong		4CPHG045
				Bentong		4CPHG092
				Bentong		4CPHG133
				Bentong		4CPHG134
				Bentong		4CPHG144
				Jengka	4	4CPHG041
				Jengka		4CPHG051
				Jengka		4CPHG087
				Jengka		4CPHG121
				Tasik Chini	10	4CPHG043
				Tasik Chini		4CPHG060
				Tasik Chini		4CPHG071
				Tasik Chini		4CPHG114
				Tasik Chini		4CPHG108
				Tasik Chini		4CPHG110
				Tasik Chini		4CPHG112
				Tasik Chini		4CPHG115
				Tasik Chini		4CPHG130
				Tasik Chini		4CPHG143
				Penjuring	1	4CPHG044
				Telemong	3	4CPHG046
				Telemong		4CPHG093
				Telemong		4CPHG094
				Benus	3	4CPHG047
				Benus		4CPHG118
				Benus		4CPHG152
				Tanglir	1	4CPHG048

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Pahang	35P	Pahang	143	Jempol	3	4CPHG049
				Jempol		4CPHG050
				Jempol		4CPHG088
				Tekam	4	4CPHG053
				Tekam		4CPHG057
				Tekam		4CPHG106
				Tekam		4CPHG107
				Batu	1	4CPHG056
				Tekal	1	4CPHG062
				Teris	3	4CPHG081
				Teris		4CPHG082
				Teris		4CPHG083
				Gapoi	1	4CPHG086
				Teh	1	4CPHG090
				Berkelah	1	4CPHG098
				Retang	1	4CPHG105
				Tahan	1	4CPHG109
Negeri Sembilan				Pertang	2	3NPHG002
Pahang				Pertang		4CPHG132
				Kelau	4	4CPHG117
				Kelau		4CPHG145
				Kelau		4CPHG146
				Kelau		4CPHG153
				Bilut	2	4CPHG119
				Bilut		4CPHG129
				Perting	1	4CPHG120
				Raub	1	4CPHG123
Negeri Sembilan				Serting	5	3NPHG003
				Serting		3NPHG004
				Serting		3NPHG005
Pahang				Serting		4CPHG101
				Serting		4CPHG102
				Belayar	1	4CPHG135
				Anak Sg. Lepar	1	4CPHG136
				Tasik Bera	1	4CPHG140
				Tembeling	1	4CPHG142
				Kecau	3	4CPHG151
				Kecau		4CPHG091
				Kecau		4CPHG116
				Bertam	4	4CPHG154
				Bertam		4CPHG155
				Bertam		4CPHG156
				Bertam		4CPHG157
				Burung	1	4CPHG158

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Pahang				Habu	1	4CPHG159
				Lenggok	1	4CPHG160
				Ringlet	1	4CPHG161
				Telom	2	4CPHG162
				Telom		4CPHG163
Negeri Sembilan				Triang	3	3NPHG006
Pahang	36	Kuantan	7	Triang		4CPHG024
				Triang		4CPHG074
				Terla	2	4CPHG164
				Terla		4CPHG165
				Tringkap	1	4CPHG166
				Kuantan	1	4CPHG168
				Ulong	1	4CPHG167
				Kuantan	7	4CKTN015
				Kuantan		4CKTN016
				Kuantan		4CKTN017
				Kuantan		4CKTN018
				Kuantan		4CKTN019
				Kuantan		4CKTN020
				Kuantan		4CKTN021
	32AE	Endau	1	Anak Endau	2	4CEND001
				Anak Endau		4CEND002
		Pontian	2	Pontian	1	4CPTN001
				Sepayang	1	4CPTN002
Pahang	33	Rompin	1	Aur	1	4CRPN005
				Bakar	1	4CRPN016
				Jekatih	2	4CRPN012
				Jekatih		4CRPN013
				Jeram	1	4CRPN006
				Kepasing	1	4CRPN010
				Keratong	4	4CRPN011
				Keratong		4CRPN018
				Keratong		4CRPN021
				Keratong		4CRPN022
				Pukin	3	4CRPN014
				Pukin		4CRPN015
				Pukin		4CRPN017
				Rompin	5	4CRPN004
				Rompin		4CRPN007
				Rompin		4CRPN008
				Rompin		4CRPN020
				Rompin		4CRPN030
	34M	Merchong	3	Merchong	3	4CMCO001
				Merchong		4CMCO002
				Merchong		4CMCO003

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Pahang	34B	Bebar	1	Bebar	2	4CBBR001
				Bebar		4CBBR002
				Serai	1	4CBBR004
				Merba	1	4CBBR005
	36	Kuantan	1	Belat	1	4CKTN001
				Galing Besar	2	4CKTN003
				Galing Besar		4CKTN004
	37	Baluk	6	Pinang	1	4CKTN005
				Charu	1	4CKTN006
				Riau	1	4CKTN007
				Kenau	1	4CKTN010
				Pandan	1	4CKTN012
				Talam	1	4CKTN013
				Reman	1	4CKTN014
				Salak	1	4CKTN022
				Baluk	2	4CBLK001
				Baluk		4CBLK002
				Yior	1	4CBLK003
				Panjang	1	4CBLK004
				Tonggok	2	4CBLK005
				Tonggok		4CBLK006
	37A	Cherating	1	Cherating	1	4CCHE001
Terengganu	38	Kemaman	1	Cherul	3	4TKMM003
				Cherul		4TKMM004
				Cherul		4TKMM010
				Kemaman	3	4TKMM007
Terengganu	39K	Kertih	2	Kemaman		4TKMM008
				Kemaman		4TKMM009
				Neram	1	4TKMM005
				Perasing	1	4TKMM006
				Ransan	1	4TKMM001
				Tebak	1	4TKMM002
				Kertih	2	4TKTH001
				Kertih		4TKTH002
	40	Paka	1	Besul	1	4TPKA001
				Rengat	1	4TPKA002
				Rasau	2	4TPKA003
				Rasau		4TPKA004
				Paka	3	4TPKA005
				Paka		4TPKA006
				Paka		4TPKA007
	41	Dungun	1	Telemboh	1	4TDGN001
				Dungun	5	4TDGN002
				Dungun		4TDGN003
				Dungun		4TDGN004

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Terengganu	41	Dungun	1	Dungun		4TDGN005
				Dungun		4TDGN006
	42M	Marang	3	Kerak	1	4TMRG001
				Marang	1	4TMRG002
				Temala	1	4TMRG003
	43	Terengganu	1	Berang	2	4TTGG002
				Berang		4TTGG011
				Nerus	6	4TTGG004
				Nerus		4TTGG005
				Nerus		4TTGG006
				Nerus		4TTGG010
				Nerus		4TTGG014
				Nerus		4TTGG015
				Pueh	2	4TTGG007
				Pueh		4TTGG008
				Telemong	1	4TTGG012
				Terengganu	4	4TTGG001
				Terengganu		4TTGG003
				Terengganu		4TTGG009
				Terengganu		4TTGG013
	44	Setiu	1	Chalok	3	4TSTU001
				Bari	1	4TSTU002
				Tarom	1	4TSTU003
				Setiu	2	4TSTU004
				Setiu		4TSTU005
				Setiu		4TSTU006
				Merang	1	4TSTU008
				Merang		4TSTU007
	46	Besut	1	Tanduk	1	4TBST001
				Besut	5	4TBST002
				Besut		4TBST003
				Besut		4TBST004
				Besut		4TBST005
				Besut		4TBST006
	47	Keluang Besar	1	Kluang	1	4TKLU005
	39C	Chukai	1	Ibok	2	4TCKI001
				Ibok		4TCKI002
	42I	Ibai	1	Chukai	1	4TCKI003
				Ruang	2	4TCKI004
				Ruang		4TCKI005
				Bungkus	1	4TCKI006
				Ibai	3	4TIBI001
				Ibai		4TIBI002
				Ibai		4TIBI003

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Terengganu	42L	Mercang	2	Landas	1	4TMCA001
				Mercang	1	4TMCA002
Kelantan	47K	Kemasin	4	Gali	1	4DKMS004
				Isos	1	4DKMS002
				Kemasin	2	4DKMS001
				Kemasin		4DKMS003
		Semerak	4	Semerak	4	4DSMK001
				Semerak		4DSMK002
				Semerak		4DSMK004
				Semerak		4DSMK003
	48	Kelantan	2	Aring	1	4DKLT013
				Belatop	3	4DKLT020
				Belatop		4DKLT018
				Belatop		4DKLT046
				Ber	1	4DKLT021
				Berok	3	4DKLT016
				Berok		4DKLT019
				Berok		4DKLT022
				Betis	1	4DKLT017
				Chiku	2	4DKLT037
				Chiku		4DKLT043
				Galas	5	4DKLT014
				Galas		4DKLT031
				Galas		4DKLT032
				Galas		4DKLT033
				Galas		4DKLT034
				Kelantan	6	4DKLT001
				Kelantan		4DKLT006
				Kelantan		4DKLT010
				Kelantan		4DKLT045
	49	Golok	1	Kelantan		4DKLT054
				Kelantan		4DKLT056
				Kelesa	1	4DKLT015
				Kenkren	1	4DKLT047
				Kerilla	2	4DKLT002
				Kerilla		4DKLT003
				Ketil	2	4DKLT036
				Ketil		4DKLT053
				Lebir	4	4DKLT026
				Lebir		4DKLT027
				Lebir		4DKLT028
				Lebir		4DKLT029
				Nenggiri	3	4DKLT023
				Nenggiri		4DKLT024
				Nenggiri		4DKLT025

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Kelantan	49	Golok	1	Muring	1	4DKLT059
				Nal	3	4DKLT007
				Nal		4DKLT008
				Nal		4DKLT009
				Pehi	2	4DKLT011
				Pehi		4DKLT044
				Pelaur	1	4DKLT048
				Penangau	1	4DKLT050
				Pergau	8	4DKLT004
				Pergau		4DKLT005
				Pergau		4DKLT038
				Pergau		4DKLT039
				Pergau		4DKLT040
				Pergau		4DKLT041
				Pergau		4DKLT051
				Pergau		4DKLT052
				Rasau	1	4DKLT061
				Relai	2	4DKLT012
				Relai		4DKLT030
				Sokor	1	4DKLT042
				Tuang	1	4DKLT035
				Golok	5	4DGLK002
				Golok		4DGLK003
				Golok		4DGLK004
				Golok		4DGLK005
				Golok		4DGLK006
				Kelantan	1	4DGLK009
				Jedok	1	4DGLK008
				Lanas	1	4DGLK007
				Tasik Garu	1	4DGLK001
	48C	Pengkalan Chepa	1	Raja Gali	1	4DPCH001
				Keladi	1	4DPCH002
				Alor B	1	4DPCH003
				Alor Lintah	1	4DPCH004
				Pengkalan Chepa	2	4DPCH005
				Pengkalan Chepa		4DPCH006
	48D	Pengkalan Datu	1	Pengkalan Datu	3	4DPDT001
				Pengkalan Datu		4DPDT002
				Pengkalan Datu		4DPDT003
				Pasir Hor	1	4DPDT004
Sarawak	50	Kayan	1	Kayan	3	6QKYN001
				Kayan		6QKYN002
				Kayan		6QKYN003
	50S	Semunsam	1	Semunsam	1	6QSMS001
	51	Sarawak	1	Kelantan	1	6QSWK017

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Sarawak	51	Sarawak	1	Kuap	2	6QSWK009
				Kuap		6QSWK010
				Maong Kiri	1	6QSWK011
				Samarahan	2	6QSWK013
				Samarahan		6QSWK014
				Sarawak	7	6QSWK001
				Sarawak		6QSWK003
				Sarawak		6QSWK004
				Sarawak		6QSWK006
				Sarawak		6QSWK007
				Sarawak		6QSWK008
				Sarawak		6QSWK002
				Sarawak Kiri	1	6QSWK005
				Semadang	1	6QSWK016
				Semenggoh	1	6QSWK012
				Tabuan	1	6QSWK015
				Tapah	1	6QSWK018
	59	Balingian	1	Balingian	2	6QBLG001
				Balingian		6QBLG002
	62	Similajau	1	Similajau	2	6QSML001
				Similajau		6QSML002
	64	Niah	1	Niah	2	6QNIA001
				Niah		6QNIA002
				Sekaloh	2	6QNIA003
				Sekaloh		6QNIA004
	68	Limbang	1	Limbang	5	6QLBG001
				Limbang		6QLBG002
				Limbang		6QLBG003
				Limbang		6QLBG004
				Limbang		6QLBG005
	69	Trusan	1	Trusan	1	6QTSN001
	70	Lawas	1	Lawas	3	6QLWS001
				Lawas		6QLWS002
				Lawas		6QLWS003
	52	Sadong	1	Batang Sadong	1	6QSDG001
				Batang Krang	1	6QSDG002
				Sadong	4	6QSDG003
				Sadong		6QSDG004
				Sadong		6QSDG005
	52	Sadong	1	Sadong		6QSDG006
				Baeh	1	6QSDG007
	53	Lupar	1	Ai	2	6QLPR001
				Ai		6QLPR002
				Lupar	3	6QLPR003

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Sarawak	53	Lupar	1	Lupar		6QLPR004
				Lupar		6QLPR005
				Sekerang	1	6QLPR006
				Seterap	1	6QLPR007
				Undup	1	6QLPR008
	54	Saribas	1	Saribas	1	6QSRB001
				Layar	2	6QSRB002
				Layar		6QSRB003
	55	Kerian	3	Kerian	2	6QKRN014
				Kerian		6QKRN015
				Seblak	1	6QKRN016
	56	Rajang	24	Baloi	1	6QRJG019
				Bintangor	1	6QRJG004
				Daro	1	6QRJG021
				Jemoreng	1	6QRJG022
				Kanowit	2	6QRJG005
				Kanowit		6QRJG006
				Meradong	1	6QRJG003
				Pakan	1	6QRJG020
				Pila Parit	1	6QRJG023
				Rajang	11	6QRJG008
				Rajang		6QRJG009
				Rajang		6QRJG010
				Rajang		6QRJG011
				Rajang		6QRJG012
				Rajang		6QRJG013
				Rajang		6QRJG014
				Rajang		6QRJG015
				Rajang		6QRJG016
				Rajang		6QRJG017
				Rajang		6QRJG018
				Kerubong	1	6QRJG024
				Salim	1	6QRJG007
				Sarikei	2	6QRJG001
	57	Oya	1	Sarikei		6QRJG002
				Oya	3	6QOYA001
				Oya		6QOYA002
				Oya		6QOYA003
	58	Mukah	1	Mukah	5	6QMKH001
				Mukah		6QMKH002
	58	Mukah	1	Mukah		6QMKH003
				Mukah		6QMKH004
				Mukah		6QMKH005
	60	Tatau	1	Tatau	1	6QTTU001

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Sarawak	61	Kemena	1	Kemena	4	6QKMN001
				Kemena		6QKMN002
				Kemena		6QKMN003
				Kemena		6QKMN004
				Sibiu	1	6QKMN005
	63	Suai	1	Suai	1	6QSUA001
	65	Sibuti	1	Kabuloh	2	6QSBT001
				Kabuloh		6QSBT002
				Kejapil	1	6QSBT003
				Satap	1	6QSBT004
				Sibuti	2	6QSBT005
				Sibuti		6QSBT006
	66	Miri	1	Adong	1	6QMRI001
				Dalam	1	6QMRI002
				Lutong	2	6QMRI003
				Lutong		6QMRI004
				Miri	2	6QMRI005
				Miri		6QMRI006
				Padang Liku	1	6QMRI007
	67	Baram	1	Baram	4	6QBRM001
				Baram		6QBRM002
				Baram		6QBRM003
				Baram		6QBRM004
				Tutuh	1	6QBRM005
Sabah	71	Menggalong	1	Mengalong	2	5SMGL001
				Mengalong		5SMGL002
	71B	Bukau	1	Lingkungan	1	5SBKU001
				Bukau	1	5SBKU002
	72	Padas	12	Bunsit	1	5SPDS001
				Liawan	1	5SPDS002
				Padas	4	5SPDS003
				Padas		5SPDS004
				Padas		5SPDS005
				Padas		5SPDS011
				Luar Sempadan	1	5SPDS012
				Pangatan	1	5SPDS006
				Pegalan	3	5SPDS008
Sabah	73	Membakut	1	Pegalan		5SPDS009
				Pegalan		5SPDS010
				Tandulu	1	5SPDS007
				Membakut	1	5SMBT001
	74	Kimanis	1	Kimanis	1	5SKMA001
	74A	Bongawan	1	Bongawan	1	5SBGW001

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Sabah	74	Papar	5	Papar	5	5SPPR001
				Papar		5SPPR002
				Papar		5SPPR003
				Papar		5SPPR004
				Papar		5SPPR005
	82	Paitan	1	Paitan	1	5SPTN001
		Monyog	4	Kasigui	1	5SMYG002
	76			Moyog	3	5SMYG001
				Moyog		5SMYG003
				Moyog		5SMYG004
	77	Tuaran	1	Damit	2	5STUA001
				Damit		5STUA002
				Tuaran	3	5STUA003
				Tuaran		5STUA004
				Tuaran		5STUA005
	78	Abai	1	Tempasuk	1	5SABI001
				Wariu	1	5SABI002
				Kedamaian	2	5SABI003
				Kedamaian		5SABI004
	78T	Sulaman	1	Tenghilan	1	5SSLN001
	79	Bandau	1	Bandau	1	5SBDU001
		Langkon	4	Sungol	2	5SLKN001
				Sungol		5SLKN002
				Bingkongan	2	5SLKN003
				Bingkongan		5SLKN004
		Tandek	1	Tandek	1	5STDK001
	80	Bengkoka	1	Bengkoka	2	5SBKK001
				Bengkoka		5SBKK002
	83	Sugut	1	Bongkud	1	5SSUG001
				Lohan	1	5SSUG002
				Miroli	1	5SSUG003
				Sugut	3	5SSUG004
				Sugut		5SSUG005
				Sugut		5SSUG006
	84	Labuk	13	Kinipir	2	5SLBK001
				Kinipir		5SLBK002
				Liwagu	2	5SLBK003
				Liwagu		5SLBK004
				Maliau	1	5SLBK005
				Labok	1	5SLBK006
				Tungud	1	5SLBK007
	87	Segama	1	Bangau Bangau	1	5SLBK008
				Sapi	3	5SLBK009
				Sapi		5SLBK010
				Sapi		5SLBK011

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Sabah	87	Segama	1	Mounad	2	5SLBK012
				Mounad		5SLBK013
				Segama	3	5SSGM001
				Segama		5SSGM002
				Segama		5SSGM003
	88	Ulu Tengku	1	Tungku	2	5STKU001
				Tungku		5STKU002
	88A	Silabukan	1	Silabukan	2	5SSBK001
				Silabukan		5SSBK002
	89	Tingkayu	1	Tingkayu	2	5STKY001
				Tingkayu		5STKY002
	91	Tawau	1	Tawau	4	5STWU001
				Tawau		5STWU002
				Tawau		5STWU003
				Tawau		5STWU004
	91A	Apas	1	Apas	1	5SAPS001
	91B	Balung	1	Balung	1	5SBLU001
	92	Tiram	1	Marutai Besar	1	5STRM001
				Merotai	2	5STRM002
				Merotai		5STRM003
	93	Umas-Umas	1	Umas Umas	1	5SUSM001
	94	Brantian	1	Brantian	1	5SBTN001
	95	Kalabakan	1	Kalabakan	3	5SKBK001
				Kalabakan		5SKBK002
				Kalabakan		5SKBK003
	76A	Karamunsing	1	Sembulan	2	5SKMG001
				Sembulan		5SKMG002
	76B	Inanam	6	Inanam	3	5SINM001
				Inanam		5SINM002
				Inanam		5SINM003
				Likas	2	5SINM004
				Likas		5SINM005
				Darau	1	5SINM006
		Mengatal	2	Menggatal	2	5SMGT001
				Menggatal		5SMGT002
	76C	Mengkabong	1	Telipok	2	5SMKG001
				Telipok		5SMKG002
	85A	Segaliud	1	Segaliud	2	5SSLD001
				Segaliud		5SSLD002
	86	Kinabatangan	1	Karamuak	1	5SKBT006
				Kinabatangan	4	5SKBT001
				Kinabatangan		5SKBT002
				Kinabatangan		5SKBT004
	90	Kalumpang	1	Kinabatangan		5SKBT005
				Koyah	1	5SKBT003

Jadual 4.4: Senarai Lembangan Sungai dan Sungai-Sungai Yang Dipantau, 2019
Table 4.4: List of the Catchments and Rivers Monitored, 2019

NEGERI/ STATE	KOD WKA/ WQH CODE	LEMBANGAN SUNGAI/ RIVER BASIN	JUMLAH STESEN/ TOTAL STATIONS	SUNGAI DIAWASI/ RIVER MONITORED	BIL. STESEN/ NO. OF STATIONS	ID STESEN/ STATIONS ID
Sabah	90	Kalumpang	1	Leepang	1	5SKBT009
				Menanggul	1	5SKBT008
				Pin	1	5SKBT010
				Takala	1	5SKBT007
				Kalumpang	3	5SKLP001
				Kalumpang		5SKLP002
				Kalumpang		5SKLP003
				Pang Burong 2	1	5SKLP004
				Pang Burong 1	1	5SKLP005

Jadual 4.5 : Senarai Stesen Pemantauan Muka Sauk Loji Rawatan Air, 2019
Table 4.5 : List of the Water Intake Monitoring Station, 2019

NEGERI/ STATE	LEMBANGAN SUNGAI/ RIVER BASIN	KOD WKA/ CODE WQR	SUNGAI/ RIVER	ID STESEN/ STATION ID	LOKASI MUKA SAUK/ WATER INTAKE LOCATION
Perlis	Perlis	01	Terusan Mada	2PS13	Muka sauk Loji Rawatan Air Arau Fasa IV
				2PS14	Muka sauk Loji Rawatan Air TTPC, Sg. Baru
Kedah	Melaka	01PLC	Sg. Melaka	2LG05	Ulu Melaka
			Sg. Saga	2LG06	Padang Saga
	Kedah	03	Sg. Temin	2KD10	Changloon
			Sg. Ahning	2KD11	Padang Sanai
			Sg. Padang Terap	2KD12	Kuala Nerang
	Muda	05	Sg. Muda	2MD16	Jeneri
				2MD17	Jeniang
				2MD18	Bukit Selambau
				2MD20	Pinang Tunggal
			Sg. Nami	2MD21	Nami
			Sg. Sedim	2MD19	Bikan
P.Pinang	Pinang	06PP	Sg. Satu	2PG12	Batu Feringgi
Perak	Kurau	9	Sg. Air Hitam	2KU07	Muka sauk Loji Rawatan Air Jelai
	Sepetang	10	Sg. Batu Tegoh	2SP18	Muka sauk Loji Rawatan Air Bukit Larut
	Perak	13	Sg. Sauk	2PK61	Muka sauk Loji Rawatan Air Sauk
			Sg. Manong	2PK62	Muka sauk Loji Rawatan Air Manong
			Sg. Woh	2PK63	Muka sauk Loji Rawatan Air Kuala Woh
			Sg. Tesong	2PK64	Muka sauk Loji Rawatan Air Sg. Klah

Jadual 4.5 : Senarai Stesen Pemantauan Muka Sauk Loji Rawatan Air, 2019

Table 4.5 : List of the Water Intake Monitoring Station, 2019

NEGERI/ STATE	LEMBANGAN SUNGAI/ RIVER BASIN	KOD WKA/ CODE WQR	SUNGAI/ RIVER	ID STESEN/ STATION ID	LOKASI MUKA SAUK/ WATER INTAKE LOCATION
Selangor/Perak	Bernam		Sg. Trolak	2BM14	Muka sauk Loji Rawatan Air Trolak Timur
			Sg. Gelinting	2BM15	Muka sauk Loji Rawatan Air Ulu Slim
Selangor	Klang	18	Sg. Gombak	1K53	Muka sauk Loji Rawatan Air Gombak
	Langat	19	Sg. Semenyih	1L09	Muka sauk Loji Rawatan Air Semenyih
			Sg. Batang Labu	1L26	Muka sauk Loji Rawatan Air Salak Tinggi
Melaka	Kesang	24	Sg. Chin-Chin	1KA08	Muka sauk Loji Rawatan Air Chin-chin
Johor	Muar	25	Sg. Jelai	1MN23	Muka sauk Loji Rawatan Air Dangi
			Sg. Muar	3MR38	Muka sauk Loji Rawatan Air Gombang
			Sg. Jementah	3MR39	Muka sauk Loji Rawatan Air Jementah
	Batu Pahat	26	Sg. Semberong Dam	3BP27	Semberong Dam, Jalan Air Hitam-Kluang
	Benut	27B	Sg. Machap Dam	3BN10	Machap Dam, Pekan Machap
Johor	Pulai	29D	Sg. Pulai Dam	3PU04	Pulai Dam, Pekan Ulu Choh, Kangkar Pulai
	Endau	32	Sg. Kahang	3ED38	Jalan Felda Kahang Timur, Kluang
Pahang	Bertam	35P	Sg. Terla	2CH14	Muka sauk Loji Rawatan Air Kuala Terla (WTSI)
			Sg. Bertam	2CH15	Muka sauk Loji Rawatan Air Habu (WWB)
			Sg. Ulong	2CH16	Brinchang Dam (WTBH)
	Pahang		Sg. Triang	4PH93	Muka sauk Loji Rawatan Air Sg. Triang
			Sg. Gapoi	4PH95	Muka sauk Loji Rawatan Air Gapoi
			Sg. Jempol	4PH96	Jmbtn Sg Jempol Jln Ladang Getah Lubuk Yu ~ Loji Air Sg Jerik
				4PH97	Jmbtn Sg Jempol Jln Bkt Tajau ~ Jengka 3 (Loji Air Jengka 3)
			Sg. Mentiga	4PH98	Jmbtn Sg Metiga Jln Muadzam ~ Felda Chini (Loji Air Chini)
Terengganu	Terengganu	43	Sg. Terengganu	4TE14	Kg Serada Up Stream Muka Loji Air Serada

Jadual 4.5 : Senarai Stesen Pemantauan Muka Sauk Loji Rawatan Air, 2019
Table 4.5 : List of the Water Intake Monitoring Station, 2019

NEGERI/ STATE	LEMBANGAN SUNGAI/ RIVER BASIN	KOD WKA/ CODE WQR	SUNGAI/ RIVER	ID STESEN/ STATION ID	LOKASI MUKA SAUK/ WATER INTAKE LOCATION
Kelantan	Kelantan	48	Sg. Chiku	4KE66	Muka sauk Felda Ciku 2 (Syarikat Air Kelantan)
			Sg. Pahi	4KE67	Muka Sauk Loji Air Pahi (Syarikat Air Kelantan)
			Sg. Kelantan	4KE68	Muka Sauk Loji Air Kelar Pasir Mas (syarika Air Kelantan)
	Golok	49	Sg. Jeduk	4GL10	Jamb. Sg Jeduk Kg Bt Gajah Jln Tnh Merah ~ Jeli (Sykt Air Kelantan)
Sarawak	Kerian	55	Sg. Selalang	55SG01	Selalang Water Intake
	Rajang	56	Sg. Pakan	56PN01	Pakan Water Intake
			Sg. Daro	56DR01	Daro Water Intake
			Sg. Jemoreng	56JG01	Jemoreng Water Intake
			Sg. Pila Parit	56PL01	Igan Water Intake
	Mukah	58	Sg. Mukah	58MH05	Mukah Water Intake
Sabah	Padas	72	Sg. Padas	72PD04	Water Intake Jabatan Air Beaufort
	Papar	75	Sg. Papar	75PP04	Jambatan Sekolah Ke-bangsaan Mandalipau
				75PP05	Water Intake Kogopon, Jabatan Air Papar
JUMLAH/ TOTAL	**55**	**25**	**49**	**55**	

Jadual 4.6: Parameter-Parameter Pengukuran Kualiti Air Sungai, 2019
Table 4.6: River Water Quality Parameters, 2019

PARAMETER/PARAMETER	UNIT/UNIT
Oksigen Terlarut/ Dissolved Oxygen (DO)	mg/l, % saturated
Permintaan Oksigen Biokimia/ Biochemical Oxygen Demand (BOD)	mg/l
Permintaan Oksigen Kimia/ Chemical Oxygen Demand (COD)	mg/l
Pepejal Terampai/ Suspended Solid (SS)	mg/l
pH	unit
Ammoniacal Nitrogen (NH_3-N)	mg/l
Suhu/ Temperature	C
Konduktiviti/ Conductivity	µs
Kemasinan/ Salinity	ppt
Kekeruhan/ Turbidity	NTU

Jadual 4.6: Parameter-Parameter Pengukuran Kualiti Air Sungai, 2019
Table 4.6: River Water Quality Parameters, 2019

PARAMETER/PARAMETER	UNIT/UNIT
Pepejal Terlarut/ Dissolved solids	mg/l
Jumlah Pepejal/ Total solids	mg/l
Nitrat/ Nitrate (NO3)	mg/l
Klorida/ Chloride (Cl)	mg/l
Fosfat/ Phosphate (PO4)	mg/l
Arsenik/ Arsenic (As)	mg/l
Merkuri/ Mercury (Hg)	mg/l
Kadmium/ Cadmium (Cd)	mg/l
Kromium/ Chromium (Cr)	mg/l
Plumbum/ Lead (Pb)	mg/l
Zink/ Zinc (Zn)	mg/l
Kalsium/ Calcium (Ca)	mg/l
Ferum/ Ferum (Fe)	mg/l
Kalium/ Potassium (K)	mg/l
Magnesium/ Magnesium (Mg)	mg/l
Natrium/ Sodium (Na)	mg/l
Minyak dan Gris Oil and Grease (O&G)	mg/l
Methylene Blue Active Substances (MBAS)	mg/l
E-coli	cfu/100ml
Total Coliform	cfu/100ml

Pada tahun 2019, sejumlah 8,118 sampel air sungai telah diuji merangkumi kesemua parameter kualiti air yang diukur. Kualiti air sungai dinilai berdasarkan Indeks Kualiti Air (IKA) dan Standard Kualiti Air Kebangsaan, (NWQSM). IKA ditentukan dengan mengambilkira kepentingan enam parameter penunjuk pencemaran utama iaitu Oksigen Terlarut (DO), Keperluan Oksigen Biokimia (BOD), Keperluan Oksigen Kimia (COD), Ammonia Nitrogen (NH_3-N), pH dan Pepejal Terampai (SS).

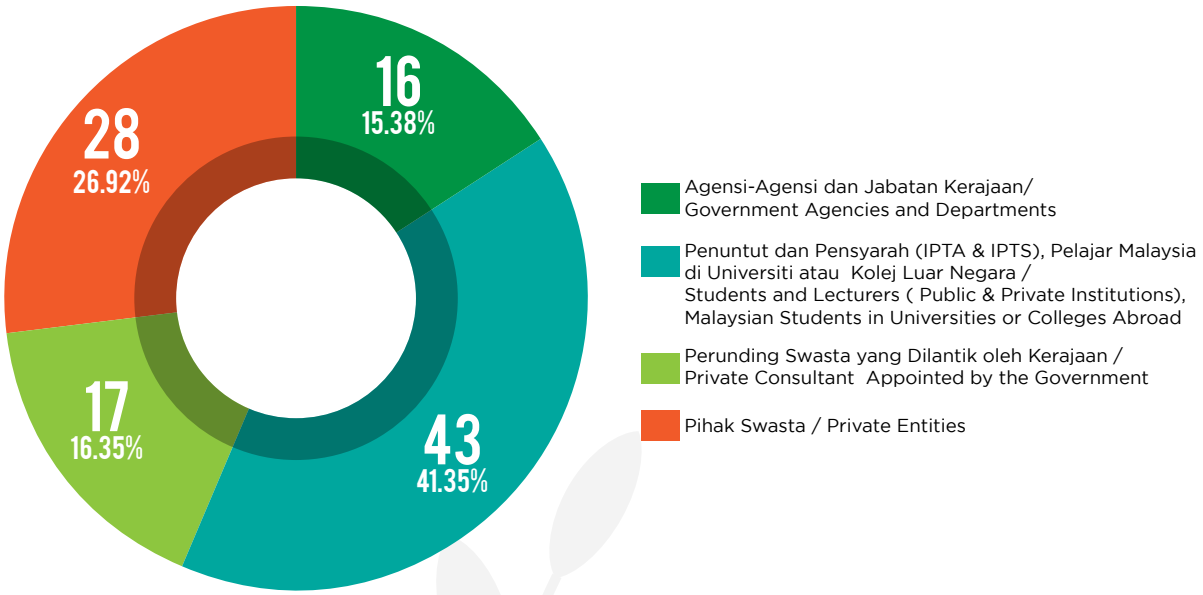
In 2019, a total 8,118 river water samples were tested covering all of the water quality parameters. River water quality is assessed based on Water Quality Index (WQI) and National Water Quality Standard for Malaysia (NWQSM). The WQI is calculated using a formula which is based on six principal parameters namely Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammoniacal Nitrogen (NH_3-N), Suspended Solids (SS) and pH.

SEBARAN DATA KUALITI AIR SUNGAI

Data-data kualiti air sungai telah digunakan oleh dua (2) kategori pengguna utama iaitu agensi/ jabatan kerajaan dan penuntut institusi pengajian tinggi yang menjalankan kajian berkaitan kualiti air sungai. Pada tahun 2019, sejumlah 104 permohonan data telah diterima oleh JAS melibatkan sejumlah 573,141 data kualiti air sungai. Sebanyak 55% daripada permohonan data kualiti air sungai adalah daripada golongan penyelidik di institusi pengajian tinggi, manakala 25% daripada perunding bagi projek kerajaan, manakala selebihnya adalah dari agensi kerajaan dan pihak swasta. Bilangan permohonan data kualiti air sungai yang diterima oleh JAS pada tahun 2019 adalah seperti yang ditunjukkan oleh **Rajah 4.2**.

DISSEMINATION OF RIVER WATER QUALITY DATA

River water quality data were utilized by two (2) categories of user which are government agencies, and researchers from higher learning institutions. In 2019, a total of 104 data requests were received by DOE covering 573,141 water quality data points. About 55% of the requests were from researchers from higher learning institutions, 25% from consultant for government project, and the rest from government agencies and privates. The number of water quality data request received by DOE in 2019 as shown in **Figure 4.2**.



Rajah 4.2 Bilangan Permohonan Data Kualiti Air Sungai yang Diterima oleh JAS, 2019
Figure 4.2 : Number of Application for Water Quality Data Received by DOE, 2019

BENGKEL DI BAWAH PROJEK RMK-11 BAGI KAJIAN SEMAKAN SEMULA KRITERIA DAN STANDARD KUALITI AIR SUNGAI

Bengkel ini telah dijalankan pada 26 hingga 29 Ogos 2019 di Amverton Heritage Resort, Melaka. Objektif bengkel tersebut adalah:

i. Menerangkan objektif bagi keperluan JAS dalam membuat semakan semula Standard Kualiti Kualiti Air Kebangsaan (NWQS) dan Indeks Kualiti Air (IKA) dengan komprehensif dan disesuaikan dengan keadaan semasa;

ii. Perkongsian pengalaman dan peranan agensi-agensi kerajaan dan pihak swasta berkaitan standard kualiti air; dan

iii. Mendapatkan input bagi merangka dan menggubal Standard Kualiti Air Sungai yang baharu.

WORKSHOP UNDER THE PROJECTS OF 11TH MALAYSIA PLAN FOR CRITERIA REVIEW AND STANDARD QUALITY STUDIES OF RIVER

This workshop was held from 26th to 29th August 2019 at Amverton Heritage Resort, Melaka. The objectives of the workshop are:

i. To explain the objectives of the DOE requirements for review the National Water Quality Standards (NWQS) and Water Quality Index (WQI) comprehensiveness, while adapted to current conditions;

ii. To share experiences and the roles of government agencies and private sector related to water quality standard; and

iii. To obtain input to draft and formulate the new River Water Quality Standards.

Lawatan Kerja Peserta Bengkel ke Sungai Melaka/
Site Visit to Sungai Melaka

Penerangan Pihak Kontraktor PSTW bagi Stesen Persampelan Automatik/
Briefing about Automatic Sampling by PSTW Contractor's

Jadual 4.7: Aktiviti dan Program Pengawasan Kualiti Air Sungai, 2019
Table 4.7: River Water Quality Monitoring Activities and Programmes, 2019

TARIKH/ DATE	AKTIVITI & PROGRAM/ ACTIVITIES & PROGRAMMES	TEMPAT/ VENUE
15 Januari 2019 15th January 2019	Mesyuarat Bagi Membincangkan Cadangan Membina Loji Rawatan Air (LRA) Labihan Dagang, Di Atas Tanah Kerajaan, Mukim Tanjung Duabelas, Daerah Kuala Langat, Selangor	JAS Malaysia
29 Januari 2019 29th January 2019	Mesyuarat Taklimat Teknikal Pembinaan Rangkaian Paip Pembentung Di Batu, Jinjang Kepong, Kuala Lumpur (Reka & Bina)	JPS Malaysia
15 Februari 2019 15th February 2019	Program Dialog Bersama Komuniti Bagi Cadangan Projek-Projek Mengganti Jambatan Sedia Ada Di Ft006/041/93 Barat Daya, Pulau Pinang	Dewan Mutiara JKKK, Balik Pulau
20 Februari 2019 20th February 2019	Mesyuarat Lembaga Perolehan Projek Pembangunan RMK-11 Kali Ke-2	MESTECC
5 Mac 2019 5th March 2019	Mesyuarat Penyelarasan Di Antara JAS-SPAN/JPP-IWK Bil. 1/2019	JAS Malaysia
7 Mac 2019 7th March 2019	Mesyuarat Membincangkan Isu-Isu Berkaitan Alam Sekitar Melibatkan Aktiviti Lombong Pasir / Mineral / Kuari.	JAS Malaysia
26 April 2019 26th April 2019	Lawatan Kerja Sambil Belajar Ke JAS Putrajaya Oleh Majlis Perbandaran Ampang Jaya - Pembentangan Bagi Pengurusan Air Sungai	JAS Malaysia
7 Mei 2019 7th May 2019	Mesyuarat Pemuktamadan Pelan Tindakan Task Force Kawalan Pencemaran Sungai Dan Tasik Wilayah Persekutuan Kuala Lumpur (WPKL)	Dewan Bandaraya Kuala Lumpur (DBKL)
13 Jun 2019 13th June 2019	Mesyuarat Membincangkan Pelan Tindakan Kejadian Bencana Pencemaran Alam Sekitar Bil. 1/2019	JAS Malaysia
18 Jun 2019 18th June 2019	Mesyuarat Pertama Majlis Air Negara (MAN 1) 2019	JAS Malaysia
19 Ogos 2019 19th August 2019	Mesyuarat Jawatankuasa Teknikal Penguatkuasaan, Pemuliharaan Dan Pemeliharaan Tasik Chini, Pahang Bilangan 1/2019	Kementeria Air, Tanah dan Sumber Asli
17 Oktober 2019 17th October 2019	Mesyuarat Khas Bagi Membincangkan Hasil Kajian Loading Analysis Dan Carrying Capacity Di Pasir Gudang	Parlimen Malaysia
4 November 2019 4th November 2019	Mesyuarat Jawatankuasa Teknikal Projek Kajian Sumber Bekalan Air Aeropolis Sepang, Selangor	Kementerian Pembangunan Usahawan Putrajaya
7 November 2019 7th November 2019	Bengkel Focus Group Discussion Greerose@Putrajaya 2019 - Penghasilan Buku Folio Hijau Putrajaya	Pulse Grande Hotel
15 November 2019 15th November 2019	Mesyuarat Jawatankuasa Prjek Kajian Semakan Semula Kriteria Dan Standard Kualiti Air Sungai Malaysia	JAS Malaysia
26 November 2019 26th November 2019	Mesyuarat Program Rakan Muda Kreatif Kebangsaan Anjuran KBS	JAS Malaysia
13 Disember 2019 13th December 2019	Mesyuarat Project Monitoring Committee (PMC) Program Pengawasan Kualiti Alam Sekitar (EQMP)	JAS Malaysia
18 Disember 2019 18th December 2019	Mesyuarat Majlis Keselamatan Aktiviti Air (MKAA) Bil.2 Tahun 2019	Kementerian Perumahan dan Kerajaan Tempatan

INISIATIF KAWALAN PENCEMARAN SUMBER AIR

Program pemantauan dan pengawasan kualiti air sungai yang dijalankan oleh JAS sejak tahun 1978 menentukan status dan perubahan ke atas kualiti air sungai. Sehingga kini, sebanyak 672 batang sungai utama dipantau melalui 1,353 stesen manual dan 30 stesen automatik. Program pengawasan kualiti air sungai dilaksanakan secara manual untuk 30 parameter dan secara automatik untuk 17 parameter kualiti air.

Berdasarkan data program pengawasan kualiti air sungai di 471 batang sungai di Malaysia sepertimana yang dilaporkan dalam Laporan Kualiti Alam Sekeliling 2017, sejumlah 32 batang sungai telah diklasifikasikan sebagai tercemar iaitu Kelas V. Kesemua 32 batang sungai ini telah menunjukkan dua (2) parameter utama iaitu Keperluan Oksigen Biokimia (BOD), dan Ammonia Nitrogen (NH_3N) berada di tahap tinggi dan melebihi standard yang ditetapkan. Kedua-dua parameter ini merupakan indikator yang menunjukan bahawa punca utama pencemaran air sungai adalah disebabkan oleh air kumbahan.

Justeru, JAS telah mengambil inisiatif untuk membentangkan Kertas Cadangan Pemantapan Pengurusan Air Kumbahan Bagi Meningkatkan Kualiti Air Sungai Di Malaysia pada Mesyuarat Majlis Air Negara Pertama yang telah diadakan pada 25 Februari 2019. Majlis Sumber Air Negara dengan keanggotaannya yang terdiri dari Menteri Besar/ Ketua Menteri, Menteri Persekutuan, Ketua Setiausaha/ Timbalan Ketua Setiausaha Kementerian, Jabatan dan agensi Persekutuan yang dipengerusikan oleh YAB Perdana Menteri Malaysia telah bersetuju dengan cadangan jangka pendek dan jangka panjang yang telah dibentangkan bagi meningkatkan kualiti air sungai di Malaysia.

WATER POLLUTION CONTROL INITIATIVE

DOE have conducted the River Water Quality Monitoring Programme since 1978 to determine the river quality status and monitoring its changes. Untill then, a total of 672 main rivers were monitored through manual stations and automatic stations throughout the country. A number of 30 parameters were monitored by 1,353 manual stations and 17 parameters were monitored continuously by 30 continuous stations.

Based on the 2017 Environmental Quality Report, 32 rivers out of the total of 471 rivers were classified as Class V or Polluted. All these 32 rivers have a high concentration of Biochemical Oxygen Demand (BOD) and Ammoniacal Nitrogen (NH_3N) which exceeds the acceptable standards. Both parameters are main indicators to pollutants from the sewage discharges.

Hence, the DOE have took the initiative to present a proposal paper to enhance the management of sewage for the improvement of river water quality in Malaysia at the first National Water Council meeting which were held in 25th February 2019. The Council which comprises of State Ministers / Chief Ministers, Federal Ministers, Chief Secretaries / Deputy Chief Secretary of Ministries, Departments and Federal Agencies which were chaired by YAB Prime Minister have agreed to the short- and long-term proposal to improve the river quality in Malaysia.

Jumlah Beban Harian Maksimum (TMDL) adalah merupakan langkah jangka panjang yang perlu dilaksanakan oleh Kerajaan Negeri dan Persekutuan bagi memulihara dan meningkatkan kualiti sumber air. Sebagai tindakan susulan yang berkaitan keputusan mesyuarat ini Bahagian Air dan Marin JAS dengan kerjasama Institut Alam Sekitar Malaysia (EiMAS) bertindak mempromosikan TMDL dengan mengadakan Kursus Course on TMDL Approach for Sustainable Pollution Management pada 30 September 2019 hingga 4 Oktober 2019.

Objektif kursus ini adalah untuk memberi pendedahan dan kefahaman kepada agensi berkaitan berhubung konsep, kaedah, isu serta cabaran dalam pelaksanaan TMDL. Di akhir kursus tersebut, para peserta telah dapat mengetahui pengurusan kawalan pencemaran sumber air secara menyeluruh dan dapat mengetahui kaedah bagaimana untuk melaksanakan TMDL yang komprehensif. Selain dari itu, kursus ini juga telah memberi peluang kepada para peserta untuk memahami bidangkuasa agensi dalam kawalan pencemaran sumber air dan berpeluang menjalin hubungan kerjasama antara agensi bagi meningkatkan keberkesanan kaedah dan carakerja melalui perkongsian pengalaman. Persekitaran ini akan memudahcara pelaksanaan kajian TMDL kelak.

Total Maximum Daily Load (TMDL) is a long-term way forward which should be done by States and Federal Government to conserve and to improve river water quality. The DOE Water and Marine Division along with Environment Institute of Malaysia (EiMAS) have taken the next step to promote TMDL by conducting a course entitled TMDL Approach for Sustainable Pollution Management from 30th September 2019 to 4th October 2019.

The objective of this course is to provide exposure and understanding to relevant agencies regarding the concepts, methods, issues and challenges in implementing TMDL. At the end of the course, participants gained a comprehensive knowledge of water pollution management and learn how to carry out a comprehensive TMDL study. In addition, the course also provided the participants with an opportunity to understand the agency's role in water resource control and to provide networking between agencies to enhance the effectiveness of conducting their daily task through agencies sharing. This environment will facilitate the implementation of TMDL studies in the near future.

Peserta Kursus Course on TMDL Approach for Sustainable Pollution Management
Course on TMDL Approach for Sustainable Pollution Management Participants

Jadual 4.8: Peserta Agensi - Kerajaan dan Badan Berkanun
Table 4.8: Participants from Government and Statutory Bodies

AGENSI /AGENCY	BILANGAN PESERTA/ NUMBER OF PARTICIPANT
Bahagian Pengurusan Sumber Air dan Hidrologi, Jabatan Pengairan dan Saliran	2
Jabatan Perlindungan Alam Sekitar, Sabah	1
Badan Kawal Selia Air Johor	1
Seksyen Sumber Air, Bahagian Sumber Air dan Hidrologi, Kementerian Air, Tanah dan Sumber Asli	1
Perbadanan Bekalan Air Pulau Pinang Sdn. Bhd.	1
Institut Penyelidikan Hidraulik Kebangsaan Malaysia, NAHRIM	3
Jabatan Pertanian	1
Lembaga Urus Air Selangor	1
Jabatan Bekalan Air Negeri Terengganu	2
Lembaga Air Perak	1
Lembaga Sumber Air Negeri Kedah	1
Jabatan Perkhidmatan Veterinar	2
Badan Kawal Selia Air Melaka	1
Jabatan Alam Sekitar	10

Jadual 4.9: Peserta Agensi Luar – Swasta
Table 4.9: Participants from Private Institution

AGENSI / AGENCY	BILANGAN PESERTA/ NUMBER OF PARTICIPANT
Indah Water Konsortium Sdn. Bhd.	1

Jadual 4.10: Aktiviti dan Program Pengawasan Kualiti Air Sungai
Table 4.10: River Water Quality Monitoring Activities and Programs

BIL/ NO.	NAMA MESYUARAT/ MEETING NAME	TARIKH/ DATE
1	Mesyuarat Pertama Majlis Air Negara	25 Februari 2019
2	Mesyuarat Pasukan Petugas Khas (Task Force) Projek 'River Of Life' Untuk Skop Pembersihan Sungai: i. Bil 1/2019 ii. Bil 2/2019 iii. Bil 3/2019 iv. Bil 4/2019 v. Bil 5/2019 vi. Bil 6/2019 vii. Bil 7/2019 viii. Bil 8/2019 ix. Bil 9/2019	 29 Januari 2019 6 Mac 2019 4 April 2019 7 Mei 2019 16 Jun 2019 18 Julai 2019 13 Ogos 2019 10 September 2019 8 Oktober 2019
3	Mesyuarat Jawatankuasa Penyelarasan Dan Pelaksanaan (Coordination and Implementation Committee, CIC) Bagi Projek River Of Life (ROL) Dan Sewerage Non River (SNR) i. Bil 1/2019 ii. Bil 2/2019 iii. Bil 3/2019 iv. Bil 4/2019 v. Bil 5/2019 vi. Bil 6/2019 vii. Bil 7/2019	 8 Mac 2019 18 April 2019 17 Mei 2019 24 Jun 2019 14 Ogos 2019 7 Oktober 2019 4 November 2019
4	Mesyuarat Jawatankuasa Teknikal Bagi Projek River Side City Development Oleh Suria Handong Sdn. Bhd: i. Bil 1/2019 ii. Bil 2/2019 iii. Bil 3/2019 iv. Bil 4/2019	 25 April 2019 19 Jun 2019 1 Ogos 2019 4 September 2019
5	Mesyuarat Jawatankuasa Pengurusan Sumber Air Negara	10 Disember 2019
6	Mesyuarat Dalaman JAS Susulan Mesyuarat Pertama Majlis Air Negara (MAN1)	18 Jun 2019
7	Mesyuarat Kumpulan Kerja Pelaksanaan Dasar Sumber Air Negara (PPPDSAN): i. Mesyuarat Kumpulan Kerja 1 (WG1): Governans Air Bil. 1/2019. ii. Mesyuarat Kumpulan Kerja 2 (WG2): Maklumat Sumber Air Bil. 1/2019.	 15 Ogos 2019 23 Mei 2019
8	Mesyuarat Penyelarasan Aplikasi Geospatial	28 November 2019
9	Mesyuarat Jawatankuasa Pemandu Pelan Pengurusan Lembangan Sungai Bersepadu (IRBM)	15 Ogos 2019
10	Mesyuarat Jawatankuasa Kerja Projek (PWG) Bil. 3/2019 Bagi Pelaksanaan Public Outreach Programme (POP) Fasa 5 Projek River Of Life (ROL)	26 September 2019
11	Mesyuarat Progress Report - Implementation Of Public Outreach Programme (POP) River Of Life (ROL): i. Phase 3a, 3b, 4 & 5 ii. Phase 5, Phase 3a & 4, Phase 3b	 19 Mac 2019 17 Julai 2019

PENGAWASAN KUALITI AIR TANAH
GROUNDWATER QUALITY MONITORING

PROGRAM AUDIT STESEN PENGAWASAN KUALITI AIR TANAH

Tujuan program audit ini dijalankan adalah seperti berikut:

i. Menjalankan penilaian terhadap kos penyelenggaraan untuk Seksyen Pengawasan Kualiti Air Tanah ; dan

ii. Memastikan kerja persampelan yang dijalankan mengikut Prosedur Operasi Tetap Program Pengawasan Kualiti Air Tanah

Program audit ini telah dijalankan oleh pegawai-pegawai Seksyen Pengawasan Kualiti Air Tanah di stesen pengawasan air tanah yang terpilih. Senarai 13 stesen air tanah yang diaudit dilampirkan dalam **Jadual 4.11**.

AUDIT PROGRAMME OF GROUNDWATER QUALITY MONITORING STATIONS

The objectives of this audit programme were as follows:

i. To carry out assessment regarding the maintenance cost of Groundwater Quality Monitoring Stations; and

ii. To ensure procedure of groundwater quality sampling has strictly follow the Standard Operation Procedure of Groundwater Quality Monitoring Program.

The audit programme was conducted by the officers from the Groundwater Quality Monitoring Section at selected groundwater monitoring stations. List of 13 audited groundwater stations as **Table 4.11**.

Program Audit Stesen Pengawasan Kualiti Air Tanah
Auditing Programme of Groundwater Quality Monitoring Stations

Jadual 4.11: Jadual Program Audit Stesen Pengawasan Kualiti Air Tanah
Table 4.11: Schedule of Inspection for Groundwater Quality Monitoring Station

BIL/ NO	NO STESEN/ NUMBER OF STATION	ALAMAT/ ADDRESS	TARIKH AUDIT/ DATE OF INSPECTION
1	MW(7)-W210103-1-10.0	Taman Wetland Putrajaya	18 Julai 2019 18th July 2019
2	MW(7)-C310302-1-6.64	Sek.Keb.Lepar, Pahang	7 Ogos 2019 7th August 2019
3	MW(7)-C310314-1-45.97	Nenasi (Agrobest), Pahang	
4	MW(7)-C310310-1-10.5	Nenasi (Agrobest), Pahang	
5	MW(7)-C310314-4-43	Nenasi (Agrobest), Pahang	
6	MW(7)-C310314-5-38	Nenasi (Agrobest), Pahang	
7	MW(7)-C310314-6-10	Nenasi (Agrobest), Pahang	
8	MW(7)-C310314-3-10	Nenasi (Agrobest), Pahang	
9	MW(7)-C310314-2-7.29	Nenasi (Agrobest), Pahang	
10	MW(7)-P510010-3-4.34	Bayan Lepas, Pulau Pinang	22 Oktober 2019 22nd October 2019
11	MW(7)-R610014-2-8.73	Sek. Keb. Kepala Batas. Mukim Bukit Tinggi, Kubang Pasu, Kedah	23 Oktober 2019 23rd October 2019
12	MW(7)-K610014-1-6.22	Sek. Keb. Darul Uloom Kepala Batas, Kedah	23 Oktober 2019 23rd October 2019
13	MW(7)-R610006-2-7.32	Lembah Chuping, Mukim Titi Tinggi, Perlis	24 Oktober 2019 24th October 2019

BENGKEL MEMBANGUNKAN GARIS PANDUAN PEMBINAAN STESEN PENGAWASAN KUALITI AIR TANAH KEBANGSAAN (SPeKAT)

Objektif bengkel adalah seperti di bawah:

i. Untuk memberi panduan yang jelas berkenaan prosedur pembinaan Stesen Pengawasan Kualiti Air Tanah mengikut spesifikasi JAS;

ii. Untuk membantu pihak berkepentingan memahami setiap komponen dan fungsi yang terdapat di dalam Stesen Pengawasan Kualiti Air Tanah; dan

iii. Untuk membantu pihak berkepentingan dalam menentukan lokasi terbaik untuk pembinaan stesen pengawasan kualiti air tanah.

Bengkel ini telah dihadiri oleh pegawai JAS Ibu Pejabat dan Negeri, agensi kerajaan seperti Jabatan Mineral dan Geosains dan Kementerian Kesihatan Malaysia, kontraktor yang membina stesen pengawasan kualiti air tanah, pakar air tanah dan jururunding EIA.

Sebanyak tiga (3) siri bengkel telah dijalankan oleh Seksyen Pengawasan Kualiti Air Tanah bagi membangunkan Garispanduan Pembinaan Stesen Pengawasan Kualiti Air Tanah Kebangsaan **(Jadual 4.12)**.

WORKSHOP FOR THE DEVELOPMENT OF GROUNDWATER QUALITY MONITORING STATION GUIDELINES (SPeKAT)

The objectives of the workshop are as follows:

i. To provide a clear guidance on construction procedures for Groundwater Quality Monitoring Station in accordance to the specifications from the DOE;

ii. To assist the stakeholders in understanding the component and function of Groundwater Quality Monitoring Station; and

iii. To assist the stakeholders to determine the best location for the construction of groundwater quality monitoring stations.

The workshop was attended by the officers from Headquarters and State DOE, government agencies such as Department of Minerals and Geoscience and Ministry of Health Malaysia, contractors in charge of building the groundwater quality monitoring stations, groundwater experts and the EIA consultants.

A total of three (3) series of workshops were conducted by the Section of Groundwater Quality Monitoring to develop the Groundwater Quality Monitoring Station Guidelines **(Table 4.12)**.

Jadual 4.12: Bengkel Bagi Membangunkan Garispanduan Pembinaan Stesen Pengawasan Kualiti Air Tanah Kebangsaan

Table 4.12: Workshop for The Development of the National Groundwater Quality Monitoring Station Guidelines

BIL/ NO	NAMA BENGKEL/ WORKSHOP	TARIKH/ DATE	TEMPAT/ VENUE
1	Bengkel bagi membangunkan Garispanduan Pembinaan Stesen Pengawasan Kualiti Air Tanah Kebangsaan- Siri 1. Workshop for the Development of Groundwater Quality Monitoring Station Guidelines- Series 1	29 - 30 April 2019/ 29th - 30th April 2019	Bilik Raflesia / Raflesia Room
2	Bengkel bagi membangunkan Garispanduan Pembinaan Stesen Pengawasan Kualiti Air Tanah Kebangsaan - Siri 2 Workshop for the Development of Groundwater Quality Monitoring Station Guidelines - Series 2	17 – 19 Jun 2019/ 17th – 19th June 2019	Bilik Raflesia / Raflesia Room
3	Bengkel memuktamadkan Garispanduan Pembinaan Stesen Pengawasan Kualiti Air Tanah Kebangsaan- Siri 3 Workshop to finalized Groundwater Quality Monitoring Station Guidelines– Series 3	18 – 19 September 2019/ 18th – 19th September 2019	Bilik Raflesia / Raflesia Room

Peserta Bengkel Memuktamadkan Garispanduan Pembinaan Stesen Pengawasan Kualiti Air Tanah Kebangsaan

Participants of Workshop for The Finalization of the National Groundwater Quality Monitoring Station Guidelines

KURSUS PENGAWASAN KUALITI AIR TANAH DENGAN KERJASAMA INSTITUT ALAM SEKITAR MALAYSIA (EiMAS)

Kursus Pengawasan Kualiti Air Tanah telah dijalankan pada 26 hingga 30 Ogos 2019 bertempat di EiMAS, Bangi Selangor.

Objektif kursus adalah seperti berikut:

i. Memberikan pendedahan dan kefahaman kepada pegawai-pegawai JAS berkaitan Deraf Garispanduan Stesen Pengawasan Kualiti Air Tanah (SPeKAT) dan Interpretasi Data Kualiti Air Tanah; dan

ii. Pelaksanaan program pengawasan air tanah mengikut Prosedure Operasi Tetap (SOP) yang diterbitkan oleh JAS.

Peserta kursus terdiri daripada pegawai dari JAS Negeri dan Ibu Pejabat.

GROUNDWATER QUALITY MONITORING COURSE WITH COOPERATION OF ENVIRONMENT INSTITUTE OF MALAYSIA (EIMAS)

The Groundwater Quality Monitoring Course was held from 26th to 30th of August 2019 at EiMAS, Bangi Selangor.

The objectives of the course are:

i. To provide exposure and understanding to the offices from DOE regarding Groundwater Quality Monitoring and Interpretation of Groundwater Quality Data; and

ii. To implement the groundwater monitoring program in accordance to the Standard Operating Procedure set by the DOE.

Participants of the course are officers from DOE Headquarters and state offices.

Kursus Pengawasan Kualiti Air Tanah
The Groundwater Quality Monitoring Course

LAIN- LAIN AKTIVITI YANG TELAH DIJALANKAN

Seksyen Pengawasan Kualiti Air Tanah juga telah menyediakan ulasan dan menghadiri sebanyak 20 Mesyuarat Jawatankuasa Teknikal Penilaian Impak Alam Sekitar (EIA) dan Terma Rujukan EIA (TOR) serta bengkel pembentukan garispanduan-garispanduan EIA. Di samping itu, Seksyen Pengawasan Air Tanah juga telah memproses sebanyak empat (4) permohonan data yang telah diterima daripada agensi kerajaan dan institusi awam.

OTHER ACTIVITIES COMPLETED

The Groundwater Quality Monitoring Section has also provided reviews and attended 20 Environmental Impact Assessment Technical Committee Meeting (EIA) and Terms of Reference (TOR) meetings and also workshop on the formation of EIA guidelines. Apart from that, the Groundwater Quality Monitoring Section has also processed four (4) applications for data received from government agencies and public institutions.

LAWATAN KERJA KE BUKIT TAGAR SANITARY LANDFILL (BTSL), MUKIM SUNGAI TINGGI, DAERAH HULU SELANGOR, SELANGOR

Lawatan kerja ini telah dijalankan ke Bukit Tagar Sanitary Landfill (BTSL) yang terletak di PT1682, Mukim Sungai Tinggi, Daerah Hulu Selangor, Selangor pada 21 Oktober 2019.

Sebanyak empat (4) orang pegawai Bahagian Air dan Marin, JAS Putrajaya telah terlibat dalam sesi lawatan kerja tersebut bersama pihak operator BTSL, KUB- Berjaya Enviro Sdn Bhd (KBE).

Objektif lawatan adalah untuk:

i. Mengenalpasti pengurusan rawatan larut lesapan yang terhasil daripada operasi di premis BTSL;

ii. Melihat keberkesanan sistem pengolahan larut lesapan untuk merawat larut lesapan yang terhasil; dan

iii. Membuat penilaian impak beban pencemaran terhadap sungai/alur air yang berdekatan dengan tapak pelupusan tersebut.

SITE VISIT TO BUKIT TAGAR SANITARY LANDFILL (BTSL), MUKIM SUNGAI TINGGI, DAERAH HULU SELANGOR, SELANGOR

A site visit to Bukit Tagar Sanitary Landfill (BTSL) located at PT1682, Mukim Sungai Tinggi, Hulu District of Selangor, Selangor was held on 21st October 2019.

Four (4) officers from the Water and Marine Division, DOE , Putrajaya participated in this visit together with BTSL operator KUB-Berjaya Enviro Sdn Bhd (KBE).

The objectives of the site visit are:

i. To identify the management of leachate treatment produced from operations at BTSL premises;

ii. To see the effectiveness of wastewater/ leachate treatment system; and

iii. To assess the impact of pollution load on rivers/ waterways near the disposal site.

Hasil lawatan ini:

i. Premis berjaya mengaplikasikan polisi pelepasan sifar untuk rawatan kumbahan yang telah dirawat. Kumbahan tersebut disalirkan ke tapak rumpaian menggunakan tumbuhan daripada spesis Phragmites (pokok mensiang). Kaedah ini dilihat berjaya mengurangkan beban pencemaran ke sungai;

ii. Premis bukan sahaja mengolah buangan domestik, tetapi turut mengolah semula buangan terjadual seperti SW104, SW110, SW202, SW 203, SW204, SW207, SW310, SW311, SW316, SW319, SW321, SW 406, SW411, SW416 dan SW 427 yang dikendalikan anak syarikatnya iaitu Amita KUB- Berjaya Kitar (AKBK) yang terdapat dalam kawasan BTSL. Buangan tersebut akan digunapakai dalam pembuatan simen di Malaysia; dan

iii. Daripada segi kecepakan penggunaan tenaga, premis berjaya menjana elektrik menggunakan gas metana yang terhasil daripada aktiviti pelupusan sampah dan dijual kepada pihak Tenaga Nasional Berhad (TNB). Selain itu, premis menggunakan tenaga solar dengan menjalankan pemasangan panel diatas tapak pelupusan sampah yang telah ditutup.

Results of this visit:

i. The premise has successfully applied zero-discharge policy for leachate treatment. The treated leachate was channelled to weed sites using plants from the Phragmites species (reed beds). This method is proven to reduce the burden of pollution load to the river;

ii. The premise has not only manage domestic waste but also scheduled waste such as SW104, SW110, SW202, SW 203, SW204, SW207, SW310, SW311, SW316, SW319, SW321, SW 406, SW411, SW416 and SW 427 that was operated by its subsidiaries namely Amita KUB- Berjaya Kitar (AKBK) located within BTSL area. The recycled waste is reused for cement manufacturing in Malaysia; and

iii. In terms of energy efficiency, the premises has successfully generated electricity using methane gas produced from landfill activities and is sold to Tenaga Nasional Berhad (TNB). In addition, the premises use solar energy generated from the installation of solar panel on the closed landfill.

Sesi Taklimat daripada Pihak Operator BTSL Berkenaan Online Monitoring System bagi Pemantauan Rawatan Air Larut Resap

Briefing Session by BTSL Operator on Online Monitoring System for The Monitoring of Leachate Treatment

RANCANGAN KONTINGENSI KEBANGSAAN KAWALAN TUMPAHAN MINYAK (RKKKTM)
NATIONAL OIL SPILL CONTINGENCY PLAN (NOSCP)

RKKKTM merupakan pelan kontingensi yang menyediakan garis panduan bagi menghadapi kejadian tumpahan minyak yang berlaku di perairan Malaysia. RKKKTM ditadbir oleh Jawatankuasa Kebangsaan Kawalan Tumpahan Minyak (JKKTM) yang dianggotai oleh 17 Jabatan dan agensi. Jawatankuasa ini dipengerusikan oleh Ketua Pengarah JAS. Kesiapsiagaan kawalan tumpahan minyak adalah melalui penempatan peralatan mengawal tumpahan minyak yang ditempatkan di lokasi-lokasi strategik seperti **Rajah 4.3**. JAS juga memberi penekanan terhadap latihan-latihan berstruktur dan berkala bagi semua kakitangan yang terlibat dalam tindakbalas tumpahan minyak. Latihan-latihan berkenaan adalah bagi memastikan semua kakitangan JAS dan agensi-agensi yang akan terlibat dalam tindakbalas tumpahan minyak dibekalkan dengan pengetahuan dan kemahiran yang mencukupi dalam pengendalian peralatan dan pengurusan krisis. Resolusi 6 di dalam International Convention on Oil Spill Preparedness and Response (OPRC) 1990 telah menggariskan obligasi negara terhadap komitmen di peringkat antarabangsa berhubung hal-ehwal kesiapsiagaan dan keperluan latihan. Keperluan kesiapsiagaan dan latihan ini telah dimasukkan ke dalam mekanisma tindakbalas RKKKTM dan dilaksanakan secara berterusan.

Di sepanjang tahun 2019, sebanyak enam (6) latihan berkaitan dengan kawalan tumpahan minyak telah dianjurkan dan dihadiri oleh pegawai-pegawai JAS, Agensi Penguatkuasaan Maritim (APMM) dan Jabatan Laut bagi tujuan peningkatan kemahiran dan perkongsian kepakaran dalam bidang ini **(Jadual 4.13)**.

NOSCP is a contingency plan which provides guideline in addressing the response on oil spill incident in Malaysian waters. The NOSCP is administered by the NOSCC consisting of 17 member departments and agencies. The committee is chaired by the Director General of DOE. Oil spill control preparedness is executed by positioning the Oil Spill Response Equipment (OSRE) at strategic locations as shown in **Figure 4.3**. DOE also emphasized on structured and scheduled training for personnel involved in oil spill response. Such training is aimed to ensure DOE officers and personnel from agencies involved in oil spill response are well equipped with necessary knowledge and skills in equipment handling and crisis management. The 6th resolution of the International Convention on Oil Spill Preparedness and Response (OPRC) 1990 has outlined the country obligation in commiting on the national level regarding matters involving preparedness and training needs. These requirements on the preparation and training had already being implemented in the NOSCP response mechanism and are being continuously implemented.

Throughout 2019, a total of six (6) trainings were organized based on zones related to oil spill Response and were attended by DOE officers, Malaysia Maritime Enforcement Agency (MMEA) and Marine Department (MarDept) for capacity building and sharing of expertise in this field **(Table 4.13)**.

Jadual 4.13: Aktiviti Kawalan Tumpahan Minyak 2019
Table 4.13: Activities on Oil Spill Control 2019

BIL. / NO.	AKTIVITI / ACTIVITIES	TARIKH / DATE
1	Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Borneo (JAS Sabah, JAS Labuan serta Cawangan) / Strengthening Expertise And Effectiveness Of Oil Spill Control Workshop Borneo Zone (JAS Sabah, JAS Labuan and Branch)	3 Julai hingga 3 Ogos 2019 / 3rd July to 3rd August 2019
2	Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Utara (JAS Kedah, JAS Pulau Pinang, JAS Perak, JAS Perlis serta Cawangan)/ Strengthening Expertise And Effectiveness Of Oil Spill Control Workshop North Zone (JAS Kedah, JAS Pulau Pinang, JAS Perak, JAS Perlis and Branch)	25 hingga 30 Ogos 2019/ 25th to 30th August 2019
3	Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Borneo (JAS Sarawak dan Cawangan)/ Strengthening Expertise And Effectiveness Of Oil Spill Control Workshop Borneo Zone (JAS Sarawak and Branch)	10 hingga 13 September 2019/ 10th to 13th September 2019
4	Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Timur (JAS Terengganu, JAS Pahang, JAS Kelantan serta Cawangan)/ Strengthening Expertise And Effectiveness Of Oil Spill Control Workshop East Zone (JAS Terengganu, JAS Pahang, JAS Kelantan and Branch)	22 hingga 25 September 2019/ 22nd to 25th September 2019
5	Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Utara (JAS Melaka, JAS Selangor, JAS Negeri Sembilan, JAS Johor serta Cawangan) / Strengthening Expertise And Effectiveness Of Oil Spill Control Workshop East Zone (JAS Melaka, JAS Selangor, JAS Negeri Sembilan, JAS Johor and Branch)	6 hingga 10 Oktober 2019/ 6th to 10th October 2019
6	Bengkel Pengemaskinian Rancangan Kontingensi Kebangsaan Kawalan Tumpahan Minyak (RKKKTM)/ Workshop on Updating of National Oil Spill Contingency Plan	29 hingga 31 Oktober 2019 29th to 31st October 2019

ROADSHOW SISTEM CETAK-JARI HIDROKARBON

Sistem Cetak-jari Hidrokarbon (HyFiS) telah dibangunkan oleh JAS pada tahun 2017. Sistem ini dibangunkan untuk membantu JAS dan Jabatan Kimia Malaysia (JKM) dalam menjalankan analisis dan pemadanan sampel minyak bagi kes tumpahan minyak di perairan Malaysia dan Kawasan ZEE Malaysia. Sistem ini berfungsi sepenuhnya pada tahun 2019 dan bilangan DNA profil hidrokarbon akan ditambah dari masa ke semasa dalam pangkalan data sistem ini. Pegawai JAS akan membuat pendaftaran sampel yang diambil daripada kes tumpahan minyak manakala pegawai JKM pula akan membuat analisis terhadap sampel-sampel ini menggunakan mesin GC-MS dan GC-FID sebelum data tersebut di muat naik ke dalam sistem ini bagi tujuan analisis dan pemadanan.

JAS Putrajaya telah mengadakan Roadshow Bengkel Pengunaan Sistem HyFiS di 13 buah negeri bermula Januari 2019 sehingga April 2019. **Jadual 4.14** menunjukkan tarikh dan Pejabat JAS Negeri yang terlibat. Peserta yang terlibat adalah pengguna utama yang seramai 350 orang terdiri daripada pegawai JAS dan JKM di seluruh Malaysia.

Objektif penganjuran bengkel ini adalah untuk memberi latihan hands-on kepada pengguna sistem HyFiS bagi memastikan pegawai JAS yang terlibat di dalam siasatan kes tumpahan minyak dan pegawai JKM yang menerima serta menganalisis sampel minyak mahir menggunakan sistem ini. Peserta telah diberi beberapa senario kes tumpahan minyak sebagai latihan bagi memahirkan penggunaan sistem ini.

ROADSHOW HYDROCARBON FINGERPRINTING SYSTEM

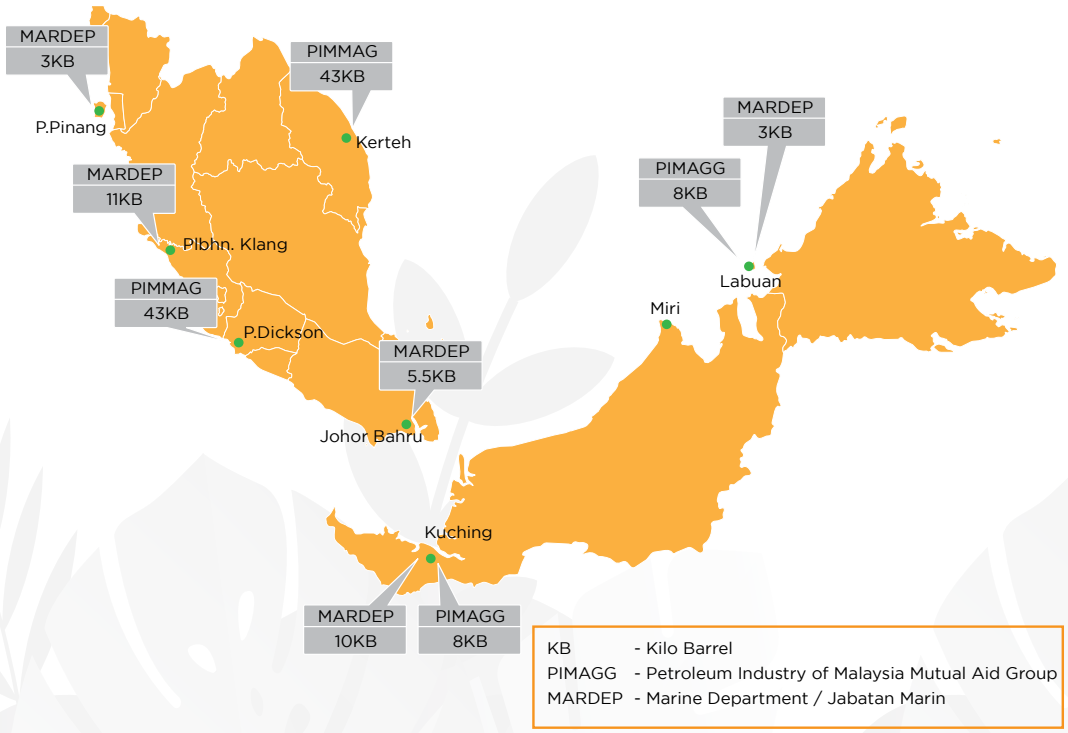
The Hydrocarbon Fingerprinting System (HyFiS) was developed by the DOE in 2017. This system was developed to assist DOE and Chemistry Department of Malaysia (JKM) in conducting analysis and matching for oil spill cases in Malaysian waters and in Malaysia EEZ. The system was fully operated in 2019 and the number of hydrocarbon profile DNA will be added from time to time in the system database. DOE officers will register the samples taken from the oil spills cases which then the officers from JKM will analyze it by using GC-MS and GC-FID machines before the data is uploaded into the system for analysis and matching purposes.

The Putrajaya DOE had organised the Roadshows for HyFiS Usage Workshop in 13 states starting from January 2019 until April of 2019. **Table 4.14** shown the date and state DOE involved. There were 350 main users participated which consists of DOE and JKM officers from all over Malaysia.

The objective of this workshop was to give hands-on training to all HyFiS users ensuring the DOE officers which were invloved in the oil spills investigation and the JKM officers whom will be accepting and analyzing the oil spills samples are proficient in using the system. Participants had been given a few of oil spills scenarios as assesment in order to master the usage of this system.

Jadual 4.14: Tarikh dan Tempat Pelaksanaan Roadshow
Table 4.14: Date and Venue of The Roadshow

BIL/ NO	TEMPAT/ VENUE	JAS DAN JKM TERLIBAT/ DOE & JKM INVOLVED	TARIKH/ DATE
1	Pejabat JAS Johor / DOE Johor Office	Johor	23 Januari 2019 23rd January 2019
2	Pejabat JAS Melaka / DOE Melaka Office	Melaka	24 Januari 2019 24th January 2019
3	Pejabat JAS Selangor / DOE Selangor Office	Selangor	31 Januari 2019 31st January 2019
4	Pejabat JAS Kedah / DOE Kedah Office	Kedah	11 Februari 2019 11th February 2019
5	Pejabat JAS Pulau Pinang / DOE Pulau Pinang Office	Pulau Pinang	12 Februari 2019 12th February 2019
6	Pejabat JAS Perak / DOE Perak Office	Perak	14 Februari 2019 14th February 2019
7	Pejabat JAS Wilayah Persekutuan Labuan / DOE Federal Territory of Labuan Office	Wilayah Persekutuan Labuan	25 Februari 2019 25th February 2019
8	Pejabat JAS Sabah / DOE Sabah Office	Sabah	26 Februari 2019 26th February 2019
9	Pejabat JAS Negeri Sembilan / DOE Negeri Sembilan Office	Negeri Sembilan	11 Mac 2019 11th March 2019
10	Pejabat JAS Sarawak / DOE Sarawak Office	Sarawak	21 Mac 2019 21st March 2019
11	Pejabat JAS Pahang / DOE Pahang Office	Pahang	16 April 2019 16th April 2019
12	Pejabat JAS Terengganu / DOE Terengganu Office	Terengganu	17 April 2019 17th April 2019
13	Pejabat JAS Kelantan / DOE Kelantan Office	Kelantan	18 April 2019 18th April 2019



Rajah 4.3: Lokasi Peralatan Melawan Tumpahan Minyak di Malaysia, 2019
Figure 4.3: The location of Oil Spill Equipment Stockpiles in Malaysia, 2019

Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Borneo (JAS Sabah serta Pejabat Cawangan dan JAS Labuan) di The Palace Hotel, Kota Kinabalu Sabah pada 30 Julai 2019 hingga 3 Ogos 2019
Strengthening Expertise and Effectiveness Of Oil Spill Control Workshop Borneo Zone (DOE Sabah with its Branch Offices and DOE F.T Labuan) at The Palace Hotel, Kota Kinabalu Sabah from 30th July to 3rd August 2019

Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Utara (JAS Kedah, JAS Pulau Pinang, JAS Perak serta Pejabat Cawangan masing masing dan JAS Perlis) di De Baron Resort, Langkawi Kedah pada 25 hingga 30 Ogos 2019
Strengthening Expertise and Effectiveness of Oil Spill Control Workshop North Zone (DOE Kedah, DOE Penang, DOE Perak and theirs Branch Offices and DOE Perlis) at the De Baron Resort, Langkawi Kedah from 25th to 30th August 2019

Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Timur (JAS Terengganu, JAS Pahang, JAS Kelantan dan Pejabat Cawangan) di Hotel Tg. Vista, Kuala Terengganu pada 22 hingga 25 September 2019.
Strengthening Expertise and Effectiveness Of Oil Spill Control Workshop East Zones (DOE Terengganu, DOE Pahang, JAS Kelantan and theirs Branch Offices) at Tg. Vista Hotel, Kuala Terengganu from 22nd to 25th September 2019

Bengkel Pengukuhan Kepakaran Dan Keberkesanan Kawalan Tumpahan Minyak Zon Selatan (JAS Selangor, JAS Negeri Sembilan, JAS Johor serta Pejabat Cawangan masing -masing dan JAS Melaka) di Hotel Metrasquare, Melaka pada 6 hingga 10 Oktober 2019

Strengthening Expertise and Effectiveness of Oil Spill Control Workshop South Zones (DOE Selangor, DOE Negeri Sembilan, DOE Johor with theirs Branch Offices and DOE Melaka) at Metrasquare Hotel, Melaka from 6th to 10th October 2019

Bengkel Pengemaskinian Rancangan Kontingensi Kebangsaan Kawalan Tumpahan Minyak (RKKKTM) di Hotel Avillion Legacy, Melaka pada 29 hingga 31 Oktober 2019.

Workshop on Updating National Oil Spill Contingency at Avillion Legacy Hotel, Melaka from 29th to 31st October 2019

JAWATANKUASA TABUNG PUSINGAN BAGI SELAT MELAKA DAN SELAT SINGAPURA (RFC)
STRAITS OF MALACCA AND SINGAPORE REVOLVING FUND COMMITTEE (RFC)

Tabung RFC ini telah ditubuhkan pada 11 Februari 1981 bagi tujuan kegunaan dalam melawan kejadian tumpahan minyak dari kapal-kapal yang melalui Selat Melaka dan Selat Singapura

RFC Fund was established on 11th February, 1981 to be used in combating oil spills from ships passing through the Straits of Malacca and Singapore.

Pengurusan Tabung ini dilaksanakan secara bergilir-gilir dikalangan tiga (3) buah negara anggota iaitu Malaysia, Singapura dan Indonesia bagi tempoh lima (5) tahun setiap giliran. Pada tahun 2011, pengurusan tabung ini ditadbir oleh Directorate General Sea Transportation di bawah Kementerian Pengangkutan negara Indonesia untuk tempoh lima (5) tahun.

The Fund is administered on a rotation basis among the three (3) member states, namely Malaysia, Singapore and Indonesia for a period of five (5) years each. In 2011, the fund is administered by Directorate General Sea Transportation under Ministry of Transportation, Indonesia for duration of five (5) years.

Di antara aktiviti yang dilaksanakan oleh Jawatankuasa Tabung Pusingan pada tahun 2019 adalah seperti berikut:

Among the activities carried out by the RFC in the year 2019 are:

i. Mesyuarat Teknikal Revolving Fund Committee (RFC) pada 11 April 2019 di Hotel Ramada, Melaka. Mesyuarat dihadiri oleh wakil-wakil dari Maritime Port Authority (MPA) Singapura, Ministry of Transportation of the Republic Indonesia, JAS Malaysia dan Jabatan Laut Malaysia; dan

i. Revolving Fund Committee Technical Meeting (RFC) on 11th April 2019 at Ramada Hotel, Melaka. The meeting was attended by delegations from Maritime Port Authority (MPA) Singapore, Ministry of Transportation of the Republic Indonesia, DOE Malaysia and Marine Department of Malaysia; and

ii. Mesyuarat Jawatankuasa Induk ke-38 Revolving Fund Committee (RFC) pada 7 Ogos 2019 di Hotel Bayview, Pulau Pinang. Mesyuarat dihadiri oleh ahli-ahli RFC dari Maritime Port Authority (MPA) Singapura, Ministry of Transportation of the Republic Indonesia, JAS Malaysia, Kaunselor Malacca Straits Council of Japan dan wakil dari Jabatan Laut Malaysia.

ii. 38th Meeting of the Revolving Fund Committee (RFC) on 7th August 2019 at Bayview Hotel, Penang. The meeting was attended by RFC members from Maritime Port Authority (MPA) Singapore, Ministry of Transportation of the Republic Indonesia, DOE Malaysia, Counsellor of Malacca Stratis Council of Japan, and representative of Department of Marine Malaysia.

Mesyuarat Teknikal Revolving Fund Committee (RFC) pada 11 April 2019 di Hotel Ramada, Melaka.
Revolving Fund Committee Technical Meeting (RFC) on 11th April 2019 at Ramada Hotel, Melaka.

PROGRAM PENGAWASAN KUALITI ALAM SEKITAR (EQMP)
ENVIRONMENT QUALITY MONITORING PROGRAMME (EQMP)

EQMP merupakan program yang merangkumi pengumpulan data bagi pemantauan kualiti udara, kualiti air sungai dan kualiti air marin di seluruh Malaysia bagi tujuan melaporkan tahap sebenar kualiti alam sekitar negara dalam usaha untuk memantau, mencegah dan mengawal pencemaran. Sistem pengawasan EQMP akan berperanan sebagai mekanisma amaran awal bagi kejadian pencemaran alam sekitar seperti jerebu, tumpahan minyak, bencana industri dan pelupusan haram buangan serta toksik berbahaya. Ia juga boleh membantu pembuat dasar dan pembuat keputusan ke atas aktiviti penguatkuasaan JAS dan agensi berkaitan dalam menyediakan input kepada perancangan projek-projek pembangunan. Sepanjang tahun 2019, semua stesen-stesen pengawasan beroperasi membekalkan data kualiti alam sekitar kepada pihak JAS.

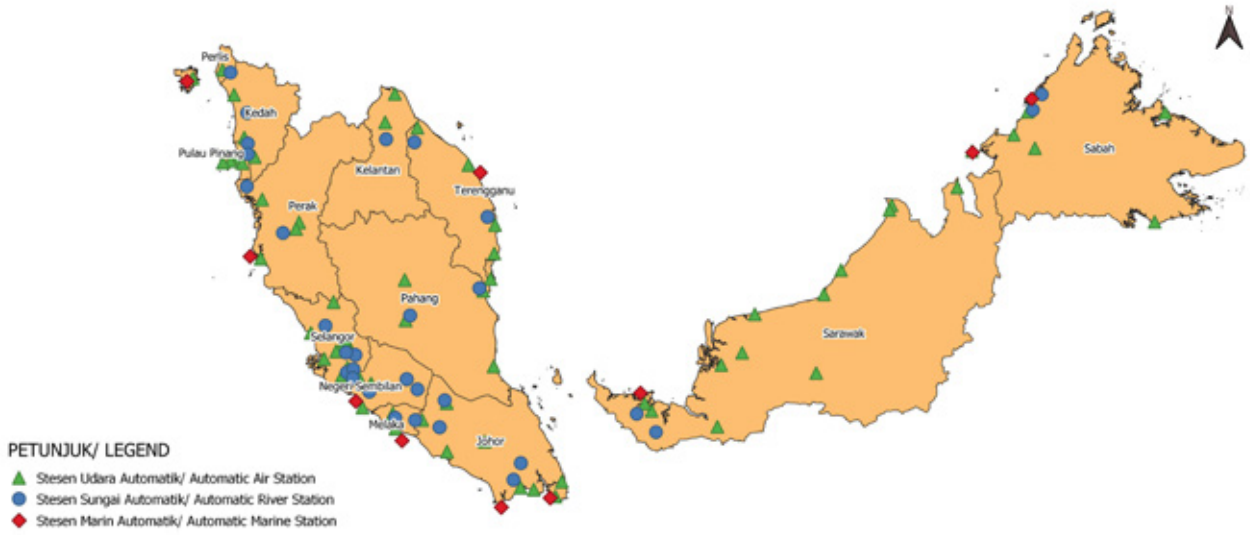
EQMP is a programme which is made up of data collections for air quality monitoring, river water quality and marine water quality throughout Malaysia for the purpose of reporting the actual level of the nation's environmental quality in an effort to monitor, prevent and control pollution. The monitoring system of the EQMP will act as an early warning mechanism for the occurrence of environmental pollution such as haze, oil spill, industrial disaster and illegal dumping of toxic and harmful wastes. This can also assist the policy and decision makers on the enforcement activities by the DOE and related agencies to provide input to the planning of project developments. Throughout 2019, all the monitoring stations had operated in supplying environmental quality data to the DOE.

Jadual 4.15 : Bilangan Stesen Pengawasan Alam Sekitar di Malaysia, 2019
Table 4.15 : The Number of Environmental Monitoring Station in Malaysia, 2019

KOMPONEN/ COMPONENT	STESEN AUTOMATIK/ AUTOMATIC STATION	STESEN MANUAL/ MANUAL STATION
Udara/ Air	65	14
Air Sungai/ River Water	30	1,353
Air Marin/ Marine Water	10	388
Jumlah Stesen/ Total No. of Stations	**105**	**1,755**

Berikut disertakan taburan stesen automatik pengawasan kualiti alam sekitar bagi stesen kualiti udara, kualiti air sungai dan kualiti air marin di Malaysia **(Rajah 4.4)**.

The following is the distribution of the automatic environmental quality stations for air quality, river water quality and marine water quality in Malaysia **(Figure 4.4)**.



Rajah 4.4 : Taburan Lokasi Stesen Automatik bagi Pengawasan Kualiti Udara, Air Sungai dan Air Marin, 2019
Figure 4.4 : Distribution of the Locations for Air, River Water and Marine Water Quality Monitoring Automatic Stations, 2019

Bagi stesen-stesen manual pengawasan kualiti alam sekitar, berikut adalah persampelan manual yang telah dijalankan bagi tahun 2019 **(Jadual 4.16)**.

For manual environmental quality monitoring stations, the followings are the number of manual samplings which had been carried out in 2019 **(Table 4.16)**.

Jadual 4.16 : Bilangan Persampelan Manual Tahun 2019
Table 4.16 : The Number of Manual Samplings in 2019

KOMPONEN/ COMPONENT	STESEN MANUAL/ MANUAL STATION	FREKUENSI PERSAMPELAN/ SAMPLING FREQUENCY	BILANGAN PERSAMPELAN/ TOTAL NO. OF SAMPLING
Udara/ Air	14	Setiap 6 hari/ Every 6 days	854
Air Sungai/ River Water	1,353	6 kali setahun/ 6 times a year	8,086
Air Marin/ Marine Water	388	6 kali setahun/ 6 times a year	2,268

Dalam komponen udara, selain daripada stesen automatik dan manual, program EQMP ini juga menyediakan stesen bergerak automatik bagi pengawasan kualiti udara atau Mobile Continuous Air Quality Monitoring (MCAQM) bagi memenuhi aspirasi penempatan stesen pengawasan kualiti udara di seluruh negara. Sebanyak tiga (3) buah stesen pengawasan kualiti udara bergerak disediakan yang mana ianya ditempatkan setiap satu (1) buah di Semenanjung, Sabah dan Sarawak.

For air component, aside from automatic and manual station, the EQMP programme also provides a mobile automatic air quality monitoring station or Mobile Continuous Air Quality Monitoring (MCAQM) to fulfil the aspiration of placing air quality monitoring stations in all parts of the country. A number of three (3) mobile environmental ambient air quality stations were provided where each one (1) was placed in the Peninsular, Sabah and Sarawak respectively.

Stesen Pengawasan Kualiti Udara Bergerak
Mobile Continuous Air Quality Monitoring Station (MCAQM)

Jadual 4.17 : Senarai Program/Aktiviti/Latihan yang Dilaksanakan Dibawah Program EQMP, 2019
Table 4.17 : List of Programme/Activity/Training Conducted Under the EQMP Programme, 2019

BIL/ NO.	TARIKH/ DATE	PROGRAM/AKTIVITI/LATIHAN/ PROGRAMME/ACTIVITY/TRAINING	LOKASI/ LOCATION
1	18 hingga 22 Februari 2019/ 18th to 22nd February 2019	Kursus EQMP Zon Timur	Kota Bharu, Kelantan
2	25 hingga 29 Mac 2019/ 25th to 29th March 2019	Kursus EQMP Zon Tengah 1	Port Dickson, Negeri Sembilan
3	22 hingga 26 April 2019/ 22nd to 26th April 2019	Kursus EQMP Zon Utara	Gurun, Kedah
4	15 hingga 19 April 2019/ 15th to 19th April 2019	Kursus Asas Renang dan Menyelamat	Putrajaya
5	17 hingga 21 Jun 2019/ 17th to 21st June 2019	Kursus EQMP Zon Sarawak	Kuching, Sarawak
6	19 hingga 23 Ogos 2019/ 19th to 23rd August 2019	Kursus EQMP Zon Selatan	Melaka
7	23 hingga 27 September 2019/ 23rd to 27th September 2019	Kursus EQMP Zon Sabah	Kota Kinabalu, Sabah
8	18 hingga 22 November 2019/ 18th to 22nd November 2019	Kursus EQMP Zon Tengah 2	Shah Alam, Selangor

Kursus Latihan EQMP kepada Pegawai JAS yang Terlibat dalam Pengawasan Kualiti Udara, Sungai dan Marin
EQMP Training Course to DOE Officers Involved in Monitoring of Air, River and Marine Quality

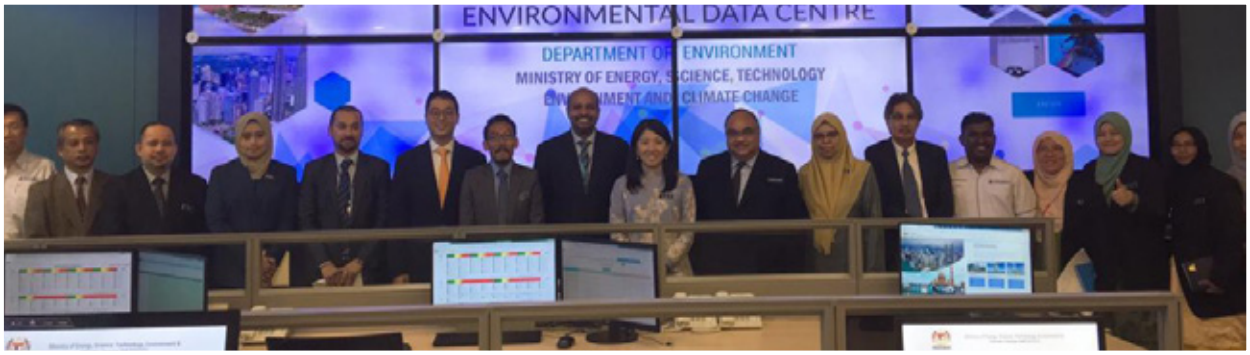
Jadual 4.18 : Senarai Lawatan Rasmi Daripada Pihak Luar Ke Pusat Data Alam Sekitar (EDC) Di Bawah Program EQMP, 2019
Table 4.18 : List of Official Visits from Outside Parties to Environmental Data Center (EDC) Under the EQMP Programme, 2019

BIL/ NO.	TARIKH/ DATE	LAWATAN RASMI DARI AGENSI AWAM /SWASTA/ OFFICIAL VISITS FROM PUBLIC/PRIVATE AGENCIES
1	8 Januari 2019/ 8th January 2019	Unit Perancang Ekonomi Negeri (UPEN) Selangor
2	25 Januari 2019/ 25th January 2019	YBhg. Timb. KSU Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC)
3	13 Februari 2019/ 13th February 2019	Unit Big Data Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC)
4	1 April 2019/ 1st April 2019	YBhg. Timb. KSU Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC)
5	2 April 2019/ 2nd April 2019	Pelajar Universiti Kuala Lumpur (UNIKL)
6	19 April 2019/ 19th April 2019	YB Menteri Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC)
7	29 Mei 2019/ 29th May 2019	Agensi Nuklear Malaysia
8	1 Ogos 2019/ 1st August 2019	Malaysian Technical Cooperation Programme, Eimas
9	2 Ogos 2019/ 2nd August 2019	YBhg. Dato' Sri KSU Kementerian Perumahan & Kerajaan Tempatan
10	5 Ogos 2019/ 5th August 2019	Pensyarah Universiti Teknologi Malaysia
11	26 Ogos 2019/ 26th August 2019	Pelajar SMK Pengkalan Chepa 2, Kelantan
12	12 September 2019/ 12th September 2019	Jabatan Audit Negara

Jadual 4.18 : Senarai Lawatan Rasmi Daripada Pihak Luar Ke Pusat Data Alam Sekitar (EDC) Di Bawah Program EQMP, 2019

Table 4.18 : List of Official Visits from Outside Parties to Environmental Data Center (EDC) Under the EQMP Programme, 2019

BIL/ NO.	TARIKH/ DATE	LAWATAN RASMI DARI AGENSI AWAM /SWASTA/ OFFICIAL VISITS FROM PUBLIC/PRIVATE AGENCIES
13	17 September 2019/ 17th September 2019	Media Bicara Politik & Ekonomi TV1 RTM
14	24 September 2019/ 24th September 2019	Pegawai Scottish, Northern Ireland, Wales Environment Protection Agency, British Deputy High Commissioner
15	11 Oktober 2019/ 11th October 2019	Pelajar UiTM Shah Alam Selangor
16	17 Oktober 2019/ 17th October 2019	NGO Alam Sekitar
17	14 Oktober 2019/ 14th October 2019	Jabatan Ukur & Pemetaan Malaysia (JUPEM)
18	28 November 2019/ 28th November 2019	Natural Recources & Environment Board (NREB) Sarawak
19	28 November 2019/ 28th November 2019	Peserta seminar UNDP- EA Net Program
20	5 Disember 2019/ 5th December 2019	Natural Recources& Environment Board (NREB) Sarawak
21	10 Disember 2019/ 10th December 2019	YBhg. Datuk KSU Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC)



Lawatan Rasmi YB Menteri Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC) ke Pusat Data Alam Sekitar (EDC), JAS

Official Visit by the Honourable Minister of Energy, Science, Technology, Environment and Climate Change (MESTECC) to the Environmental Data Centre (EDC), DOE

BENCANA PENCEMARAN INDUSTRI

Sepanjang tahun 2019, negara digemparkan dengan beberapa episod pencemaran industri yang membabitkan keselamatan orang awam. JAS yang merupakan Jabatan Kerajaan yang menguatkuasakan undang-undang pencemaran alam sekitar yang dihasilkan oleh pihak industri memberikan komitmen sepenuhnya sepanjang episod tersebut.

Komitmen yang diberikan dari segi kepakaran, kewangan, tenaga kerja dan masa yang digembelingkan oleh seluruh jabatan bagi memastikan episod pencemaran industri tersebut tidak bertambah mudharat kepada

INDUSTRIAL POLLUTION DISASTER

Throughout 2019, the country had been hit with several episodes of industrial pollutions which had involved the safety of the public. DOE which is the body trusted to enforce the laws on environmental pollution which were created by the industries gave full commitments during the entirety of the episodes.

The commitments given in terms of expertise, financial, work force and time which were contributed by the whole department to ensure that the industrial disaster episode did not worsen the public's health and at the

orang awam dan dalam masa yang sama menjalankan penguatkuasaan bagi menjejak dan mengheret si pelaku ke muka pengadilan di bawah bidang kuasa Akta Kualiti Alam Sekeliling 1974.

Juga turut bersama jabatan di dalam beberapa episod ini sepanjang tahun 2019 adalah Jabatan Bomba dan Penyelamat Malaysia, Jabatan Kimia Malaysia, Kementerian Kesihatan Malaysia, Jabatan Pertahanan Awam, RELA, Polis Diraja Malaysia, Jabatan Meteorologi Malaysia, Angkatan Tentera Malaysia dan Pihak BerkuasaTempatan.

Berikut adalah beberapa episod pencemaran di Pasir Gudang Johor yang memberikan impak kepada jabatan khususnya orang awam dan keselamatan alam sekitar di kawasan tersebut.

SUNGAI KIM–KIM, PASIR GUDANG, JOHOR

Kejadian ini bermula dari aktiviti pelupasan haram buangan terjadual oleh individu yang tidak bertanggungjawab di tebing sungai Kim-Kim dipercayai pada malam 06 Mac 2019. Pihak BOMBA dan Penyelamat Negeri Johor, Pasukan HAZMAT telah menerima aduan daripada orang awam dan bergegas ke Sungai Kim–Kim pada 06 pagi 07 Mac 2019. Manakala JAS Johor telah menerima aduan awam bau busuk dan meloyakan pada jam 8.30 pagi di kawasan Taman Kota Masai, Pasir Gudang.

Siasatan mendapati punca adalah daripada sejenis bahan buangan terjadual yang dibuang di tepi Sungai Kim-Kim berhampiran Taman Pasir Puteh. Bahan tersebut telah meruap disebabkan oleh cuaca panas dan bahan tersebut melepaskan beberapa jenis gas beracun yang menyebabkan kesan kepada pelajar sekolah dan penduduk setempat.

Sepanjang tempoh dari 7 hingga 19 Mac 2019, JAS telah menjalankan pemantauan kualiti udara secara berkala setiap 4 jam di 30 buah sekolah di dalam lingkungan radius 5 kilometer dari tapak pelupusan haram tersebut. Pemantauan juga dilakukan di 24 lokasi awam yang dilaporkan oleh penduduk setempat dan mengikut rekod pesakit akibat terhidu gas beracun yang disyaki berpunca daripada aktiviti pelupusan haram tersebut.

same time carried out enforcements to track and to bring the offenders to court under the jurisdiction of the Environmental Quality Act (EQA) 1974.

Several others were also involved with the department in some of the episodes throughout 2019 which include the Malaysian Fire and Rescue Department, Department of Chemistry, the Malaysian Ministry of Health, the Civil Defence Force, RELA, the Royal Malaysian Force, the Malaysian Meteorological Department, the Malaysian Armed Force and the Local Authorities.

Below are several pollution episodes in Pasir Gudang, Johor which had impacted the department especially the public and the safety of its surrounding environment.

KIM-KIM RIVER, PASIR GUDANG, JOHOR

This incident started from the illegal dumping of scheduled waste activity by irresponsible individuals at the river bank of Kim – Kim river which was believed to have occurred on the night of March 6th, 2019. The Johor Fire and Rescue unit, the HAZMAT team had received complaints from the locals and had set out to the river bank of Kim – Kim river at 6 o'clock in the morning of March 7th, 2019. At the same time, Johor DOE had received public complaints regarding bad and nauseating odours around 8.30 in the morning from Taman Kota Masai area, Pasir Gudang.

Investigations had found that the source came from a type of scheduled waste which were dumped at the side of the Kim – Kim river nearby Taman Pasir Puteh. The waste had volatilized due to the hot weather and the waste had released several toxic gases which caused adverse effects to the surrounding locals and school children.

From March 7th to March 19th, 2019, DOE had conducted regular air quality monitoring for every 4 hours at 30 schools within 5 kilometre radius from the illegal dumping site. Surveillance were also done in 24 public locations which were reported by the locals and according to the patient's record whom accidently inhaled the toxic gases from the suspected illegal dumping activity.

Sepanjang episod ini, Kementerian Kesihatan Malaysia (KKM) mencatatkan jumlah seramai 5,039 mangsa hadir ke pusat bencana atau ke klinik kesihatan berdekatan. Kesemua pesakit mengalami simptom pening, loya dan muntah. Dari jumlah tersebut seramai 1,224 dimasukkan ke wad untuk rawatan dan pemantauan lanjut.

JAS juga dengan bantuan Pihak Berkuasa Tempatan dan agensi-agensi lain telah menjalankan kerja-kerja pembersihan di sepanjang 1.5 kilometer di tebing dan di sungai yang tercemar oleh bahan buangan terjadual tersebut. Jumlah keseluruhan jumlah sisa buangan yang tercemar selepas pembersihan adalah 650 tan tanah tercemar dan 850 tan liter air tercemar. Semua sisa tersebut di hantar ke Tapak Pelupusan Selamat iaitu Kualiti Alam Sdn. Bhd, Bukit Pelandok, Negeri Sembilan.

Dalam pada itu tindakan penguatkuasaan bersepadu yang dijalankan oleh JAS bersama dengan pihak Polis Diraja Malaysia (PDRM) dan Pihak Berkuasa Tempatan telah berjaya mengesan pelaku dan punca bahan buangan yang telah dilupuskan secara haram di tepi sungai Kim-Kim tersebut. Pelaku dan industri tersebut telah didakwa di bawah Seksyen 34B, AKAS 1974 yang jika disabit kesalahan akan di denda sebanyak RM500 ribu dan penjara tidak melebihi lima (5) tahun.

Throughout the episode, the Malaysian Ministry of Health (MOH) recorded a total of 5,039 victims attended the disaster centre or to the nearby health clinic. All the victims experienced symptoms of dizziness, nausea and vomiting. From the total recorded number, 1,244 victims were admitted into wards for further treatment and monitoring.

The DOE with the help from the Local Authorities and other agencies had performed clean ups along the 1.5 kilometres of the contaminated river and river banks due to the dumping of the scheduled waste. The overall total of the contaminated wastes after clean ups were 650 tonnes of contaminated soils and 850 litre tonnes of contaminated waters. All the wastes were sent to the Safe Disposal Site at Kualiti Alam Sdn. Bhd, Bukit Pelandok, Negeri Sembilan.

Meanwhile, the integrated enforcement actions were conducted by the DOE with the Royal Malaysian Police (RMP) and the Local Authority had succeeded in identifying the culprits and the source of the scheduled waste which had been dumped illegally at the river bank of Kim – Kim river. The culprits and the respective industry had been prosecuted under Section 34B, AKAS 1974 and if found to be guilty of the offense are liable to a fine of RM500, 000 and a jail sentence of no more than five (5) years.

Pengawasan dan Penguatkuasaan Bersepadu JAS bersama Agensi Lain seperti Polis Diraja Malaysia, Pasukan HAZMAT dari Bomba dan Penyelamat, Kementerian Kesihatan Malaysia dan Majlis Perbandaran Pasir Gudang di Kawasan Pasir Gudang, Johor

Joint Monitoring and Enforcement Team Between DOE and Other Agencies such as Royal Police Department (PDRM), HAZMAT Team from Fire and Rescue Department, Ministry of Health and Pasir Gudang Municipal Council (MPPG) in Pasir Gudang Area, Johor

OPERASI MAWAR, PASIR GUDANG, JOHOR

Tiga (3) bulan selepas negara telah digemparkan dengan kejadian pencemaran bencana industri Sungai Kim-Kim, Pasir Gudang, Johor, iaitu pada 20 Jun hingga 05 Julai 2019, satu lagi episod kemalangan yang berkaitan dengan pencemaran udara dan bau telah berlaku di Pasir Gudang, Johor. Kali ini berlaku kejadian gangguan kesihatan yang menyebabkan pelajar muntah, pening dan pitam di Sekolah Agama Taman Mawar, Pasir Gudang, Johor.

Sekali lagi, keseluruhan agensi kerajaan berkerjasama demi kepentingan orang awam dan alam sekitar. Di dalam episod ini, JAS dengan kerjasama pihak Kementerian Kesihatan Malaysia telah mengesan lokasi di 22 buah sekolah sekolah yang terlibat bagi menjalankan pemantauan kualiti udara secara berkala setiap 4 jam. Pemantauan juga dilakukan di sepuluh (10) lokasi lain iaitu di premis industri dan di tapak pelupusan sampah.

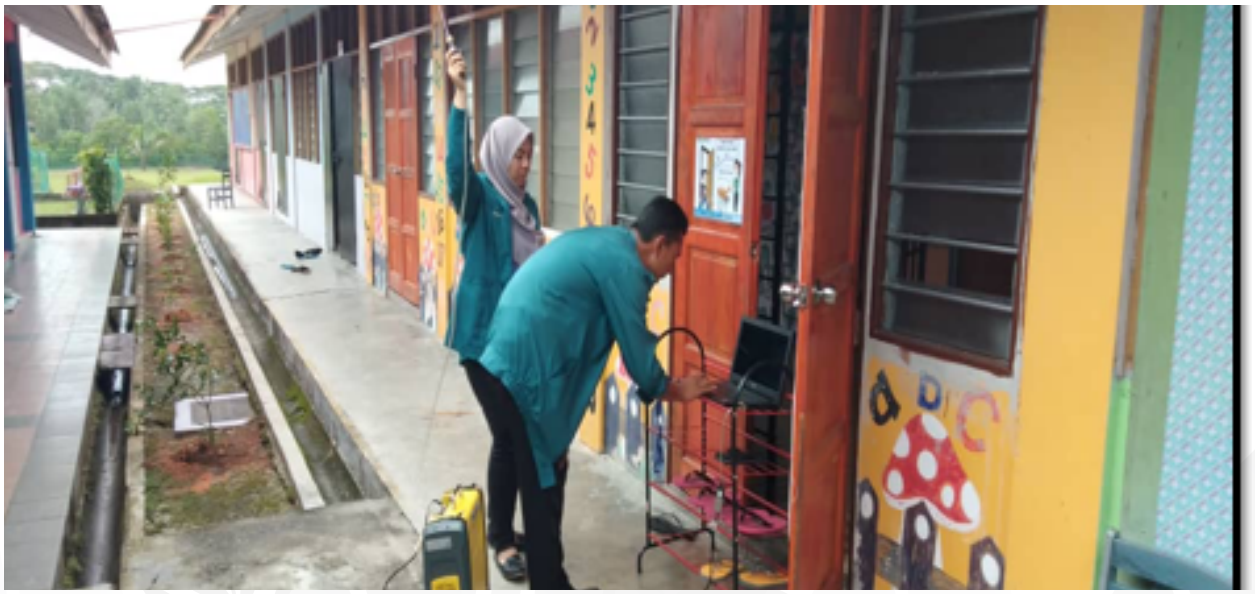
Jabatan juga telah menjalankan aktiviti pemantauan dan pengesanan di sepanjang lima (5) buah sungai iaitu Sungai Kim-Kim, Sungai Laloh, Sungai Buluh, Sungai Perembi, Sungai Masai dengan menggunakan kenderaan darat dan dron.

MAWAR OPERATION, PASIR GUDANG, JOHOR

Three (3) months after the nation was hit with the incident of industrial pollution disaster at the Kim-Kim river, Pasir Gudang, Johor, in June 20th to July 5th, 2019 another episode of incident had occurred which was related to air and odour pollution at Pasir Gudang, Johor. This time, there was health disturbance incident that caused students in Sekolah Agama Taman Mawar, Pasir Gudang vomiting, feeling dizziness and fainted.

Once again, the whole government agencies had cooperated for the sake of well beings of the public and the environment. In this episode, DOE with the assistance from the Malaysian Ministry of Health (MOH) had identified the locations of 22 affected schools for conducting periodic air quality monitoring for every 4 hours. The monitoring was also done at other ten (10) locations which were industrial premises and waste disposal sites.

The Department had also conducted surveillance and tracking activities along five (5) rivers which were Kim – Kim river, Laloh river, Buluh river, Perembi river and Masai river using land vehicles and drones.



Pemantauan Kualiti Udara di Sekolah-Sekolah di Pasir Gudang, Johor
Air Quality Monitoring in Schools in Pasir Gudang, Johor

PEMERKASAAN PEMANTAUAN KUALITI UDARA DAN GAS TOKSIK DI PASIR GUDANG, JOHOR

JAS melalui Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC) telah menerima peruntukan sebanyak RM 6 juta pada akhir tahun 2019 bagi memperkasakan pemantauan kualiti udara ambien dan gas toksik di kawasan Pasir Gudang, Johor.

JAS telah membuat perolehan dan memasang sebanyak 25 buah stesen pengawasan gas toksik Total Volatile Organic Compounds (TVOC) menggunakan Photo Ionization Detector (PID) yang akan mengesan gas TVOC dan memberikan amaran awal kepada pihak berkuasa dan orang awam **(Jadual 4.19)**. Daripada 25 stesen PID ini, terdapat 5 stesen meteorologi yang terletak bersebelahan antara satu sama lain untuk mendapatkan data meteorologi tempatan bagi tujuan pemodelan dan mengesan penyerakan pencemar udara.

Selain itu, JAS juga telah membuat perolehan satu (1) unit Mobile Gas Chromatography Mass Spectrometry (GC-MS) dan 1 unit Mobile Gas Chromatography Flame Ionization Detector (GC-FID). Stesen pengawasan Total Volatile Organic Compounds (TVOC) telah siap dipasang pada hujung Disember 2019. Stesen ini dijangka beroperasi sepenuhnya pada suku tahun kedua 2020.

EMPOWERMENT OF AIR QUALITY AND TOXIC GASES MONITORING AT PASIR GUDANG, JOHOR

The DOE through the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) had received an allocation of RM 6 million at the end of 2019 to empower the monitoring of ambient air quality and toxic gases at Pasir Gudang, Johor area.

DOE had acquired and installed 25 Total Volatile Organic Compounds (TVOC) toxic gases monitoring stations using Photo Ionization Detector (PID) which will trace TVOC gases and will trigger warning system to the authorities as well as to the public **(Table 4.19)**. Amongst the 25 PID stations, there were 5 meteorological stations situated next to each other in order to obtain local meteorological data for the purpose of modelling and detect dispersion of the air pollution.

Besides, DOE had also acquired 1 unit of Mobile Gas Chromatography Mass Spectrometry (GC-MS) and one (1) unit of Mobile Gas Chromatography Flame Ionization Detector (GC-FID). Monitoring station for Total Volatile Organic Compounds (TVOC) had been set up at the end of December 2019. This station was expected to be fully operational at the second quarter of 2020.

Jadual 4.19 : Senarai Stesen Pengawasan Total Volatile Organic Compounds (TVOC)
Table 4.19 : List of Total Volatile Organic Compounds (TVOC) Monitoring Stations

BIL/ NO.	STESEN/ STATION	LOKASI STESEN/ LOCATION OF STATION
1	HAP01	Sekolah Kebangsaan Tanjong Langsat
2	HAP02	Sekolah Kebangsaan Kota Masai 2
3	HAP03	Sekolah Menengah Kebangsaan Pasir Putih
4	HAP04	Sekolah Kebangsaan Tanjung Puteri Resort
5	HAP05	Sekolah Kebangsaan Pasir Puteh
6	HAP06	Johor Port Berhad
7	HAP07	Klinik Kesihatan Pasir Gudang
8	HAP08	Sekolah Kebangsaan Pasir Gudang (2)
9	HAP09	Sekolah Menengah Kebangsaan Pasir Gudang 3
10	HAP10	Klinik Kesihatan Masai

Jadual 4.19 : Senarai Stesen Pengawasan Total Volatile Organic Compounds (TVOC)
Table 4.19 : List of Total Volatile Organic Compounds (TVOC) Monitoring Stations

BIL/ NO.	STESEN/ STATION	LOKASI STESEN/ LOCATION OF STATION
11	HAP11	Sekolah Menengah Kebangsaan Pasir Gudang 2
12	HAP12	Stadium Majlis Perbandaran Pasir Gudang
13	HAP13	Masjid Jamek Pasir Gudang
14	HAP14	Sekolah Kebangsaan Taman Rinting 3
15	HAP15	Dewan Muafakat Masai @ Dewanraya Masai
16	HAP16	Sekolah Kebangsaan Taman Cendana
17	HAP17	Sekolah Menengah Kebangsaan Bandar Seri Alam
18	HAP18	Sekolah Menengah Kebangsaan Kota Masai
19	HAP19	Sekolah Menengah Kebangsaan Taman Scientex
20	HAP20	Sekolah Kebangsaan Kopok
21	HAP21	Sekolah Jenis Kebangsaan (Tamil) Ladang Sg Plentong
22	HAP22	Sekolah Kebangsaan Seri Kota Puteri
23	HAP23	Sekolah Menengah Kebangsaan Dato' Penggawa Timur
24	HAP24	Masjid Taman Pasir Putih
25	HAP25	Sekolah Menengah Kebangsaan Tanjung Puteri Resort

Note: HAP – Hazard Air Pollutant Station

HAP 12, Stesen TVOC (kiri) dan Stesen Meteorologi Terletak Bersebelahan di Kawasan Stadium Pasir Gudang, Johor
HAP 12: TVOC Station (left) and Meteorology Station Located Side By Side in an Area in Pasir Gudang Stadium, Johor

Stesen Bergerak GCMS (kiri) dan Stesen Bergerak GC-FID (kanan)
Mobile GCMS Station (left) and Mobile GC-FID Station (right)

PENGUATKUASAAN TERHADAP AKTIVITI PEMBAKARAN TERBUKA
ENFORCEMENT AGAINST OPEN BURNING ACTIVITIES

Kes pembakaran terbuka dikesan melalui operasi rondaan mencegah pembakaran terbuka yang dilaksanakan oleh JAS Negeri di kawasan-kawasan yang dikenalpasti sebagai kawasan yang berisiko berlaku kebakaran dan sering menerima aduan daripada orang awam. Di samping itu maklumat hotspots juga diperolehi melalui satelit yang dipantau dan dilaporkan oleh ASEAN Specialised Meteorological Centre (ASMC) yang berpusat di Singapura. Pada tahun 2019 sebanyak 1,224 hotspots di seluruh negara telah dilaporkan melalui satelit **(Jadual 4.20)**.

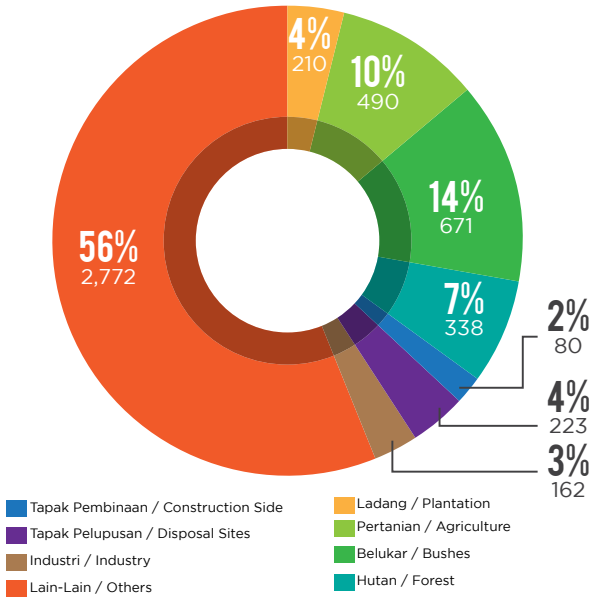
Sebanyak 4,946 kes pembakaran terbuka secara keseluruhan telah dikesan pada tahun 2019 **(Jadual 4.21)**, **(Jadual 4.22)** dan **(Rajah 4.5)** dilaporkan oleh setiap JAS Negeri melalui sistem atas talian dalaman JAS iaitu Sistem Elektronik Kawalan Alam Sekitar (e-KAS) dibawah Sub-Modul Pembakaran Terbuka dan Sub-Modul Aduan. Kejadian pembakaran terbuka yang utama sering berlaku adalah pembakaran sampah sarap di kawasan perumahan, pembakaran sampah sarap di tepi bahu jalan dan pembakaran untuk aktiviti keagamaan atau penyembahan yang dikategorikan sebagai lain-lain aktiviti (2,772), belukar (671) dan pertanian (490) terutamanya semasa cuaca panas dan kering iaitu pada bulan Mac (780) dan September (868). Daripada 4,946 kes pembakaran terbuka tersebut, 517 telah dikompaun dengan jumlah kompaun yang dikutip ialah sebanyak RM 699,600.00

Berdasarkan kepada data bilangan hotspot serta pembakaran terbuka bagi tempoh lima (5) tahun kebelakang iaitu dari tahun 2015 sehingga 2019 **(Rajah 4.6)**, tahun 2017 mencatatkan jumlah bilangan hotspot dan kes pembakaran terbuka yang paling rendah. Manakala kes hotspot dan pembakaran terbuka tertinggi dalam tempoh tersebut dicatatkan pada tahun 2019 iaitu bilangan hotspot sebanyak 1,224 dan bilangan kes pembakaran terbuka sebanyak 4,946 kes.

Open burning cases were detected during daily ground surveillance conducted by DOE State Offices at fire-prone areas, which have frequent public complaints and also through hotspots detected via satellites reported by the ASEAN Specialised Meteorological Centre (ASMC) based in Singapore. Throughout the year 2019, a total of 1,224 hotspots were detected via satellites **(Table 4.20)**.

A total of 4,946 open burning cases were detected in 2019 **(Table 4.21)**, **(Table 4.22)** and **(Figure 4.5)** these cases were reported by the DOE State Offices in DOE's internal online system (e-KAS) under the Open Burning Sub-Module and Complaint Sub-Module. Frequent open burning incidents were found to occur from activities such as burning of garbage in residential area, garbage burning by roadside and burning of any articles as part of religious rites or worshipping activities (categorised as other activities) (2,772), bushes (671) and agricultural areas (490) that normally occured during the hot and dry period in the months of March (780) and September (868). Out of the 4,946 open burning cases detected, 517 were issued with compounds amounting to RM 699,600.00

According to the data on hotspot numbers and open burning for the last five (5) years period from 2015 to 2019 **(Figure 4.6)**, 2017 recorded the lowest number of hotspots and open burning cases. While the highest hotspot and open burning cases during the period were recorded in 2019, which 1,224 of hotspots and 4,946 of open burning cases were recorded.



Rajah 4.5 : Bilangan Kes Pembakaran Terbuka Mengikut Kategori, 2019
Figure 4.5: Number Of Open Burning Cases By Categories,2019

Nota / Note :
Lain-lain - Pembakaran sampah sarap di kawasan perumahan, tepi jalan dan aktiviti keagamaan/penyembahan
Others - Burning garbage in residential areas, streets and religious activities / worship

Jadual 4.20 : Bilangan Kes Hotspots Dikesan Melalui Satelit Mengikut Negeri, 2019
Table 4.20: Number of Hotspots Detected through Satellite by States, 2019

NEGERI/ STATE	BULAN / MONTH												
	JAN/ JAN	FEB/ FEB	MAC/ MARCH	APRIL/ APRIL	MEI/ MAY	JUN/ JUNE	JULAI/ JULY	OGOS/ AUG	SEP/ SEPT	OKT/ OCT	NOV/ NOV	DIS/ DEC	JUMLAH/ TOTAL
Johor	1	15	21	3	0	0	3	6	53	10	7	9	**128**
Kedah	0	14	7	0	0	0	1	0	3	1	2	4	**32**
Kelantan	0	8	14	11	4	1	2	2	3	2	0	3	**50**
Melaka	0	0	0	0	0	0	0	0	5	0	5	0	**10**
Negeri Sembilan	1	5	2	0	0	0	1	0	0	1	0	2	**12**
Pahang	4	27	93	28	15	7	16	23	28	19	4	0	**264**
Perak	2	4	1	0	0	0	0	0	10	1	6	6	**30**
Perlis	0	1	0	0	0	0	0	0	0	0	0	4	**5**
Pulau Pinang	0	0	1	0	0	0	0	0	1	0	0	0	**2**
Sabah	6	37	29	20	16	2	5	12	60	32	21	1	**241**
Sarawak	2	0	16	21	17	4	22	34	208	15	23	9	**371**
Selangor	0	1	2	0	0	0	1	0	7	7	6	4	**28**
Terengganu	0	0	13	10	2	0	2	0	12	6	3	3	**51**
W.P. Kuala Lumpur / Putrajaya	0	0	0	0	0	0	0	0	0	0	0	0	**0**
W.P. Labuan	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Jumlah/ Total	**16**	**112**	**199**	**93**	**54**	**14**	**53**	**77**	**390**	**94**	**77**	**45**	**1,224**
JUMLAH KESELURUHAN / TOTAL :								**1,224**					

(Sumber: ASMC) / (Source: ASMC)

Jadual 4.21: Bilangan Kes Pembakaran Terbuka Mengikut Negeri, 2019
Table 4.21: Number Of Open Burning Cases By States,2019

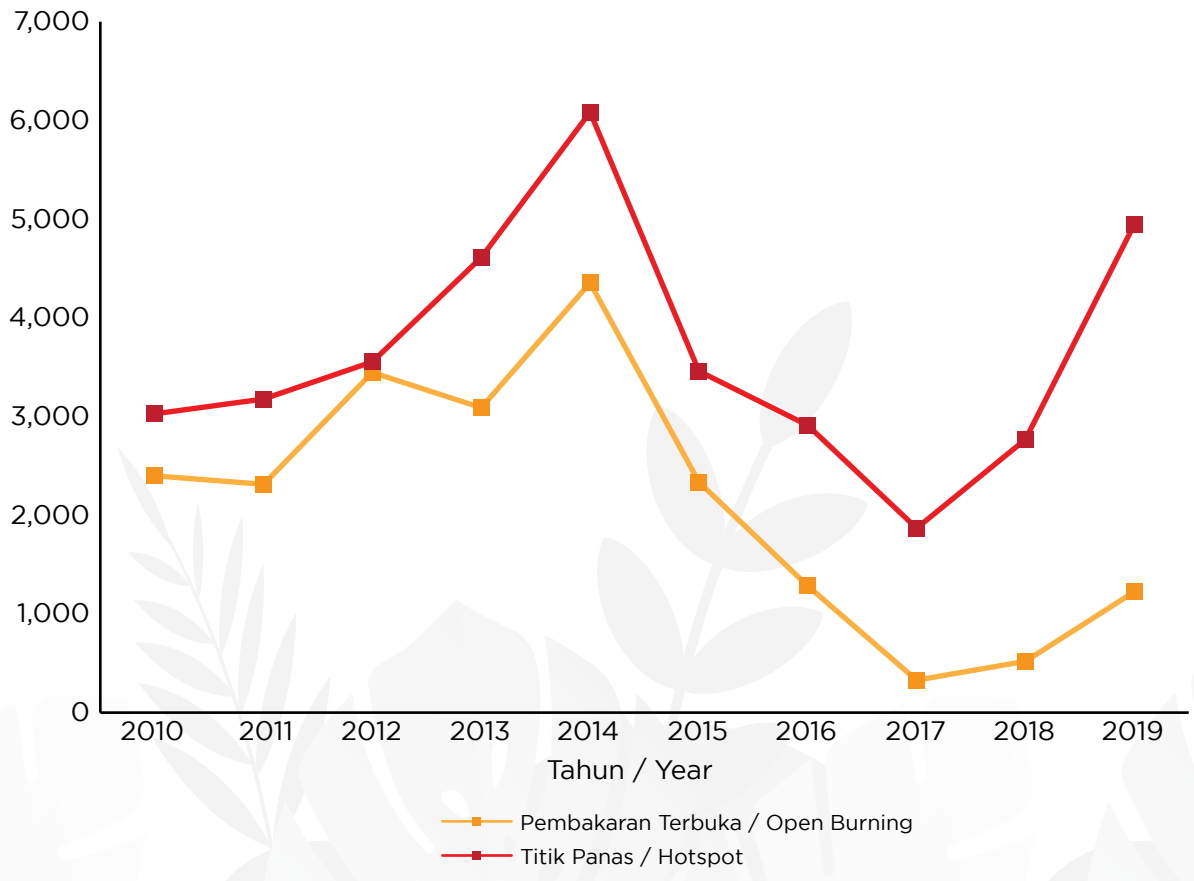
NEGERI/ STATE	KATEGORI / CATEGORIES								
	LADANG/ PLANTATION	PERTANIAN/ AGRICULTURE	BELUKAR/ BUSHES	HUTAN/ FOREST	TAPAK PEMBINAAN/ CONSTRUCTION SITES	TAPAK PELUPUSAN/ DISPOSAL SITES	INDUSTRI/ INDUSTRY	LAIN-LAIN/ OTHERS*	JUMLAH/ TOTAL
Johor	30	46	53	17	16	111	55	357	**685**
Kedah	7	42	48	10	6	24	1	145	**283**
Kelantan	16	2	11	60	2	2	2	68	**163**
Melaka	6	35	29	2	9	11	6	168	**266**
Negeri Sembilan	2	24	12	10	2	6	1	103	**160**
Pahang	33	17	172	80	11	3	5	124	**445**
Perak	12	19	14	7	3	4	5	239	**303**
Perlis	1	1	0	0	0	0	0	7	**9**
Pulau Pinang	3	43	13	3	2	5	0	307	**376**
Sabah	22	191	50	37	6	12	13	170	**501**
Sarawak	62	48	181	61	2	2	43	32	**431**
Selangor	7	8	4	4	10	16	9	704	**762**
Terengganu	9	9	75	47	6	11	22	59	**238**
W.P. Kuala Lumpur / Putrajaya	0	4	9	0	5	16	0	279	**313**
W.P. Labuan	0	1	0	0	0	0	0	10	**11**
Jumlah/ Total	**210**	**490**	**671**	**338**	**80**	**223**	**162**	**2,772**	**4,946**
JUMLAH KESELURUHAN / TOTAL :					4,946				

Jadual 4.22: Bilangan Kes Pembakaran Terbuka Bulanan, 2019
Table 4.22: Number of Open Burning Cases by Month, 2019

NEGERI/ STATE	KATEGORI / CATEGORIES								
	LADANG/ PLANTATION	PERTANIAN/ AGRICULTURE	BELUKAR/ BUSHES	HUTAN/ FOREST	TAPAK PEMBINAAN/ CONSTRUCTION SITES	TAPAK PELUPUSAN/ DISPOSAL SITES	INDUSTRI/ INDUSTRY	LAIN-LAIN/ OTHERS*	JUMLAH/ TOTAL
Januari/ January	6	27	21	4	11	16	1	332	**418**
Februari/ February	27	62	57	32	8	17	2	280	**485**
Mac/ March	39	71	208	82	21	25	8	326	**780**
April/ April	23	32	63	43	6	8	9	147	**331**
Mei/ May	14	14	38	43	5	20	5	157	**296**

Jadual 4.22: Bilangan Kes Pembakaran Terbuka Bulanan, 2019
Table 4.22: Number of Open Burning Cases by Month, 2019

NEGERI/ STATE	KATEGORI / CATEGORIES								
	LADANG/ PLANTATION	PERTANIAN/ AGRICULTURE	BELUKAR/ BUSHES	HUTAN/ FOREST	TAPAK PEMBINAAN/ CONSTRUCTION SITES	TAPAK PELUPUSAN/ DISPOSAL SITES	INDUSTRI/ INDUSTRY	LAIN-LAIN/ OTHERS*	JUMLAH/ TOTAL
Jun/ June	2	6	10	5	3	5	2	160	**193**
Julai/ July	23	21	28	19	3	30	0	275	**399**
Ogos/ August	18	26	54	18	8	27	3	220	**374**
September/ September	36	152	149	73	6	24	59	369	**868**
Oktober/ October	6	43	20	8	3	28	24	181	**313**
November/ November	12	30	7	6	5	13	32	145	**250**
Disember/ December	4	6	16	5	1	10	17	180	**239**
Jumlah/ Total	**210**	**490**	**671**	**338**	**80**	**223**	**162**	**2,772**	**4,946**
JUMLAH KESELURUHAN / TOTAL :					**4,946**				



Rajah 4.6 : Bilangan Hotspot dan Kes Pembakaran Terbuka dari 2010 sehingga 2019
Figure 4.6 : Number of Hotspot and Open Burning Cases from 2010 to 2019

PROTOKOL MONTREAL DAN PERLINDUNGAN LAPISAN OZON
MONTREAL PROTOCOL AND PROTECTION OF THE OZONE LAYER

LATAR BELAKANG

Malaysia telah meratifikasikan Konvensyen Vienna bagi Perlindungan Lapisan Ozon dan Protokol Montreal mengenai Bahan-Bahan Pemusnah Lapisan Ozon pada 29 Ogos 1989. Sebagai negara Parti kepada Protokol Montreal, Malaysia telah memenuhi obligasi untuk menghentikan pengimportan Klorofluorokarbon (CFC), Halon dan Karbon Tetraklorida (CTC) mulai 1 Januari 2010.

Mulai 1 Januari 2015, Metil Bromida yang juga merupakan bahan pemusnah ozon telah dikawal dan hanya dibenarkan untuk kegunaan kuarantin dan aktiviti pra perkapalan. Pelan penghapusan penggunaan Hidroklorofluorokarbon (HCFC) sedang dijalankan dan pengimportan HCFC akan dilarang sepenuhnya menjelang tahun 2040.

Pada Mesyuarat Parti ke-28 yang telah diadakan di Rwanda, Kigali, ahli-ahli parti telah bersetuju dengan penyusutan terhadap Bahan Hidrofluorokarbon (HFC) yang dikenali sebagai Pindaan Kigali. Pindaan Kigali akan mula berkuatkuasa pada 1 Januari 2019 atau selepas 20 buah negara telah meratifikasikan pindaan itu.

PEMATUHAN TERHADAP PROTOKOL MONTREAL

Malaysia diwajibkan untuk menghapuskan penggunaan HCFC secara berperingkat mulai 2013 sehingga larangan penggunaan sepenuhnya menjelang 2040 seperti yang telah ditetapkan di bawah Protokol Montreal. Bagi mencapai sasaran ini, Pelan Pengurusan Penghapusan HCFC (HPMP) telah menggariskan polisi dan strategi jangka panjang untuk menghapuskan penggunaan HCFC mulai tahun 2012 hingga 2040. **Jadual 4.23** menunjukkan jadual strategi dan polisi dalam pelaksanaan HPMP. **Rajah 4.7** menunjukkan jadual penghapusan HCFC di mana menjelang 2015 sebanyak 10% HCFC akan dikurangkan, 35% pada 2020, 67.5% pada 2025, 97.5% pada tahun 2030 (sebanyak 2.5% akan dihadkan untuk kegunaan dalam sektor servis dan penyenggaraan sahaja) dan seterusnya HCFC akan menjadi larangan mutlak pada tahun 2040. **Rajah 4.8** menunjukkan pengimportan HCFC pada tahun 2019 yang berjumlah 3,583 metrik tan.

BACKGROUND

Malaysia ratified the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer on 29th August 1989. As a Party to the Montreal Protocol, Malaysia has complied to the obligation to stop importing chlorofluorocarbon (CFC), halon and carbon tetrachloride (CTC) by 1st January 2010.

Since 1st January 2015, others ozone depleting substances such as methyl bromide will only be allowed to use for quarantine and pre shipment activities. The phase-out of hydrochlorofluorocarbons (HCFC) plan is ongoing and the importation will be totally banned by 2040.

During the 28th Meeting of Parties that was held in Rwanda, Kigali, member of parties have agreed with the Hydrofluorcarbon (HFC) phase down known as Kigali Amendment. The amendment will come into force on 1st January 2019 or after 20 countries have ratified the amendment.

MONTREAL PROTOCOL'S OBLIGATION

Malaysia is obligated to phase out HCFC by stages from 2013 until the total banned of usage by 2040 as stipulated under the Montreal Protocol. To achieve the target, the HCFC Phase-out Management Plan (HPMP) has outlined the policies and long term strategies to phase-out HCFC from 2012 to 2040. **Table 4.23** shows the policies and strategies of HPMP. **Figure 4.7** shows the HCFC phase out schedule for Malaysia whereby HCFC will be reduced by 10 % in 2015, 35% in 2020, 67.5% in 2025 , 97.5% by 2030 (2.5% is strictly for servicing sector) and subsequently total ban on HCFC will be imposed by 2040. **Figure 4.8** shows the importation of HCFC in 2019 amounted to 3,583 metric tonnes.

Selaras dengan pewartaan Perintah Kastam (Larangan Import) 2012 yang berkuatkuasa pada 1 Januari 2013, Malaysia telah melaksanakan sistem kuota bagi mengimport HCFC oleh pengimport yang berdaftar dengan JAS. Permohonan permit kelulusan atau Approved Permit (AP) diproses melalui sistem atas talian, e-Permit mengikut agihan kuota HCFC yang diperuntukan berdasarkan garis dasar atau tahap pembekuan berjumlah sebanyak 515.8 ODPT (Ozone Depleting Potential Tonnes) atau sebanyak 7,900 Metrik Tan.

In line with the Customs (Prohibition of Import) Order 2012, which came into forced on 1st January 2013, Malaysia has implemented the quota system for the importation of HCFC. Application for Approval Permit (AP) are processed by DOE through the e-Permit online system according to the HCFC quota allocation according to baseline level or freeze limit of 515.8 ODPT (ozone depleting potential tonnes) or 7,900 metric tonnes.

Sistem e-Permit secara atas talian telah diwujudkan untuk memproses dan seterusnya meluluskan permohonan import dan eksport HCFC. Sistem atas talian ini melibatkan jaringan di antara pengimport/ pengeksport berdaftar HCFC, JAS dan Sistem Maklumat Kastam (SMK), Jabatan Kastam DiRaja Malaysia. Sistem ini diwujudkan selaras dengan kehendak strategi HPMP iaitu pelaksanaan sistem Kelulusan Permit (AP) dan kuota bagi kawalan import HCFC. Bagi tahun 2019, sebanyak 264 permohonan untuk mengimport HCFC telah diterima daripada 16 pengimport berdaftar dan sebanyak lima (5) permohonan untuk mengeksport HCFC telah diterima melalui sistem e-Permit.

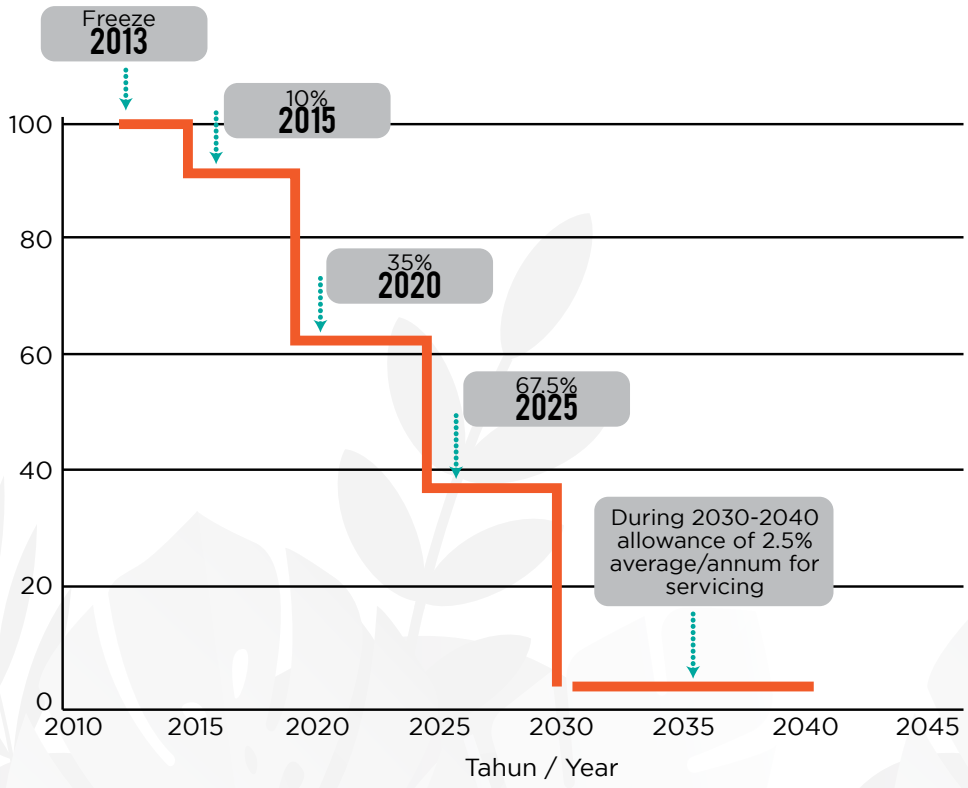
The e-Permit on-line system was developed to process and subsequently approve import and export of HCFC from registered importers and exporters. The on-line system is a linkage network between the HCFC importers and exporters, DOE Malaysia and the Customs Information System of the Royal Customs of Malaysia. The establishment of this system is in line with the HPMP strategy which is the implementation of Approved Permit (AP) and quota system for import of HCFC. In 2018, 264 applications for importing HCFC from 16 registered importers and five (5) applications for exporting HCFC have been received through the e-Permit system.

Jadual 4.23: Polisi Dan Strategi Perundangan Pelan Penghapusan HCFC (HPMP), 2012-2040
Table 4.23: Policies And Regulatory Actions Of HCFC Phase Out Management Plan (HPMP), 2012-2040

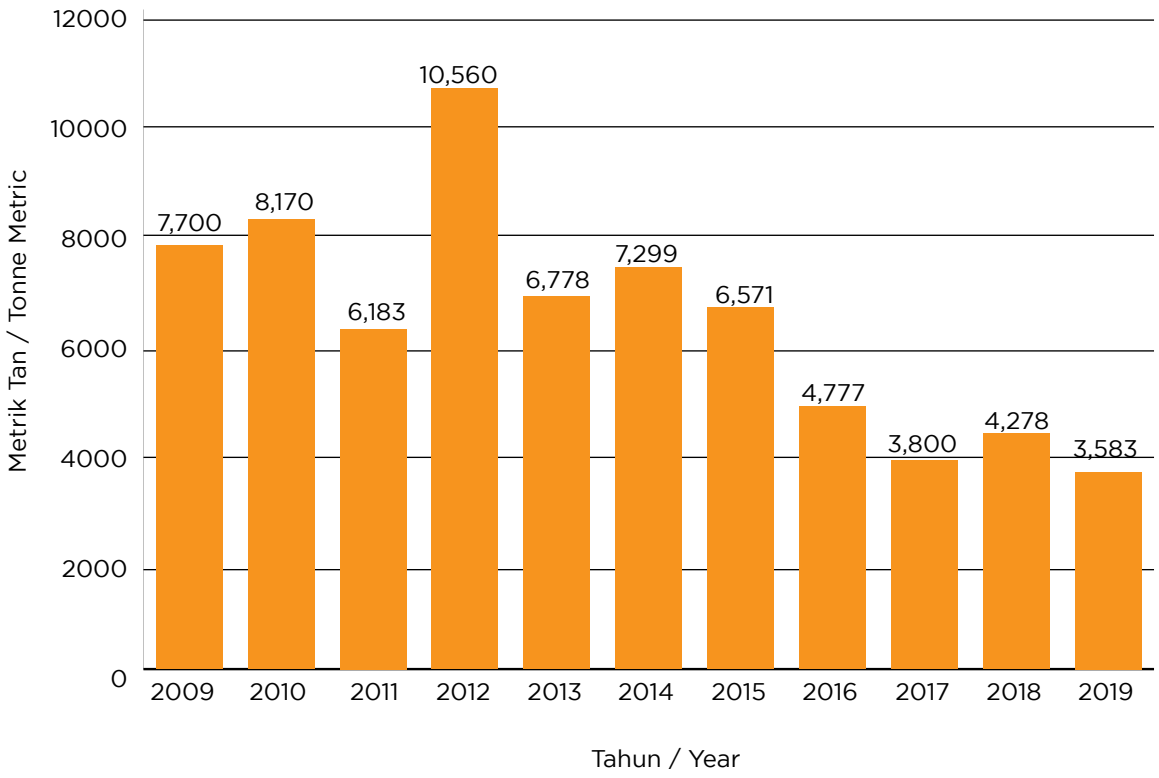
TAHUN/ YEAR	POLISI DAN TINDAKAN PERUNDANGAN/ POLICIES AND REGULATORY ACTIONS
2012	Mewujudkan sistem AP bagi pengagihan kuota import HCFC berdasarkan baseline atau purata import 2009/2010 Establishment of AP for HCFC import quota based on National average consumption for 2009/2010
	Meminda perundangan sedia ada untuk mengawal penggunaan, import, pembuatan, pemasangan produk dan peralatan yang menggunakan HCFC Amend existing legislation for control on the use, import, manufacture, assembly or installation of products and equipment using HCFCs.
2013	Mewujudkan sistem perlesenan untuk mengeksport semula gas HCFC Licence re-export of HCFC chemicals
	Pelaksanaan sistem AP pada 1 Januari 2013 mengikut Jadual Pembekuan Protokol Montreal Implement Approved Permit (AP) system for HCFC import (by Jan 2013)
	Larangan menambah (expansion) atau membina fasiliti pembuatan baru menggunakan HCFC Prohibit expansion of new manufacturing facilities using HCFCs
	Promosi menggunakan bahan alternatif melalui pemberian insentif Promote the use of alternatives through incentives
	Latihan dan Pensijilan bagi pekerja yang mengendalikan HCFC Undertake certification of skilled workers trained to handle HCFCs

Jadual 4.23: Polisi Dan Strategi Perundangan Pelan Penghapusan HCFC (HPMP), 2012-2040
Table 4.23: Policies And Regulatory Actions Of HCFC Phase Out Management Plan (HPMP), 2012-2040

TAHUN/ YEAR	POLISI DAN TINDAKAN PERUNDANGAN/ POLICIES AND REGULATORY ACTIONS
2015	Larangan bagi membuat, memasang dan mengimport peralatan penyaman udara menggunakan HCFC yang berkuasa 2.5 hp dan ke bawah (untuk penggunaan dalam Malaysia) Prohibit the manufacture, assembly and import of HCFC-based air-con equipment of 2.5hp and below (for use in Malaysia)
	Mewartakan HCFC sebagai bahan terkawal Include HCFCs as restricted gas
	Larangan ke atas pengimportan polyol yang mengandungi HCFC Prohibit import of pre-blended polyols with HCFCs
2020	Larangan membuat, memasang dan mengimport semua barangan dan peralatan yang menggunakan HCFC kecuali bagi penggunaan khas (essential use) Prohibit the manufacture, assembly and import of all products and equipment using HCFCs (except for essential uses)
	Larangan menggunakan HCFC 141b sebagai agen pengembang Prohibit the use of HCFC 141b as blowing agent
	Larangan pembuatan dan pemasangan baru sistem pemadam api yang menggunakan HCFC Prohibit the use of HCFC in the manufacturing and installation of new fire extinguishing systems
2025	Larangan pemasangan baru semua barangan dan peralatan yang menggunakan HCFC No more new installation of products and equipment using HCFCs
2030	Pemberian AP terhad kepada 2.5% daripada jumlah baseline dan hanya untuk sektor servis sahaja AP limited to 2.5% of baseline and for servicing use only
2040	Larangan mutlak pengimportan HCFC mulai 1 Januari 2040 Total ban on the import and use of HCFCs.



Rajah 4.7: Jadual Penghapusan HCFC
Figure 4.7: HCFC Phase Out Schedule Consumption



Rajah 4.8: Tren Penggunaan HCFC Di Malaysia, 2009 -2019

Figure 4.8: HCFC Consumption Trend In Malaysia, 2009 -2019

ENABLING ACTIVITIES BAGI PINDAAN KIGALI

Bagi tujuan meratifikasikan Pindaan Kigali, pihak Tabung Pelbagai Hala (MLF) melalui The World Bank sebagai Implementing Agency (IA) telah meluluskan peruntukan sebanyak USD 250,000 bagi menjalankan aktiviti-aktiviti ke arah meratifikasi pindaan tersebut. Pada tahun 2018. JAS telah mengadakan bengkel konsultasi bersama pihak-pihak yang berkepentingan termasuk industri, agensi kerajaan dan badan bukan kerajaan yang berkaitan di Semenanjung Malaysia, Sabah dan Sarawak.

Usaha-usaha ke arah meratifikasi Pindaan Kigali ini diteruskan pada tahun 2019 dengan pelaksanaan Kajian "National Survey on Non-ODS (Ozone Depleting Substance) Alternatives untuk mengkaji tren penggunaan HFC di Malaysia. Kajian tersebut mengumpulkan data penggunaan dari industri yang terlibat seperti pembekal bahan kimia, sektor penyaman udara dan penyejukbekuan, pembuatan kenderaan (penyaman udara kenderaan), sektor pemadaman api, sektor aerosol dan pelarut. Satu bengkel konsultasi telah diadakan pada 24 Julai 2019 untuk

ENABLING ACTIVITIES ON KIGALI AMENDMENT

For the fast start of Kigali Amendment ratification, The Multilateral Fund (MLF) through The World Bank being the Implementing Partner (IA) has approved USD 250,000 for enabling activities. In 2018, DOE has organized consultation workshops with stakeholders including relevant industries, government agencies and non-governmental organizations in Peninsular Malaysia, Sabah and Sarawak.

Efforts towards ratification of Kigali Amendment is continued in 2019 with the implementation of National Survey on Non-ODS (Ozone Depleting Substance) Alternatives to study the trend of HFC usage in Malaysia. The study collected consumption data from relevant industries including chemical suppliers, refrigeration and air conditioning sector, car manufacturers (mobile air conditioners), fire extingushing sector, aerosol and solvent sector. Consultation workshop was held on 24th July 2019 to present the outcome of the study

membentangkan hasil kajian tersebut kepada pihak berkepentingan untuk mendapatkan cadangan dan maklumbalas mengenai kajian tersebut. Hasil daripada kajian tersebut akan digunapakai dalam merangka strategi pengurangan HFC bagi Malaysia yang dijadualkan bermula pada tahun 2024.

to stakeholders for their comments and feedbacks. Outcome from the study will be used in formulating the HFC phase down strategy for Malaysia which is scheduled to start in 2024.

Pada 18 Oktober 2019, Kabinet telah bersetuju untuk meratifikasi Pindaan Kigali kepada Protokol Montreal setelah pelaksanaan sistem kawalan pengimportan dan pengeksportan HFC. JAS dengan kerjasama Jabatan Kastam DiRajaMalaysiasedangmemindaperundangan yang berkaitan bagi membolehkan kawalan terhadap pengimportan dan pengeksportan HFC. Sistem kawalan tersebut dijangkakan akan bermula pada 1 Mac 2020.

On 18th October 2019, the Cabinet has agreed to ratify Kigali Amendment to the Montreal Protocol provided that the control system for import and export of HFC is in place. DOE with the cooperation of the Royal Customs Department is in the process to amend relevant legislation to enable the control of import and export of HFC. The control system is expected to commence on the 1st March 2020.

Bengkel Konsultasi Pemegang Taruh untuk The Ratification of Kigali Amendment and Enabling Activities for HFC Phase Down Under The Montreal Protocol telah Diadakan di Sarawak pada 7 Mac 2019

Stakeholders Consultation Workshop for The Ratification of Kigali Amendment and Enabling Activities for HFC Phase Down Under The Montreal Protocol at Sarawak On 7th March 2019

METIL BROMIDA

Metil Bromida yang merupakan bahan pemusnah ozon dikawal selia penggunaannya oleh Jabatan Pertanian, Kementerian Pertanian dan Asas Tani Malaysia. Mulai tahun 2015 penggunaannya terhad terhadap kuarantin dan pra-perkapalan sahaja. Pada 20 November 2019, JAS dengan kerjasama Jabatan Pertanian telah mengadakan Seminar Alternatif Methil Bromida di Hotel Marriot, Putrajaya. Majllis telah dirasmikan oleh Datin Jatil Aliah Binti Timin, Timbalan Ketua Pengarah Pertanian (Pengurusan dan Regulatori) selain turut dihadiri oleh pegawai kanan dari Jabatan Pertanian, Puan Mashitah Darus, Pengarah Udara mewakil Puan Ketua Pengarah JAS serta pegawai JAS yang lain.

METHYL BROMIDE

Methyl Bromide being amongst other ozone depleting substances are being monitored by Department of Agriculture, Ministry of Agriculture and Agro-Based Industry Malaysia. Since 2015, the usage is limited only to quarantine and pre-shipment. On 20th November 2019, DOE in collaboration with Department of Agriculture organised a Seminar on Methyl Bromide Alternatives at Marriot Hotel, Putrajaya. The seminar was officiated by Datin Jatil Aliah Binti Timin, Deputy Director General (Management and Regulatory) besides other senior officials from Department of Agriculture, Puan Mashitah Darus, Director of Air Division representing the Director General of Environment Malaysia and other senior DOE officials.

Para Panel Semasa Sesi Soal Jawab Seminar Alternatif Methil Bromida
Panels During The Question & Answers Session At Seminar On Methyl Bromide Alternatives

PELAN PENGURUSAN PENGHAPUSAN HCFC PERINGKAT II

Pada 21 Mac 2011, Kabinet telah meluluskan strategi Pelan Pengurusan Penghapusan HCFC (HPMP). Malaysia telah menerima bantuan kewangan sejumlah USD 9,587,470 bagi pelaksanaan HPMP Peringkat 1 dari Tabung Multilateral Protokol Montreal (MLF). Pada Mesyuarat ke-77 Executive Commitee (ExCOM) for the Implementation of Montreal Protocol yang telah diadakan pada 3 November 2016, mesyuarat telah meluluskan Pelan Pengurusan Penghapusan HCFC Peringkat II berjumlah sebanyak USD 6,138,063 bagi penghapusan 146.24 ODP Tan HCFC. Pelan HPMP Peringkat II ini telah diluluskan bagi projek-projek termasuk

PHASE-OUT MANAGEMENT PLAN (HPMP) STAGE II

On 21st March 2011, the Cabinet approved the HCFC Phase-Out Management Plan (HPMP) strategy. Malaysia received financial assistance amounting to USD 9,587,470 for the implementation of HPMP Stage 1 from the Montreal Protocol Multilateral Fund (MLF). At the 77th Executive Commitee Meeting (ExCOM) for the Implementation of the Montreal Protocol held on 3rd November 2016 approved the HPMP Stage II for a total of USD 6,138,063 for the phase-out of 146.24 ODP Ton HCFC. HPMP Stage 2 Plan has been approved for projects including the conversion technology of zero ODP dan low GWP to 67 small and medium industries from

penukaran teknologi kepada ODP sifar dan rendah GWP kepada 67 industri kecil dan sederhana dari sektor busa, latihan juruteknik servis dan projek-projek bantuan teknikal dalam sektor penyejukbekuan dan penyamanan udara.

the foam sector, service technician training and technical assistance projects in the refrigeration and servicing sector.

Pelaksanaan Pelan HPMP Peringkat II ini adalah dari tahun 2017 sehingga 1 Januari 2022. Pada dua tahun pelaksanaan pelan ini tumpuan adalah kepada 10 industri busa yang menggunakan lebih dari 20 MT HCFC 141b bagi penghapusan dalam sektor busa di mana premis-premis ini telahpun berjaya melengkapkan proses penukaran yang melibatkan penghapusan 33.0 ODPT. Baki sebanyak 57 industri busa kecil dan sederhana yang lain diberi peluang untuk terus menggunakan HCFC 141b sehingga 1 Januari 2022. Ini bertujuan memberi peluang kepada pihak industri memilih alternatif yang bersifat sifar ODP serta rendah GWP selain kos yang kompetitif dan teknologi yang boleh diterima pakai digunakan apabila ianya tersedia di pasaran.

The implementation of Stage II HPMP Plan is from 2017 to 1st January 2022. The focus during the first 2 years implementation are to the 10 foam industries using more than 20 MT HCFC 141b for the phase – out of HCFC 141b in the foam sector. 33.0 ODPT of ODS has been phased - out when these companies completed the conversion project. While the remaining 57 small and medium foam industries (SMEs) will continue using HCFC 141b until 2022. This is to allow the industries to choose alternatives that are zero ODP and low GWP as well as competitive costs and acceptable technologies when there are available in the market.

Pada mesyuarat EXCOM ke-84 yang telah diadakan pada 16 hingga 20 Disember 2019, mesyuarat telah meluluskan permohonan tranche kedua di bawah Pelan Pengurusan Penghapusan HCFC (HPMP) Peringkat II sejumlah USD 2,475,225.

During the 84th EXCOM meeting that was held on 16th to 20th December 2019, the meeting approved USD 2,475,225 being the second tranche under HCFC Phase-out Management Plan Stage II.

Projek Penukaran Teknologi Dalam Sektor Busa Dari Bahan Pemusnah Ozon, Hcfc 141B Kepada Bukan Pemusnah Ozon, Cyclopentane
Conversion Project In Foam Sector From Ozone Depleting Substances, To Non - Ozone Depleting Substances, Cyclopentane

Program Pentauliahan Juruteknik Servis (CSTP) Bagi Sektor Penyejukbekuan dan Penyaman Udara (RACs)

Pentauliahan kepada juruteknik servis sektor penyejukbekuan dan penyaman udara merupakan salah satu keperluan di dalam Peraturan–Peraturan Kualiti Alam Sekeliling (Pengurusan Refrigeran) 1999. Sektor servis alat penyejukbekuan dan penyaman udara merupakan salah satu penyumbang utama kepada penggunaan HCFC dalam negara. Sehubungan itu, JAS melalui Pusat Latihan Bertauliah (ATC) yang dilantik daripada institut latihan awam dan swasta menganjurkan siri latihan CSTP khusus kepada juruteknik sektor ini sebagai salah satu langkah pematuhan terhadap Protokol Montreal. Penekanan terhadap tatacara dan kod etika yang betul semasa pengendalian refrigeran juga diberikan semasa sesi latihan sebagai usaha untuk mengelakkan pelepasan refrigeran ke persekitaran.

Sepanjang tahun 2019, sebanyak 180 siri latihan CSTP telah dijalankan untuk melatih dan mentauliahkan juruteknik servis sektor penyejukbekuan dan penyaman udara. Seramai 4,098 orang Juruteknik telah mendaftar untuk mendapatkan pentauliahan dan 3,299 dari mereka telah lulus. JAS juga mengadakan lawatan audit ke ATC yang terpilih semasa mereka menjalankan latihan bagi memastikan sesi latihan dijalankan selaras dengan manual latihan yang telah ditetapkan oleh Jabatan.

JAS juga menyediakan pembangunan kapasiti bagi tenaga pengajar kursus CSTP dan memastikan tenaga pengajar tersebut adalah sentiasa mengikut peredaran masa dan teknologi terkini dalam sektor penyejukbekuan dan penyaman udara. JAS telah mengadakan dua (2) siri kursus Master Trainers for CSTP kepada tenaga pengajar baru CSTP dan satu (1) kursus Refresher Course for Master Trainers kepada tenaga pengajar yang sedia ada. Selain itu, JAS telah mengemaskini dan menambahbaik manual latihan kursus CSTP bagi merangkumi alternatif refrigeran bukan bahan pemusnah ozon seperti HFC dan hidrokarbon.

Certified Service Technician Program (CSTP) for Refrigeration and Air-Conditioning Sectors (RACs)

Certification for service technicians in refrigeration and air conditioning sector is one of the requirements under the Environmental Quality Regulations (Refrigerant Management) 1999. Servicing sector for refrigeration and air conditioning equipments is one of the main contributor for HCFC consumption in the country. Therefore, DOE through the appointed Authorized Training Centers (ATC) from government and private training institutes organized series of CSTP training for the technicians to comply to the Montreal Protocol. The training focused on the best practices and code of etiquette during the handling of refrigerant in the effort of preventing the release of refrigerant to the environment.

In 2019, 180 series of CSTP training had been organized by ATCs to train and certify technicians in the refrigeration and air conditioning sector. A total of 4,098 technicians have enrolled for the training and 3,299 of them have been certified. DOE also conducted audit on selected ATCs to ensure that the training were implemented in accordance to the training manual as determined by the Department.

DOE also provides capacity building to the trainers for CSTP training and ensure that the trainers are up to date to the current and latest technologies in the refrigeration and air conditioning sector. DOE had organized two (2) series of Master Trainers for CSTP Course to train new trainers and one (1) Refresher Course for Master Trainers for the existing trainers. DOE has also updated and improved the training manual for CSTP to include other alternative refrigerants such as HFC and hydrocarbon.

Kursus Master Trainers untuk CSTP Pada 23 hingga 27 September 2019
Master Trainers for CSTP Course from 23rd to 27th September 2019

Jelajah Refresher Course For Technicians In Mobile Air Conditioner Sector (Mac) And Reclamation In Refrigerant Management Di Shah Alam
Roadshows On Refresher Course For Technicians In Mobile Air Conditioner Sector (Mac) And Reclamation In Refrigerant Management At Shah Alam

Di bawah komponen pengurusan, koordinasi dan kerjasama JAS bersama dengan Jabatan Kastam DiRaja Malaysia (JKDM) telah menganjurkan dua (2) sesi Kursus Kawalan Bahan Pemusnah Ozon iaitu pada 19 Mac hingga 22 Mac 2019 di Miri, Sarawak dan 19 Ogos hingga 23 Ogos 2019 di Alor Setar, Kedah. Seramai 84 orang pegawai penguatkuasa dari JKDM dan JAS telah menghadiri kursus tersebut.

Under the cooperation, coordination and management components DOE together with the Malaysia Royal Customs Department (MRCD) organized two (2) sessions of Training On Ozone Depleting Substances (ODS) held on 19th March to 25th March 2019 at Miri, Sarawak and 19th August to 23rd August 2019 at Alor Setar, Kedah. A total of 84 Malaysia Royal Customs Department and Department of Environment enforcement officers attended the course.

Program ini diadakan bagi menyebarkan maklumat kepada penguatkuasa JKDM dan JAS berkenaan pelaksanaan dan pematuhan terhadap Protokol Montreal, peraturan-peraturan bagi mengawal dan mengawasi pengimportan dan pengeksportan bahan pemusnah ozon. Satu lawatan berobjektif ke pelabuhan berdekatan turut diadakan bagi memberi pendedahan kepada peserta mengenai tatakerja pengimportan dan pengeksportan bahan pemusnah ozon di lapangan.

This programme was organized to disseminate information to the enforcement officers on the implementation and compliance towards the Montreal Protocol, regulations for controlling and monitoring importation and exportation of the ozone depleting substances. A visit to the nearest port was organized to expose the participants on the import and export procedures at the point of entry.

Kumpulan Semasa Kursus Kastam Mengenai Bahan Pemusnah Ozon, 19 hingga 22 Mac 2019, Miri, Sarawak
Group On The Customs Training On Ozone Depleting Substances, 19th to 22nd March 2019, Miri, Sarawak

Kumpulan Semasa Lawatan Berobjektif Ke Stesen Bukit Kayu Hitam, Kursus Kastam Mengenai Bahan Pemusnah Ozon, 19 hingga 23 Ogos 2019, Alor Setar, Kedah
Group During Visit To Bukit Kayu Hitam Station, Customs Training On Ozone Depleting Substances, 19th to 23rd August 2019, Alor Setar, Kedah

PROGRAM DAN KEMPEN KESEDARAN

Sempena sambutan Hari Ozon Sedunia yang disambut setiap 16 September, pengumuman khas tema 32 Years and Healing telah disiarkan di laman sesawang JAS dan laman sosial di facebook dan Instagram.

Majlis sambutan ini telah diadakan di Hotel Tenera, Bangi, Selangor pada 24 September 2019 dan dirasmikan oleh YBrs. Puan Norlin binti Jaafar, Ketua Pengarah JAS Malaysia, Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC).

Sempena sambutan Hari Ozon 2019 ini, JAS dengan kerjasama Malaysia's Chapter Association in Heating, Refrigeration and Air Conditioning (MASHRAE) telah mengadakan seminar bertajuk Cooling Technology In Refrigeration dan Air Conditioning (RAC) Sector (Food & Beverages Industry). Seminar ini bertujuan untuk berkongsi pengetahuan dan menyebarkan maklumat terkini kepada pengguna dan sektor servis khususnya dari Sektor Penyejukan dan Penghawa Dingin (RAC) mengenai perkembangan teknologi di dalam sektor penyejukan dan refrigeran yang digunapakai dalam sektor rantaian sejuk. Pakar-pakar dari dalam dan luar negara telah berkongsi maklumat dan pengetahuan bersama hampir 350 pemegang taruh yang terdiri daripada agensi kerajaan, pengusaha, kontraktor dan pengguna dari sektor RAC serta pelajar-pelajar universiti.

Pameran mengenai pelaksanaan Protokol Montreal dan alternatif terhadap bahan pemusnah ozon turut diadakan. Pameran ini telah disertai oleh para pemegang taruh yang terdiri dari agensi kerajaan dan industri berkaitan seperti JAS, PUSPEK (Pusat Penyelidikan Kebombaan), Jabatan Bomba dan Penyelamat Malaysia, UniKL-MFI, pengimport dan pengeksport refrigeran serta pembekal peralatan.

Hari Ozon Sedunia yang diraikan pada 16 September ini bukan hanya dilaksanakan di peringkat Ibu Pejabat, pejabat-pejabat JAS Negeri turut sama menjayakan pelbagai program kesedaran perlindungan lapisan ozon antaranya Kem Kesedaran Perlindungan Lapisan Ozon yang merangkumi sesi ceramah

AWARENESS PROGRAMMES AND CAMPAIGNS

In conjunction with the World Ozone Day Celebration on the 16th September, special announcements with the theme "32 Years and Healing" were made through Department's website and social media in Facebook and Instagram.

The celebration was officiated by YBrs Puan Norlin binti Jaafar, Director General of Environment Malaysia, Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) at Tenera Hotel, Bangi, Selangor on 24th September 2019.

In conjunction with the celebration, DOE collaborated with Malaysia's Chapter Association in Heating, Refrigeration and Air Conditioning (MASHRAE) in organising a seminar entitled 'Cooling Technology In Refrigeration and Air Conditioning (RAC) Sector (Food & Beverages Industry)'. The seminar aims to disseminate and share information mainly to the user and service sector from the Refrigeration and Air Conditioning (RACs) sector on the updated information and emerging technologies particularly in the cold-chain sector. Foreign and local experts shared information and experiences with almost 350 stakeholders comprising of government agencies, manufacturer, contractor and end user from the RAC sector besides university students.

Exhibition on Montreal Protocol's implementation and the alternative to the ozone depleting substances was organized. The exhibition was participated by the stakeholders from industries and government agencies such as DOE, PUSPEK (Pusat Penyelidikan Kebombaan), Fire and Resque Department of Malaysia, UniKL-MFI, refrigerant's importers and exporters as well as equipment supplier.

The World Ozone Day held on September 16th is not only celebrated by the DOE Headquarters, the celebration continues to spread nationwide with the involvement of the DOE State offices by conducting ozone layer protection awareness programmes including Awareness Camps on Ozone Layer Protection

dan perkongsian maklumat berkaitan perlindungan ozon, Sesi Ujian Sistem Penghawa Dingin Kenderaan dan bekerjasama dengan Rakan Alam Sekitar (RAS) melalui program ESTECC Education in Schools.

Programme incorporating talks and sharing information on ozone layer protection, Testing Session on Mobile Air Conditioning System and collaborated with Rakan Alam Sekitar through ESTECC Education programs in Schools.

Pelancaran Gimik Sambutan Hari Ozon Sedunia 2019
Launching of The Gimmick for The World Ozone Day 2019

Pameran Bersempena Dengan Sambutan Hari Ozon Sedunia 2019
Exhibition During World Ozone Day 2019 Celebration

MESYUARAT KE 31 PARTI - PARTI KEPADA PROTOKOL MONTREAL, 4 HINGGA 8 NOVEMBER 2019, ROME, ITALI

Mesyuarat Parti ke-31 Parti-Parti kepada Protokol Montreal telah diadakan di bangunan Food and Agriculture Organisation (FAO), United Nations di Rome, Itali pada 4 November hingga 8 November 2019. Mesyuarat Peringkat Persediaan telah diadakan pada 4 November hingga 6 November 2019 manakala Mesyuarat Peringkat Tertinggi telah diadakan pada 7 November hingga 8 November 2019. Delegasi Malaysia yang diketuai oleh Ketua Pengarah Alam Sekitar Malaysia, Puan Norlin binti Jaafar, turut serta bersama Duta Besar Malaysia di Itali, YBhg. Dato' Abdul Malik Melvin Castelino Anthony, pegawai kanan MESTECC, JAS dan pegawai kedutaan Malaysia di Itali telah menghadiri mesyuarat ini.

THE 31ST MEETING OF PARTIES TO THE MONTREAL PROTOCOL, 4th TO 8th NOVEMBER 2019, ROME, ITALY.

The 31st Meeting of Parties to the Montreal Protocol was held at the Food and Agriculture Organisation (FAO) building, United Nations in Rome, Italy from the 4th November to 8th November 2019. The Preparatory Meeting was held from the 4th November to 6th November 2019 followed by the High Level Segment from the 7th November to 8th November 2019. Malaysian delegates headed by the Director General of Environment Malaysia, Madam Norlin binti Jaafar, together with His Excellency Dato' Abdul Malik Melvin Castelino Anthony, Malaysian ambassador in Italy, senior officials from MESTECC, DOE and Malaysian Embassy in Italy had attended the meeting.

Deligasi Malaysia Yang Menghadiri Mesyuarat Ke-31 Parti-Parti Kepada Kepada Protokol Montreal, 4 hingga 8 November 2019, Rome, Itali
Malaysian Delegates Attended The 31st Meeting of Parties to The Montreal Protocol, 4th to 8th November 2019, Rome, Italy.

PROGRAM PENCEGAHAN KEBAKARAN TANAH GAMBUT

Di bawah program pencegahan kebakaran terbuka tanah gambut bagi mengatasi jerebu telah bermula sejak tahun 2009 di bawah Rancangan Malaysia ke-9. Pengurusan tanah gambut yang lestari adalah sangat penting bagi mencegah berlakunya pembakaran terbuka tanah gambut yang boleh menyebabkan jerebu setempat. Melalui program ini, pembinaan sekatan saliran (check dam) dan telaga tiub (tube well), kolam takungan air (retention pond) dan pemasangan paip saluran air (water pipe) telah dikenalpasti sebagai kaedah pengurusan air di tanah gambut yang berkesan untuk mencegah dan mengawal pembakaran terbuka.

Program ini melibatkan kerjasama erat pelbagai agensi iaitu JAS, Jabatan Pengairan dan Saliran (JPS), Jabatan Mineral dan Geosains (JMG), Jabatan Perhutanan Negeri Selangor, Jabatan Perhutanan Negeri Sabah dan Majlis Bandaraya Miri (MBM). Projek ini telah dilaksanakan di tujuh (7) buah negeri iaitu Johor, Pahang, Selangor, Kelantan, Sarawak, Sabah dan Terengganu. Projek ini merangkumi aktiviti-aktiviti seperti pembinaan sekatan saliran (check dam) berjumlah 339 buah iaitu Pahang (92), Johor (80), Terengganu (51), Sarawak (43), Kelantan (36), Selangor (23) dan Sabah (14). Di samping itu juga, sebanyak 91 buah buah telaga air tanah telah dibina iaitu Sarawak (15), Pahang (16), Johor (14), Kelantan (13), Selangor (15), Sabah (11) dan Terengganu (7). Manakala sebanyak 5 buah menara tinjau telah dibina untuk digunakan bagi pemantauan pembakaran terbuka pada musim panas dan kering iaitu masing-masing di Selangor, Pahang, Sarawak dan Sabah. Selain daripada itu adalah pembinaan dua (2) buah kolam takungan di Hutan Simpan Kuala Langat Selatan, Kuala Langat.

Bagi tahun 2019, sebanyak 23 buah sekatan saliran dibina di Pahang (9), Sarawak (6), Terengganu (5), Sabah (2) dan Kelantan (1). Untuk telaga tiub, sebanyak 6 buah telaga telah dibina di Selangor (2), Sabah (2), Terengganu (1) dan Pahang (1) dan 2 kolam takungan di Selangor telah dibina merangkumi peruntukan sebanyak RM5,010,000.00.

PEATLAND FIRE PREVENTION PROGRAM

Sustainable management of peatlands is very important to prevent burning or fire on peatlands which can cause localized haze. Construction of canal blocks (check dams), tube wells, retention pond and water pipe has been identified as effective methods for water management in peatlands to prevent and control open burning.

The program involves various agencies, which are DOE, Department of Irrigation and Drainage (DID), Minerals and Geoscience Department (MGD), Selangor Forestry Department, Sabah Forestry Department and Miri City Council (MCC). The project has been implemented in seven (7) states which include Johor, Pahang, Selangor, Kelantan, Sarawak, Sabah and Terengganu. The project includes construction of 339 check dams namely Pahang (92), Johor (80), Terengganu (51), Sarawak (43), Kelantan (36), Selangor (23) and Sabah (14). In addition, a total of 91 tube wells were constructed namely Sarawak (15), Pahang (16), Johor (14), Kelantan (13), Selangor (15), Sabah (11) and Terengganu (7). A total of 5 watch towers were also constructed to monitor open burning especially during the dry season namely Selangor, Pahang, Sarawak and Sabah. Apart from that were the construction of two (2) retention pools in South Kuala Langan Forest Reserve, Kuala Langat

In 2019, a total of RM5,010,000.00 was spent for the program last year to construct 23 check dams in Pahang (9), Sarawak (6), Terengganu (5), Sabah (2) and Kelantan (1). For tube well, 6 wells were constructed in Selangor (2), Sabah (2), Terengganu (2) and Pahang (1) and 2 retention ponds were constructed in Selangor.

Sekatan Saliran di Penur, Pahang
Check Dam in Penur, Pahang

Paip Saluran Air di Hutan Simpan Raja Musa, Kuala Selangor, Selangor bagi Meningkatkan Paras Air Tanah Gambut
Water Pipeline in Raja Musa Forest Reserve, Bestari Jaya, Selangor to Raise Peat Land Water Level

Telaga Tiub di Beris Lalang, Bachok, Kelantan
Tube Well in Beris Lalang, Bachok, Kelantan

Menara tinjau di Hutan Simpan Klias, Beaufort, Sabah
Watch tower in Klias Forest Reserve, Beaufort, Sabah

Kombinasi Menara Tinjau, Telaga Air Tanah, Sekatan Saliran dan Papan Tanda Larangan Pembakaran Terbuka di Kuala Langat, Selangor
Combination of Tube Well. Check Dam, Watch Tower and Open Burning Prohibited Sign at Kuala Langat, Selangor

PENGURUSAN BUANGAN TERJADUAL
SCHEDULED WASTE MANAGEMENT

Lesen Premis Yang Ditetapkan

Sejumlah 721 lesen dikeluarkan kepada kemudahan baru dan sediada pada tahun 2019 yang terdiri daripada 191 kemudahan pemerolehan kembali luar tapak bukan e-waste, 11 kemudahan pemerolehan kembali penuh luar tapak bagi e-waste, 89 kemudahan pemerolehan kembali separa luar tapak bagi e-waste, 23 kemudahan penunu buangan terjadual, enam (6) kemudahan pengolahan luar tapak, enam (6) kemudahan tapak pelupusan selamat dan 49 kemudahan penstoran luar tapak. Sejumlah 338 lesen dikeluarkan kepada pembawa yang ditetapkan **(Jadual 4.24).**

Licences for Prescribed Premises

A total number of 721 licenses were issued for both existing and new facilities in 2019 which consists of 191 licenses for off-site recovery (non e-waste), 11 licenses for off-site full recovery plants (e-waste), 89 licenses for off-site partial recovery plants (e-waste), 23 licenses for scheduled wastes incinerators, 1 license for land treatment, six (6) licenses for off-site treatment, six (6) licenses for secure landfills and 49 licenses for off-site storage facilities. A total of 338 licenses were issued for prescribed conveyance **(Table 4.24).**

Jadual 4.24: Lesen-Lesen yang Dikeluarkan bagi Kemudahan Pemerolehan Kembali, Pengolahan & Pelupusan Buangan Terjadual yang Diluluskan oleh JAS, 2019

Table 4.24: Licenses Issued for Recovery Facilities Processing Hazardous Waste Disposal Approved by the DOE, 2019

JUMLAH LESEN DIKELUARKAN MENGIKUT NEGERI / NUMBER OF LICENSE PRODUCED																	
BIL/ NO	KEMUDAHAN / FACILITIES	JHR	KDH	KLN	MLK	N.S	PHG	PRK	PRS	PP	SBH	SRK	SLG	TRG	WP (KL)	WP (LAB)	JUMLAH / TOTAL
1	Pembawa Yang Ditetapkan/ Prescribed Conveyance	63	23	3	22	22	6	26	1	43	9	24	79	6	6	5	338
	Penstoran Luar Tapak/ Off- Site Storage	5	1	1	3	2	1	1	0	0	6	21	2	0	0	6	49
2	Pemerolehan Kembali Luar Tapak/ Off Site Recovery																
	a. Pemerolehan Kembali Luar Tapak (bukan e-Waste) / Off Site Recovery (Non e-waste)	37	13	0	11	19	8	22	1	22	2	4	54	4	0	2	191
	b. Pemerolehan Kembali Luar Tapak (penuh e-Waste)/ Off Site Recovery (Full e-Waste)	1	0	0	0	2	0	0	0	6	0	0	2	0	0	0	11
	c. Pemerolehan Kembali Luar Tapak (separa e-Waste)/ Off Site Recovery (Partial e-Waste)	17	9	2	9	3	0	1	0	16	1	3	20	2	6	0	89
3	Penunu Buangan Terjadual/ Scheduled Waste Incinerator	6	0	0	0	2	1	6	0	0	2	2	2	2	0	0	23
4	Pengolahan Di Tanah/ Land Treatment Facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Pengolahan Luar Tapak/ Off-Site Treatment Facilities	1	0	0	1	0	0	2	0	0	0	0	1	0	0	1	6
6	Tapak Pelupusan Selamat / Secure Landfill	1	1	0	0	1	1	0	0	0	0	1	0	1	0	0	6
	Bil. Lesen / No. of Licenses	131	47	6	46	51	17	58	2	87	20	55	160	15	12	14	721
	Bil. Premis/ No. of Premises	68	24	3	24	29	11	32	1	44	11	31	81	9	6	9	383

PERLAKSANAAN KONVENSYEN BASEL DI MALAYSIA
IMPLEMENTATION OF BASEL CONVENTION IN MALAYSIA

The Conference of Parties (COPs) telah ditubuhkan berdasarkan Artikel 15 Konvensyen Basel. COPs merupakan badan yang mentadbir Konvensyen Basel dan terdiri dari kerajaan bagi negara-negara yang telah menerima, mengesahkan atau menyetujui konvensyen tersebut. Fungsi COPs adalah:-

i. Untuk mengkaji dan menilai pelaksanaan konvensyen;

ii. Untuk mempertimbang dan meluluskan, sebagaimana diperlukan, pindaan pada konvensyen dan lampirannya;

iii. Mempromosikan penyelarasan dasar, strategi dan langkah-langkah yang sesuai untuk meminimumkan bahaya kepada kesihatan manusia dan alam sekitar dengan sisa berbahaya; dan

iv. Meluluskan program kerja dan budget Konvensyen untuk setiap dua tahun.

Pada tahun 2019 persidangan COPs Konvensyen Basel kali ke-14 (COPs 14) telah diadakan pada 29 April 2019 hingga 11 Mei 2019 di Geneva Switzerland. Tema persidangan kali ini adalah Clean Planet, Healthy People: Sound Management of Chemicals and Waste.

Persidangan ini telah dihadiri oleh lebih daripada 200 pakar pengurusan buangan berbahaya di peringkat antarabangsa. Persidangan ini telah meluluskan keputusan yang bertujuan untuk memperkasakan pelaksanaan perjanjian global berkaitan pengurusan dan pergerakkan merentasi sempadan buangan berbahaya. Sebanyak 29 keputusan telah diluluskan semasa persidangan COPs 14 yang merangkumi pelbagai bidang, termasuklah: -

i) Pindaan pada lampiran Konvensyen Basel untuk memasukkan sampah plastik, penubuhan perkongsian mengenai Sisa Plastik;

ii) Kelulusan interim Technical Guidelines on Transboundary Movements of Electrical and Electronic Waste and Used Electrical and Electronic Equipment, terutama perbezaan di antara buangan dan bukan buangan di bawah Konvensyen Basel; dan

The Conference of Parties (COP), was established pursuant to Article 15 of the Basel Convention. It is the governing body of the Basel Convention which comprises the governments of countries that have accepted, ratified, or acceded to the Convention. The functions of the COP are: -

i. To review and evaluate the implementation of the convention;

ii. To consider and adopt, as required, amendments to the convention and its annexes;

iii. To promote the harmonisation of appropriate policies, strategies, and measures for minimising harm to human health and the environment caused by hazardous wastes and other wastes; and

iv. To adopt the program of work and budget of the Convention for each biennium.

In 2019,The 14th meeting of the COP during the Basel Convention (COPs 14) was held from 29th April 2019 to 11th May 2019 in Geneva, Switzerland. The theme of the meeting was 'Clean Planet, Healthy People: Sound Management of Chemicals and Waste'.

The conference was attended by more than 200 international experts on hazardous waste management. The conference adopted decisions aimed at strengthening the implementation of the global treaty governing hazardous wastes. The COP-14 adopted 29 decisions in various areas which include:

i) Amendments to the annexes to the Basel Convention, to include plastic waste and the establishment of a Partnership on Plastic Waste;

ii) The interim adoption of technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention; and

iii) Kelulusan lima set panduan teknikal dan dokumen panduan untuk pengurusan buangan berbahaya yang mesra alam yang dibangunkan oleh oleh pakar dan badan subsidiari untuk konvensyen.

Malaysia telah menyatakan pendirian tegasnya mengenai isu pengimportan sampah plastik yang dihadapi oleh Malaysia dan menyokong cadangan mengenai mekanisme untuk mengawal pergerakan sampah plastik di bawah Konvensyen Basel menggunakan prosedur Persetujuan yang Dimaklumkan Sebelumnya (PIC).

Malaysia juga telah menyatakan pendiriannya semasa sesi Group Contact for Plastics (Annexes Amendments and Partnership) mengenai perlunya menetapkan garis panduan teknikal mengenai sampah plastik yang dikategorikan sebagai Y48 sebagai panduan bagi pihak-pihak untuk membezakan antara Y48 (Lampiran II) dan sampah plastik yang dikategorikan sebagai B3010 (Lampiran IX).

iii) Approval of five further sets of technical guidelines and guidance documents for environmentally-sound management of hazardous waste developed by subsidiaries and expert bodies to the convention.

During the conference, Malaysia stated its firm stand on the issue of importation of plastic waste faced by our country. Malaysia also supported the proposed mechanism to control the movement of plastic waste under the Basel Convention using the Prior Informed Consent (PIC) procedure.

During the Contact Group for Plastics (Annexes Amendments and Partnership) session, Malaysia also made known our stand on the need to establish technical guidelines for plastic waste categorised as Y48, to be used as a guide for Parties to differentiate between Y48 (Annex II) and plastic waste categorised as B3010 (Annex IX).

Persidangan COPs14 Sedang Berlangsung pada 29 April 2019 hingga 11 Mei 2019 di Geneva, Switzerland
The COPs14 Conference is Taking Place from 29th April 2019 to 11th May 2019 in Geneva, Switzerland

Sesi Contact Group for Plastics semasa Persidangan COPs14 pada 29 April 2019 hingga 11 Mei 2019 di Geneva, Switzerland
Contact Group for Plastic Session during the COPs14 Conference from 29th April 2019 to 11th May 2019 in Geneva, Switzerland

PELUPUSAN HARAM BUANGAN TERJADUAL
ILLEGAL DUMPING OF SCHEDULED WASTES

Sejumlah 9 kes pelupusan haram buangan terjadual telah direkodkan di seluruh Malaysia pada tahun 2019. Antara insiden yang memberi impak yang besar adalah insiden Sungai Kim-Kim di Pasir Gudang, Johor yang berlaku pada 7 Mac 2020 hingga 20 Mac 2020. Siasatan mendapati kejadian berpunca dari tindakbalas sisa-sisa kimia yang dilupuskan ke dalam Sungai Kim-Kim oleh pihak yang tidak bertanggungjawab. Insiden ini telah menjejaskan kesihatan hampir 6,000 penduduk di sekitar Pasir Gudang.

A total of 9 cases of illegal disposal of scheduled wastes were recorded in Malaysia in 2019. Among the incidents that have had a major impact was the Sungai Kim-Kim incident in Pasir Gudang, Johor which occurred from 7th March 2020 until 20th March 2020. Investigations on the case revealed that the incident was caused by the reaction of chemical wastes (categorised as scheduled wastes) dumped illegally in Sungai Kim-Kim by irresponsible parties. The incident had affected the health of almost 6,000 residents around Pasir Gudang.

Kes simptom pertama telah dilaporkan pada 7 Mac 2019 selepas beberapa pelajar dan pekerja kantin dari dua sekolah yang terletak berhampiran sungai berkenaan mula jatuh sakit dan mengadu sukar bernafas. Sehingga 14 Mac 2020, seramai 2,775 orang awam telah menerima rawatan di hospital dan 111 sekolah telah ditutup.

The first cases of symptoms were reported on 7th March 2019 after several students and canteen workers from two schools located near the river began to fall ill and had breathing difficulties. As of 14th March 2020, a total of 2,775 members of the public had received hospital treatment and 111 schools were closed down.

Lokasi Kejadian Insiden Sungai Kim-Kim
Location of Sungai Kim-Kim Incident

JAS Johor telah menjalankan siasatan dan persampelan di lokasi kejadian pada hari pertama kes dilaporkan iaitu pada 7 Mac 2020.

The Johor State DOE conducted their investigations and sampling at the site when the first case of symptoms was reported on 7th March 2020.

Lokasi Persampelan
Sampling Location

Persampelan sedang dibuat oleh Pegawai JAS Johor
Sampling by Johore DOE

Keputusan analisis ke atas sampel yang diambil oleh JAS dari Sungai Kim-Kim menunjukkan sisa kimia yang terdapat dalam Sungai Kim-Kim mengandungi pelarut organik benzene, toluene, xylene, ethyl benzene dan D-Limonene.

Analysis on the samples taken by the Johor DOE from Sungai Kim-Kim showed that the chemical residues found in the river contained the organic solvents benzene, toluene, xylene, ethyl benzene, and D-Limonenthe.

Jawatankuasa Bencana Negeri telah diaktifkan untuk kerja-kerja pembersihan dan kawalan pencemaran dijalankan di kawasan yang terkesan di Sungai Kim-Kim. Sebanyak RM6.4 juta telah memperuntukkan oleh Kerajaan Johor untuk kerja-kerja pembersihan di sepanjang 1.5km Sungai Kim-Kim serta pemasangan boom di kawasan yang terlibat bagi membendung pencemaran. Kerja-kerja pembersihan telah berjaya dilaksanakan oleh kontraktor yang dilesenkan oleh JAS. Pada 20 Mac 2020, YB Yeo Bee Yin, Menteri MESTECC telah mengisytiharkan bahawa Sungai Kim-Kim telah bebas dari insiden pencemaran.

The State Disaster Committee was set up to oversee the clean-up works and to implement pollution control measures in the affected areas of Sungai Kim-Kim. About RM6.4 million was allocated for clean-up works along the 1.5kilometre length of Sungai Kim-Kim as well as for the installation of booms for pollution containment. The clean-up work was successfully carried out by a contractor licensed by the DOE. On 20th March 2020, YB Yeo Bee Yin, the Minister of MESTECC, officially declared that Sungai Kim-Kim was free from the pollution incident.

Kerja-Kerja Pemasangan Boom di Sungai Kim-Kim
Boom Installation at Kim-Kim River

Kerja-Kerja Pembersihan dan Pengumpulan Tanah Tercemar sedang Dilakukan
Cleaning of the Scheduled Waste/ Contaminated Land in Progress

Hasil siasatan JAS Johor mendapati sebuah kilang yang menjalankan aktiviti pyrolysis adalah bertanggungjawab terhadap insiden pencemaran ini. Tiga (3) individu dalam syarikat terbabit telah dituduh di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014 di bawah Akta Kualiti Alam Sekeliling 1974. Perbicaraan masih berlangsung.

Investigations by the Johor DOE found that a factory carrying out pyrolysis activities was responsible for the pollution incident. Three (3) individuals from the company involved were charged under the Environmental Quality (Scheduled Wastes) Regulations 2005 and the Environmental Quality (Clean Air) Regulations 2014 under the Environmental Quality Act 1974. The trial is still ongoing.

PENGGUNAAN SEMULA BUANGAN TERJADUAL MELALUI PEMPROSESAN BERSAMA
RE-UTILIZATION OF SCHEDULED WASTES THROUGH CO-PROCESSING

JAS telah menetapkan halatuju pengurusan buangan terjadual berdasarkan konsep cradle to cradle bagi meningkatkan kadar kitar semula buangan terjadual melalui penekanan terhadap perlaksanaan prinsip 4R (Reduce, Reuse, Recycle, Recovery) dalam sektor industri di negara ini. Pengintegrasian amalan pengeluaran bersih melalui teknologi mesra alam di dalam pengurusan buangan terjadual juga sedang dipromosikan oleh JAS. Salah satu kaedah yang berkesan dalam pengurusan buangan terjadual secara lestari yang sedang dilaksanakan adalah Pemprosesan Bersama.

Perlaksanaan Pemprosesan Bersama di kilang-kilang simen dapat mewujudkan kesan positif terhadap alam sekitar dan komuniti setempat seperti berikut:

i. Merancakkan ekonomi negara dengan mengurangkan kos pengurusan buangan terjadual yang ditanggung oleh pengeluar buangan;

ii. Mengurangkan pelepasan gas karbon dioksida secara tidak langsung dengan penggantian bahan api fosil dengan bahan api alternatif;

iii. Menyumbang kepada Zero Waste Future dengan mengurangkan kuantiti buangan ke tapak pelupusan dan secara tidak langsung mengurangkan kesan pencemaran ke atas tanah dan sumber air serta pelepasan gas rumah hijau;

iv. Mengekalkan sumber semula jadi yang dijadikan sebagai bahan mentah utama dalam industri simen;

v. Suhu operasi di antara 1,450°C sehingga 2,000°C akan memastikan pembakaran lengkap bagi buangan; dan

vi. Mewujudkan konsep Eco Town supaya pengurusan buangan lebih sistematik atau mesra alam serta mengurangkan kes pelupusan haram.

The Department of Environment has set the direction for scheduled waste management based on the concept of 'cradle to cradle'. This is in order to increase the recycling rate of scheduled waste via an emphasis on the implementation of 4R principles (Reduce, Reuse, Recycle, Recovery) in the country's industrial sector. The integration of clean production practices through environmentally friendly technologies in scheduled waste management is also being promoted by the DOE. Among the effective methods to conduct sustainable scheduled waste management is Co-processing.

The implementation of Co-processing in cement plants would bring positive benefits on the environment and the local community as follows:

i. Boosts the national economy by reducing the cost of scheduled waste management borne by waste generators;

ii. Indirectly reduces carbon dioxide emissions by replacing fossil fuels with alternative fuels;

iii. Contributes to a Zero Waste Future by reducing the amount of waste sent to landfills and indirectly reducing the effects of pollution on land and water resources, as well as lowering greenhouse gas emissions;

iv. Preserves natural resources which are currently the main source of raw materials for the cement industry;

v. Operating temperatures between 1,450 °C to 2,000°C will ensure the complete combustion of waste; and

vi. Establishes the concept of Eco Town'so that waste management is carried out in a more systematic or environmentally friendly way, hence reducing the number of cases on illegal disposal..

Justeru, pada tahun 2019, JAS telah mengeluarkan sebanyak 39 kelulusan secara dasar kepada kilang simen untuk menerima buangan terjadual daripada pengeluar buangan dengan kuantiti penggunaan sebanyak 190,976 metrik tan setahun sebagai bahan mentah gantian bagi penghasilan klinker simen, manakala sebanyak 640,800 metrik tan setahun sebagai bahan tambah simen.

In 2019, the Department of Environment has given 39 principle approvals to the cement plant to receive scheduled waste from waste generators with a consumption quantity of 190,976 metric tonnes per year as alternative raw material for the production of cement clinker, whereas a total of 640,800 metric tonnes per year as cement additives.

KENDERAAN BERMOTOR MOTOR VEHICLES

Sehingga akhir tahun 2019, sebanyak 31,214,842 buah kenderaan bermotor telah berdaftar di Malaysia, iaitu pertambahan sebanyak 1,258,317 buah kenderaan (4.20%) berbanding tahun 2018. Pecahan keseluruhan kenderaan bermotor yang berdaftar mengikut jenis kenderaan adalah seperti di **Rajah 4.10**.

As of end 2019, a total of 31,214,842 motor vehicles were registered in Malaysia, an increase of 1,258,317 units (4.20%) compared to 2018. The breakdown of the total registered vehicles according to vehicle types is given in **Figure 4.10**.

Dari sejumlah 1,258,317 buah kenderaan baru yang didaftarkan dalam tahun 2019, kategori motosikal merupakan yang tertinggi iaitu 596,112 unit (47.25%) diikuti kereta 528,203 unit (41.86%), manakala 134,002 unit (10.89%) adalah dari lain-lain jenis kenderaan termasuk lori, bas, van dan sebagainya.

Out of 1,258,317 new vehicles registered in 2019, motorcycles made up the highest number with 596,112 units (47.25%) followed by motorcars 528,203 units (41.86%), and the remaining 134,002 units (10.89%) were from the other vehicle types such as lorries, buses, vans and others.

Taburan bilangan kenderaan bermotor di Malaysia mengikut negeri adalah seperti di **Rajah 4.11**. Wilayah Persekutuan Kuala Lumpur mendahului negeri-negeri lain dengan mempunyai bilangan kenderaan yang tertinggi iaitu 6,677,481 unit (atau 21.39%) daripada keseluruhan bilangan kenderaan yang berdaftar di negara ini, diikuti oleh Johor, Selangor, P. Pinang dan Perak.

The distribution of registered vehicles throughout the states is given in **Figure 4.11**. The Federal Territory of Kuala Lumpur recorded the highest number of vehicles registered, with 6,677,481 units (or 21.39%) and followed by Johor, Selangor, P. Pinang and Perak.

KAWALAN PELEPASAN ASAP DAN GAS DARI KENDERAAN BERMOTOR

Pelepasan asap serta gas-gas pencemar seperti karbon monoksida (CO), hidrokarbon (HC), oksida-oksida nitrogen (NOx) serta partikulat (PM) yang dilepaskan melalui ekzos kenderaan bermotor adalah dikawal di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Diesel) 1996 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Petrol) 1996.

CONTROL OF SMOKE AND GASEOUS EMISSIONS FROM MOTOR VEHICLES

Emission of smoke and gaseous pollutants such as carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO_x) and particulate matters (PM) emitted from motor vehicle exhausts are controlled under the Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996 and the Environmental Quality (Control of Emission from Petrol Engines) Regulations 1996.

KAWALAN PELEPASAN ASAP HITAM DARIPADA KENDERAAN DIESEL

Kawalan pelepasan asap hitam berlebihan daripada ekzos kenderaan diesel dipantau melalui operasi statik secara bersepadu dengan agensi penguatkuasa lain (JPJ dan Trafik Polis-PDRM), operasi pemerhatian melalui video kamera dan Program AWASI. Melalui program ini, skuad peronda JAS akan menjalankan penguatkuasaan, rondaan, pemerhatian pelepasan asap hitam dari ekzos kenderaan dan memberhentikan kenderaan untuk menjalankan ujian asap ke atas kenderaan-kenderaan diesel yang diperhatikan mengeluarkan asap hitam berlebihan.

Tindakan kompaun akan diambil serta merta kepada pemandu dan tuan punya kenderaan yang didapati gagal mematuhi had pelepasan asap 50% kelegapan. Kompaun serta perintah larangan (larangan mengunakan kenderaan) akan dikeluarkan sekiranya kenderaan didapati melepaskan asap melebihi 70% kelegapan.

Pada tahun 2019, sebanyak 4,282 program penguatkuasaan telah dilaksanakan di bandar-bandar di seluruh negara. Sejumlah 419,942 buah kenderaan diesel telah diperiksa secara visual. Dari jumlah tersebut, sebanyak 419 buah kenderaan telah dikompaun kerana gagal mematuhi had pelepasan asap hitam sebanyak 50% kelegapan. Manakala 179 kenderaan telah dikenakan perintah larangan beroperasi sehingga lulus ujian asap semula oleh JAS. Pada keseluruhannya, peratus pematuhan oleh kenderaan diesel adalah 98.61%. Ini adalah penurunan sebanyak 0.28% berbanding dengan tahun 2018.

Bilangan kenderaan diesel yang dikompaun dan peratus pematuhannya mengikut jenis kenderaan adalah seperti di **Rajah 4.12**. **Rajah 4.13** pula menunjukkan bilangan kenderaan dikompaun, pengeluaran perintah larangan serta peratus pematuhan mengikut negeri. Tindakan mahkamah telah juga diambil ke atas 14 pemandu serta pemilik kenderaan kerana gagal menjelaskan kompaun yang telah dikenakan. Sejumlah 2,009 kenderaan diesel juga telah diarahkan untuk menjalankan ujian semula di PUSPAKOM.

TROL OF BLACK SMOKE EMISSION FROM DIESEL VEHICLES

The control of excessive black smoke emission emitted from diesel vehicle exhausts is monitored through the curbside operation with others enforcement agencies (RTD dan Police Traffic PDRM), camera video surveillance and the AWASI (Area Watch And Sanction Inspection) Programme. Through this programme the DOE's mobile squad would enforce, patrol the streets, observing, stop and testing diesel vehicles belching excessive smoke.

Compounds were issued on-the-spot to the drivers and owners if their vehicles fail to comply with the stipulated smoke limit of 50% opacity. A prohibition order (prohibiting vehicle use) will be issued if the smoke limit exceeds 70% opacity.

In 2019, a total of 4,282 enforcement programmes were conducted in the cities throughout the country. A total of 419,942 diesel vehicles were visually inspected. Out of these, 419 vehicles were compounded for failing to comply with the 50% opacity smoke limit while 179 vehicles issued with the prohibition order until passed or undergo smoke retest by the DOE. Generally, the percentage of compliance of diesel vehicles was 98.61%. This is a decrease of 0.28% compared to 2018.

The number of diesel vehicles summoned and their percentage of compliance according to vehicle types is given in **Figure 4.12**. **Figure 4.13** shows the number of vehicles compounded, number of prohibition orders issued and the percentage of compliance according to the states. Court actions were also taken against 14 drivers and vehicle owners for failing to settle the compounds issued. A total of 2,009 diesel vehicles were instructed to undergo smoke retest at PUSPAKOM.

Kawalan Pelepasan Gas CO dan HC Dari Kenderaan Petrol

Sepanjang tahun 2019 sejumlah 562 buah kenderaan berenjin petrol telah diuji pelepasan CO dan HC dengan menggunakan meter gas CO-HC Analyzer melalui kaedah ujian idling di jalan raya. Dari jumlah ini, sebanyak 31 buah kenderaan telah dikompaun kerana gagal mematuhi had pelepasan yang ditetapkan. Peratus pematuhan keseluruhannya adalah 94.48% iaitu penurunan sebanyak 5.11% berbanding dengan tahun 2018. Surat amaran juga telah dikeluarkan kepada pemandu-pemandu kenderaan yang gagal mematuhi had-had pelepasan CO dan HC supaya segera menyelenggara kenderaan bagi memastikan kenderaan sentiasa mematuhi had pelepasan yang ditetapkan oleh undang-undang.

Control of CO and HC Gas Emissions from Petrol Vehicles

Throughout 2019, a total of 562 petrol engine vehicles were inspected using the CO-HC gas analyzer via the idling test method conducted at the road side. From the total vehicle inspected, 31 vehicles were compounded for failing to comply with the stipulated CO and HC limits. The overall percentage of compliance is 94.48% i.e. an decrease of 5.11% compared to 2018. Warning letters were also issued to drivers for immediate servicing of their vehicles to ensure compliance with the emission limits stipulated in the law.

UJIAN KELULUSAN JENIS (KENDERAAN PETROL)

Malaysia telah memperkenalkan standard pelepasan pencemar untuk model baru kenderaan yang menggunakan petrol dengan tujuan memperbaiki pelepasan pencemar menggunakan rekabentuk enjin baru dan teknologi kawalan pelepasan.

Mana-mana model baru kenderaan bermotor pada atau selepas 1 Januari 2000 adalah dikehendaki mematuhi standard pelepasan pencemar yang ditetapkan dalam Jadual Ketiga, Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Petrol), 1996 yang berdasarkan Arahan Majlis 94/12/EEC dan 93/59/EEC. Pada tahun 2019, JAS telah mengeluarkan 43 Sijil Ujian Kelulusan Jenis bagi model baru kenderaan petrol yang akan dipasarkan di Malaysia.

TYPE APPROVAL TEST (PETROL VEHICLE)

Malaysia had established exhaust emission standard for new petrol vehicles in order to improve exhaust emission by utilizing new engine design and emission control technology.

Any new model of motor vehicle that is commissioned on or after 1st January 2000 is required to comply with the emission standards prescribed in the Third Schedule of the Environmental Quality (Control of Emission from Petrol Engines) Regulations, 1996 which is based on the Council Directive 94/12/EEC and 93/59/EEC. In 2019, the DOE has issued 43 Type Approval Test Certificates for new models of petrol vehicles to be marketed in Malaysia.

UJIAN KELULUSAN JENIS (KENDERAAN DIESEL)

Bagi mengawal pelepasan dari kenderaan berenjin diesel di Malaysia, setiap model baru kenderaan bermotor pada atau selepas 1 Januari 1997 adalah dikehendaki mematuhi standard pelepasan pencemar yang ditetapkan dalam Jadual Kedua, Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Pelepasan Daripada Enjin Diesel),1996 yang berdasarkan Peraturan No. 49.02 ECE dan Arahan Majlis 93/59/EEC. Pada tahun 2019, JAS telah mengeluarkan 74 Sijil Ujian Kelulusan Jenis bagi model baru kenderaan diesel yang akan dipasarkan di Malaysia.

TYPE APPROVAL TEST (DIESEL VEHICLE)

To control emissions from diesel vehicles in Malaysia, each new model of motor vehicle on or after January 1, 1997 is required to comply with emission standards prescribed in the Second Schedule, Environmental Quality (Control of Emission from Diesel Engines) Regulations, 1996, which is based on ECE Regulation No.49.02 and Council Directive 93/59/EEC. In 2019, the DOE has issued 74 Certificate of Type Approval Test for the new model diesel vehicles to be marketed in Malaysia.

PENGWUJUDAN KEMUDAHAN YANG DILULUSKAN

Bagi memudahkan orang awam menghantar kenderaan mereka untuk menjalani ujian pelepasan asap dan gas, JAS melalui program Kemudahan Yang Diluluskan (KYDL) telah memberi pengiktirafan kepada bengkel-bengkel kenderaan yang memenuhi kriteria-kriteria yang telah ditetapkan. Kemudahan ini boleh bertindak sebagai pengujian segera dan kenderaan yang tidak mematuhi diperbaiki di pusat-pusat ini supaya memastikan kenderaan sentiasa mematuhi had pelepasan asap.

Sehingga akhir tahun 2019, sejumlah 133 sijil pengiktirafan telah dikeluarkan kepada bengkel serta pusat-pusat pemeriksaan kenderaan di seluruh negara sebagai sebagai Kemudahan Yang Diluluskan oleh JAS.

KAWALAN PELEPASAN GAS PENCEMAR DARIPADA MOTOSIKAL

Mulai 1 Januari 2016 semua model baru motosikal adalah dikehendaki mematuhi standard EURO3 bagi pelepasan gas pencemar daripada motosikal yang berdasarkan European Committee 97/24/EC amendments 2002/51/EC Chapter 5 ANNEX II sec. 2.2.1.1.5. of 19 July 2002 atau World motorcycle emission test cycle "WMTC" under the European Committee ("EC") 2006/72/EC of 18 August 2006. Pematuhan standard EURO3 bagi model sedia ada motosikal dimulakan pada 1 Januari 2017.

Pada tahun 2019, sebanyak 97 Sijil Kelulusan Jenis telah dikeluarkan kepada pembuat, pemasang dan pengimport motosikal untuk pasaran tempatan.

BUNYI BISING KENDERAAN BERMOTOR

Pelepasan bunyi bising daripada kenderaan bermotor dikawal di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Bunyi Bising Kenderaan Bermotor) 1987.

Operasi penguatkuasaan bagi mengawal pelepasan bunyi bising dari motorsikal telah dilaksanakan oleh pejabat-pejabat JAS negeri dengan kerjasama Polis DiRaja Malaysia (Cawangan Trafik). Pada 2019, sejumlah 4,971 buah motosikal telah ditahan bagi menjalani ujian pelepasan bunyi bising. Dari jumlah ini, 76 penunggang motosikal telah dikompaun oleh pihak polis kerana

ESTABLISHMENT OF APPROVED TESTING FACILITIES

To facilitate convenient public access to workshops for smoke and gaseous emission testing, DOE accredited a number of workshops that fulfilled the prescribed criteria as Approved Testing Facilities. These testing facilities could also serve as immediate testing and repair centers for the non-complying vehicles, to ensure they are always in compliance with the emission limits stipulated.

By the end of 2019, a total of 133 certificates of accreditation were issued to the workshops and vehicle testing centers throughout the country as Approved Testing Facilities by DOE.

CONTROL OF EMISSION FROM MOTORCYCLES

From 1st January 2016, all new models of motor motorcycles are required to comply with the standards EURO3 for gaseous emissions from motorcycles by referring to European Committee 97/24/EC amendments 2002/51/EC Chapter 5 ANNEX II sec. 2.2.1.1.5. of 19 July 2002 or World of motorcycle emission test cycle "WMTC" under the European Committee ("EC") 2006/72 / EC of 18 August 2006. Compliance with the EURO3 emission standards for motorcycles existing model has started since 1st January 2017.

In 2019, a total of 97 Type Approval Test Certificates were issued to the manufacturers, assemblers and importers of motorcycles for the domestic market.

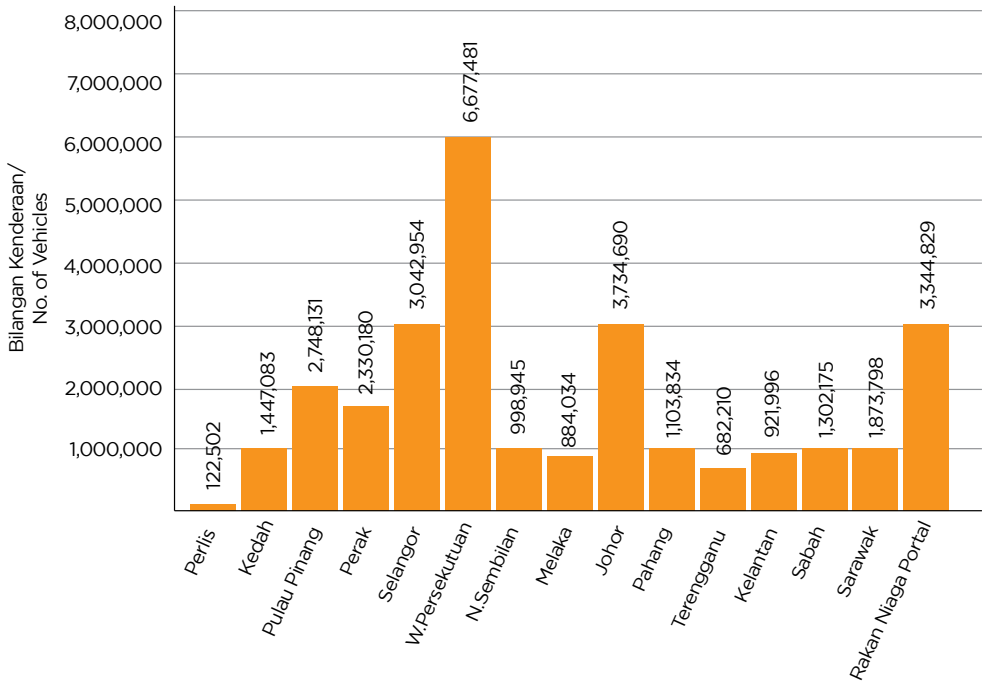
NOISE FROM MOTOR VEHICLES

The emission of noise from motor vehicles is enforced under the Environmental Quality (Motor Vehicle Noise) Regulations 1987.

Enforcement operations to control excessive noise from motorcycles were jointly conducted by the DOE and the Traffic Police. In 2019, a total of 4,971 motorcycles were detained for the noise inspection. Out of this, 76 motorcyclists were summoned for violating the stipulated noise limits. The

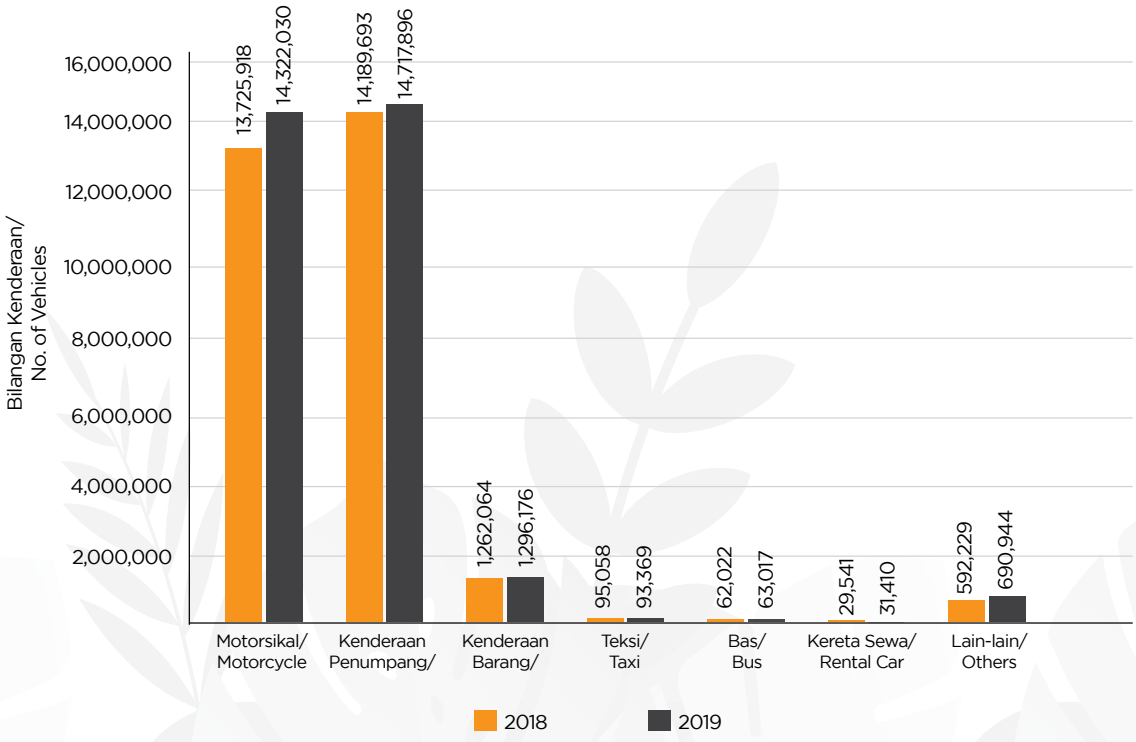
melanggar had bunyi bising yang dibenarkan. Peratus pematuhan secara keseluruhannya ialah 98.74% meningkat 0.35% berbanding pada 2018 **(Rajah 4.13)**.

overall percentage of compliance was 98.74% which was an increase of 0.35% compared to 2018 **(Figure 4.13)**.

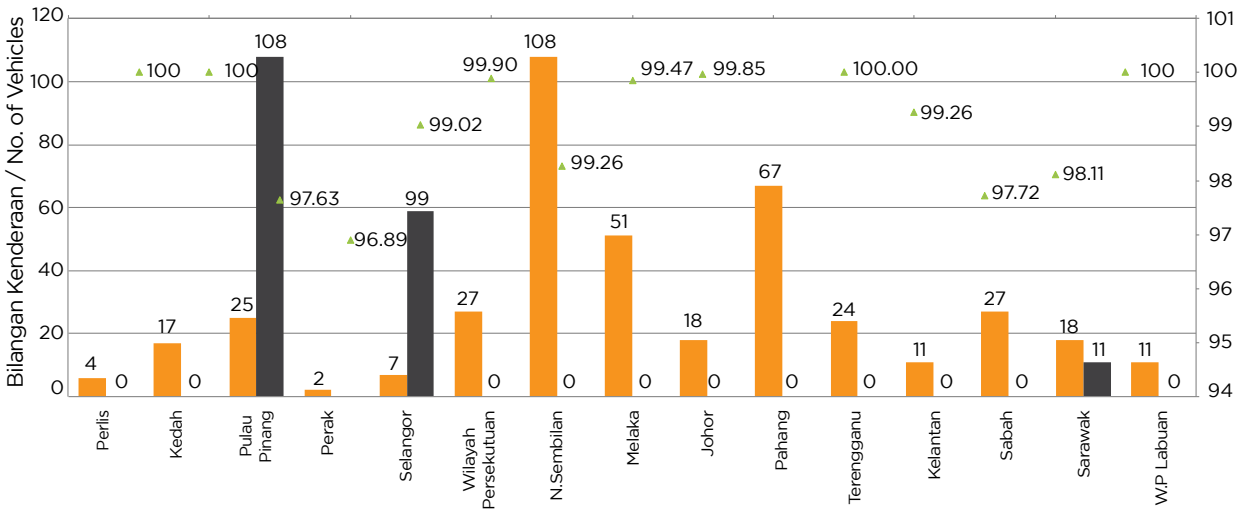


Sumber : Jabatan Pengangkutan Jalan, 2019
Source : Road Transport Department, 2019

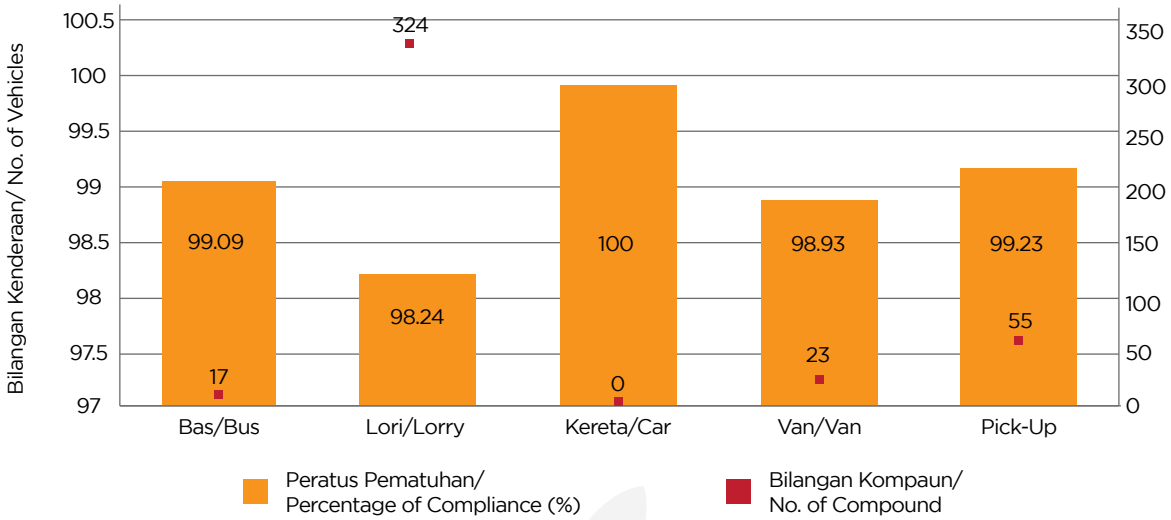
Rajah 4.9 : Bilangan Kenderaan Bermotor Mengikut Negeri, 2019
Figure 4.9 : Number of Vehicles by States, 2019



Rajah 4.10: Bilangan Kenderaan Bermotor Mengikut Jenis, 2019
Figure 4.10: Number of Motor Vehicles by Type, 2019



Rajah 4.11 : Bilangan Kenderaan Bermotor Mengikut Negeri, 2019
Figure 4.11 : Number of Vehicles by States, 2019



Jadual 4.12 : Peratus Pematuhan Mengikut Jenis Kenderaan & Bilangan Kompaun, 2019
Table 4.12 : Percentage of Compliance, According to Type Vehicles & Number of Compound 2019

KAWALAN TERHADAP PREMIS YANG DITETAPKAN
CONTROL OF PRESCRIBED PREMISES

Kilang getah asli mentah dan kilang kelapa sawit mentah dikategorikan sebagai premis yang ditetapkan masing-masing di bawah Perintah Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah) 1978 dan Perintah Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Kelapa Sawit Mentah) 1977. Operasi premis-premis ini adalah tertakluk kepada keperluan Seksyen 18, Akta Kualiti Alam Sekeliling 1974 di mana pemilik premis ini perlu mempunyai lesen daripada JAS bagi menduduki dan atau menggunakan premis.

Raw natural rubber factories and crude palm oil mills are classified as prescribed premises under the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Order 1978 and the Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order 1977 respectively. The operation of these premises are subjected to the requirement of Section 18 of the Environmental Quality Act 1974 whereby the owners of the premises are required to obtain a licence from the DOE for the occupation and or use of the said premises.

Kilang Getah Asli Mentah

Pada tahun 2019 sejumlah 54 buah kilang getah asli mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Getah Asli Mentah), 1978. Daripada jumlah ini, sembilan (9) buah kilang telah dilesenkan bagi melepaskan efluen yang telah diolah ke alur air, tiga (3) kilang telah dilesenkan untuk melepaskan efluen ke atas tanah, manakala 42 buah kilang dibenarkan untuk mengitar semula efluen. Tempoh lesen yang diberikan adalah berbeza bagi setiap premis; kurang dari setahun bagi premis bermasalah dan setahun bagi premis yang tidak bermasalah. **Rajah 4.13** menunjukkan bilangan kilang getah asli mentah mengikut negeri.

Pada tahun 2019 JAS telah menjalankan sejumlah 157 pemeriksaan lapangan ke atas 54 buah kilang getah asli mentah yang telah dilesenkan. Kilang-kilang yang mempunyai rekod pematuhan yang rendah sebelum ini telah diberi keutamaan pemeriksaan. Tindakan susulan pemeriksaan penguatkuasaan yang diambil adalah seperti yang ditunjukkan dalam **Rajah 4.13**.

Sejumlah 30 notis arahan telah dikeluarkan kepada premis-premis tersebut supaya mengambil tindakan pembaikan bagi mematuhi keperluan perundangan. Sejumlah satu (1) kompaun dikeluarkan dan satu premis dibawa ke mahkamah (**Rajah 4.14)**.

Raw Natural Rubber Factories

In 2019 there were 54 raw natural rubber factories licensed under the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations 1978. Out of these, nine (9) factories were licensed to discharge treated effluent into inland watercourse, three (3) was permitted to practice land disposal, while the remaining 42 were allowed to recycle their effluent. The licensing periods of these premises varies; less than one year for problematic premise and one year for nonproblematic premise **Figure 4.13** shows the distribution of raw natural rubber factories according to states.

In 2019, DOE has conducted 157 field inspection to the 54 licensed raw natural rubber factories. The factories with low compliance record were prioritized for inspections. Follow up actions taken as a result of these inspections are as shown in **Figure 4.13**.

A total of 30 notices were issued to the concerned premises to take corrective actions in order to comply with the legal requirements. One (1) compound were issued and one non-compliance case was taken to court (**Figure 4.14**).

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Getah Asli Mentah) 1978

Pada tahun 2019, pencapaian pematuhan keseluruhan kilang getah asli mentah yang tertakluk di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Getah Asli Mentah) 1978 adalah 94.44% bagi pemeriksaan lapangan.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014

Kilang getah asli mentah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014. Pada tahun 2019, pencapaian pematuhan keseluruhan oleh kilang getah asli mentah adalah 100% bagi pemeriksaan lapangan.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005

Pada tahun 2019, pencapaian pematuhan keseluruhan oleh kilang getah asli mentah bagi Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 adalah 100% bagi pemeriksaan lapangan.

Kilang Kelapa Sawit Mentah

Sejumlah 460 buah kilang kelapa sawit mentah telah dilesenkan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan)(Kelapa Sawit Mentah) 1977 pada tahun 2019. Dari 460 buah kilang yang dilesenkan, 316 buah kilang telah dilesenkan bagi melepaskan efluen yang diolah ke dalam alur air, 12 buah kilang melupuskan efluen ke atas tanah, 77 buah kilang melupuskan efluen dengan menggunakan gabungan kaedah alur air dan atas tanah. Selain itu, 6 buah kilang menggunakan kaedah kompos, 48 buah kilang menggunakan gabungan kaedah alur air dan kompos serta satu (1) buah kilang menggunakan gabungan kaedah atas tanah dan kompos. **Rajah 4.15** menunjukkan taburan bilangan kilang kelapa sawit mentah di Malaysia mengikut negeri.

Status Of Compliance With The Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations 1978

In 2019, the overall compliance achieved by the raw natural rubber factories that were subjected to the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations 1978 was 94.44% for field inspection.

Status Of Compliance With The Environmental Quality (Clean Air) Regulations 2014

Raw natural rubber factories are also subjected to the Environmental Quality (Clean Air) Regulations 2014. In 2019, overall compliance achieved by the raw natural rubber factories was 100% for field inspection.

Status Of Compliance With The Environmental Quality (Scheduled Wastes) Regulations 2005

In 2019, overall compliance achieved by the raw natural rubber factories for the Environmental Quality (Scheduled Wastes) Regulations 2005 was 100% for field inspection.

Crude Palm Oil Mills

There were 460 palm oil mills licensed under the Environmental Quality (Prescribed Premises) (Crude Palm Oil Mill) Regulations 1977 in year 2019. From these 460 licensed prescribed premises, 316 were granted permission to discharge treated effluent into inland watercourse, 12 to practice land disposal, 77 to discharge effluent by a combination of into inland watercourse and land disposal. Other than that, 6 to practice composting, 48 to discharge treated effluent using a combination of inland watercourse and composting and one (1) using a combination of land disposal and composting. **Figure 4.15** shows the distribution of palm oil mills in Malaysia according to states.

Pada tahun 2019 JAS menjalankan sejumlah 1,179 pemeriksaan lapangan ke atas 460 buah kilang kelapa sawit mentah yang telah dilesenkan.

In 2019, DOE has conducted 1,179 field inspection on 460 licensed palm oil mills.

Kilang-kilang yang mempunyai rekod pematuhan yang rendah sebelum ini telah diberi keutamaan pemeriksaan. Tindakan susulan pemeriksaan penguatkuasaan yang diambil adalah seperti yang ditunjukkan dalam **Rajah 4.15**.

The factories that previously has a low compliance record were prioritized for inspections. Follow up actions taken as a result of these inspections are as shown in **Figure 4.15**.

Sejumlah 266 notis arahan telah dikeluarkan kepada premis-premis tersebut supaya mematuhi keperluan perundangan. Sebanyak 159 kompaun dikeluarkan bagi kesalahan yang dilakukan. Manakala, sepuluh (10) tindakan mahkamah telah diambil bagi kegagalan mematuhi syarat-syarat lesen.

A total of 266 notices were issued to the mills to comply with the legal requirements. 159 compounds were issued for offences committed, while ten (10) court actions were taken for failure to comply with the licence conditions.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Minyak Kelapa Sawit Mentah) 1977

Pada tahun 2019, pencapaian pematuhan keseluruhan kilang kelapa sawit mentah yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Minyak Kelapa Sawit Mentah) 1977 adalah 94.35% bagi pemeriksaan lapangan.

Status Of Compliance With The Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations 1977

In 2019, the overall compliance achieved by the crude palm oil mills that were subjected under the Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977 was 94.35% for field inspection.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014

Kilang minyak kelapa sawit mentah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014. Pada tahun 2019, pencapaian pematuhan keseluruhan oleh kilang minyak kelapa sawit mentah adalah 99% bagi pemeriksaan lapangan.

Status Of Compliance With The Environmental Quality (Clean Air) Regulations 2014

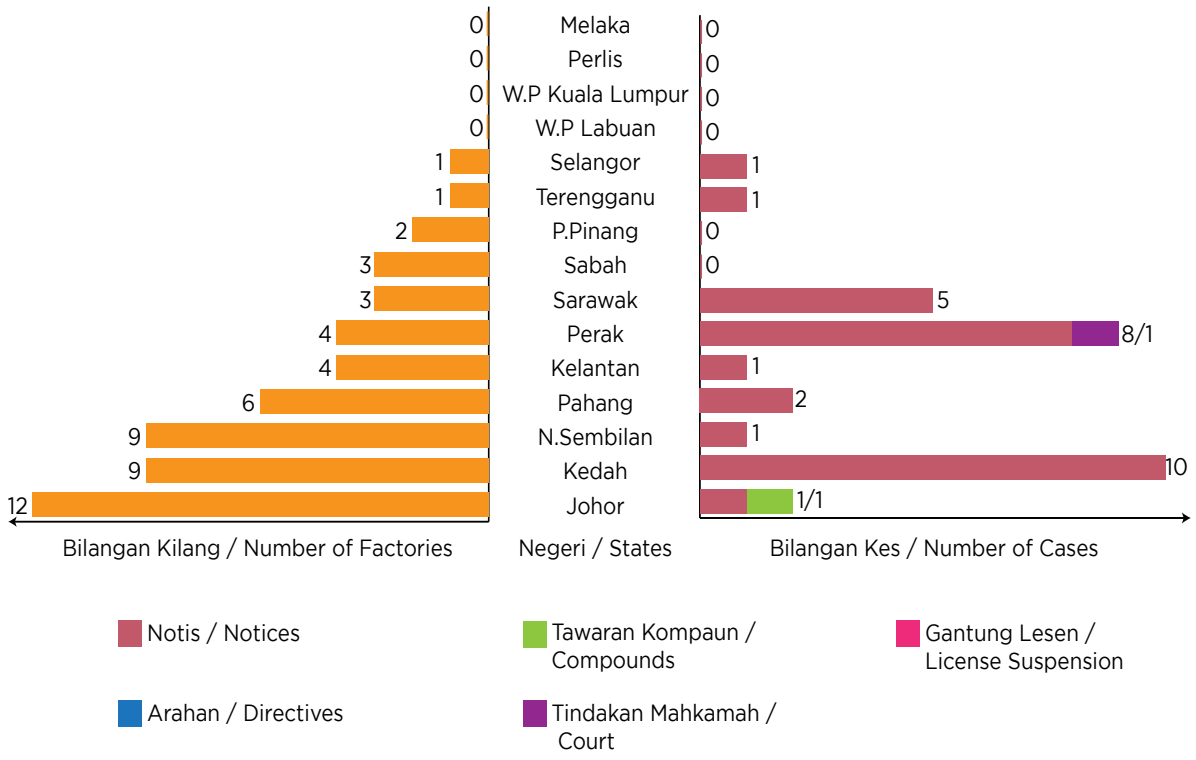
Palm oil mills are also subjected to the Environmental Quality (Clean Air) Regulations 2014. In 2019, the overall compliance achieved palm oil mills was 99% for field inspection.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005

Pada tahun 2019 pencapaian pematuhan keseluruhan kilang minyak kelapa sawit di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 adalah 98.04% bagi pemeriksaan lapangan.

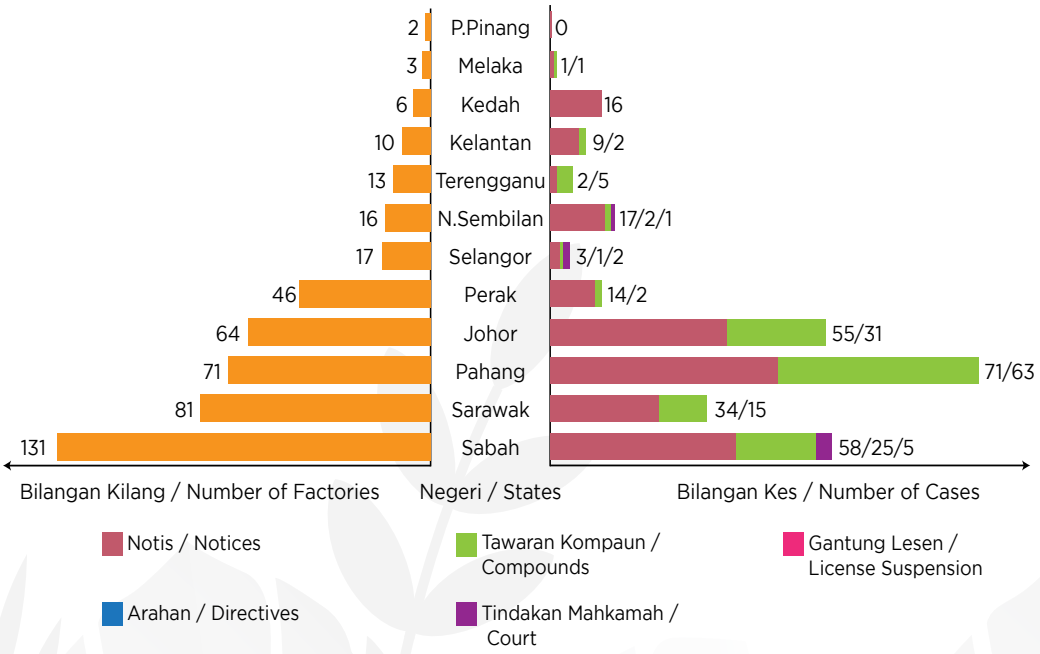
Status Of Compliance With The Environmental Quality (Scheduled Wastes) Regulations 2005

In 2019, the overall compliance achieved by the palm oil mills for Environmental Quality (Scheduled Wastes) Regulations 2005 was was 98.04% for field inspection.



Rajah 4.13: Bilangan Kilang Getah Asli Mentah dan Tindakan Undang-Undang Terhadap Kilang Getah Asli Mentah, 2019

Figure 4.13: Number of Raw Natural Rubber Factories and Legal Actions Against Raw Natural Rubber Factories, 2019



Rajah 4.14: Bilangan Kilang Minyak Kelapa Sawit Mentah dan Tindakan Undang-Undang Terhadap Kilang Minyak Kelapa Sawit Mentah, 2019

Figure 4.14: Number of Crude Palm Oil Mills Factories and Legal Actions Against Crude Palm Oil Mills, 2019

KAWALAN PREMIS YANG BUKAN DITETAPKAN
CONTROL OF NON-PRESCRIBED PREMISES

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009

Premis-premis yang bukan ditetapkan yang melepaskan efluen adalah tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009.

Pada tahun 2019, sejumlah 5,203 pemeriksaan lapangan ke atas 42 kategori industri pembuatan dan lain-lain premis yang bukan ditetapkan yang tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009.

Pendekatan penguatkuasaan yang dilakukan oleh JAS pada tahun 2019 adalah melalui Command and Control (CAC) Self Regulation (SR) melalui pelaksanaan tujuh (7) Environmental Mainstreaming Tools (EMT) yang telah diperkenalkan oleh JAS

Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 95.34% bagi pemeriksaan di lapangan. Terdapat 18 kategori industri mencapai pematuhan 100% pada tahun 2019 **(Rajah 4.15)**.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014

Premis-premis yang bukan ditetapkan adalah tertakluk kepada Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014. Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 98.27%. Terdapat 14 kategori industri mencapai pematuhan 100% pada tahun 2019 **(Rajah 4.16)**.

Status Pematuhan Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005

Premis-premis yang bukan ditetapkan adalah juga tertakluk kepada kawalan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005. Pencapaian pematuhan keseluruhan oleh premis yang bukan ditetapkan adalah 98.82%. Antara kegagalan pematuhan yang direkodkan

Status of Compliance with the Environmental Quality (Industrial Effluents) Regulations 2009

The non-prescribed premises that discharge effluents are subjected to the Environmental Quality (Industrial Effluents) Regulations, 2009.

In 2019, DOE has conducted 5,203 field inspection to 42 categories of manufacturing industry and other non-prescribed premises that were subjected to the Environmental Quality (Industrial Effluents) Regulations, 2009.

The enforcement approach adopted by JAS in 2019 is through Command and Control (CAC) dan Self Regulation (SR) through the implementation of seven (7) Environmental Mainstreaming Tools (EMT) introduced by DOE.

The overall compliance achieved by the non-prescribed premises was 95.34%. There were 18 categories of industries achieved 100% compliance in 2019 (**Figure 4.15**).

Status of Compliance with the Environmental Quality (Clean Air) Regulations 2014

The non-prescribed premises are subjected to the Environmental Quality (Clean Air) Regulations 2014. The overall compliance by the non-prescribed premises was 98.27%. 14 categories of industries have achieved 100% compliance in 2019 **(Figure 4.16)**.

Status of Compliance with the Environmental Quality (Scheduled Wastes) Regulations 2005

The non-prescribed premises are also subjected to the Environmental Quality (Scheduled Wastes) Regulations 2005. The overall compliance achieved by the non-prescribed premises was 98.82%. Among the non-compliances recorded were failure to submit notifications of scheduled wastes

adalah termasuk gagal mengemukakan pemberitahuan mengenai pengeluaran buangan terjadual kepada JAS, buangan terjadual tidak distor dan tidak dilabel dengan sempurna selain gagal menyimpan rekod inventori buangan terjadual dengan tepat dan terkini (Peraturan-Peraturan 3, 8, 9, 10 dan 11).

Pada tahun 2019, terdapat sepuluh (10) kategori industri mencapai pematuhan 100% terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005 **(Rajah 4.17)**.

TINDAKAN PENGUATKUASAAN

Sejumlah 55 kes premis yang tidak patuh telah dituduh di mahkamah dengan RM 8,046,500 denda telah dipungut. Tindakan-tindakan penguatkuasaan lain yang diambil adalah pengeluaran 2,109 notis arahan dan 3,032 kompaun kepada industri supaya mengambil tindakan yang sewajarnya bagi mematuhi Akta Kualiti Alam Sekeliling, 1974 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009, Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014 dan Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005.

Bagi meningkatkan pematuhan kepada peraturan, JAS telah mengeluarkan arahan-arahan kepada industri supaya memasang alat kawalan pencemaran yang sesuai dan efisien, meningkatkan keupayaan kawalan pencemaran yang sedia ada dan juga menyediakan jadual perancangan serta pelaksanaan sistem pengurusan alam sekitar yang baik. Sebagai tambahan, pelbagai aktiviti kesedaran dilaksanakan sepanjang tahun untuk kumpulan sasaran yang spesifik. Aktiviti-aktiviti tersebut termasuklah dialog, seminar dan bengkel untuk industri dengan tujuan untuk meningkatkan tahap pematuhan undang-undang. JAS juga dalam usaha memastikan pematuhan sepenuhnya, mempromosi penggunaan teknologi kawalan yang efisien, amalan pengeluaran bersih serta pematuhan kendiri. Pihak industri juga dinasihatkan untuk mewujudkan sistem pengurusan alam sekitar yang baik dan digalakkan untuk mendapatkan pensijilan ISO 14000.

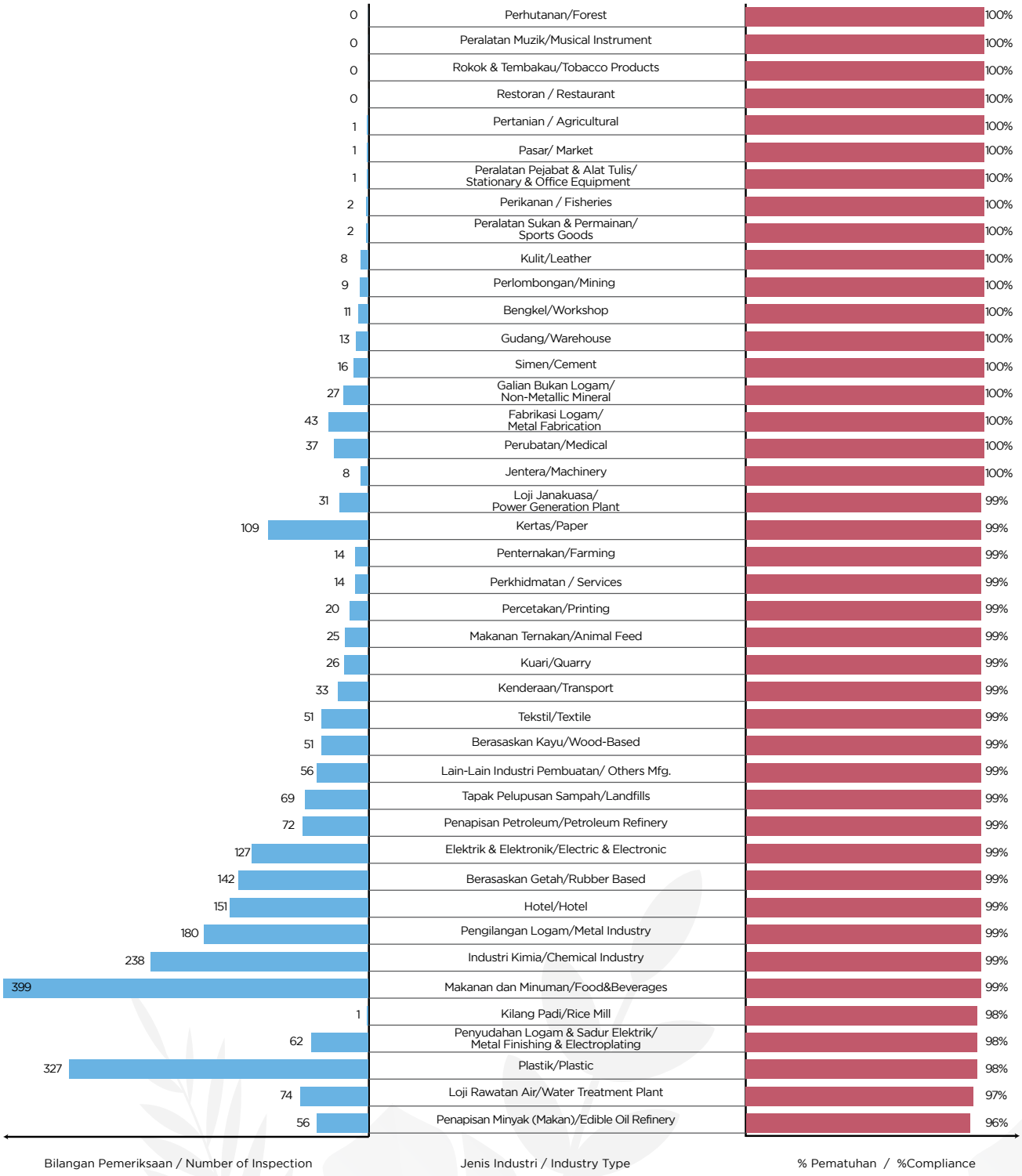
generated to DOE, improper storage and labelling of scheduled wastes and failure to keep accurate and up-to-date inventory records of scheduled wastes (Regulations 3, 8, 9, 10 and 11).

In 2019, ten (10) categories of industries subjected under the Environmental Quality (Scheduled Wastes) Regulations 2005 achieved 100% compliance **(Figure 4.17)**.

ENFORCEMENT ACTIONS

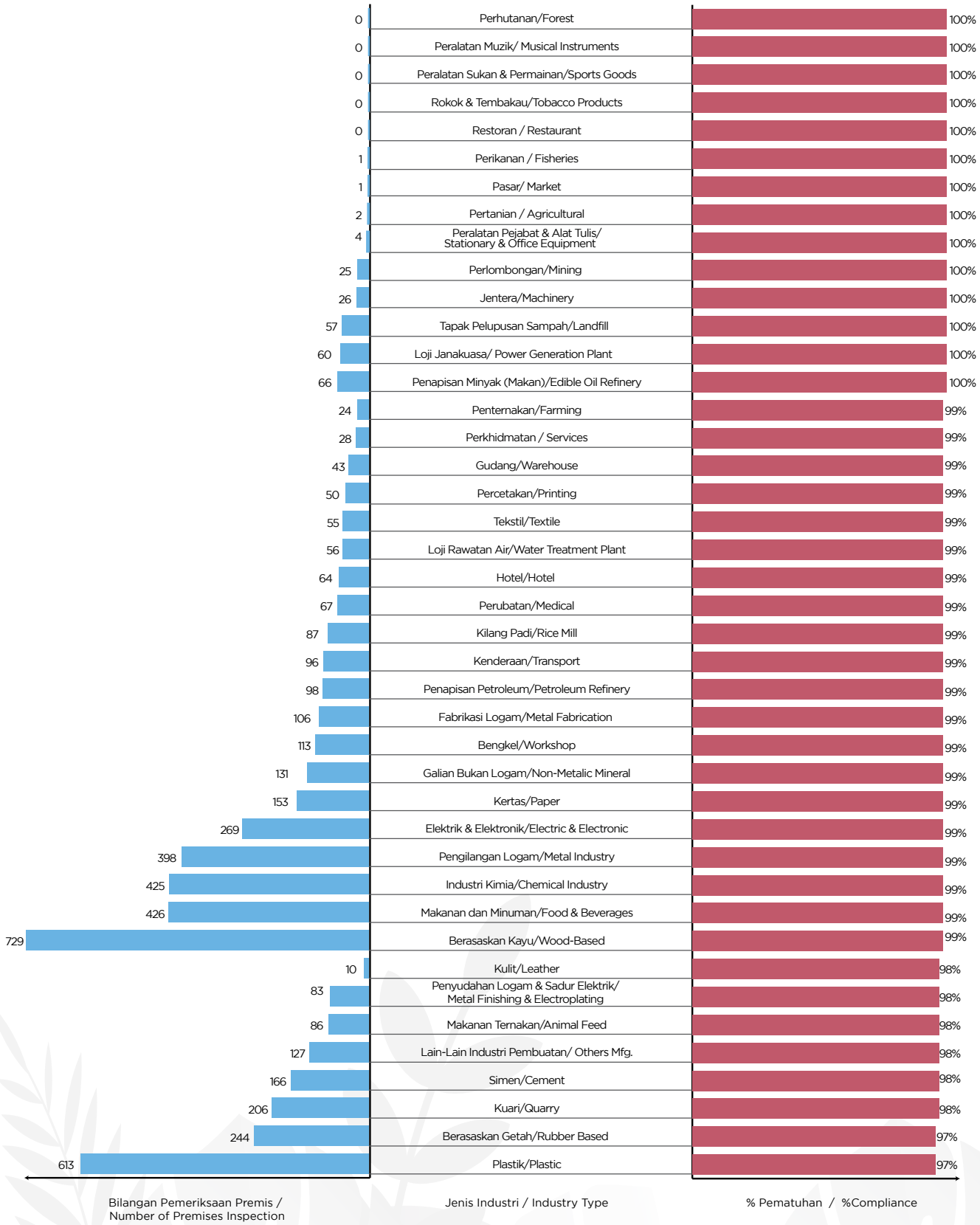
A total of 55 cases of non-compliance premises were charged in courts with a collected fine of RM 8,046,500. Other enforcement actions taken against the non-complying industries were issuance of 2,109 notices and 3,032 compounds to industries for them to take appropriate actions towards complying with the Environmental Quality Act 1974, Environmental Quality (Industrial Effluents) Regulations 2009, Environmental Quality (Clean Air) Regulations 2014 and Environmental Quality (Scheduled Wastes) Regulations 2005.

In order to improve compliance to the regulations, DOE has issued directives to the industries to install suitable and efficient pollution control equipment, upgrade existing pollution control facilities and to have a good planning and implementation schedule of environmental management system. In addition, various awareness activities were conducted throughout the year for specific target groups. Such activities included dialogues, seminars and workshops for industries, aiming to improve the level of regulatory compliance. The DOE in its effort to ensure full compliance also promoted the adoption of more efficient pollution control technologies, cleaner production practices as well as self-regulations. The industries were also advised to set up a good environmental management system and be a ISO 14000 certified.



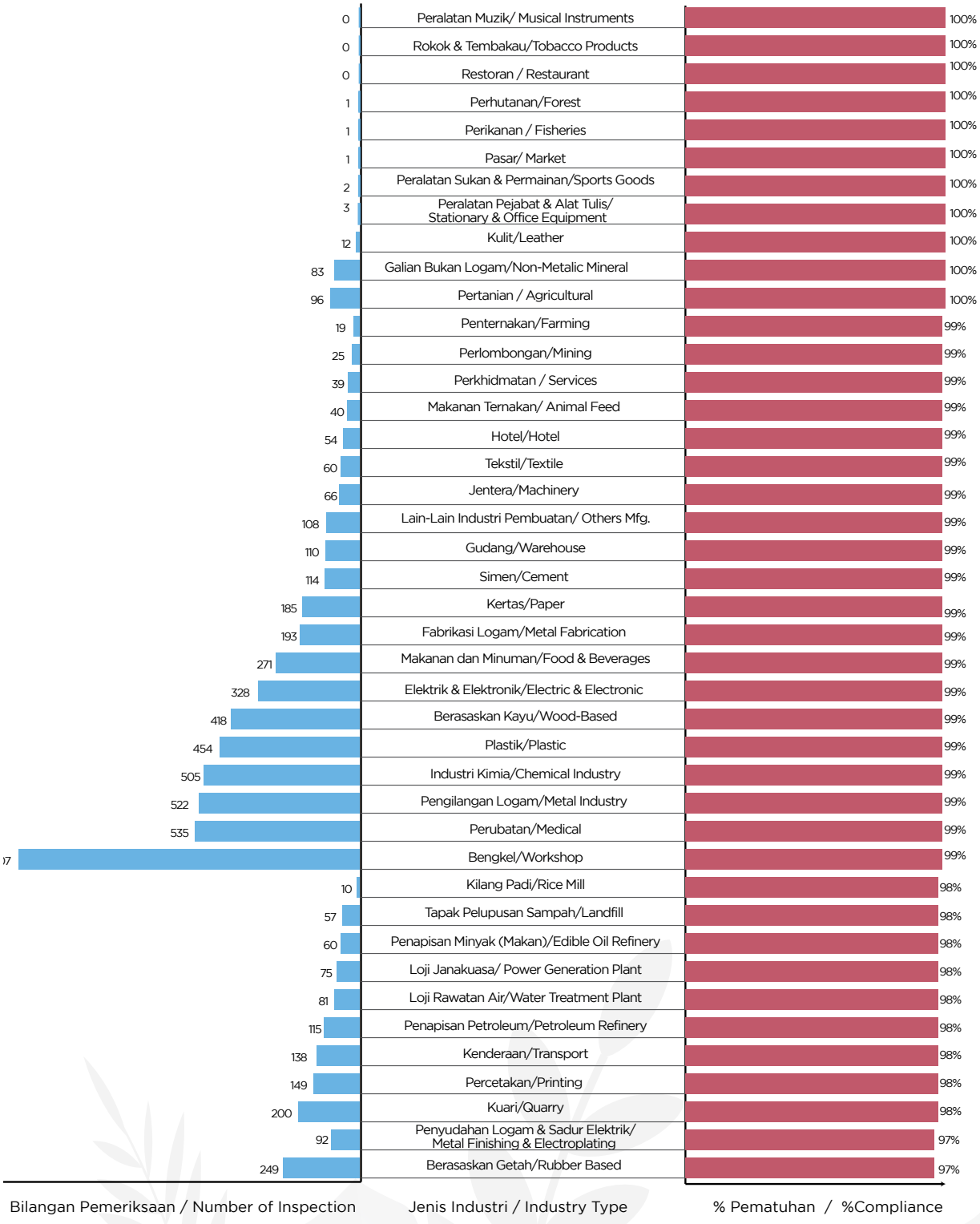
Rajah 4.15: Status Pematuhan Industri Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009, 2019

Figure 4.15: Compliance Status to the Environmental Quality (Industrial Effluent) Regulations 2009, 2019



Rajah 4.16 : Status Pematuhan Industri Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014, 2019

Figure 4.16 : Compliance Status to the Environmental Quality (Clean Air) Regulations 2014, 2019



Rajah 4.17 : Status Pematuhan Industri Terhadap Peraturan-Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005, 2019

Figure 4.17 : Compliance Status to the Environmental Quality (Scheduled Wastes) Regulations 2005, 2019

TINDAKAN UNDANG-UNDANG
LEGAL ACTION

Pendakwaan

Pada tahun 2019, sejumlah 291 kes kesalahan di bawah Akta Kualiti Alam Sekeliling (AKAS) 1974 telah didakwa di mahkamah dengan denda yang dikenakan berjumlah RM 5,253,500 dan denda penjara selama satu (1) hari dikenakan **(Rajah 4.18)**.

Daripada jumlah keseluruhan kes tersebut, sebanyak 52 (17.87%) kes mahkamah adalah melibatkan kesalahan di bawah Seksyen 16(1), Akta Kualiti Alam Sekeliling 1974 dengan jumlah denda sebanyak RM 649,000 Sebanyak 54 (18.56%) kes mahkamah melibatkan kesalahan di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Efluen Perindustrian) 2009 dengan jumlah denda sebanyak RM1,527,000 sementara 185 (63.57%) kes yang selebihnya melibatkan kesalahan-kesalahan lain di bawah AKAS 1974.

Kompaun

Sejumlah 4,247 kompaun telah dikeluarkan sepanjang tahun 2019 kepada premis dan syarikat untuk pelbagai kesalahan di bawah AKAS 1974. Pecahan mengikut kesalahan adalah seperti di **Rajah 4.19**.

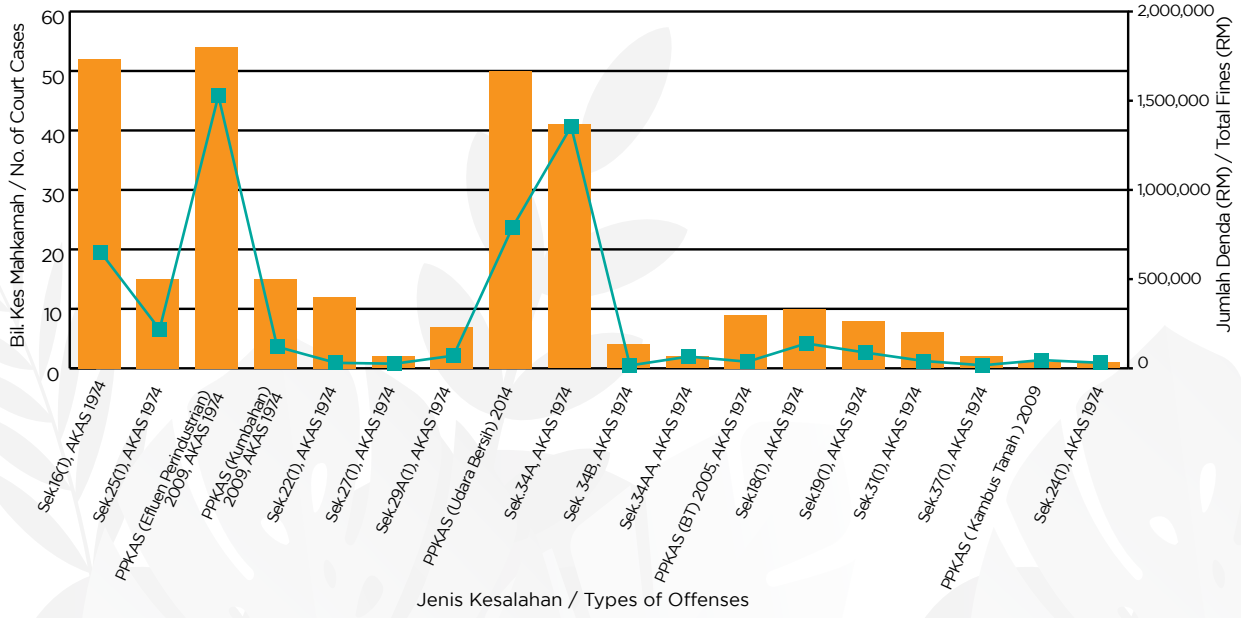
Prosecution

In 2019, a total of 291 offences were prosecuted under the Environmental Quality Act (EQA) 1974 with a total fine of RM 5,253,500 and one (1) day imprisonment **(Figure 4.18)**.

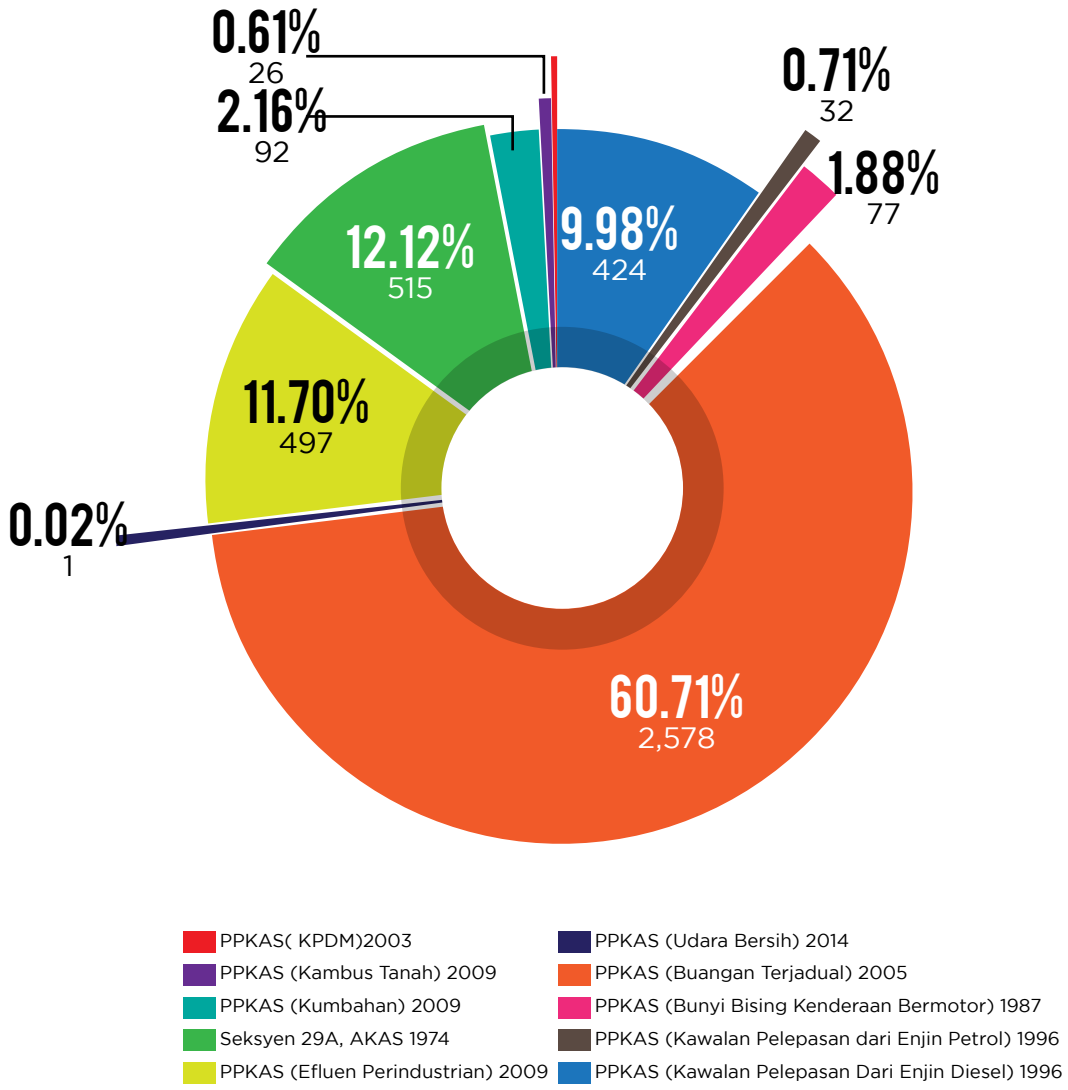
Out of this total, 52 (17.87%) court cases involved offences under Section 16(1), Environmental Quality Act (EQA) 1974 with a total fine of RM649,000. There were 54 (18.56%) court cases involved offences under Environmental Quality (Industrial Effluent) Regulations 2009 with a total fine of RM 1,527.000 while the remaining 185 (63.57%) cases were prosecuted for various other offences under the EQA 1974.

Compounds

A total of 4,247 compounds were issued in 2019 against premises and companies for various offences under the EQA 1974. Breakdown by offences is shown in **Figure 4.19**.



Rajah 4.18: Bilangan Kes Mahkamah dan Denda, 2019
Figure 4.18: Number of Court Cases and Fines, 2019



Rajah 4.19: Bilangan Kes Kompaun Mengikut Pecahan PPKAS, 2019
Rajah 4.19: Number of Compound Cases According to Environmental Quality Regulations, 2019

MAKLUMBALAS TERHADAP PENGADUAN AWAM
RESPONSE TO PUBLIC COMPLAINTS

Pada tahun 2019, sejumlah 11,127 aduan pencemaran alam sekitar telah diterima oleh JAS. 9,753 kes aduan telah diambil tindakan di bawah peruntukan Akta Kualiti Alam Sekeliling (AKAS) 1974 dan peraturan-peraturan di bawahnya oleh pejabat JAS Negeri, manakala 1,374 kes aduan adalah diluar bidangkuasa JAS dan telah dirujuk kepada agensi lain yang berkaitan untuk diambil tindakan **(Rajah 4.20)**.

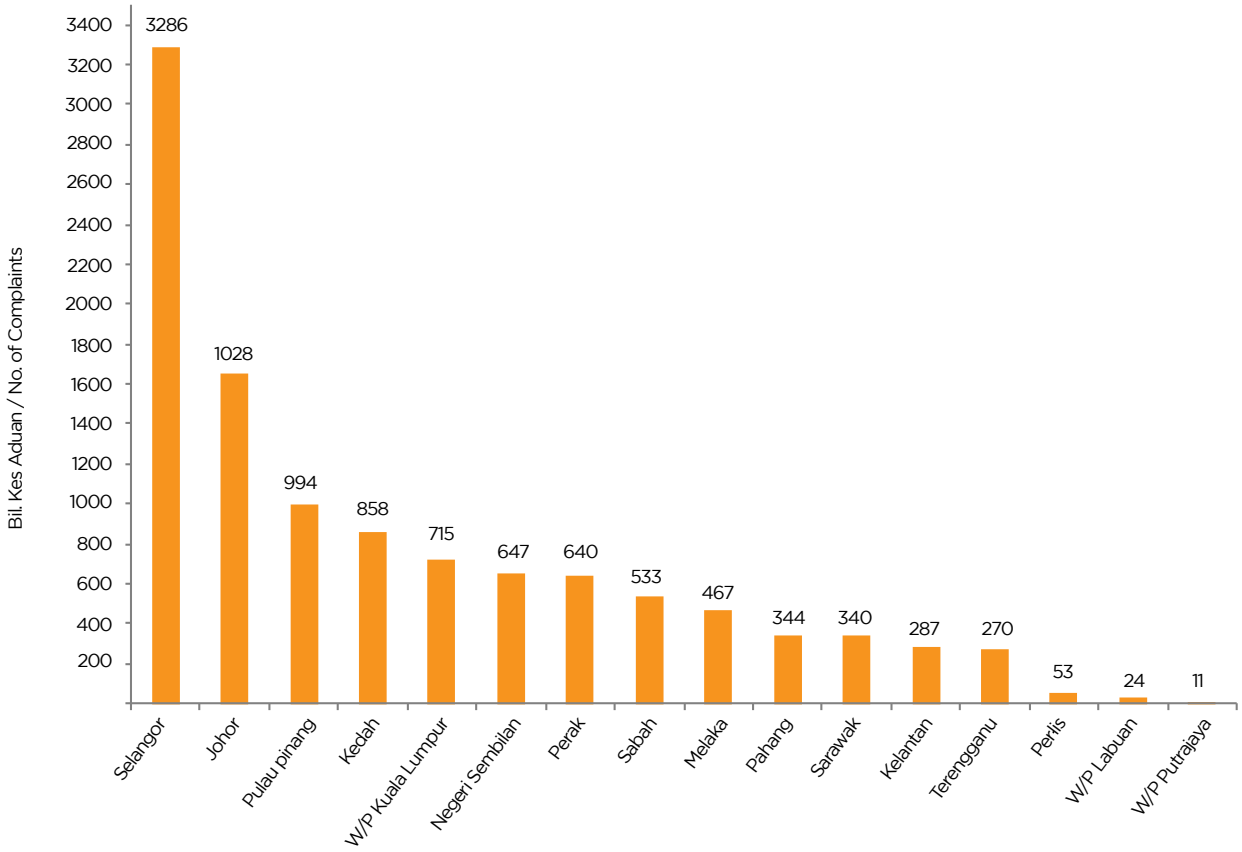
Pada tahun 2019, Selangor menerima aduan yang tertinggi iaitu 3,286 (29.5%), Johor 1,658 (14.9%) dan Pulau Pinang 994 (8.9%). Wilayah Persekutuan Putrajaya menerima aduan yang paling sedikit iaitu sebanyak 11 (0.1%) dan diikuti dengan Wilayah Persekutuan Labuan iaitu 24 (0.2%).

Seperti tahun-tahun yang sebelumnya, bilangan aduan pencemaran yang tertinggi adalah berkaitan dengan pencemaran udara iaitu 9,085 (81.7%), 976 (8.8%) pencemaran air, 278 (2.5%) pencemaran bunyi, 189 (1.7%) buangan terjadual, 84 (0.8%) tumpahan minyak, 69 (0.6%) pencemaran tanah dan 446 (4.0%) lain-lain aduan **(Rajah 4.21)**.

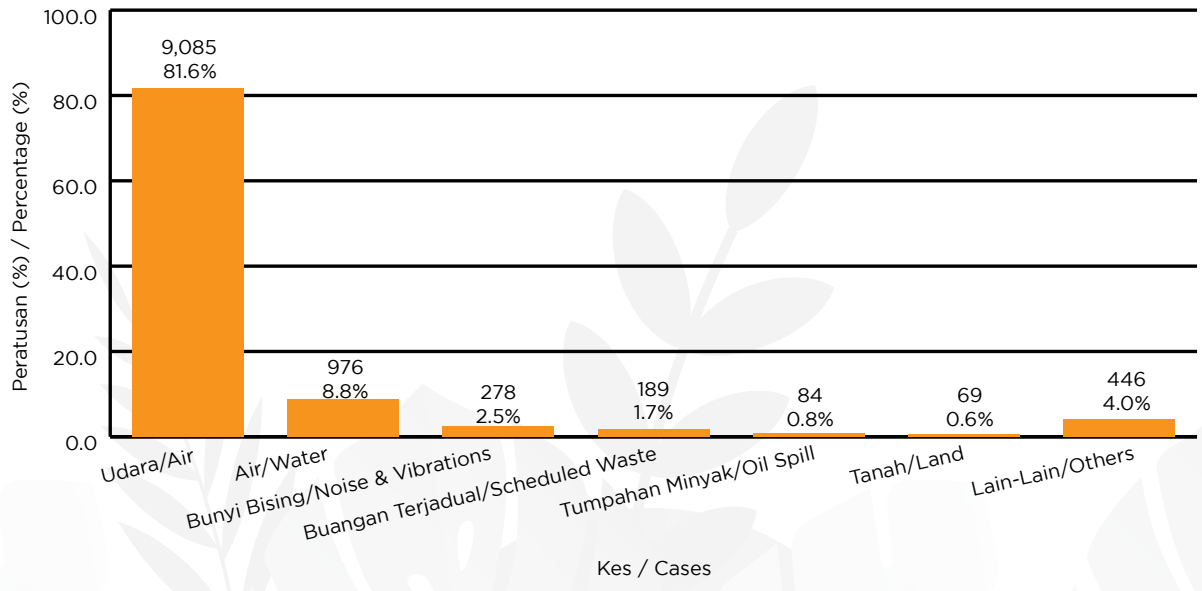
The DOE received 11,127 environmental pollution complaints in the year of 2019. Out of these, 9,753 were under the Environmental Quality Act, 1974 and investigated by the DOE State Offices, while the remaining 1,374 cases were outside the jurisdiction of DOE and was referred to other relevant agencies **(Figure 4.20)**.

In the year 2019, Selangor recorded 3,286 (29.5%) complaints, the highest number received, followed by Johor 1,658 (14.9%) and Pulau Pinang 994 (8.9%). Federal Territory of Putrajaya recorded the least number of complaints received with 11 (0.1%) complaints and followed by Federal Territory of Labuan 24 (0.2%).

As in the previous years, most of the complaints received were related to air pollution 9,085 (81.7%), followed by 976 (8.8%) water pollution, 278 (2.5%) noise pollution, 189 (1.7%) on illegal dumping of scheduled or toxic wastes, 84 (0.8%) oil spillage, 69 (0.6%) land pollution and 446 (4.0%) of other complaints **(Figure 4.21)**.



Rajah 4.20 : Bilangan Aduan Mengikut Negeri, 2019
Figure 4.20 : Number of Complaints by State, 2019



Rajah 4.21: Bilangan Kes Aduan Mengikut Jenis, 2019
Figure 4.21: Number of Complaint Cases by Types, 2019








Penguatkuasaan Bersepadu ke atas Kontena Sisa Buangan Plastik.
Integrated Enforcement on Plastic Waste Containers.

BAB 5
CHAPTER 5

MENGARUSPERDANA INDUSTRI HIJAU
MAINSTREAMING GREEN INDUSTRY PRACTICES

MEMPERKASAKAN AMALAN INDUSTRI HIJAU DALAM KALANGAN PERUSAHAAN KECIL DAN SEDERHANA (PKS) KE ARAH PERTUMBUHAN HIJAU

MAINSTREAMING GREEN INDUSTRY PRACTICES AMONG SMALL AND MEDIUM ENTERPRISES (SME) TOWARDS GREEN GROWTH

Di bawah Rancangan Malaysia Kesebelas (RMK-11) Seksyen Industri Hijau (SIH) telah merancang pelbagai program dan projek sebagai menyokong hasrat dan wawasan Malaysia mencapai status Negara Maju menjelang tahun 2020.

Dengan tema Mengarusperdana Amalan Industri Hijau Dalam Kalangan Perusahaan Kecil dan Sederhana (PKS) Ke Arah Pertumbuhan Hijau, SIH telah menetapkan matlamat RMK-11 iaitu untuk memperkukuhkan amalan Industri Hijau dalam kalangan Perusahaan Kecil dan Sederhana (PKS) ke arah Pengeluaran Lestari dan untuk mengurangkan pelepasan gas rumah hijau (GHG).

Di antara objektif program adalah untuk :

i. Menyokong inisiatif pengurangan jejak karbon, selaras dengan hasrat negara untuk mengurangkan intensiti pelepasan gas rumah kaca daripada Keluaran Dalam Negara Kasar sebanyak 45% menjelang 2030 berbanding intensiti pelepasan GHG pada tahun 2005;

ii. Menyokong usaha penghijauan industri;

iii. Menerapkan budaya pematuhan kendiri terpimpin dan mewujudkan PKS yang berdaya saing dan mesra alam;

iv. Meningkatkan pematuhan PKS terhadap keperluan perundangan alam sekitar; dan

v. Meningkatkan penggunaan sumber secara lestari selaras dengan 2030 Agenda for Sustainable Development Goals (SDG).

Under the Eleventh Malaysia Plan (RMK-11), the Green Industry Section (SIH) DOE had planned various projects and programmes to support the national vision to become a developed country by 2020.

Under the theme of Mainstreaming Green Industry Practices Among Small And Medium Enterprises (SME) Towards Green Growth, SIH is committed to deliver its RMK-11 programme objectives to strengthen Green Industry practices among Small and Medium enterprises towards sustainable production and to reduce Green House Gas (GHG) emission.

The objectives of the programme were:

i. To support Carbon Footprint reduction initiative in line with the national target to reduce 45 % of greenhouse gas intensity in the year 2030 based on the Gross Domestic Product (GDP) of 2005;

ii. To support the greening of industrial initiatives;

iii. To inculcate Guided Self-Regulation (GSR) and create competitive and environmentally friendly SMEs;

iv. To increase SME environmental compliance; and

v. To increase sustainable resource consumption in line with the 2030 Agenda for Sustainable Development Goals (SDG).

PROGRAM PENYELIDIKAN DAN PEMBANGUNAN PREMIS DEMONSTRASI AMALAN INDUSTRI HIJAU

Objektif utama program adalah untuk membangunkan premis demonstrasi Amalan Industri Hijau yang akan menjadi contoh dan galakkan kepada industri untuk melaksanakan amalan Industri Hijau di dalam operasi premis masing-masing.

Pada tahun 2019 program Penyelidikan dan Pembangunan (R&D) Premis Demonstrasi Amalan Industri Hijau adalah merupakan projek sambungan tahun 2018 iaitu tahun kedua pelaksanaan program Latihan Pengeluaran Bersih (CP) Untuk Pembangunan Premis Demonstrasi Amalan Industri Hijau Bagi Kilang Minyak Kelapa Sawit Mentah.

Di antara aktiviti program di bawah fasa kedua pembangunan adalah seperti berikut:

i. Membangunkan buku Garis Panduan Pelaksanaan Amalan Industri Hijau Kilang Minyak Kelapa Sawit Mentah; dan

ii. Melaksanakan bengkel/seminar bagi mempromosikan pelaksanaan Amalan Industri Hijau Kilang Minyak Kelapa Sawit Mentah untuk pengusaha premis minyak kelapa sawit mentah dan juga sektor industri yang lain di Malaysia.

Semua aktiviti telah dilaksanakan mengikut jadual dan mencapai objektif yang telah disasarkan.

PROGRAM BANTUAN KHIDMAT NASIHAT PENGELUARAN BERSIH (CP) KEPADA PERUSAHAAN KECIL & SEDERHANA (PKS)

Program Khidmat Nasihat Industri Hijau kepada Perusahaan Kecil dan Sederhana (PKS) dan Industri lain

Projek Audit Pengeluaran Bersih kepada Perusahaan Kecil dan Sederhana (PKS) dilaksanakan bertujuan untuk meningkatkan kesedaran dan kefahaman pengusaha Perusahaan Kecil dan Sederhana (PKS) mengenai konsep Pengeluaran Bersih.

RESEARCH AND DEVELOPMENT OF GREEN INDUSTRY PREMISES

The main objective of the programme was to develop Green Industry Practices on premises as a showcase and to encourage other industries especially SMEs to implement Green Industry practices in their operations.

In 2019, the Research and Development (R&D) Programme of the Green Industry continued with a project that began in 2018 under the programme “Latihan Pengeluaran Bersih (CP) Untuk Pembangunan Premis Demonstrasi Amalan Industri Hijau Bagi Kilang Minyak Kelapa Sawit Mentah”.

The activities under the second implementation phase of the programme included:

i. Development of Guidelines for the Implementation of Green Industry Practices in Crude Palm Oil Mills; and

ii. Organising a seminar on the promotion of Green Industry Implementation in Crude Palm Oil Mills for crude palm oil mill owners and other industries in Malaysia.

All of the above activities were successfully implemented, and the projected objectives were achieved.

CLEANER PRODUCTION AUDIT ASSISTANCE FOR SMALL AND MEDIUM INDUSTRIES (SME)

Green Industry Advisory Services for Small and Medium Industry (SMEs) and other industries

The Cleaner Production Audit Assistance project for Small and Medium Enterprises (SMEs) was introduced to enhance the awareness and understanding of the Cleaner Production concept among SMEs.

Bagi tahun 2019 program ini telah dilaksanakan oleh pihak perunding yang dilantik iaitu Dr. Tenaga Solution. **Jadual 5.1** menunjukkan senarai sepuluh (10) buah premis PKS terpilih di seluruh Malaysia yang telah menyertai program ini. Melalui program ini, latihan dan pendedahan berkaitan konsep Pengeluaran Bersih diberikan kepada pekerja PKS yang dipilih oleh pihak pengurusan PKS sendiri dan seterusnya pekerja PKS akan melaksanakan aktiviti audit pengeluaran bersih secara terperinci.

For the year 2019, the Cleaner Production Training for SMEs towards the development of Green Industry Demonstration Site programme was carried out in collaboration with Dr Tenaga Solution. As shown in **Table 5.1**, ten (10) SMEs throughout Malaysia were selected to participate in the programme. Through this programme, training and exposure were being given to the SMEs staffs whom had been chosen by the SMEs own management in which afterwards they will meticulously performed the audit activity for net production.

Laporan Terperinci Audit Pengeluaran Bersih akan memberi maklumat profil operasi PKS dan cadangan-cadangan opsyen Pengeluaran Bersih yang boleh dilaksanakan oleh pihak PKS dan juga maklumat tentang jumlah jejak karbon yang telah dihasilkan daripada keseluruhan operasi pengeluaran PKS. Pihak PKS seterusnya dapat menilai cadangan opsyen CP yang boleh dilaksanakan kearah pengurangan jejak karbon bagi premis PKS tersebut. Peserta PKS juga didedahkan dengan pengalaman dan pengetahuan tentang Pengeluaran Bersih. Secara keseluruhan sebanyak 96 Opsyen CP telah dicadangkan di dalam 10 laporan berasingan Audit Terperinci Pengeluaran Bersih.

From the CP audit findings, they produced a detailed CP audit report which contained profiled information of SMEs and proposed CP options that can be implemented by SMEs. The document also reported on the total carbon footprint of the SME. With that, an SME could identify which CP option could be implemented to reduce certain amount of carbon footprint in their operations. SME participants gained the experience and knowledge of Cleaner Production. In total 96 CP options were proposed in 10 individual detailed CP audit reports.

Di samping itu, dua (2) draf garis panduan pelaksanaan Amalan Industri Hijau telah dibangunkan untuk rujukan pihak PKS. Garis panduan tersebut adalah Garis Panduan Pelaksanaan Amalan Industri Hijau Bagi Kilang Kitar Semula Plastik Terpakai dan Garis Panduan Pelaksanaan Amalan Industri Hijau Bagi Industri Berasaskan Kayu.

Besides that, two (2) draft guidelines were developed as references to other SMEs. They included the guidelines on Green Industry Implementation for Recycled Plastics Waste Industries and guidelines on Green Industry Implementation for Wood- based Industries.

Memperkukuhkan Mekanisma Institusi Industri Hijau

Salah satu skop Program Memperkasakan Amalan Industri Hijau Dalam Kalangan Perusahaan Kecil dan Sederhana (PKS) Ke Arah Pertumbuhan Hijau di bawah RMKe-11 adalah Memperkukuhkan Mekanisma Institusi Industri Hijau. Senarai aktiviti yang telah dilaksanakan pada tahun 2019 adalah seperti di dalam **Jadual 5.2**

Strenghtening Green Industry Institutional Mechanisms

One of the scopes under Mainstreaming Green Industry Practices Among Small and Medium Enterprises (SME) Towards Green Growth in RMK-11 was to strengthen Green Industry institutional mechanisms. List of activities conducted in the year 2019 are as listed in **Table 5.2**.

i) Mesyuarat, Bengkel dan Sesi Penerangan Prosedur Tetap Operasi Pengeluaran Bersih untuk Pegawai JAS Negeri.

Di antara program yang telah dilaksanakan di bawah skop tersebut adalah melaksanakan taklimat Amalan Industri Hijau dan (SOPCP) kepada Pegawai JAS Negeri. Pada tahun 2019 taklimat tersebut telah berjaya dilaksanakan di Zon Timur melibatkan pegawai dari JAS Kelantan, JAS Terengganu dan JAS Pahang telah diadakan di Pejabat JAS Terengganu pada 2 Julai 2019. Program yang sama turut berjaya diadakan di pejabat JAS W.P Labuan pada 20 Ogos 2019.

Selain daripada itu dibawah skop yang sama, Mesyuarat Kerja Bagi Memperkukuh Institusi Industri Hijau Dalam Kalangan Pegawal JAS telah diadakan di Hotel Nexus Regency, Shah Alam. Mesyuarat telah dipengerusikan oleh Pengarah Bahagian Penguatkuasa iaitu Tn. Hj. Rosli Bin Zul. Mesyuarat dihadiri oleh pegawai JAS Negeri dan Ibu Pejabat seramai 16 orang peserta.

Tujuan mesyuarat diadakan adalah untuk meningkatkan pembangunan kapasiti pegawai JAS dalam melaksanakan elemen penguatkuasaan melalui Prosedur Tetap Operasi Pengeluaran Bersih (CP) semasa pemeriksaan di lapangan. Tuan Pengerusi juga banyak berkongsi pandangan tentang hala tuju dan pemantapan program Industri Hijau.

ii) Seminar Bagi Mempromosikan Amalan Industri Hijau Bagi Kilang Minyak Kelapa Sawit Mentah

Di bawah skop Penyelidikan dan Pembangunan (R&D) Premis Demonstrasi Amalan Industri Hijau Seminar Bagi Mempromosikan Amalan Industri Hijau Bagi Kilang Minyak Kelapa Sawit Mentah telah dianjurkan pada 25 September 2019 di Hotel Seri Malaysia, Bagan Lalang, Sepang. Seminar telah dirasmikan oleh Timbalan Ketua Pengarah (Operasi) iaitu YBrs. En. Wan Abdul Latiff Bin Wan Jaffar. Seminar telah dihadiri oleh peserta seramai 96 daripada pengusaha dan pekerja kilang minyak kelapa sawit mentah dan seramai 31 pegawai JAS Ibu Pejabat dan JAS negeri.

i) Meeting, Briefing and Workshops to discuss the Cleaner Production Standard Operating Procedure for DOE State Offices

Among the programmes conducted under the above scope, include a roadshow of Green Industry and Standard Operating Procedures of Cleaner Production on Site Inspection for DOE offices. In 2019, two (2) roadshows, were successfully organised which included a roadshow in the east zone covering DOE Kelantan, DOE Terengganu, and DOE Pahang; which was held in DOE Terengganu on the 2nd July 2019. Similar roadshows were also successfully organised at DOE F.T Labuan on the 20th August 2019.

Under the scope of strengthening DOE Green Industry Institutions, a working meeting was organised at Nexus Regency Hotel in Shah Alam. The meeting was chaired by the Director of Enforcement Division, Tuan Haji Rosli Bin Zul. The meeting was attended by 16 participants from State and Head Quarters of the DOE offices.

The objectives of the meeting were to enhance the capacity building of DOE officers in implementing Standard Operating Procedure of Cleaner Production during on-site inspections. The chairman also shared his views on the way forward and measures to take to strengthen the Green Industry programme.

ii) Seminar to promote Green Industry Practices for Crude Palm Oil Mills

A seminar to promote Green Industry Practices for Crude Palm Oil Mills was successfully organised on 25th September 2019 at Hotel Seri Malaysia Bagan Lalang, Sepang. The seminar was launched by Deputy Director General (Operation) Encik Wan Abdul Latiff Bin Wan Jaffar. The seminar attracted 96 participants who comprised crude palm oil mill owners and workers as well as 31 participants from the DOE Headquarters and state offices.

Sebanyak three (3) kertas kerja disampaikan oleh para penceramah. Kertas kerja pertama adalah Program Latihan Industri Hijau Ke Arah Pembangunan Premis Demonstrasi Amalan Industri Hijau Dan Faedahnya Kepada Industri yang disampaikan oleh Ketua Seksyen Industri Hijau iaitu Puan. Zuraini Siam. Kertas kerja kedua adalah Pelaksanaan Amalan Industri Hijau bagi Kilang Kelapa Sawit Mentah melalui kaedah Pengeluaran Bersih yang telah disampaikan oleh En. Saiful Azam Bin Mahmud dari Sirim Berhad. Manakala untuk kertas kerja ketiga merupakan perkongsian pengalaman pengusaha kilang kelapa sawit mentah yang terlibat dalam program Amalan Industri Hijau telah disampaikan oleh Tn. Hj. Shokeri Bin Jab bersama dengan En. Mohd Yusof Bin Awaldin dari Sime Darby Plantations Berhad (KKS Tanah Merah)

Three (3) working papers were presented at the seminar which included the first paper entitled "Program Latihan Industri Hijau Ke Arah Pembangunan Premis Demonstrasi Amalan Industri Hijau Dan Faedahnya Kepada Industri" presented by the Head of the Green Industry Unit, Puan Zuraini Siam. The second paper entitled "Pelaksanaan Amalan Industri Hijau bagi Kilang Kelapa Sawit Mentah melalui kaedah Pengeluaran Bersih" was presented by Encik Saiful Azam Bin Mahmud from Sirim Berhad. Meanwhile, the third presentation was about sharing experiences by crude palm oil mill managers who were involved in the Green Industry Programme. The presentation jointly presented by Tuan Haji Shokeri Bin Jab bersama dengan Encik Mohd Yusof Bin Awaldin from Sime Darby Plantations Berhad (KKS Tanah Merah).

iii) Pameran dan Promosi Industri Hijau

SIH telah terlibat dalam pameran , IGEM 2019 yang telah berlansung pada 09 hingga 11 Oktober 2019 di Kuala Lumpur Convention Center (KLCC). Pameran ini diadakan bersama-sama dengan Bahagian JAS yang lain. Ketua Setiausaha Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim YBhg. Datuk Seri Dr. Mohd Azhar Bin Haji Yahaya telah meluangkan masa melawat ruang pameran JAS.

iii) Green Industry Promotion and Exhibitions

SIH was involved in the International Greentech and Eco Products Exhibition and Conference Malaysia, IGEM 2019 held from 9th to 11th October 2019 at Kuala Lumpur Convention Centre (KLCC). The exhibition was organised in collaboration with other DOE divisions. Among the VIP visitors to DOE booth included the Secretary General Ministry of Energy, Science, Technology, Environment and Climate Change YBhg. Datuk Seri Dr. Mohd Azhar Bin Haji Yahaya.

PROGRAM ANUGERAH INDUSTRI HIJAU TAHUN 2019/2020

Anugerah Industri Hijau merupakan anugerah yang diperkenalkan bagi memberi pengiktirafan kepada Perusahaan Kecil dan Sederhana (PKS) ke atas inisiatif melaksanakan Amalan Industri Hijau

Objektif utama anugerah ini bertujuan untuk memberikan pengiktirafan dan motivasi khususnya kepada PKS atas inisiatif, kreativiti dan komitmen berterusan yang diberikan dalam pelaksanaan Amalan Industri Hijau serta mengadaptasikan elemen pengeluaran bersih dalam proses pembuatan.

Manfaat pelaksanaan Amalan Industri Hijau ini ialah penjimatan penggunaan tenaga dan utiliti dan pengurangan sisa buangan yang menjurus kepada proses pengeluaran industri yang lebih bersih dan efisen ini secara tidak

GREEN INDUSTRY AWARD PROGRAMME 2019/2020

Green industry award is an award to recognise small and medium enterprises (SMEs) for their initiative in implementing Green Industry Practices.

The main objective of this award is to give recognition and motivation to SMEs on the initiative, creativity and continuous commitment in the implementation of Green Industry Practices and adoption of cleaner production concepts in manufacturing processes.

The benefits of the implementation of Green Industry Practices include saving energy and utilities and reduction of waste that lead to cleaner industrial production processes that indirectly contribute to low carbon footprint

langsung boleh menyumbang kepada selaras dengan hasrat negara untuk mengurangkan intensiti pelepasan gas rumah hijau sebanyak 45% daripada Keluaran Dalam Negara Kasar menjelang 2030 berbanding intensiti pelepasan pada tahun 2005.

Pada tahun 2019 sebanyak 10 premis telah mengemukakan borang penyertaan dan penilaian awal telah dilaksanakan terhadap lapan (8) premis yang berjaya mengemukakan borang penilaian kendiri dalam tempoh yang ditetapkan. Majlis penganugerahan dirancang akan diadakan pada tahun 2020.

in line with the countries commitment to reduce the intensity of greenhouse gas (GHG). The targeted reduction rate is 45% less greenhouse gas intensity in the year 2030 based on the Gross Domestic Product (GDP) of 2005.

In 2019 DOE received 10 participation forms from industries and out of that only eight (8) industries submitted their self-evaluation form. The awards will be held in the year 2020.

Jadual 5.1: Senarai Premis Bagi Program Latihan Pengeluaran Bersih (CP) Kepada PKS
Table 5.1: List of Premises Involve in CP Training Program for SME

BIL./ NO	PREMIS/ PREMISES	TARIKH/ DATE	BILANGAN OPSYEN CP DIJANA/ NO OF CP OPTION
1.	RJH Marketing & Trading Sdn. Bhd. Beranang, Selangor.	2 Mei 2019/ 2nd May 2019	12
2.	Huahong Plastic Industries Sdn. Bhd. Beranang, Selangor.	14 Mei 2019/ 14th May 2019	10
3.	Technology PP Industries Sdn. Bhd. Beranang, Selangor.	15 Mei 2019/ 15th May 2019	10
4.	Rubberflex Sdn. Bhd. Bentong, Pahang.	30 Mei 2019/ 30th May 2019	13
5.	Paragon Progress Sdn. Bhd. Muar, Johor.	8 Julai 2019/ 8th July 2019	9
6.	Keppel Wood Industries (M) Sdn. Bhd. Muar, Johor.	9 Julai 2019/ 9th July 2019	8
7.	Gold Coin Feedmill (Sabah) Sdn. Bhd. W.P. Labuan.	19 Ogos 2019/ 19th August 2019	8
8.	Focus Lumber Bhd Keningau, Sabah.	21 Ogos 2019/ 21st August 2019	8
9.	Rajang Winery Sdn Bhd, Papar Sabah.	22 Ogos 2019/ 22nd August 2019	9
10	Makeson Sdn Bhd Kota Kinabalu Sabah	23 Ogos 2019/ 23rd August 2019	9

Jadual 5.2: Program Memperkukuhkan Mekanisma Institusi Industri Hijau, 2019
Table 5.2: Strenghtening Green Industry Institutional Mechanisms Program Year, 2019

BIL./ NO.	TARIKH/ DATE	NAMA SYARIKAT / ORGANISASI / PROGRAM COMPANY'S NAME / ORGANISATION / PROGRAMME	LOKASI / LOCATION	CATATAN / NOTES
1.	2 Julai 2019/ 2nd July 2019	Roadshow dan Taklimat JAS Negeri/ Roadshow and DOE State Briefing.	JAS Negeri Terengganu./ DOE Terengganu	Bengkel dan taklimat berkaitan Amalan Industri Hijau dan SOPCP kepada JAS Terengganu, Pahang dan Kelantan/ Workshop and briefing on Green Industry Practices and SOPCP to DOE Terengganu, Pahang and Kelantan.
2.	20 Ogos 2019/ 20th August 2019	Roadshow dan Taklimat JAS Negeri/ Roadshow and DOE State Briefing.	JAS W.P. Labuan/ DOE Labuan	Bengkel dan taklimat berkaitan Amalan Industri Hijau dan SOPCP kepada JAS W.P. Labuan/ Workshop and briefing on Green Industry Practices and SOPCP to DOE W.P. Labuan
3.	25 September 2019/ 25th September 2019	Seminar Amalan Industri Hijau Bagi Kilang Minyak Kelapa Sawit Mentah/ Seminar Green Industry Practices for for Crude Palm Oil Mill	Hotel Seri Malaysia Bagan Lalang, Sepang Selangor/ Hotel Seri Malaysia Bagan Lalang, Sepang Selangor	Seminar kepada pegawai JAS dan pihak industri./ Seminar for DOE officers and industry
4.	13 hingga 15 Oktober 2019/ 13th to 15th October 2019	Mesyuarat Kerja Industri Hijau/ Green Industry Working Meeting	Hotel Nexus Regency, Shah Alam Selangor/ Hotel Nexus Regency, Shah Alam Selangor	Mesyuarat Kerja Bagi Memperkukuh Institusi Industri Hijau Dalam Kalangan Pegawai JAS/ Working Meeting To Strengthen Green Industry Institutions Among DOE Officers
5.	2 Julai 2019/ 2nd July 2019	Majlis Penganugerahan dan Penyerahan Lesen Sawit 2019 Oleh Jabatan Alam Sekitar Negeri Pahang./ Palm Oil Mill operating license 2019 presentation ceremony by DOE Pahang	Awana Resort World Genting, Pahang/ Awana Resort World Genting, Pahang	Sesi ceramah berkaitan pelaksanaan program Pengeluaran Bersih (CP) kepada kilang kelapa sawit (KKS) Talk on Cleaner Production Program for Crude Palm Oil Mill
6.	6 Ogos 2019/ 6th August 2019	Majlis Penganugerahan Dan Penyerahan Lesen Sawit 2019 Oleh Jabatan Alam Sekitar Negeri Sarawak/ Palm Oil Mill operating license 2019 presentation ceremony by DOE Sarawak	Hotel Imperial, Kuching, Sarawak/ Hotel Imperial, Kuching, Sarawak	Sesi ceramah berkaitan pelaksanaan program Pengeluaran Bersih (CP) kepada kilang kelapa sawit (KKS)/ Talk on Cleaner Production Program for Crude Palm Oil Mill
7.	5 November 2019/ 5th November 2019	Seminar Pengurusan Buangan Terjadual/ Seminar on Scheduled Waste Management	Persada International Convention Center Johor Bahru/ Persada International Convention Center Johor Bahru	Sesi ceramah berkaitan pelaksanaan program Pengeluaran Bersih (CP)/ Talk on Cleaner Production Program

Aktiviti-Aktiviti Yang Dijalankan Di Bawah Program Memperkukuhkan Institusi Industri Hijau Dalam Kalangan Pegawai JAS pada 13 hingga 15 Oktober 2019

Activities Which Were Held Under The Enhancing Green Industry Institutions Among DOE Officers Program from 13th to 15th October 2019

Perasmian Seminar Amalan Industri Hijau Bagi Kilang Minyak Kelapa Sawit Mentah yang Berlangsung pada 25 September 2019 oleh Timbalan Ketua Pengarah (Operasi) JAS.

Opening ceremony of the Green Industry Practice Seminar for Crude Palm Oil Factory on 25th September 2019 by the Deputy Director General (Operations) of the DOE

Lawatan Peserta Persidangan Ke Ruang Pameran Jabatan Alam Sekitar Pada IGEM 2019, Di Kuala Lumpur Convention Center

A Visit by Conference Participants to Department of Environment Booth at IGEM 2019 in Kuala Lumpur Convention Center

BAB 6
CHAPTER 6

HAL EHWAL ALAM SEKITAR ANTARABANGSA
INTERNATIONAL ENVIRONMENTAL AFFAIRS

HAL EHWAL ALAM SEKITAR ANTARABANGSA – KERJASAMA DUA HALA
INTERNATIONAL ENVIRONMENTAL AFFAIRS – BILATERAL COORPERATION

MALAYSIA - SINGAPURA

i) Mesyuarat Ke-17 Kumpulan Kerja Jawatankuasa Bersama Malaysia - Singapura mengenai Alam Sekitar (MSJCE WG)

Mesyuarat Ketujuh belas Kumpulan Kerja Jawatankuasa Bersama Malaysia - Singapura mengenai Alam Sekitar (WG of MSJCE) telah diadakan pada 19 hingga 20 Jun 2019 di Singapura, Malaysia. YBrs. Puan Norlin Binti Jaafar, Ketua Pengarah Alam Sekitar, Malaysia dan Encik Tan Meng Dui, Ketua Pegawai Eksekutif, National Environment Agency, Singapura telah mempengerusikan bersama mesyuarat berkenaan.

Seramai 27 orang delegasi dari pelbagai agensi Malaysia seperti Kementerian Luar Negeri, Jabatan Peguam Negara, Jabatan Pengaliran dan Saliran, Unit Perancang Ekonomi Negeri Johor, Jabatan Laut Malaysia, Lembaga Pelabuhan Johor dan wakil dari Kementerian Sumber Asli dan Alam Sekitar telah menghadiri mesyuarat ini.

Sementara itu, seramai 50 orang wakil yang terdiri dari pelbagai agensi di antaranya Public Utilities Board, Ministry of National Development, Ministry of Foreign Affairs, Housing and Development Board, Maritime and Port Authority, Ministry of the Environment and Water Resources membentuk delegasi Singapura.

Mesyuarat ini berperanan penting untuk kedua-dua negara bertukar-tukar maklumat dan pengalaman dalam menangani isu-isu alam sekitar yang berkepentingan bersama.

Mesyuarat ini juga telah melihat semula dan membincangkan kerjasama baru dalam aspek pencemaran industri, pengurusan sampah termasuk plastik dan pembungkusan sampah, keselamatan radiasi, ekonomi dan perubahan iklim.

MALAYSIA - SINGAPORE

i) 17th Malaysia - Singapore Joint Committee Meeting on the Environment Working Group (MSJCE WG)

The 17th meeting of the Malaysia - Singapore Joint Committee on the Environment (MSJCE) Working Group (WG of MSJCE) was held between 19th to 20th June 2019 in Singapore. Puan Norlin binti Jaafar, Director-General of Environment, Malaysia and Mr. Tan Meng Dui, Chief Executive Officer, National Environment Agency, Singapore co-chaired the meeting.

A total of 27 delegates came from various Malaysian agencies namely the Ministry of Foreign Affairs, Attorney General's Chambers, Department of Irrigation and Drainage, Johor State Economic Planning Unit, Marine Department, Johor Port Authority, and a representative from the Ministry of Natural Resources and Environment attended the meeting.

Meanwhile, Singapore was represented by 50 delegates from different agencies including the Public Utilities Board, Ministry of National Development, Ministry of Foreign Affairs, Housing and Development Board, Maritime and Port Authority, Ministry of the Environment and Water Resources.

This meeting served an important role for both countries to exchange information and experiences in tackling environmental issues of mutual interest.

The meeting also reviewed and discussed new cooperation in the areas of industrial pollution, waste management including plastic and waste packaging, radiation safety, circular economics, and climate change.

Delegasi Malaysia turut telah dibawa melawat ke ECO Special Waste Management di akhir agenda mesyuarat bagi melihat pengurusan sampah di Singapura.

Malaysian delegates also paid a visit to Eco Waste Management in Singapore, to see how waste was managed throughout Singapore.

Mesyuarat Jawatankuasa Kerja Malaysia- Singapura Kali Ke-17 pada 19 hingga 20 Jun 2019 di Singapura
The 17th Malaysia - Singapore Working Committee Meeting on 19th to 20th June 2019 in Singapore

ii) Mesyuarat Jawatankuasa Bersama Malaysia - Singapura Mengenai Alam Sekitar Ke-33, Sekitar (MSJCE) dan Lawatan Muhibah Tahunan ke - 32

Mesyuarat Jawatankuasa bersama Malaysia-Singapura mengenai Alam Sekitar ke-33 dan Lawatan Muhibah Tahunan ke-32 telah diadakan pada 14 hingga 15 November 2019.

Mesyuarat ini telah dipengerusikan bersama oleh YB Yeo Bee Yin, Menteri Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim bersama Encik Masagos Zulkifli, Menteri Alam Sekitar dan Sumber Air.

Sementara itu, barisan delegasi Malaysia telah dihadiri oleh Timbalan Ketua Setiausaha (Alam Sekitar dan Perubahan Iklim), MESTECC, Pegawai-pegawai kanan MESTECC, JAS dan Agensi Kerajaan Malaysia berkaitan. Manakala delegasi Singapura telah dihadiri oleh Setiausaha Tetap, Encik Albert Chua, Pegawai-pegawai kanan Kementerian Alam Sekitar dan Sumber Air, NEA dan Agensi Kerajaan Singapura yang berkaitan.

Mesyuarat yang ini diadakan bertujuan membincangkan isu-isu alam sekitar yang melibatkan kedua-dua negara.

ii) 33rd Malaysia- Singapore Joint Committee on the Environment and 32nd Malaysia- Singapore Annual Exchange of Visits

Annual Exchange of Visits (AEV) between the Environment Ministries of Malaysia and Singapore was held from 14th to 15th November 2019 in Singapore.

The meeting was led by Yang Berhormat Yeo Bee Yin, Minister of Energy, Science, Technology, Environment and Climate Change of Malaysia (MESTECC) with Mr. Masagos Zulkifli, Minister for The Environment and Water Resources, Singapore.

The Malaysian delegation comprised the Deputy Secretary General (Environment and Climate Change) of MESTECC, Dr Nagulendran Kangayatkarasu, Senior officer from MESTECC, DOE and other government agencies. Meanwhile, the Singapore delegation comprised the Permanent Secretary Mr. Albert Chua and senior officials from the Ministry of the Environment and Water Resources, the National Environment Agency Singapore and other government agencies.

This meeting served an important role for both countries to exchange information and experiences in tackling environmental issues of mutual interest.

Mesyuarat kali ke-33 ini telah membincangkan perkara berkaitan perhatian jerebu merentasi sempadan dan kebakaran hutan yang telah memberi kesan kepada penduduk di Malaysia dan Singapura.

Aspek kerjasama baru dalam perubahan iklim, pengurusan sampah termasuk plastik, ekonomi, pencemaran industri dan keselamatan radiasi turut telah dilihat dan dibincangkan di dalam pertemuan ini.

This 33rd meeting discussed concerns over the transboundary haze from land and forest fires in the region which affected the citizens of Malaysia and Singapore.

Cooperation in new areas such as climate change, waste management including plastics and packaging waste, circular economy, industrial pollution and radiation safety, were also discussed in the meeting.

Barisan Delegasi Yang Turut Hadir Di Lawatan Muhibbah Tahunan Ke-32 Di Singapura
The Delegation Who Also Attended The 32nd Annual Good Will Visit In Singapore

iii) Malaysia – Program Pembangunan Bangsa-Bangsa Bersatu (UNDP)

Kunjungan Hormat oleh Resident Representative, Program Pembangunan Bangsa-Bangsa Bersatu (UNDP)

Pada 25 November 2019, JAS Malaysia telah menerima kunjungan hormat delegasi dari Program Pembangunan Bangsa-Bangsa Bersatu (UNDP). Delegasi ini diketuai oleh Mr. Niloy Banerjee, Resident Representative, Program Pembangunan Bangsa-Bangsa Bersatu (UNDP).

Delegasi tersebut telah disambut oleh YBrs. Puan Norlin Binti Jaafar, Ketua Pengarah JAS, pengurusan tertinggi JAS dan semua Pengarah/Wakil Bahagian JAS Ibu pejabat dan wakil dari Institut Alam Sekitar Malaysia (EiMAS).

Kunjungan hormat ini bertujuan untuk meneroka bidang kerjasama masa depan yang akan bermanfaat bagi kedua-dua pihak.

iii) Malaysia – United Nation Development Programme (UNDP)

Courtesy Visit by the Resident Representative of the United Nations Development Programme (UNDP)

On 25th November 2019, the DOE Malaysia received a courtesy visit from the United Nations Development Programme (UNDP). The delegation was led by Mr. Niloy Banerjee, Resident Representative, United Nations Development Programme (UNDP).

The delegation was welcomed by YBrs. Mrs. Norlin Binti Jaafar, Director General of the DOE, top management of DOE and all directors and representatives from head of departments and delegates from the Environment Institute of Malaysia (EiMAS).

This courtesy visit aimed to explore areas of future cooperation that will benefit both parties.

Selain itu, JAS juga berkongsi pengalaman dalam pengendalian pencemaran udara dan pengurusan kawalan pelepasan pencemaran selain untuk meneroka peluang untuk meningkatkan kerjasama yang ada antara JAS dan UNDP semasa sesi kunjungan hormat tersebut.

In addition, the DOE also shared experiences in air pollution control and pollution control management in addition to exploring opportunities to enhance the cooperation between DOE and UNDP during the visit.

Mr. Niloy Benerjee Menandatangani Buku Pelawat JAS
Mr. Niloy Benerjee Signed The DOE Visitor Book

Kunjungan Hormat Sedang Berlangsung
Courtesy Call in Progress

HAL EHWAL ALAM SEKITAR ANTARABANGASA - KERJASAMA SERANTAU
INTERNATIONAL ENVIRONMENTAL AAIRS - REGIONAL COOPERATION

COORDINATING BODY ON THE SEAS OF EAST ASIA (COBSEA)

COBSEA merupakan organisasi kerjasama serantau antara kerajaan bagi negara-negara di laut Asia Timur yang ditubuhkan di bawah United Nations Environment Programme (UNEP). COBSEA terdiri daripada sepuluh (10) buah negara iaitu Cambodia, China, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand dan Vietnam.

COBSEA berperanan dalam menyelaras pembentukan Pelan Tindakan Perlindungan dan Pembangunan Marin dan Persisiran Pantai Laut Asia Timur bermula tahun 1981.

Komponen utama pelan ini adalah penilaian ke atas impak dari aktiviti-aktiviti manusia ke atas persekitaran marin, kawalan pencemaran di persisiran pantai, perlindungan paya bakau, rumpai laut serta batu karang dan juga pengurusan sisa buangan.

COORDINATING BODY ON THE SEAS OF EAST ASIA (COBSEA)

COBSEA is an intergovernmental regional organization for East Asian Seas comprising of the ten-member countries which are Cambodia, China, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand dan Vietnam.

Under COBSEA forum, an Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas Region (the East Asian Seas Action Plan) was developed and approved in 1981.

The main components of East Asian Seas Action Plan are assessment of the effects of human activities on the marine environment, control of coastal pollution, protection of mangroves, sea grasses and coral reefs, and waste management.

Pada tahun 2019, Bahagian Kawalan Pencemaran, Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC) telah mengambil alih tugas sebagai National Focal Point (NFP) daripada JAS dan menyelaraskan pelaksanaan program / aktiviti berkaitan di peringkat kebangsaan serta akan mewakili Malaysia ke mesyuarat, program atau aktiviti yang dianjurkan oleh COBSEA.

In 2019, the Pollution Control Division, Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) had taken the role as the National Focal Point (NFP) from DOE and coordinating the implementation of program / activities as well as representing Malaysia at meetings, programs or activities organized by COBSEA.

ASEAN WORKING GROUP ON COASTAL AND MARINE ENVIRONMENT(AWGCME)

AWGCME adalah satu kerjasama serantau yang dianggotai oleh 10 buah negara ASEAN iaitu Brunei Darussalam, Kemboja, Indonesia, Lao PDR, Malaysia, Myanmar, Filipina, Singapura, Thailand dan Vietnam.

AWGCME is a regional cooperation which involve 10 ASEAN countries including Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

Mesyuarat tahunan AWGCME merupakan platform bagi meningkatkan usaha sama di kalangan negara-negara ASEAN untuk menggalakkan aktiviti dan pembentukan dasar berkaitan dengan pencegahan dan kawalan pencemaran marin di rantau ini.

AWGCME annual meeting is a platform to enhance collaboration among ASEAN Member States (AMS) to promote activities and policy development on marine pollution control and prevention.

Mesyuarat ini juga turut melibatkan organisasi seperti ASEAN Centre for Biodiversity (ACB), Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Coral Triangle Initiative-Coral Reefs, Fisheries and Food Security (CTI-CFF) Regional Interim Secretariat, dan Mangrove for Future/ International Union for Conservation of Nature (IUCN).

This meeting also participated by other organization such as ASEAN Centre for Biodiversity (ACB), Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Coral Triangle Initiative-Coral Reefs, Fisheries and Food Security (CTI-CFF) Regional Interim Secretariat and Mangrove for Future/International Union for Conservation of Nature (IUCN).

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BAY OF BENGAL LARGE MARINE ECOSYSTEM (BOBLME)

BOBLME adalah projek kerjasama serantau yang melibatkan lapan (8) buah negara di persisiran Teluk Bengal iaitu Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand. Projek ini dibentuk bertujuan menambah baik kehidupan penduduk pantai menerusi kerjasama pengurusan perikanan dan alam sekitar di peringkat serantau.

Projek BOBLME ini telah bermula semenjak April 2009 di mana Food and Agriculture Organization (FAO) adalah agensi pelaksana. Jabatan Perikanan Malaysia merupakan agensi penyelaras bagi peringkat Malaysia. Ketua Pengarah Alam Sekitar telah dilantik sebagai Project Steering Committee (Environment) dan Ketua Pengarah Perikanan sebagai Project Steering Committee (Fisheries) untuk Malaysia di bawah projek ini.

Output utama projek BOBLME adalah menghasilkan satu Strategic Action Programme (SAP) untuk rantau ini. SAP tersebut telah dipersetujui dan ditandatangani oleh Ketua Setiausaha Kementerian Pertanian dan Industri Asas Tani dan Ketua Setiausaha Kementerian Sumber Asli dan Alam Sekitar pada 28 Ogos 2015.

Pada tahun 2019, Jabatan Perikanan Malaysia telah menganjurkan beberapa sesi perbincangan pada 2 Julai 2019 dan 6 Ogos 2019 bersama-sama Agensi Teraju SAP BOBLME termasuk JAS. Ini adalah bagi menyediakan input Draf Dokumen Projek BOBLME Fasa 2 yang akan dilaksanakan pada tahun 2021-2024.

BOBLME is a regional cooperation project comprises of eight (8) countries surrounding the Bay of Bengal namely Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand. The aim of Bay of Bengal Large Marine Ecosystem (BOBLME) Project is to improve the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries.

The BOBLME Project was initiated in April 2009 and the Food and Agriculture Organization (FAO) is the executing agency. Department of Fisheries is the National Coordinator for Malaysia. Director General of Department of Environment and Director General of Department of Fisheries had been appointed as Project Steering Committee (Environment) and Project Steering Committee (Fisheries) for Malaysia, respectively.

The main output of BOBLME Project is to develop regional *Strategic Action Programme* (SAP). This SAP was agreed and signed by the Secretary General, Ministry of Agriculture and Agro-Based Industry and Ministry of Natural Resources and Environment on 28th August 2015.

In 2019, the Department of Fisheries Malaysia has held several discussions dated on 2nd July and 6th August 2019 with the Lead Agencies for SAP BOBLME including DOE. These were to prepare and finalise the input for the Draft Project Document of BOBLME Phase 2 which will be implemented in 2021-2024.

Perbincangan dengan Agensi Utama yang Terlibat dengan Projek BOBLME
Discussion with the Main Agencies Involved with BOBLME Project

Barisan Ahli Mesyuarat Membincangkan Pelaksanaan Strategic Action Programme (SAP) BOBLME Bersama Pakar Daripada Food and Agriculture Organization (FAO)
Members of the Meeting Discussing The Implementation of BOBLME Strategic Action Program (SAP) with Expert from the Food and Agriculture Organization (FAO)

BAB 7
CHAPTER 7

PROGRAM- PROGRAM PROMOSI DAN KESEDARAN
PROMOTIONAL AND AWARENESS PROGRAMMES

PROGRAM RAKAN ALAM SEKITAR (RAS)
RAKAN ALAM SEKITAR (RAS) PROGRAMME

RAS yang dilancarkan pada 4 Jun 2009 telah mempunyai seramai 348,193 ahli di seluruh Malaysia sehingga 31 Disember 2019. Program RAS melibatkan anggota masyarakat secara hands-on iaitu menjadi mata dan telinga untuk membantu agensi-agensi kerajaan yang bertanggungjawab dalam membanteras kegiatan-kegiatan yang merosakkan atau mencemarkan alam sekitar.

RAS was launched on the 4th of June 2009 and there were 348,193 registered members until 31st December 2019. RAS programmes involve community members in hands-on of the eyes and ears to help the Government agencies responsible for combating the activities that damage or pollute the environment.

Objektif :

Objectives:

1. Memberi kesedaran alam sekitar di setiap lapisan masyarakat
   Provide environmental awareness at all levels of society
2. Memupuk rasa tanggungjawab di kalangan masyarakat untuk bertindak dan mengambil bahagian dalam menjaga alam sekitar
   To include a sense of responsibility in society to act and participate in caring for the environment
3. Menyediakan saluran yang tepat bagi masyarakat membuat aduan
   Provide proper channel for the public to make complaints or suggestions

Aktiviti –Aktiviti Program RAS
RAS Programme Activities

Program Enviro Hiking sempena Sambutan Hari Bumi di Gunung Angsi, Negeri Sembilan
Enviro Hiking Programme in conjunction with Earth Day at Gunung Angsi, Negeri Sembilan

Program Enviro Hiking sempena Sambutan Hari Alam Sekitar Negara di Gunung NoPunggok, Kota Belud, Sabah bersama LPSSA.
Enviro Hiking Programme in conjunction with National Environment Day at Gunung NoPunggok, Kota Belud, Sabah with LPSSA

Program Plogging Bersama Ahli RAS Sempena Sambutan Hari Bumi di Sabah.
Plogging Programme with RAS members in conjunction with Earth Day Celebration in Sabah.

PAMERAN ALAM SEKITAR

Pameran merupakan salah satu platform yang digunakan dalam menyampaikan informasi kepada masyarakat awam. Pada tahun 2019, JAS Ibu Pejabat telah menyertai sebanyak 21 pameran bertemakan alam sekitar yang dianjurkan oleh JAS dan yang dijemput oleh rakan strategik dan agensi lain.

ENVIRONMENT EXHIBITIONS

Exhibitions are one of the platforms used to convey information to the public. In 2019, the DOE Headquarters has been participated 21 Environmental Exhibitions that organized by DOE and invited by other strategic partners and agencies.

Pameran Tangisan Sg.Kim Kim di Pusat Sains Negara sempena Minggu Sains Negara.
'Tangisan Sg. Kim Kim' Exhibition at National Science Centre in conjunction with National Science Week.

Pameran Sempena Seminar Pematuhan Continuing Professional Development (CPD Hours) anjuran EiMAS, JAS di Hotel Tenera, Bangi.
Exhibition in conjunction with Seminars Pematuhan Continuing Professional Development (CPD Hours) organised by EiMAS, DOE at Tenera Hotel, Bangi.

BENGKEL PENYEDIAAN DOKUMEN GARIS PANDUAN NUDGE BAGI MENGUKUHKAN PENGURUSAN KELESTARIAN ALAM SEKITAR

Bahagian Komunikasi Strategik, JAS telah melaksanakan satu Bengkel Penyediaan Dokumen Garis Panduan Kaedah Nudge Bagi Mengukuhkan Pengurusan Kelestarian Alam Sekitar pada 29 hingga 30 April 2019 di Hotel RHR, Bangi.

Melalui bengkel ini perbincangan berkumpulan telah dibuat bagi merangka dokumen garis panduan dan disamping itu para perserta bengkel juga telah didedahkan konsep nudge yang digunapakai oleh negara-negara maju. Bengkel ini turut dihadiri oleh Y.Brs. Puan Norlin bt. Jaafar (Timbalan Ketua Pengarah (Pembangunan), Tn. Hj. Ruslan bin Mohamad (Pengarah Bahagian Komunikasi Strategik), pasukan dari Universiti Teknologi Malaysia (UTM) yang diketuai oleh Prof. Madya Dr Choong Weng Wai serta pegawai JAS.

WORKSHOP ON PREPARATION OF NUDGE GUIDANCE DOCUMENT IN STRENGTHENING THE ENVIRONMENTAL SUSTAINABILITY MANAGEMENT

The Strategic Communications Division, DOE conducted a 'Workshop for Preparing a Document of Nudge Guidance to Strengthen Environmental Sustainability Management' on the 29th and 30th of April 2019 at the RHR Hotel, Bangi.

During this workshop, group discussions were held to draft the guideline and the workshop participants were also exposed to the concept of nudge practiced by developed countries. The workshop was also attended by YBrs. Mrs. Norlin bt. Jaafar (Deputy Director General (Development), Mr. Hj. Ruslan bin Mohamad (Director of Strategic Communication Division), a team from University of Technology Malaysia (UTM) led by Associate Prof. Dr Choong Weng Wai and officers from DOE.

Aktiviti Perbincangan Bersama Y. Brs. Puan Norlin bt. Jaafar, Timbalan Ketua Pengarah (Pembangunan) dan Pihak Universiti Teknologi Malaysia serta pegawai Jabatan Alam Sekitar.
Discussion Activities with Y. Brs. Mrs. Norlin bt. Jaafar, Deputy Director General (Development) and University of Technology Malaysia and Department of Environment officers.

PROGRAM KESEDARAN DENGAN MENGGUNAKAN KAEDAH NUDGE

JAS dengan kerjasama pihak Universiti Teknologi Malaysia (UTM) telah melaksanakan satu program dengan mengguna kaedah nudge iaitu teknik peringatan bagi mengingatkan pengunjung pasaraya supaya dapat membawa beg guna semula.

Papan tanda Teknik Peringatan (nudge) diletakkan di tempat letak kereta supaya ia dapat menarik perhatian pengunjung dan seterusnya dapat membawa beg guna semula.

AWARENESS PROGRAM USING NUDGE METHOD

The DOE in collaboration with University of Technology Malaysia (UTM) had implemented a program using the nudge method of 'Reminder Technique' to remind hypermarket visitors to bring reusable bags.

The signage (nudge) was placed in the parking lot so that it can attract visitors and bring a reusable bag.

Program Kesedaran Dengan Menggunakan Kaedah Nudge Di Giant Hypermarket, Shah Alam.
Awareness Program Using The Nudge Method At Giant Hypermarket, Shah Alam.

PROGRAM KESEDARAN ALAM SEKITAR BERSEMPENA DENGAN HARI BUMI
ENVIRONMENTAL AWARENESS PROGRAM IN CONJUNCTION WITH EARTH DAY

Tanggal 24 April setiap tahun, Hari Bumi disambut oleh masyarakat di seluruh dunia. Ianya bermula sebagai satu gerakan di Amerika sejak 1970an yang bertujuan meningkatkan kesedaran serta melibatkan penyertaan orang awam dalam usaha ke arah pemeliharaan dan pemuliharaan alam sekitar serta menarik minat masyarakat setempat untuk mengambil tahu, memahami dan seterusnya menghayati mesej alam sekitar yang ingin disampaikan.

Tema Hari Bumi pada tahun 2019 adalah Lindungi Spesis Kita (Protect Our Species). Tema ini dipilih bertujuan untuk menarik perhatian masyarakat mengenai isu pengurangan dan kemusnahan spesis tumbuh-tumbuhan dan populasi haiwan liar adalah berhubungkait dengan aktiviti manusia seperti pencemaran alam sekitar, aktiviti pertanian dan penggunaan racun perosak yang tidak terkawal, penebangan hutan, perubahan iklim serta pemerdagangan dan pemburuan haram. Pendekatan yang diambil dalam usaha untuk memulihara ekosistem dijangka akan:

i. Mendidik dan meningkatkan kesedaran masyarakat mengenai kepupusan berjuta-juta spesies dan punca serta akibat kepupusan tersebut.

ii. Membina dan mengaktifkan pergerakan di peringkat global yang merangkumi sifat dan nilai intrinsik alam sekitar.

iii. Usaha ke arah pencapaian dari segi penetapan dasar dan polisi yang melindungi spesies spesifik di seluruh dunia.

Di Malaysia, pelbagai aktiviti bertemakan alam sekitar dianjurkan oleh pelbagai pihak bersempena dengan Hari Bumi 2019. Kementerian Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC) melalui JAS telah menganjurkan Majlis Pelancaran Hari Bumi 2019 di Telok Likas, Kota Kinabalu, Sabah pada 20 hingga 21 April 2019 dengan pengisian beberapa signature event seperti aktiviti plogging dan gotong royong, pertandingan mewarna, pertandingan ikon cilik alam sekitar, pameran alam sekitar, Program Pengumpulan Buangan Elektrik dan Elektronik Isi Rumah

On the 24th of April every year, Earth Day is celebrated by communities around the world. It has begun as a movement in America since the 1970s aiming at raising awareness and engaging the public in efforts towards preserving and conserving the environment, and attracting local people to recognise, understand and further appreciate the environmental message.

The theme for Earth Day for 2019 was Protect Our Species. The theme was chosen to draw the public's attention to the issue of degradation and destruction of fauna and flora species, especially wildlife populations in relation to human activities such as environmental pollution, agricultural activities and the use of uncontrolled pesticides, deforestation, climate change and poaching. The approaches taken in an effort to conserve the ecosystem were expected as follows:

i. Educating and raising public awareness of the extinction of millions of species and the causes and consequences of extinction;

ii. Building and activating global movements that include the intrinsic nature and value of the environment; and

iii. Promoting efforts towards achievement in terms of policy setting to protect specific species worldwide.

In Malaysia, various environmental related activities were organised by various parties in conjunction with Earth Day 2019. The Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) through the DOE organised the Earth Day 2019 Launch Ceremony in Telok Likas, Kota Kinabalu, Sabah on the 20th and 21st of April 2019 with a host of signature events such as gotong royong, colouring contest, environmental youth icon contest, environmental exhibition, Household e-Waste Collection Program, Protect Our Species Expedition and the Environmental

(Household E-Waste), ekspedisi Lindungi Spesies Kita dan Kem Kesedaran Alam Sekitar. Majlis pelancaran ini telah disempurnakan oleh YB Timbalan Menteri Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim (MESTECC). Selain daripada Program Pengumpulan Buangan Elektrik dan Elektronik Isi Rumah ini bertujuan untuk meningkatkan kesedaran orang awam mengenai pengurusan dan pelupusan e-waste secara selamat, hebahan kesedaran mengenai promosi tanpa penggunaan plastik sekali guna turut dilaksanakan. Ianya adalah merupakan salah satu Inisiatif MESTECC yang digariskan untuk mengurangkan penjanaan sisa plastik sekali guna yang berupaya memberi impak kepada spesies hidupan marin. Aktiviti ekspedisi Lindungi Spesies Kita dan Kem Kesedaran Alam Sekitar yang disertai oleh para pelajar dan peserta awam telah memberikan nilai tambah kepada mereka dalam menghargai keberadaan sesuatu spesies kerana ianya saling melengkapi antara satu sama lain di dalam sebuah ekosistem.

Awareness Camp. The launch was officiated by the Deputy Minister of Energy, Science, Technology, Environment and Climate Change (MESTECC). In addition to the Household e-Waste Collection Program, the objective was to raise the public's awareness on e-waste management and disposal, as well as to promote the single-use plastic campaign. It was one of MESTECC's initiatives designed to reduce the generation of single-use plastic waste that has the potential to impact marine species. Protecting Our Species Expedition and Environmental Awareness Camps attended by students and public participants had given them added value in recognising the existence of a species as it complements each other within an ecosystem.

Pelbagai program kesedaran alam sekitar juga dianjurkan oleh JAS Negeri bersempena dengan Hari Bumi 2019. Antaranya adalah plogging di pantai, seminar, pameran dan enviro-hiking. Selaras dengan tema Hari Bumi 2019 iaitu Lindungi Spesies Kita, aktiviti pentas yang dimeriahkan dengan persembahan artis tempatan dan Geng Bubut RTM telah menyampaikan mesej yang berkesan mengenai keperluan semua pihak berganding bahu dalam memastikan nilai yang tinggi untuk mengekalkan populasi semua spesies bagi kelangsungan hidup manusia sejagat.

Various environmental awareness programs were also organised by the DOE state offices in conjunction with Earth Day 2019. These included beach cleanup, seminars, exhibitions and enviro-hiking. In line with the 2019 Earth Day theme of "Protect Our Species," the live-action stage performance by local artist and RTM's had delivered an effective message about the need for all parties to work together to ensure high value in maintaining the populations of all species for human survival.

Program Pengumpulan Buangan Elektrik Dan Elektronik Isi Rumah
Household Electrical and Electronics Waste Collection Program

Aktiviti Plogging Di Pantai Bersama Ahli RAS dan Pelajar Sekolah
Plogging Activities At The Beach With RAS Members and School Students

HARI ALAM SEKITAR NEGARA (HASN)
NATIONAL ENVIRONMENT DAY (HASN)

HASN merupakan penjenamaan semula daripada Minggu Alam Sekitar Malaysia (MASM) yang telah disambut buat julung kalinya pada 22 Oktober 2016. Penganjuran sambutan HASN/ MASM oleh Kementerian Sumber Asli dan Alam Sekitar melalui JAS ini telah diadakan pada setiap tahun bermula pada tahun 1991 dan penjenamaan semula ini adalah selaras dengan usaha ke arah mentransformasikan program kesedaran alam sekitar kepada masyarakat awam bagi mendapatkan impak yang lebih besar. Penjenamaan semula ini adalah bertujuan untuk mengajak seluruh masyarakat agar sama-sama meraikan semangat kecintaan kepada alam sekitar. Objektif HASN adalah:

i. Mempromosikan pendidikan dan kesedaran alam sekitar secara meluas di kalangan orang awam dari pelbagai lapisan masyarakat;

ii. Menyediakan platform kepada masyarakat untuk bersama-sama dalam menghayati alam sekitar;

iii. Memupuk kesedaran di kalangan masyarakat khususnya dalam pemeliharaan dan pemuliharaan alam sekitar; dan

iv. Meningkatkan dan mengukuhkan jalinan kerjasama antara Jabatan dan Kementerian dengan pihak luar seperti Kerajaan Negeri, industri, swasta, badan bukan kerajaan (NGO), institusi pengajian tinggi, media dan masyarakat setempat.

The National Environment Day (HASN) is a re-branding of the Malaysian Environment Week (MASM) and it was celebrated for the first time on the 22nd of October 2016. The celebration of MASM is organised annually by the Ministry of Natural Resources and Environment through the DOE since 1991 and this re-branding is in line with the efforts made towards transforming the environmental awareness program to gain greater impact to the public. This re-branding aims at bringing the whole community to celebrate the spirit of love for the environment. The objectives of HASN are:

i. To promote education and environmental awareness among the public;

ii. To provide a platform to all Malaysians in celebrating and appreciating the environment;

iii. To increase public awareness towards the preservation and conservation of the environment; and

iv. To enhance and strengthen cooperation between the ministries and departments with external parties such as state governments, industries, private sectors, non-governmental organisations (NGOs), higher learning institutions, media and local community.

Sambutan HASN menyasarkan pelbagai lapisan masyarakat seperti kanak-kanak tadika, sekolah, institusi pengajian tinggi (IPT), badan-badan bukan kerajaan (NGO), komuniti setempat, agensi kerajaan dan swasta, industri dan orang awam.

The celebration of HASN targets various levels of society such as kindergartens, schools, institutions of higher learning (IPTs), non-governmental organisations (NGOs), local communities, government and private agencies, industries and the public.

Sambutan HASN 2019 disambut meriah sekali lagi setelah ditangguhkan pelaksanaannya pada tahun 2018. Majlis Pelancaran Hari Alam Sekitar Negara Tahun 2019 telah diadakan pada 19 Oktober 2019 di Taman Pudu Ulu, Cheras, Kuala Lumpur. Majlis tersebut telah disempurnakan bersama oleh YB Yeo Bee Yin Menteri Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim dan YB Tuan Khalid Bin Abdul Samad, Menteri Wilayah Persekutuan. Antara aktiviti pengisian kepada program tersebut adalah Pertandingan Pakaian Beragam dari Bahan Kitar Semula, Pocket Talk, Enviro Race, Persembahan Kebudayaan, Penanaman Pokok, Program Kitar Semula Buangan, Program Pengumpulan eWaste, Zumba, Beyblade, Face Painting, penanaman pokok dan lain–lain pengisian pameran interaktif telah dilaksanakan. Program tersebut telah dihadiri oleh lebih kurang 5,010 orang peserta yang terdiri daripada pihak agensi kerajaan negeri dan persekutuan, industri, pelajar dari institusi pengajian tinggi dan sekolah serta masyarakat setempat.

The celebration of HASN 2019 was celebrated once again with the suspension of the event in 2018. The program was held on the 19th October 2019 at Taman Pudu Ulu, Cheras, Kuala Lumpur. The event was jointly launched by YB Yeo Bee Yin Minister of Energy, Science, Technology, Environment and Climate Change and YB Tuan Khalid bin Abdul Samad, Minister of Federal Territories. Among the activities for the program were Fashion Contests from Recycling Materials, Pocket Talk, Enviro Race, Cultural Shows, Tree Planting, Waste Recycling Program, e-Waste Collection Program, Zumba, Beyblade, Face Painting, tree planting and other interactive exhibitions. The programme was attended by 5,010 participants from various government agencies, industries, students and local communities.

Sambutan HASN pada tahun 2019 telah dianjurkan secara serentak di seluruh Negara pada bermula 19 hingga 21 Oktober 2017 dengan tema Alam Sekitar Tanggungjawab Bersama. Pelbagai aktiviti menarik juga telah dilaksanakan dan antaranya melibatkan seminar berkaitan pengurusan alam sekitar, pertandingan fotografi eko–kreatif, gotong royong, pembersihan pantai, pertandingan pentomin bertemakan alam sekitar, envir amazing race, promosi No Single Use Plastic, penanaman pokok, pengumpulan e-waste dan pameran alam sekitar. Jumlah kehadiran keseluruhan sambutan Hari Alam Sekitar Negara 2019 yang disambut diseluruh negara mencapai 30,150 orang yang hadir.

The HASN 2019 celebration was held simultaneously throughout the country from the 19th to the 21st October 2019 with the theme Environment is Our Responsibility. A number of interesting activities were carried out, including seminars on environmental management, eco-creative photography competition, gotong royong, beach cleanup, environmental themed pantomime competition, enviro amazing race, No Single Use Plastic campaign, tree planting, e-waste collection and environmental exhibitions. The total attendance of the country's HASN 2019 celebration reached almost 30,150 people.

Bagi merancakkan rasa semarak sambutan pelbagai aktiviti awal lain turut diadakan bersempena dengan HASN 2019, antaranya adalah bacaan khutbah Jumaat, sesi temubual melalui radio penyiar tempatan dan negeri dan televisyen dan seminar pengurusan yang dilaksanakan di seluruh Negara. Penganjuran sambutan HASN 2019 telah mendapat kerjasama dan sokongan padu dari Kerajaan

In addition, other early activities in conjunction with HASN 2019 included khutbah readings, interviews with local and state radio broadcasters and television and management seminars conducted nationwide. The organisation of the HASN 2019 celebration had received strong cooperation and support from the state government as well as federal government agencies and environmental

Negeri serta semua agensi kerajaan di peringkat Negeri dan Persekutuan serta Rakan Strategik Alam Sekitar. Komitmen dari semua pihak dalam menjayakan penganjuran sambutan HASN 2019 menunjukkan semangat perpaduan ke arah melestarikan alam sekitar secara bersama.

strategic partners. Commitment from all parties contribute to the success of the HASN 2019 celebration reflects the spirit of unity towards conserving the environment.

Perasmian Hari Alam Sekitar Negara 2019 oleh Y.B. Tuan Khalid bin Abd. Samad, Menteri Wilayah Persekutuan
Commencement of National Environment Day 2019 by the Minister of Federal Territories, Y.B Tuan Khalid Abd. Samad

Flag-off Eco Fun Walk oleh YBrs. Puan Norlin binti Jaafar, Ketua Pengarah Jabatan Alam Sekitar
Eco Fun Walk Flag Off Ceremony by YBrs. Puan Norlin binti Jaafar, Director-General, Department of Environment

Program 1 Warga 1 Pokok bersama pelajar Institut Pengajian Tinggi (IPT) dengan penampilan selebriti Maya Karin
"1 Warga 1 Pokok" Program with Students From the Institute of Higher Learning Alongside Celebrity Maya Karin

PROGRAM SEKOLAH LESTARI- ANUGERAH ALAM SEKITAR (SLAAS) SESI 2018/2019

SUSTAINABLE SCHOOLS - ENVIRONMENTAL AWARDS PROGRAMME SESSION 2018/2019

Program Sekolah Lestari-Anugerah Alam Sekitar (SLAAS) menitikberatkan konsep pendekatan bersepadu dengan menggembelingkan empat (4) komponen utama iaitu Pengurusan, Kurikulum, Kokurikulum dan Penghijauan di sekolah. Pada masa yang sama, penekanan juga turut mengfokuskan aspek Elemen Khas seperti Pengurusan Kamar Selesa, Keusahawanan serta Teknologi dan Inovasi.

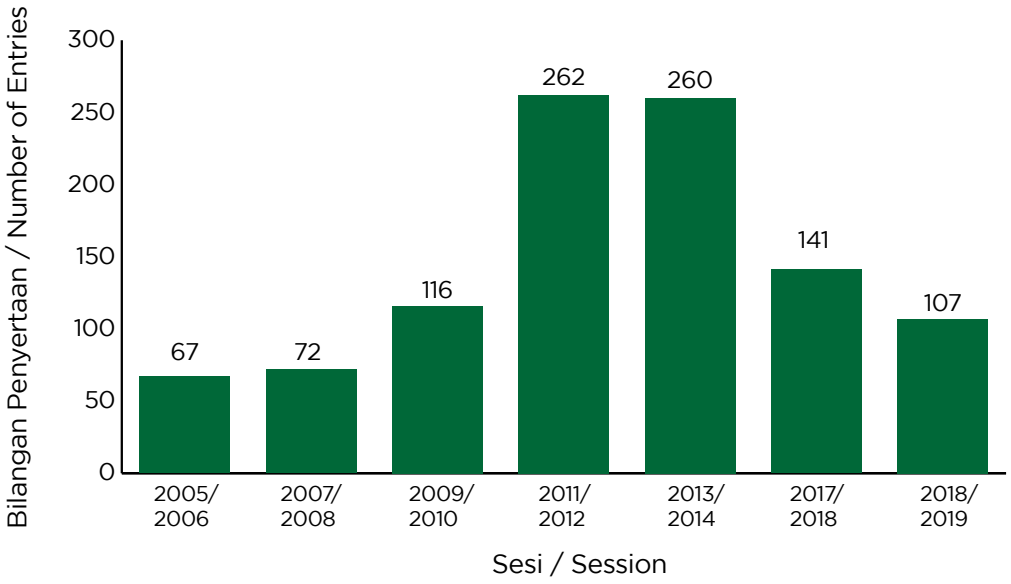
Program SLAAS telah bermula pada tahun 2005 dan program ini telah dilaksanakan sebanyak tujuh (7) sesi sehingga tahun 2019. **Rajah 7.1** menunjukkan Penyertaan Keseluruhan Sekolah Lestari. Manakala **Jadual 7.1** menunjukkan data bilangan sekolah yang terlibat di dalam program SLAAS bagi tempoh tujuh (7) sesi mengikut negeri di seluruh Malaysia.

Bagi program SLAAS Sesi 2018/2019 telah dilaksanakan dengan kerjasama Kementerian Pendidikan Malysia (KPM), Institut Alam Sekitar dan Pembangunan (LESTARI), UKM dan Yayasan Bank Rakyat (YBR). Penyertaan SLAAS telah dibuka bermula pada 28 Januari 2019 hingga 15 Mei 2019 secara atas talian. Sekolah menyerahkan borang penyertaan, laporan sekolah dan video menerusi google drive yang ditetapkan. Proses penilaian sekolah melibatkan dua (2) peringkat iaitu Penilaian Peringkat Negeri dan Penilaian Peringkat Kebangsaan. Sebanyak 107 penyertaan telah diterima dari sekolah-sekolah seluruh Malaysia. Bilangan penyertaan terdiri daripada 60 buah Sekolah Rendah dan 47 buah Sekolah Menengah. **Jadual 7.2** dan **Jadual 7.3** menyenaraikan sekolah-sekolah yang telah menyertai program SLAAS Sesi 2018/2019.

The Sustainable Schools - Environmental Awards Program (SLAAS) emphasizes on integrated concepts by addressing four (4) key components related to Management, Curriculum, Co-Curriculum and Greening. At the same time, the emphasis is also on aspects of Special Elements such as Kamar Selesa, Entrepreneurship and Technology and Innovation.

The SLAAS program began in 2005 and has been running for seven (7) sessions through 2019. **Figure 7.1** shows the number of school participation in Sustainable Schools - Environmental Awards. **Table 7.1** shows the number of schools participation fractions by state for the last seven (7) sessions.

For the SLAAS Session 2018/2019 program was implemented in collaboration with the Ministry of Education (MOE), Institute of Environment and Development (LESTARI), UKM and Bank Rakyat Foundation (YBR). SLAAS entries are open from 28th January 2019 to 15th May 2019 online. Schools would submit entry forms, school reports and videos through a designated google drive. The evaluation process is divided into two (2) stages namely the state level and the national level. A total of 107 schools throughout Malaysia have participated in this program of which 60 are primary schools and 47 secondary schools. **Table 7.2** and **Table 7.3** list the participating schoos in SLAAS Program for 2018/2019 session.



Rajah 7.1: Penyertaan Keseluruhan Sekolah Lestari- Anugerah Alam Sekitar
Figure 7.1: Overall Number of School Participation in Sustainable Schools - Environmental Awards

Jadual 7.1: Bilangan Penyertaan Sekolah Lestari-Anugerah Alam Sekitar Mengikut Negeri
Table 7.1: Number of Schools Participation Fractions By State

NEGERI/ STATE	SESI (TAHUN) / SESSION (YEAR)							JUMLAH/ TOTAL
	2005/2006	2007/2008	2009/2010	2011/2012	2013/2014	2017/2018	2018/2019	
Selangor	13	3	7	18	26	6	4	**77**
Sarawak	17	10	27	52	35	11	7	**159**
Pulau Pinang	4	6	6	18	31	16	16	**97**
Sabah	5	4	11	23	40	33	15	**131**
Terengganu	3	2	2	7	9	6	4	**33**
Johor	5	15	28	27	33	17	15	**140**
Perak	11	3	6	23	8	1	4	**56**
Kedah	1	4	7	27	12	9	3	**63**
Negeri Sembilan	1	8	4	7	9	12	7	**48**
Pahang	0	7	3	20	8	9	5	**52**
Perlis	0	6	1	5	3	2	9	**26**
Melaka	0	3	3	13	7	10	6	**42**
Kelantan	7	1	6	6	14	4	7	**45**
W.P. Kuala Lumpur	0	0	5	11	23	2	3	**44**
W.P. Labuan	0	0	0	5	2	3	2	**12**
Jumlah / Total	**67**	**72**	**116**	**262**	**260**	**141**	**107**	**1,025**

Jadual 7.2: Peyertaan SLAAS Sesi 2018/2019 (Sekolah Rendah)
Table 7.2: SLAAS Participation for 2018/2019 Session (Primary School)

BIL./ NO	NAMA SEKOLAH / SCHOOL NAME	NEGERI / STATE	BIL. PELAJAR / NUMBER OF STUDENTS
1	SJKC ENG CHUAN	PULAU PINANG	53
2	SJKC KUALA KEMAMAN	TERENGGANU	150
3	SK BAYAN BARU	PULAU PINANG	760
4	SK PUTRA	PERLIS	466
5	SK LUI SELATAN	NEGERI SEMBILAN	296
6	SJKC SIN MIN	PULAU PINANG	28
7	SJK TUNG HUA, SIBU	SARAWAK	825
8	SK LAMBIDAN	SABAH	38
9	SJKC CHENG MING	SABAH	181
10	SK KEBUN SIREH	PULAU PINANG	575
11	SJKT RINGLET	PAHANG	82
12	SK BABAGON TOKI	SABAH	62
13	SK BUKIT DAMANSARA	WPKL	1,062
14	SK TAMAN IMPIAN	PULAU PINANG	356
15	SK LIANG BATU LENGA	JOHOR	51
16	SK KAYANG	PERLIS	857
17	SJKC KWANG HWA	PULAU PINANG	1,472
18	SK PALONG 14	NEGERI SEMBILAN	135
19	SK TAMAN SENANGAN	PULAU PINANG	721
20	SJKC EOK HUA	PULAU PINANG	65
21	SJKC LEE CHEE	PULAU PINANG	156
22	SK PASIR PUTIH	SABAH	759
23	SK TASIK DAMAI	PERAK	988
24	SK TAMAN BUKIT MALURI	WPKL	501
25	SK TIONG WIDU	SABAH	42
26	SK TAMAN SURIA	JOHOR	925
27	SJKC SIN MIN	PERLIS	189
28	SJKC UNION	PULAU PINANG	769
29	SK ALMA JAYA	PULAU PINANG	757
30	SK SUASA	SABAH	75
31	SJKC KHOON AIK	PERLIS	714
32	SK LKTP CHUPING	PERLIS	333
33	SK ALOR MENGKUDU	KEDAH	450
34	SJKC MIN DAIK	SARAWAK	127
35	SK DATUK AWANG UDIN	SARAWAK	367
36	SJKT RAMAKRISHNA	PULAU PINANG	270
37	SK SG. DUA	NEGERI SEMBILAN	92
38	SK KUALA BERANG	TERENGGANU	510
39	SK JALAN ENAM	SELANGOR	1,682
40	SK SANDAU	SABAH	277
41	SK PEKAN II	WP LABUAN	735
42	SK TERUNTUM	PAHANG	948
43	SK GOLONG, BELURAN	SABAH	79
44	SK JAYA SETIA	SELANGOR	300
45	SK SEPAGAYA	SABAH	637

Jadual 7.2: Peyertaan SLAAS Sesi 2018/2019 (Sekolah Rendah)
Table 7.2: SLAAS Participation for 2018/2019 Session (Primary School)

BIL./ NO	NAMA SEKOLAH / SCHOOL NAME	NEGERI / STATE	BIL. PELAJAR / NUMBER OF STUDENTS
46	SK SERI LALANG	JOHOR	350
47	SK BUKIT BAKONG	SELANGOR	206
48	SK HOLY CROSS	SABAH	111
49	SK CONVENT INFANT JESUS	MELAKA	318
50	SK KAMPUNG TUN RAZAK	MELAKA	1,056
51	SK RUMINDING	SABAH	8
52	SK PASIR PEKAN	KELANTAN	837
53	SK TUNKU MAHMOOD 2	JOHOR	595
54	SK ABDUL RAHMAN YASSIN	JOHOR	56
55	SK JUBLI INTAN	JOHOR	127
56	SK BUNUT SUSU	KELANTAN	573
57	SK KIAMBANG	KELANTAN	1,186
58	SK NETING, KELANTAN	KELANTAN	671
59	SJKT MERLIMAU	MELAKA	111
60	SK SERI MACHAP	MELAKA	210
JUMLAH			27,332

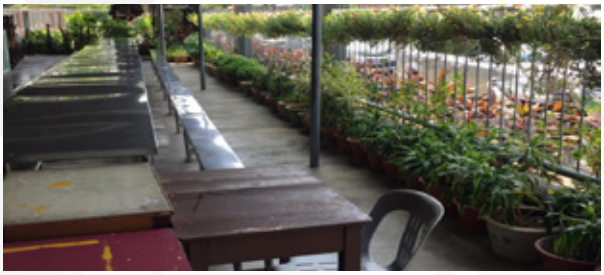
Jadual 7.3: Penyertaan SLAAS Sesi 2018/2019 (Sekolah Menengah)
Table 7.3: SLAAS Participation for 2018/2019 Session (Secondary School)

BIL./ NO	NAMA SEKOLAH / SCHOOL NAME	NEGERI / STATE	BIL. PELAJAR / NUMBER OF STUDENTS
1	SMK RAJA PEREMPUAN	PERAK	797
2	SMK SANGLANG	PERLIS	428
3	SMK(A) PEREMPUAN ALAWIYAH	PERLIS	655
4	SMK CONVENT PULAU TIKUS	PULAU PINANG	215
5	SMK PADANG MIDIN	TERENGGANU	1,613
6	SMK BERAPIT	PULAU PINANG	1,425
7	SMK TAWAU	SABAH	1,779
8	SMK CONVENT TAIPING	PERAK	543
9	SMK SIMPANG KUALA	KEDAH	604
10	SM ST PATRICK	SABAH	1,433
11	SMK KAMPUNG PASIR PUTEH	PERAK	1,127
12	SMK INDERAPURA	PAHANG	505
13	SMK SUNGAI SOI	PAHANG	948
14	SMK DATO ONN	PULAU PINANG	640
15	SMK PAYA PULAI	PAHANG	410
16	SMK TELOK KERANG	JOHOR	510
17	SMK TUNKU AMPUAN NAJIHAH	NEGERI SEMBILAN	482
18	SMK CONVENT BUKIT MERTAJAM	PULAU PINANG	728
19	SMK MEGAT DEWA	KEDAH	1,079
20	SMK DATUK MANSOR	NEGERI SEMBILAN	1,113
21	SMK BANDAR SIBU	SARAWAK	840
22	SMK BUKIT ASSEK, SIBU	SARAWAK	851
23	SMK PENDING	SARAWAK	1,177

Jadual 7.3: Penyertaan SLAAS Sesi 2018/2019 (Sekolah Menengah)
Table 7.3: SLAAS Participation for 2018/2019 Session (Secondary School)

BIL./ NO	NAMA SEKOLAH / SCHOOL NAME	NEGERI / STATE	BIL. PELAJAR / NUMBER OF STUDENTS
24	SMK TENGKU SULEIMAN	PERLIS	1,087
25	SMK AGASEH	SABAH	2,405
26	SMK UNDANG JELEBU	NEGERI SEMBILAN	455
27	SMK DURIAN TUNGGAL	MELAKA	1,154
28	SMK TUNKU KURSIAH	NEGERI SEMBILAN	362
29	SMK AGAMA MIRI	SARAWAK	702
30	SMK TAPU	TERENGGANU	200
31	SMK RANCHA-RANCHA	WP LABUAN	416
32	SMK(P) AIR PANAS	WPKL	674
33	SMK TAMAN RIA	SABAH	728
34	SMK TUN MUTAHIR	MELAKA	1,138
35	SMK SULTAN ISMAIL	JOHOR	926
36	SMK KELAPA SAWIT	JOHOR	1,521
37	SMK MEDINI	JOHOR	550
38	SMK TANJUNG PENGELIH	JOHOR	74
39	SMK MAJIDI BARU 2	JOHOR	1,260
40	SMK BANDAR UDA UTAMA	JOHOR	1,457
41	SMK EMPIAN EMAS	JOHOR	1,572
42	SMKA LATI, KELANTAN	KELANTAN	757
43	SMK TG BUDRIAH	PERLIS	575
44	SMK KIAMBANG	KELANTAN	728
45	SMK BANDAR MAHARANI	JOHOR	610
46	SMK DEWAN BETA	KELANTAN	570
47	SMK SERI KERAMAT	SELANGOR	778
JUMLAH / TOTAL			40,621



Projek Yang Dilaksanakan Di Sekolah Bagi Penyertaan Program Sekolah Lestari Anugerah Alam Sekitar (SLAAS)
Projects That Were Done in School to Participate in SLAAS

MAJLIS PENGANUGERAHAN SEKOLAH LESTARI-ANUGERAH ALAM SEKITAR SESI 2018/2019
SUSTAINABLE SCHOOLS - ENVIRONMENTAL AWARDS CEREMONY SESSION 2018/2019

Majlis Penganugerahan SLAAS Sesi 2018/2019 telah diadakan serentak dengan Sambutan Hari Alam Sekitar Negara Peringkat Kebangsaan yang disempurnakan oleh YB Tuan Haji Khalid Bin Abd. Samad, Menteri Wilayah Persekutuan dan turut dihadiri oleh YB Puan Yeo Bee Yin, Menteri Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim pada 19 Oktober 2019 bertempat di Taman Pudu Ulu, Cheras, Wilayah Persekutuan Kuala Lumpur.

Penyampaian anugerah SLAAS telah disampaikan oleh YB Tuan Haji Khalid Bin Abd. Samad diiringi oleh YB Puan Yeo Bee Yin dan disaksikan bersama oleh YBrs. Puan Norlin Bt Jaafar, Ketua Pengarah Alam Sekitar, YBhg. Dr. Nagulendran Kangayatkarasu, Timbalan Ketua Setiausaha (Alam Sekitar dan Perubahan Iklim), YBhg. Dato' Rosman Mohamed, Pemangku Pengarah Bank Rakyat, YBrs. Puan Norashikin Shaharudin, Pengurus Besar YBR serta Encik Abd Samad Khalid, Setiausaha Lembaga Pemegang Amanah Yayasan Bank Rakyat.

Penglibatan pelajar sewaktu Majlis Penganugerahan SLAAS dianggarkan seramai 1,500 orang pelajar sekolah rendah dan menengah yang melibatkan 30 sekolah serta 500 orang mahasiswa Institusi Pendidikan Tinggi (IPT) (**Jadual 7.4** dan **Jadual 7.5**).

The Sustainable School - Environmental Award Session 2018/2019 award ceremony was held simultaneously with the National Level, National Environment Day Celebration which is officiated by YB Tuan Haji Khalid Bin Abd. Samad, Minister of Federal Territories and also attended by YB Mrs. Yeo Bee Yin, Minister of Energy, Science, Technology, Environment and Climate Change on 19th October 2019 at Taman Pudu Ulu, Cheras, Federal Territory of Kuala Lumpur.

The awards have been given by YB Tuan Haji Khalid Bin Abd. Samad was accompanied by YB Mrs. Yeo Bee Yin and witnessed together by YBhg. Dr. Nagulendran Kangayatkarasu, Deputy Secretary General (Environment and Climate Change), YBrs. Mrs. Norlin Bt Jaafar, Director General of Environment, YBhg. Dato 'Rosman Mohamed, Acting Director of Bank Rakyat, YBrs. Mrs. Norashikin Shaharudin, General Manager of Yayasan Bank Rakyat and Mr. Abd Samad Khalid, Secretary of the Board of Trustees of Yayasan Bank Rakyat.

A total of 1,500 students from 30 schools and 500 students of Higher Education Institutions attended during the SLAAS Award Ceremony. **(Table 7.4** and **Table 7.5)**.

Penyampaian cenderahati kepada YB Tuan Haji Khalid Bin Abd. Samad, Menteri Wilayah Persekutuan
Presentation of souvenirs to YB Tuan Haji Khalid Bin Abd. Samad, Minister of Federal Territories

Penerima Anugerah Utama SLAAS Sesi 2018/2019 Kategori Sekolah Rendah - SK Putra, Perlis
Recipients of the SLAAS Main Award Session 2018/2019 Primary School Category - SK Putra, Perlis

Penerima Anugerah Khas SLAAS (Kamar Selesa Lestari) Sesi 2018/2019 Kategori Sekolah Menengah - SMK Padang Midin, Terengganu
Recipient of SLAAS Special Award (Kamar Selesa) Session 2018/2019 Secondary School Category SMK Padang Midin, Terengganu

Penerima Anugerah Khas SLAAS (Komponen Kurikulum) Sesi 2018/2019 Kategori Sekolah Rendah - SK Lambidan, Sabah
Recipient of SLAAS Special Award (Curriculum Component) Session 2018/2019 Primary School Category - SK Lambidan, Sabah

Penerima Anugerah Khas SLAAS (Sekolah Harapan) Sesi 2018/2019 Kategori Sekolah Rendah - SK Bayan Baru,Pulau Pinang
Recipient of SLAAS Special Award (School of Hope) Session 2018/2019 Primary School Category - SK Bayan Baru, Penang

Penerima Anugerah SLAAS Sesi 2018/2019
Recipients of SLAAS Award Session 2018/2019

Jadual 7.4: Anugerah dan Hadiah Sekolah Lestari Sesi 2018/2019 (Kategori Sekolah Menengah)
Table 7.4: Sustainable School Awards and Prizes Session 2018/2019 (Secondary School Category)

NAMA SEKOLAH / SCHOOL NAME	KATEGORI / CATEGORY	HADIAH / PRIZES
SM ST PATRICK, SABAH	Anugerah Sekolah Lestari/ Sustainable School Award	Wang Tunai RM 10,000.00, Piala dan Sijil/ Cash RM 10,000.00, Trophies and Certificates
SMK PADANG MIDIN, TERENGGANU	Anugerah Khas (Kamar Selesa Lestari)/ Special Award (Kamar selesa)	Wang Tunai RM 2,000.00, Plak dan Sijil/ Cash RM 2,000.00, Trophies and Certificates
SMK SIMPANG KUALA, KEDAH	Anugerah Khas (Pengurusan)/ Special Award (Management)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SMK (P) ALAWIYAH, PERLIS	Anugerah Khas (Kurikulum)/ Special Award (Curriculum)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SMK BERAPIT, PULAU PINANG	Anugerah Khas (Kokurikulum)/ Special Award (Co-curriculum)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SMK RAJA PEREMPUAN, PERAK	Anugerah Khas (Penghijauan)/ Special Award (Greening)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SMK CONVENT PULAU TIKUS, PULAU PINANG	Anugerah Khas (Sekolah Harapan)/ Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates
SMK TAWAU, SABAH	Anugerah Khas (Sekolah Harapan)/ Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates
SMK SANGLANG, PERLIS	Anugerah Khas (Sekolah Harapan)/ Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates
SMK CONVENT TAIPING, PERAK	Anugerah Khas (Sekolah Harapan)/ Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates

Jadual 7.5: Anugerah dan Hadiah Sekolah Lestari Sesi 2018/2019 (Kategori Sekolah Rendah)
Table 7.5: Sustainable School Awards and Prizes Session 2018/2019 (Primary School Category)

NAMA SEKOLAH/ SCHOOL NAME	KATEGORI / CATEGORY	HADIAH / PRIZES
SK PUTRA, PERLIS	Anugerah Sekolah Lestari Sustainable School Award	Wang Tunai RM10,000.00, Piala dan Sijil/ Cash RM 10,000.00, Trophies and Certificates
SJKC TUNG HUA, SARAWAK	Anugerah Khas (Kamar Selesa Lestari)	Wang Tunai RM 2,000.00, Plak dan Sijil/ Cash RM 2,000.00, Trophies and Certificates
SK BUKIT DAMANSARA, WP Kuala Lumpur	Anugerah Khas(Pengurusan) Special Award (Management)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SK LAMBIDAN, SABAH	Anugerah Khas (Kurikulum) Special Award (Curriculum)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SJKC KUALA KEMAMAN, TERENGGANU	Anugerah Khas (Kokurikulum) Special Award (Co-curriculum)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SJKC CHENG MING, SABAH	Anugerah Khas (Penghijauan) Special Award (Greening)	Wang Tunai RM 1,250.00, Plak dan Sijil/ Cash RM 1,250.00, Trophies and Certificates
SK LUI SELATAN, NEGERI SEMBILAN	Anugerah Khas (Sekolah Harapan) Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates
SJKC ENG CHUAN, PULAU PINANG	Anugerah Khas (Sekolah Harapan) Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates
SJKT RINGLET, PAHANG	Anugerah Khas (Sekolah Harapan) Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates
SK BAYAN BARU, PULAU PINANG	Anugerah Khas (Sekolah Harapan) Special Award (School of Hope)	Wang Tunai RM 750.00, Plak dan Sijil/ Cash RM 750.00, Trophies and Certificates

PERTANDINGAN DEBAT ALAM SEKITAR ANTARA INSTITUSI PENDIDIKAN TINGGI TAHUN 2019
INTER-VARSITY ENVIRONMENTAL DEBATE OF YEAR 2019

Setelah tiga (3) tahun tidak dianjurkan, kali terakhir tahun 2015, maka Debat Alam Sekitar antara Institusi Pendidikan Tinggi (IPT) yang merupakan program tahunan sebelum ini sejak tahun 1991 yang dianjurkan oleh JAS dengan kerjasama Kementerian Pendidikan Malaysia, Majlis Debat Universiti Malaysia (MADUM), Dewan Bahasa dan Pustaka telah pun kembali semula dengan Rakan Strategik, Petroliam Nasional Berhad.(Petronas) pada tahun ini.

After three (3) years of not being held, last in 2015, the Environmental Debate for Institution of Higher Learning had been returned and held back by the DOE in collaboration with the Ministry of Education Malaysia, Malaysian University Debate Council (MADUM) and Dewan Bahasa dan Pustaka and our Strategic Partner, Petroliam Nasional Berhad (Petronas).

Pertandingan debat ini dikendalikan secara debat ala Parlimen dan juga debat terbuka (debat biasa). Penentuan pasukan yang bertanding sama ada berperanan sebagai kerajaan atau pembangkang dibuat menggunakan kaedah sistem bracket power match untuk peringkat pusingan awal. Kedudukan setiap pasukan dibuat berdasarkan menang/kalah, juri, julat kemenangan dan markah keseluruhan.

The Inter-Varsity Environmental Debate was conducted in a Parliamentary manner and open debate. The bracket power match system was adopted in the preliminary rounds to determine whether a team is in the proposition or opposition side. The ranking of each team was based on several criteria such as winner/loser, jury, margin, and overall score.

Pertandingan peringkat awal melibatkan lima (5) pusingan. Lapan (8) pasukan terbaik dipilih untuk ke peringkat suku akhir dan empat (4) pasukan yang menang pula ke peringkat separuh akhir dan seterusnya dua (2) pasukan terbaik bertanding di peringkat akhir. Senarai pasukan IPT yang menyertai pertandingan adalah seperti di **Jadual 7.6**.

The preliminaries consist of five (5) rounds. The eight (8) highest-ranking teams were then selected to compete in the quarterfinals, out of which only four (4) will qualify for the semi-finals and eventually two (2) teams will reach the finals. The list of the institutions of Higher Learning teams participated in the contest is as **Table 7.6**.

Jadual 7.6: Senarai Pasukan Institut Pendidikan Tinggi yang Menyertai Pertandingan
Table 7.6: List of Institution Of Higher Learning Teams Participated In the Competition

BIL	IPTA/IPTS/IPG/POLITEKNIK
1	Politeknik Shah Alam
2	Universiti Kebangsaan Malaysia
3	Universiti Tenaga Nasional
4	Universiti Kuala Lumpur
5	Institut Pendidikan Guru Malaysia
6	Universiti Islam Antarabangsa Malaysia
7	Universiti Malaya
8	Universiti Teknologi Mara
9	Universiti Putra Malaysia
10	Universiti Teknologi Tun Hussein Onn Malaysia
11	Universiti Teknikal Malaysia
12	Universiti Teknologi Malaysia
13	Universiti DRB-HICOM
14	Universiti Pertahanan Nasional Malaysia

Jadual 7.6: Senarai Pasukan Institut Pendidikan Tinggi yang Menyertai Pertandingan
Table 7.6: List of Institution Of Higher Learning Teams Participated In the Competition

BIL	IPTA/IPTS/IPG/POLITEKNIK
15	Universiti Sultan Zainal Abidin
16	Universiti Sains Malaysia
17	Universiti Malaysia Terengganu
18	Universiti Pendidikan Sultan Idris
19	Universiti Teknologi Petronas
20	Universiti Malaysia Kelantan
21	Universiti Sains Islam Malaysia
22	Universiti Utara Malaysia
23	Universiti Malaysia Sabah
24	Universiti Malaysia Perlis
25	Universiti Malaysia Pahang
26	Universiti Sultan Abdul Halim Muadzam Shah
27	Universiti Multimedia
28	Institut Perguruan Kampus Dato' Razali Ismail

Pertandingan Debat Alam Sekitar antara IPT kali ke-26 ini telah diadakan di Universiti Sultan Zainal Abidin (UniSZA) bermula dari 31 Oktober hingga 3 November 2019 bersempena sambutan Hari Alam Sekitar Negara (HASN) 2019. Pelbagai program kesedaran alam sekitar yang lain turut dianjurkan selain perdebatan bagi memberi galakan kepada pelajar dan orang awam untuk lebih mencintai alam sekitar seperti pameran lestari dan program mengutip sampah di tepi pantai sambil beriadah. Di samping itu, sesi Pelancaran Alumni Debat Alam Sekitar juga diadakan seperti maklumat dalam **Jadual 7.7**.

Pertandingan peringkat akhir pada malam 03 November 2019 telah pun berlangsung di Dewan Al-Muktafibillah Shah, UniSZA di antara pasukan Universiti Islam Antarabangsa Malaysia (UIAM) dan Universiti Malaya (UM).

Majlis perasmian dan penyampaian hadiah telah disempurnakan oleh Timbalan Menteri Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim, YB Puan Isnaraissah Munirah Majilis sambil diiringi oleh Yang Berbahagia Puan Norlin binti Jaafar, Ketua Pengarah Alam Sekitar Malaysia dan disaksikan oleh Timbalan Naib Canselor (Akademik dan Antarabangsa) UniSZA, Yang Berbahagia Profesor Dr. Kamarul Shukri bin Mat Teh, Pengerusi MADUM, Yang Berbahagia Prof. Madya Dr. Zulkifli Hassan dan Y.M. Ungku Haslina binti Ungku Md Tahir, Ketua Sektor Alam Sekitar, Kesihatan dan Keselamatan Petronas.

The competition was held at University Sultan Zainal Abidin (UniSZA) from 31st October to 3rd November 2019 which coincided with the National Day of Environmental Celebration (HASN). Various other environmental awareness programs were also organized apart form debate, in conjunction with HASN to encourage the students and publics to love and appreciate the nature as well as sustainable exhibitions and plogging exercise along the beach. Besides that, the Launching Session of Environmental Debate Alumni is also held as shown in **Table 7.7**.

The finals on the night of 3rd November 2019, were held at Al-Muktafibillah Shah Hall, UniSZA between teams from the International Islamic University Malaysia (IIUM) and University of Malaya (UM).

The opening ceremony and prize presentation were officiated by Deputy Minister of Energy, Science, Technology, Environmental and Climate Change, YB Puan Isnaraissah Munirah Majilis while accompanied by Puan Norlin binti Jaafar, Director General of Environment Malaysia and witnessed by Prof. Dr. Kamarul Shukri bin Mat Teh, Deputy Vice-Chancellor (Academic and International), UniSZA, the Honorable Prof. Madya Dr. Zulkifli Hassan, MADUM Chairman and Chief Sector of Environmental, Health, and Security of Petronas, Y.M. Ungku Haslina binti Ungku Md Tahir.

Jadual 7.7: Sesi Pelancaran Alumni Debat Alam Sekitar Dengan Perkongsian Empat Generasi Debat Alam Sekitar
Table 7.7: Launching Session Of Environmental Debate Alumni With Sharing Regarding On Four Generation Environmental Debator

BIL	NAMA	JAWATAN	STATUS
1	Puan Norlin binti Jaafar	Ketua Pengarah Alam Sekitar Malaysia	Moderator
2	Prof. Madya Ts. Dr. Ramzah bin Dambul	Timbalan Naib Canselor (Penyelidikan dan Inovasi) UMS	Johan Debat Alam Sekitar 1993
3	Encik Mohd Nazri bin Noh	Setiausaha Politik kepada Menteri Luar Negeri	Johan Debat Alam Sekitar 1994
4	Puan Nur Ezzah binti Abdullah	Peguam Persekutuan, Jabatan Peguam Negara	Johan Debat Alam Sekitar 2013
5	Puan Asriyah binti Abdul Hafid	Penolong Pengarah Kanan Jabatan Tenaga Kerja	Johan Debat Alam Sekitar 1999

Johan bagi Pertandingan Debat Alam Sekitar antara IPT akan membawa pulang wang tunai berjumlah RM8,000.00 berserta sijil penyertaan, piala iringan dan Piala Pusingan Menteri MESTECC.

The grand prize worth RM8,000.00 with a participation certificate, The Minister of MESTECC Challenge Trophy, and an accompaniment cup.

Manakala bagi naib johan pula menerima wang tunai berjumlah RM5,000.00 berserta piala iringan dan sijil penyertaan dan bagi dua pasukan pencapaian separuh akhir menerima wang tunai RM1,500.00, plak dan sijil penyertaan.

The second place received prize money worth RM5,000.00 with an accompaniment cup and participation certificate. For two teams who reached the quarterfinals had received price money worth RM1,500.00 with a participation certificate and plaque.

Bagi pendebat terbaik peringkat akhir akan menerima wang tunai RM1,500, plak dan sijil penyertaan. Manakala bagi pendebat terbaik liga akan menerima wang tunai RM1,000.00, plak dan sijil penyertaan. Senarai nama pemenang-pemenang adalah seperti **Jadual 7.8**.

For finals, the best debater will receive the plaque together with a cash prize of RM1,500.00, and a participation certificate. Meanwhile for the league best debater will also receive RM1,000.00, a plaque, and a participation certificate. The list of winners is shown in **Table 7.8**.

Pihak MADUM juga telah berbesar hati untuk memberi pengiktirafan kepada Pertandingan Debat ini sebagai Debat Bahasa Melayu pertama yang menggunakan penjurian hakim tanpa penggunaan kertas (Sijil Penilaian Mesra Alam).

MADUM is also honored to give recognition for this Debate Competition as the first Malay Debate adopted digital judging which is paperless (Green Assessment Certificate).

Jadual 7.8: Senarai Pemenang Pertandingan Debat Alam Sekitar Antara IPT Tahun 2019
Table 7.8: The List Of Winners For Inter-Varsity Environmental Debate Of Year 2019

KATEGORI	NAMA PESERTA DEBAT	NAMA IPT
JOHAN	a) Muhammad Ilham Hafiz bin Azmi b) Muhammad Wafi Anwar bin Roslan c) Anis Afilna binti Hassan Sanusi d) Muhammad Aniq Qawiem bin Mohd Sazaly	UIAM
NAIB JOHAN	a) Nur Nadiah binti Basir b) Mohd Helmi bin Ahmad Jani c) Muhd Shahidil bin Saril d) Zulaikha binti Zamaludin	UM
SEPARUH AKHIR (KETIGA)	a) Intan Nur Sahira binti Baharudin b) Muhammad Zulhilmi bin Mohd Noor c) Faqris Aqasha bin Shahlan d) Abdullah Umar bin Mahfudz	UiTM
SEPARUH AKHIR (KETIGA)	a) Munirah binti Muhamad b) Muhamad Aizudin bin Radthuan c) Nurul Aisyah binti Aminurrahman d) Fatin Izzati binti Zanuari	USIM
PENDEBAT TERBAIK AKHIR	Muhammad Wafi Anwar bin Roslan	UIAM
PENDEBAT TERBAIK LIGA	Muhammad Izzuddin bin Kamarulzaman	UniSZA

Pertandingan Akhir Debat Alam Sekitar antara IPT di antara pasukan Universiti Malaya (UM) dan Universiti Islam Antarabangsa Malaysia (UIAM)
The Final of the Inter-Varsity Environmental Debate between International Islamic aUniversity Malaysia (IIUM) and University of Malaya (UM)

Majlis penyampaian Hadiah disempurnakan oleh YB Puan Isnaraissah Munirah Majilis, Timbalan Menteri MESTECC
The Prize Giving Ceremony was Officiated by YB Puan Isnaraissah Munirah Majilis, Deputy Minister of MESTECC

Pemenang Kategori Pendebat Terbaik Akhir Sebagai Pembangkang, Muhammad Wafi Anwar dari UIAM
The Winner of Best Finals Debator as Opposition, Muhammad Wafi Anwar from IIUM

BAB 8
CHAPTER 8

PENGURUSAN TEKNOLOGI MAKLUMAT
INFORMATION TECHNOLOGY (IT) MANAGEMENT

PENGURUSAN TEKNOLOGI MAKLUMAT
INFORMATION TECHNOLOGY (IT) MANAGEMENT

AKTIVITI PEMBANGUNAN APLIKASI 2019

Portal Informasi Alam Sekitar yang menjadi rujukan setempat bagi memaparkan maklumat alam sekitar di sesebuah kawasan. Menggunakan data-data alam sekitar daripada data JAS, Portal Data Terbuka Sektor Awam dan data terbuka pelbagai agensi.

Objektif :

i. Membantu meningkatkan kesedaran awam terhadap pencemaran alam sekitar; dan

ii. Melahirkan masyarakat yang lebih cakna terhadap kualiti alam sekitar di persekitaran mereka.

Memenangi tempat kedua dalam pertandingan Hackathon Data Terbuka Malaysia 2019 (Kategori Sektor Awam) anjuran MAMPU.

APPLICATION DEVELOPMENT ACTIVITIES 2019

This portal shows the environmental information of a particular area. The environmental data are data collected from the DOE, Public Sector Open Data Portal, and Malaysia's Open Data Portal from various agencies.

Objectives:

i. To raise and promote environmental pollution awareness in the society; and

ii. To nurture a society that is sensible towards the environmental quality of their area.

Runner-up in Open Data Hackathon Malaysia 2019 (Public Sector Category) competition by the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU).

Sesi Penyampaian Hadiah Kepada Pemenang
Prize Giving Ceremoy to the Winners

LAPORAN AKTIVITI KEPERLUAN PEMBANGUNAN SISTEM ELEKTRONIK KAWALAN ALAM SEKITAR (e-KAS)

Sistem eKAS ini telah dibangunkan sejak tahun 2003 dan sentiasa ditambahbaik. Dalam tempoh RMK11, e-KAS telah menerima peruntukan bagi pembangunan naiktaraf e-KAS versi 4.0 khusus bagi tambahan modul dan sub-modul baharu, penambahbaikan aliran kerja, pelaporan dan antaramuka.

Aktiviti naik taraf sistem e-KAS ini melibatkan mesyuarat dan bengkel kajian keperluan pengguna yang melibatkan wakil semua pengguna daripada lapan (8) Bahagian dan 15 JAS Negeri. Mesyuarat dan bengkel tersebut telah berlangsung dari 3 hingga 6 September 2019.

Pembangunan sistem e-KAS versi 4.0 ini akan membantu memudahkan pemantauan dan pengawasan penguatkuasaan alam sekitar dan meningkatkan keberkesanan operasi warga JAS.

PROGRAM LATIHAN TEKNOLOGI MAKLUMAT DAN KOMUNIKASI (ICT)

Pada tahun 2019, Bahagian Teknologi Maklumat (BTM) telah berkolaborasi dengan bahagian-bahagian di JAS bagi menganjurkan program latihan ICT termasuk kursus dan perkongsian ilmu sebagai usaha untuk meningkatkan kefahaman, pengetahuan dan kemahiran ICT di kalangan staf BTM dan JAS amnya.

Di antara Program Latihan ICT yang diadakan adalah :

a. Chit Chat ICT BTM – Program ini bertujuan untuk meningkatkan kesedaran dan kepentingan Keselamatan ICT dan perkongsian mengenai Portal MyEnviro.

b. Mobile Application Development
c. ASP.Net and VB.Net
d. ArcGIS
e. JavaScript
f. Database Administration
g. Smart Cities Conference
h. Endpoint Security
i. Infographic and E-Poster
j. Tips and Trick MS Excel Course
k. Office 365
l. ICT Strategic Planning

REQUIREMENT ACTIVITIES OF ELECTRONIC ENVIRONMENT CONTROL SYSTEM DEVELOPMENT

e-KAS system started in 2003, and it has been upgraded ever since. Therefore, an amount of budget has been allocated to upgrade e-KAS v4.0. specifically for developing new modules/submodules and enhancing the current work process, new reporting module, and new interface design.

Several activities to gather user requirement have been conducted through meetings and workshops which involves user from eight (8) Divisions and 15 state DOE. The meetings and workshops were held from 3rd to 6th September 2019.

This system is a pillar of DOE's operation as an environmental monitoring and enforcement agency, hence the development of the new e-KAS v4.0 is very essential and crucial.

INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) TRAINING PROGRAMMES

In 2019, the Information Technology Division (ITD) collaborated with other divisions in organising information and communications technology (ICT) training programmes, including courses and talks in its effort to increase the understanding, knowledge, and skills in ICT among ITD and DOE staff.

Among the ICT training programmes are:

a. Chit Chat ICT Information and Communications Technology Division (BTM) — This programme aimed to raise awareness of the importance of ICT Security and share about MyEnviro Portal.
b. Mobile Application Development
c. ASP.Net and VB.Net
d. ArcGIS
e. JavaScript
f. Database Administration
g. Smart Cities Conference
h. Endpoint Security
i. Infographic and E-Poster
j. Tips and Trick MS Excel Course
k. Office 365
l. ICT Strategic Planning

PENGGUNAAN DRON DI JAS

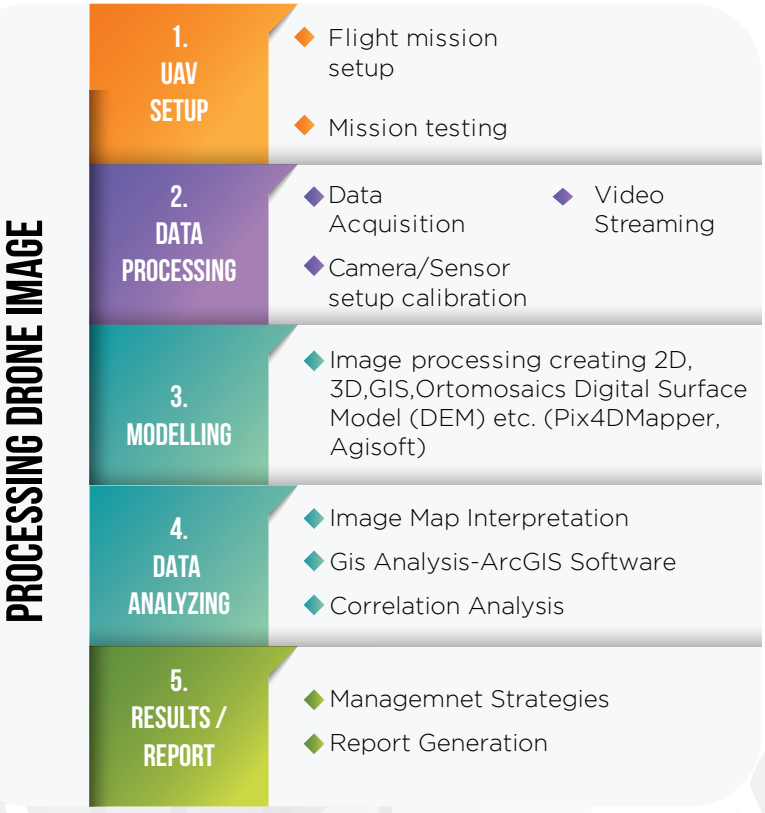
Dron mula digunakan secara meluas oleh JAS pada penghujung tahun 2018 sehingga sekarang bagi membantu pegawai JAS menjalankan kerja-kerja penguatkuasaan di lapangan seperti siasatan aduan pencemaran, pembakaran terbuka, pemantauan tapak projek EIA dan sebagainya.

Teknologi dron perlu disokong dengan kaedah pemprosesan imej digital yang baik untuk tafsiran imej yang lebih jelas tinggi (dron mampu hasilkan imej beresolusi sehingga kurang dari 10 cm). **(Rajah 8.1)** Terdapat beberapa perisian yang amat baik digunakan bagi memproses imej-imej dron seperti Agisoft, pix4Dmapper untuk menghasilkan data seperti orthophoto dan data Elevation Model (DEM). Data Elevation Model (DEM) amat berguna bagi menentukan atribut bumi seperti ketinggian di mana-mana titik, cerun dan bagi pembangunan aplikasi

DRONE APPLICATION IN THE DOE

Drones were widely used by DOE from the late 2018 to the present to assist DOE officers in field enforcement work, such as investigating pollution complaints, monitoring open burning and environmental impact assessment (EIA) project sites, and so on.

Drone technology needs to be supported with good digital image processing methods for better image interpretation (drones can produce images up to 10 cm in resolution). **(Figure 8.1)** There are some excellent software used to process drone images, such as Agisoft and Pix4Dmapper which produce processed data, such as orthophoto and digital elevation model (DEM) data. The DEM data is very useful in determining the earth attributes, such as elevation at any point and slope, and developing geographic information system (GIS) applications.



Rajah 8.1: Aliran Proses Imej Dron
Figure 8.1: Drone Images Process Flow

BAB 9
CHAPTER 9

INSTITUT ALAM SEKITAR MALAYSIA (EiMAS)
ENVIRONMENT INSTITUTE OF MALAYSIA (EiMAS)

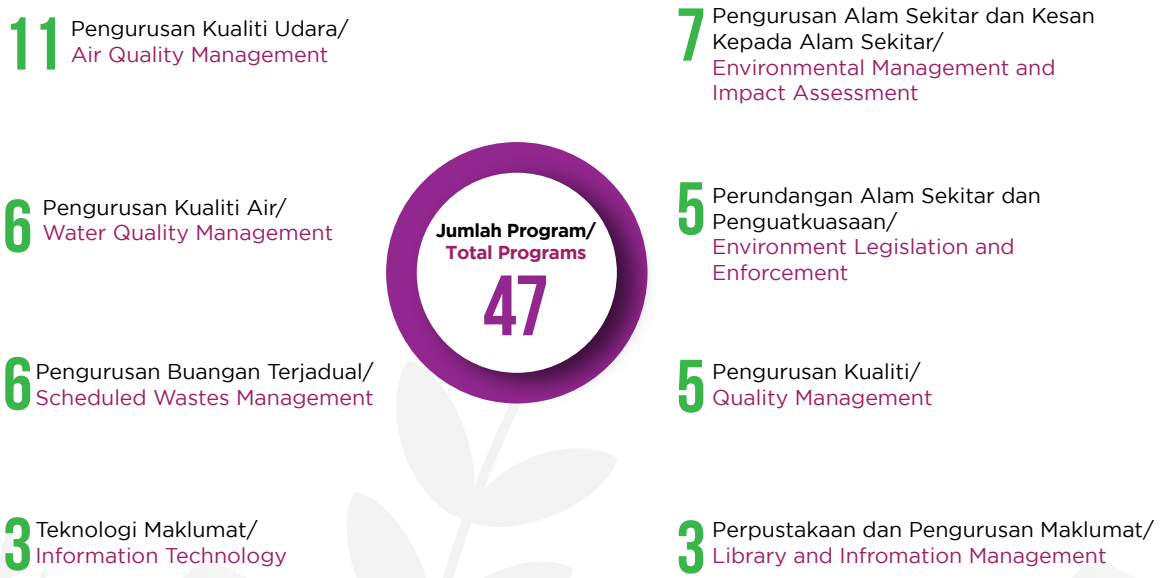
INSTITUT ALAM SEKITAR MALAYSIA (EiMAS)
ENVIRONMENT INSTITUTE OF MALAYSIA (EiMAS)

Sebagai sebuah Pusat kecemerlangan bagi Pengurusan Alam Sekitar di Malaysia, EiMAS bukan sahaja berperanan dalam meningkatkan kompetensi warga JAS malah bertanggungjawab dalam melaksanakan pelan latihan berasaskan pengetahuan, praktikal, kompetensi dan pembelajaran berterusan dalam bidang alam sekitar termasuklah agensi-agensi kerajaan yang lain, organisasi, industri tempatan dan juga agensi-agensi alam sekitar antarabangsa. Jumlah perjawatan EiMAS sehingga 31 Disember 2019 adalah 50 perjawatan dengan pengisian sebanyak 48 perjawatan.

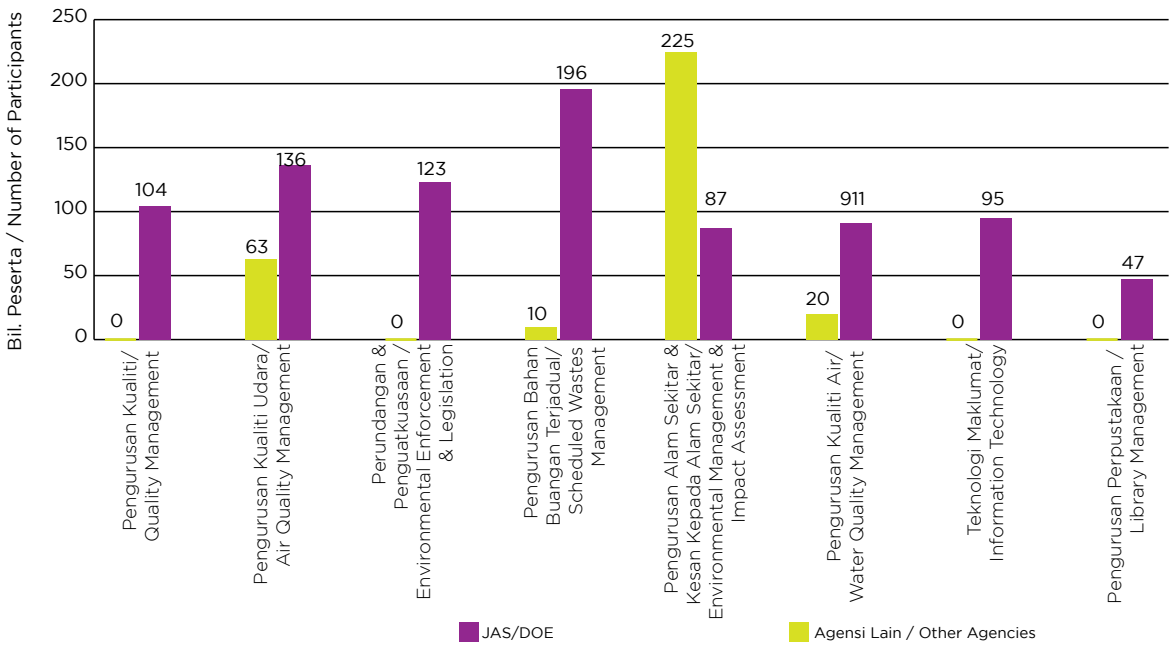
EiMAS telah mempertingkatkan program latihan dalam bidang pengurusan alam sekitar dan kawalan pencemaran, serta perhatian telah diberikan kepada pembangunan modal insan yang dapat melindungi dan menguruskan alam sekitar secara holistik **(Rajah 9.1)**.

The role of the Environment Institute of Malaysia (EiMAS) is not solely for upgrading the skills of DOE staffs but also to implement training plans based on knowledge, skills, competencies, and continuous learning in the environmental field that include government agencies, organisations, local industries, and also international environmental agencies. The total posts in EiMAS as of 31st December 2019 are 50 posts. Out of the 50 posts, 48 posts have been filled.

EiMAS has intensified its training programmes on environmental management and pollution control and more attention has been given to develop human capital capable of protecting and managing the environment in a holistic manner. **(Figure 9.1)**.



Rajah 9.1: Program Latihan Eimas 2019
Figure 9.1: EiMAS Training Programme, 2019



Rajah 9.2: Bilangan Peserta Mengikut Kategori Kursus
Figure 9.2: Number Of Participants By Course Category

Rajah 9.2 menunjukkan bilangan peserta mengikut kategori kursus. Daripada 1,197 peserta yang menyertai program latihan yang dilaksanakan, 879 orang (73.4%) adalah kakitangan JAS, manakala selebihnya adalah peserta dari agensi-agensi lain yang berkaitan.

Figure 9.2 shows the number of participants according to course category. From 1,197 participants that participated in the training programme held, 879 participants (73.4%) were DOE staff members, while the remaining were participants from other related agencies.

Jadual 9.1: Program Latihan EiMAS, 2019
Table 9.1: EiMAS Training Programmes, 2019

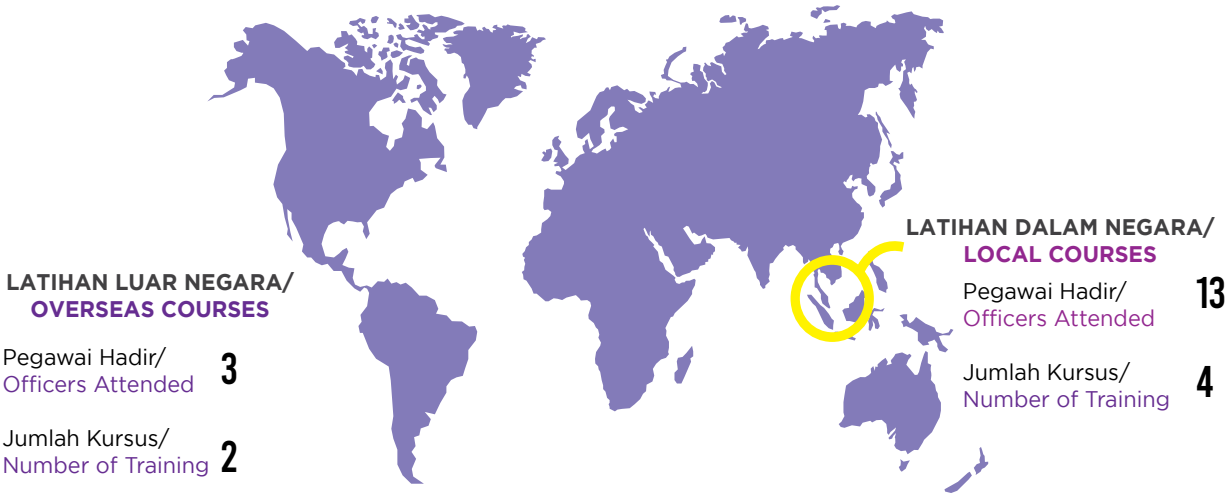
BIL./ NO.	PENGURUSAN KUALITI UDARA / AIR QUALITY MANAGEMENT	TARIKH/ DATE	PESERTA/ PARTICIPANTS
1.	Minilab Pembangunan Modul Kompetensi a. Continuos Emission Monitoring System (CEMS) b. Source Emission Stack Sampling c. Electrostatic Precipitator (EP) d. Penguji Ujian Pelepasan Asap Kenderaan	15 hingga 18 April/ 15th to 18th April	10
2.	Course on Understanding The Procedure and Execution of CEMS in Industries	24 hingga 27 Jun/ 24th to 27th June	21
3.	Course on Certified Environmental Professional in Bag Filter Inspection (CEPBFI) – Nos. 1/2019	8 hingga 11 Julai/ 8th to 11th July	13
4.	Course on Certified Environmental Professional in Scrubber Inspection (CEPSI) – Nos. 1/2019	15 hingga 18 Julai/ 15th to 18th July	24
5.	Competency Course on Control of Air Pollution From The Emission of Motor Vehicle	23 hingga 25 Julai/ 23rd to 25th July	26
6.	Course on Industrial Emission Monitoring of Stationary Source	5 hingga 7 Ogos/ 5th to 7th August	16
7.	Course on Certified Environmental Professional on Air Pollution Control Engineering (Design Reviewer)	19 hingga 23 Ogos/ 19th to 23rd August	21

Jadual 9.1: Program Latihan EiMAS, 2019
Table 9.1: EiMAS Training Programmes, 2019

BIL./ NO.	PENGURUSAN KUALITI UDARA / AIR QUALITY MANAGEMENT	TARIKH/ DATE	PESERTA/ PARTICIPANTS
8.	Industrial Hygiene Technician (Inspection, Testing and Examination of Engineering Control Equipment) yang anjuran NIOSH	22 hingga 26 Ogos/ 22nd to 26th August	5
9.	Kursus Persijilan Penguji Ujian Pelepasan Asap Kenderaan (Diesel & Petrol) – Fleet Operator (FO)/ Kemudahan Yang Dilesenkan (KYDL) (SIRI 1)	8 hingga 10 April/ 8th to 10th April	20
10.	Kursus Persijilan Penguji Ujian Pelepasan Asap Kenderaan (Diesel & Petrol) – Fleet Operator (FO)/ Kemudahan Yang Dilesenkan (KYDL) (SIRI 2)	22 hingga 24 April/ 22nd to 24th April	22
11.	Kursus Persijilan Penguji Ujian Pelepasan Asap Kenderaan (Diesel & Petrol) – Fleet Operator (FO)/ Kemudahan Yang Dilesenkan (KYDL) (SIRI 3)	1 hingga 3 Julai/ 1st to 3rd July	21
BIL./ NO.	**PENGURUSAN KUALITI AIR / WATER QUALITY MANAGEMENT**	**TARIKH/ DATE**	**PESERTA/ PARTICIPANTS**
1.	Bengkel Untuk Mengemaskini Kandungan Modul Course On Method of Sampling and Preservation Serta Penyediaan Video	8 hingga 10 April/ 8th to 10th April	9
2.	Certified Environmental Professional in Industrial Effluent Treatment System Inspection (CePIETSI)	22 hingga 26 Julai/ 22nd to 26th July	25
3.	Certified Environmental Professional in Industrial Effluent Treatment System Inspection (CePIETSI) – Lab Session	3 hingga 5 September/ 3rd to 5th September	22
4.	Kursus Pengawasan Kualiti Air Tanah	26 hingga 30 Ogos/ 26th to 30th August	17
5.	Course On Total Maximum Daily Load (TMDL)	30 September hingga 4 Oktober / 30th September to 4th October	34
6.	Program Sangkutan (Attachment Program) Bagi Pembangunan Kepakaran Pegawai-Pegawai Jabatan Alam Sekitar Dalam Bidang Kawalan Pencemaran Air	8 hingga 10 Oktober/ 8th to 10th October	8
BIL./ NO.	**PERUNDANGAN DAN PENGUATKUASAAN / ENVIRONMENTAL LEGISLATION AND ENFORCEMENT**	**TARIKH/ DATE**	**PESERTA/ PARTICIPANTS**
1.	Kursus Pemantapan Pegawai Pendakwa JAS	22 hingga 26 April/ 22th to 26th April	24
2.	Kursus Penyiasatan dan Penguatkuasaan Pembakaran Terbuka	17 hingga 20 Jun/ 17th to 20th June	31
3.	Kursus Penyediaan Kertas Siasatan & Pengendalian serta Penyimpanan Keterangan Gambar Digital & Fotografi Penyiasatan	19 hingga 22 Ogos/ 19th to 22nd August	24
4.	Kursus Penguatkuasaan Praktikal PYDT, PYBDT & Punca Bukan Industri	10 hingga 13 September/ 10th to 13th September	27
5.	Kursus Pemahaman dan Kemahiran Tangkapan Mengikut Undang-Undang Peringkat Lanjutan	23 hingga 27 September/ 23rd to 27th September	17
BIL./ NO.	**PENGURUSAN BUANGAN TERJADUAL / SCHEDULED WASTE MANAGEMENT**	**TARIKH/ DATE**	**PESERTA/ PARTICIPANTS**
1.	Certified Environmental Professional in Scheduled Wastes Inspection (CePSWI) Siri 1	22 hingga 26 April/ 22nd to 26th April	32
2.	Bengkel dan Mesyuarat Penyediaan Modul Protokol Persampelan Buangan Terjadual	17 hingga 20 Jun/ 17th to 20th June	15
3.	Certified Environmental Professional in Scheduled Wastes Inspection (CePSWI) Siri 2	15 hingga 19 Julai/ 15th to 19th July	30
4.	Kursus Kompetensi Protokol Persampelan Buangan Terjadual	26 hingga 30 Ogos/ 26th to 30th August	16
5.	Kursus Kawalan Import dan Eksport Buangan Terjadual	23 hingga 27 September/ 23rd to 27th September	23
6.	Seminar Pengurusan Scheduled E-Waste di Malaysia untuk Pegawai JAS dan Agensi Kerajaan	31 Oktober/ 31st October	80

Jadual 9.1: Program Latihan EiMAS, 2019
Table 9.1: EiMAS Training Programmes, 2019

BIL./ NO.	PENGURUSAN ALAM SEKITAR DAN KESAN KEPADA ALAM SEKITAR / ENVIRONMENTAL MANAGEMENT AND IMPACT ASSESSMENT	TARIKH/ DATE	PESERTA/ PARTICIPANTS
1.	Kursus Try Run on Land Disturbing Pollution Prevention and Mitigation Measures (LDP2M2) Designer Training Program	11 hingga 15 Mac/ 11st to 15th March	44
2.	Kursus Asas Geospatial	8 hingga 12 April/ 8th to 12th April	29
3.	Kursus Try Run on Certified Professional Environmental Officer in EIA Project Development and Operation (CePEOEIA)	8 hingga 12 Julai/ 8th to 12th July 11 hingga 15 Mac/ 11th to 15th March	17
4.	Induction Course for EIA Consultant Siri 1 & 2	22 hingga 25 April/ 22nd to 25th April 23 hingga 26 September/ 23rd to 26th September	55 60
5.	Induction Course for Environmental Auditor	29 Julai hingga 1 Ogos/ 29th July to 1st August	60
6.	Certified Professional Environmental Officer in EIA Project Development and Operation (CePEOEIA)	14 hingga 18 Oktober/ 14th to 18th October	51
BIL./ NO.	**PENGURUSAN KUALITI / QUALITY MANAGEMENT**	**TARIKH/ DATE**	**PESERTA/ PARTICIPANTS**
1.	Pengurusan Stress dan Emosi Untuk Pegawai JAS	23 hingga 26 April/ 23rd to 26th April	21
2.	Kursus Perundingan Berkesan	25 hingga 28 Jun/ 25th to 28th June	25
3.	Kursus Kepimpinan dan Pengurusan Untuk Pengurusan Atasan JAS	8 hingga 10 Oktober/ 8th to 10th October	17
4.	Program Pembangunan Kepakaran: Kursus Pengurusan dan Kawalan Pencemaran Air Bawah Tanah dan Pengawasan Air Marin	22 hingga 25 Oktober/ 22nd to 25th October	5
5.	Bengkel Kajian Keperluan Training Needs Analysis (TNA) dan Pelan Operasi Latihan (POL) 2020	5 hingga 8 November/ 5th to 8th November	36
BIL./ NO.	**TEKNOLOGI KOMUNIKASI MAKLUMAT / INFORMATION COMMUNICATION TECHNOLOGY**	**TARIKH/ DATE**	**PESERTA/ PARTICIPANTS**
1.	Kursus Sistem Latihan Bersepadu Kepada Pentadbir Negeri	23 hingga 24 April/ 23rd to 24th April	50
2.	Kursus Videografik Menggunakan Peranti Mobile	16 hingga 19 Julai/ 16th to 19th July	20
3.	Rekabentuk Poster dan Banner Menggunakan Adobe Illustrator	21 hingga 25 Oktober/ 21st to 25th October	25
BIL./ NO.	**PENGURUSAN MAKLUMAT PERPUSTAKAAN / LIBRARY INFORMATION MANAGEMENT**	**TARIKH/ DATE**	**PESERTA/ PARTICIPANTS**
1.	Bengkel EKMC dan EMuseum	4 hingga 5 April/ 4th to 5th April	20
2.	Bengkel Rekabentuk Infografik sebagai bahan hebahan dan promosi.	10 hingga 12 September/ 10th to 12th September	15
3.	Bengkel Penulisan Artikel/Rencana.	8 hingga 10 Oktober/ 8th to 10th October	12



Rajah 9.3: Program Latihan Dalam Dan Luar Negara, 2019
Figure 9.3: Local And Overseas Training Courses, 2019

PROGRAM LATIHAN DI DALAM DAN LUAR NEGARA

Selain daripada kursus dalaman, EiMAS turut menghantar pegawai-pegawai JAS untuk menghadiri program latihan sama ada di dalam dan luar negara anjuran agensi luar/ swasta.

Pada tahun 2019, seramai 13 pegawai JAS telah menghadiri sejumlah empat (4) program latihan dalam negara yang dianjurkan oleh agensi luar/swasta seperti dalam **Rajah 9.2** dan senarai latihan dalam negara adalah seperti dalam **Jadual 9.2**.

Seramai tiga (3) pegawai JAS juga telah menghadiri sejumlah dua (2) program latihan luar negara dalam tahun 2019 seperti dalam **Rajah 9.3** dan senarai latihan dalam negara adalah seperti dalam **Jadual 9.3**.

LOCAL AND OVERSEAS TRAINING PROGRAMMES

Apart from internal training, EiMAS also sends DOE officers for attending training programmes either locally or internationally that are organised by other agencies/private.

A total of 13 DOE officers attended four (4) local courses in 2019, as shown in **Figure 9.2** and the list of the training programmes is as shown in **Table 9.2**.

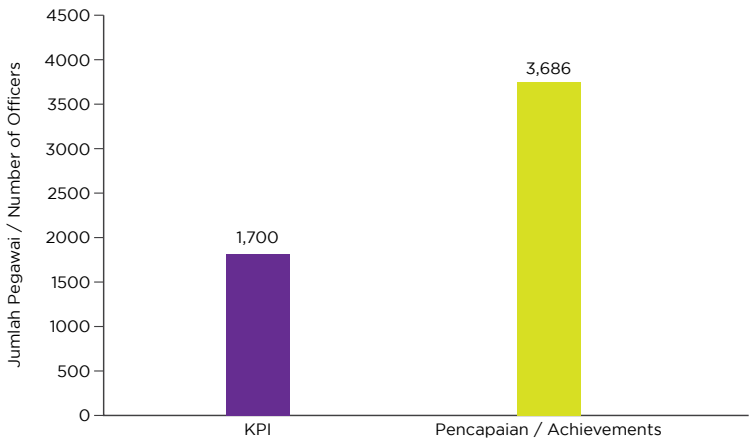
A total of three (3) DOE officers attended two (2) overseas training programmes in 2019, as shown in **Figure 9.3** and the list of the overseas training programmes is as shown in **Table 9.3**.

Jadual 9.2: Bilangan Peserta Mengikut Kategori Kursus
Table 9.2: Number Of Participants By Course Category

BIL/ NO	TAJUK/ TITLE	PENGANJUR/ ORGANIZER	TEMPAT/ PLACE	TARIKH/ DATE	BILANGAN PESERTA/ NO. OF PARTICIPANTS
1.	Kursus Basic Occupational First Aid	National Institute of Occupational Safety and Health (NIOSH)	NIOSH Bangi	2 hingga 3 April/ 2nd to 3rd April	1
2.	Program Latihan SME Bagi Pengurusan Buangan Terjadual	Pusat Bahan Berbahaya, EiMAS	Press Metal Bintulu Sdn. Bhd, Bintulu, Sarawak	23 hingga 25 Oktober/ 23rd to 25th October	7
3.	Program Sangkutan (Attachment Program) Bagi Pembangunan Kepakaran Pegawai-Pegawai Jabatan Alam Sekitar Dalam Bidang Kawalan Pencemaran Air	EiMAS	Petronas Chemicals Fertiliser Kedah Sdn. Bhd.	8 hingga 10 Oktober/ 8th to 10th October	8
4.	Seminar 'Talk on Balance Coastal Reclamation and Environment'	The Institute of Engineers Malaysia (IEM)	Wisma IEM, Petaling Jaya	28 Ogos/ 28th August	3
5.	Hands-on Design of Erosion and Sediment Control Plan (ESCP)	Malaysian Stormwater Organisation	The Light Hotel, Pulau Pinang	1 Oktober/ 1st October	2
6.	Theory and Application of Sediment Control System (SCS) at Constrcution Site (New Sediment Control BMPS Shown)	Malaysian Stormwater Organisation	The Light Hotel, Pulau Pinang	1 Oktober/ 1st October	6
7.	SWaM National Conference - Managing Stormwater Runoff	Malaysian Stormwater Organisation	The Light Hotel, Pulau Pinang	2 hingga 3 Oktober/ 2nd to 3rd October	2

Jadual 9.3: Senarai Program Latihan Luar Negara, 2019
Table 9.3: List Of Overseas Training Programmes, 2019

BIL./ NO	TAJUK/ TITLE	PENGANJUR/ ORGANIZER	TEMPAT/ PLACE	TARIKH/ DATE	BILANGAN PESERTA/ NO. OF PARTICIPANTS
1.	Program Kursus Bagi Pembangunan Kepakaran: International Clean Air And Environment Conference	Clean Air Society of Australia & New Zealand	Queenstown, New Zealand	15 hingga 19 September/ 15th to 19th September	2
2.	Managing Coastal Biodiversity under Urbanisation and Climate Change Pressure	Singapore Coorperation Programme (SCP)	Singapore	14 hingga 19 Oktober/ 14th to 19th October	1



Rajah 9.4: Bilangan Pegawai Industri Dilatih Berbanding Key Performance Indicator (KPI) Yang Ditetapkan
Figure 9.4: Number Of Industry Personnel Trained Against KPI Set

Bagi tahun 2019, Key Performance Indicator (KPI) yang telah ditetapkan untuk bilangan pegawai industri yang dilatih adalah seramai 1,700 orang, bagi kursus-kursus kompetensi seperti berikut:

i. **CePSWaM**
Course for Certified Environmental Professional in Scheduled Waste Management

ii. **CePBFO**
Course for Certified Environmental Professional in Bag Filter Operation

iii. **CePSO**
Course for Certified Environmental Professional in Scrubber Operation

iv. **CePIETSO – BP**
Course for Certified Environmental Professional in the Operation of Industrial Effluent Treatment Systems (Biological Process)

v. **CePIETSO – PCP**
Course for Certified Environmental Professional in the Operation of Industrial Effluent Treatment Systems (Physical Chemical Process)

vi. **CePPOME**
Course for Certified Environmental Professional in the Treatment of Palm Oil Mill Effluent (Pond Processes)

The Key Performance Indicator (KPI) set for the number of trained industry personnels in 2019 was 1,700 for competency courses, such as follows:

i. **CePSWaM**
Course for Certified Environmental Professional in Scheduled Waste Management

ii. **CePBFO**
Course for Certified Environmental Professional in Bag Filter Operation

iii. **CePSO**
Course for Certified Environmental Professional in Scrubber Operation

iv. **CePIETSO**
Course for Certified Environmental Professional in the Operation of Industrial Effluent Treatment Systems (Biological Processes)

v. **CePIETSO – PCP**
Course for Certified Environmental Professional in the Operation of Industrial Effluent Treatment Systems (Physical Chemical Processes)

vi. **CePPOME**
Course for Certified Environmental Professional in the Treatment of Palm Oil Mill Effluent (Pond Processes)

vii. CePSTPO
Course for Certified Environmental Professional in Sewage Treatment Plant Operation

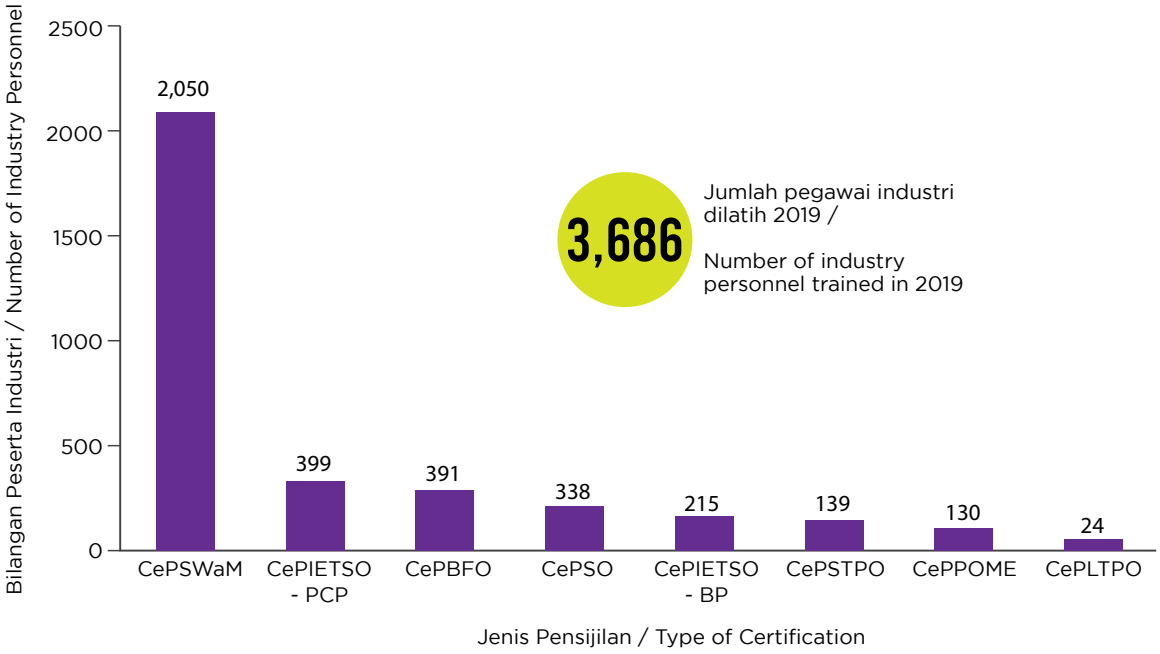
viii. CePLTPO
Course for Certified Environmental Professional in Leachate Treatment Plant Operation

Sepanjang tahun 2019, EiMAS telah berjaya melatih seramai 3,686 orang pegawai industri **(Rajah 9.4)**

vii. CePSTPO
Course for Certified Environmental Professional in Sewage Treatment Plant Operation

viii. CePLTPO
Course for Certified Environmental Professional in Leachate Treatment Plant Operation

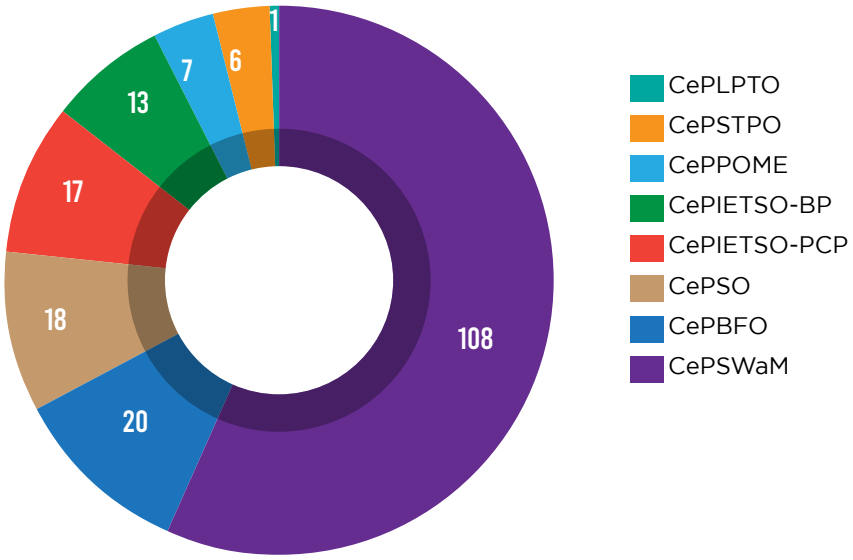
Throughout 2019, EiMAS has successfully trained 3,686 industry personnels **(Figure 9.4)**.



Rajah 9.5: Statistik Bilangan Pegawai Industri Dilatih Mengikut Kursus, 2019
Figure 9.5: Number Of Industry Personnel Trained According To Course, 2019

Bilangan kehadiran pegawai industri mengikut jenis kursus kompetensi menunjukkan kursus Certified Environmental Professional in Scheduled Waste Management (CePSWaM) mencatat bilangan peserta yang tertinggi sebanyak 56%, seperti yang ditunjukkan dalam **Rajah 9.5**.

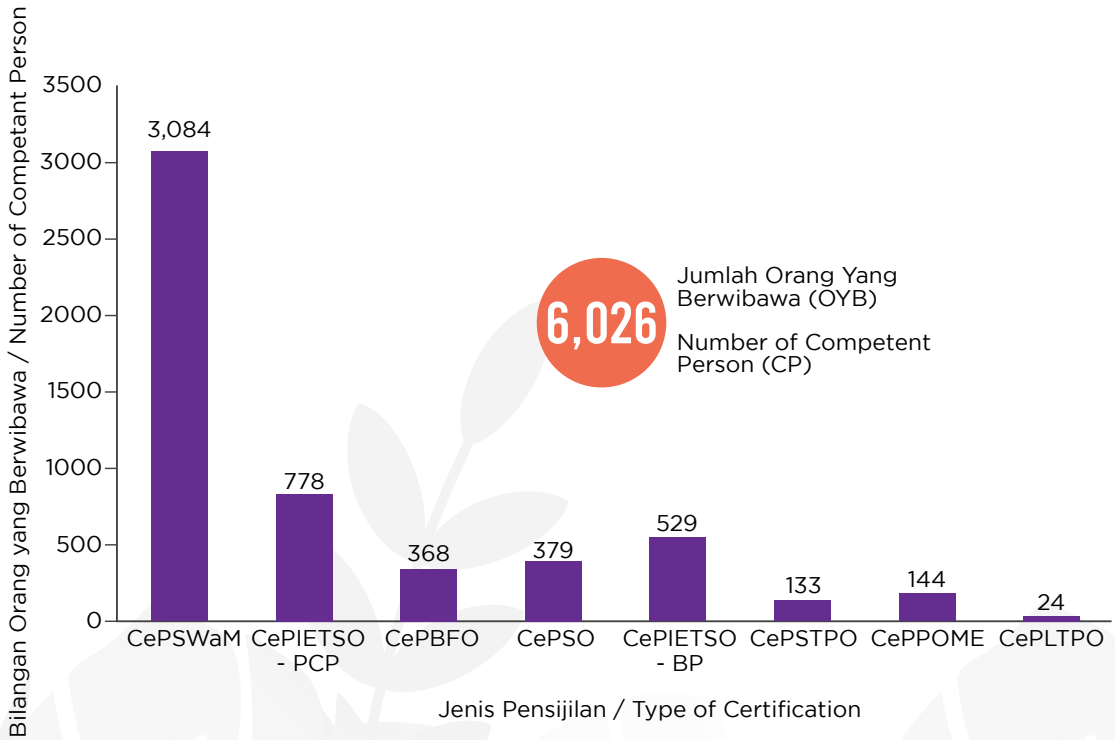
Attendance of industrial personnels according to type of courses indicate the course for Certified Environmental Professional in Scheduled Waste Management (CePSWaM) recorded the highest number of participants by 56%, as shown in **Figure 9.5**.



Rajah 9.6: Bilangan Kursus Pensijilan Industri Yang Dianjurkan, 2019
Figure 9.6: Number Of Industry Certification Courses Conducted, Year 2019

Sepanjang tahun 2019, sebanyak lapan (8) jenis kursus pensijilan industri telah dilaksanakan dengan jumlah 190 siri kursus, seperti yang ditunjukkan dalam **Rajah 9.6**.

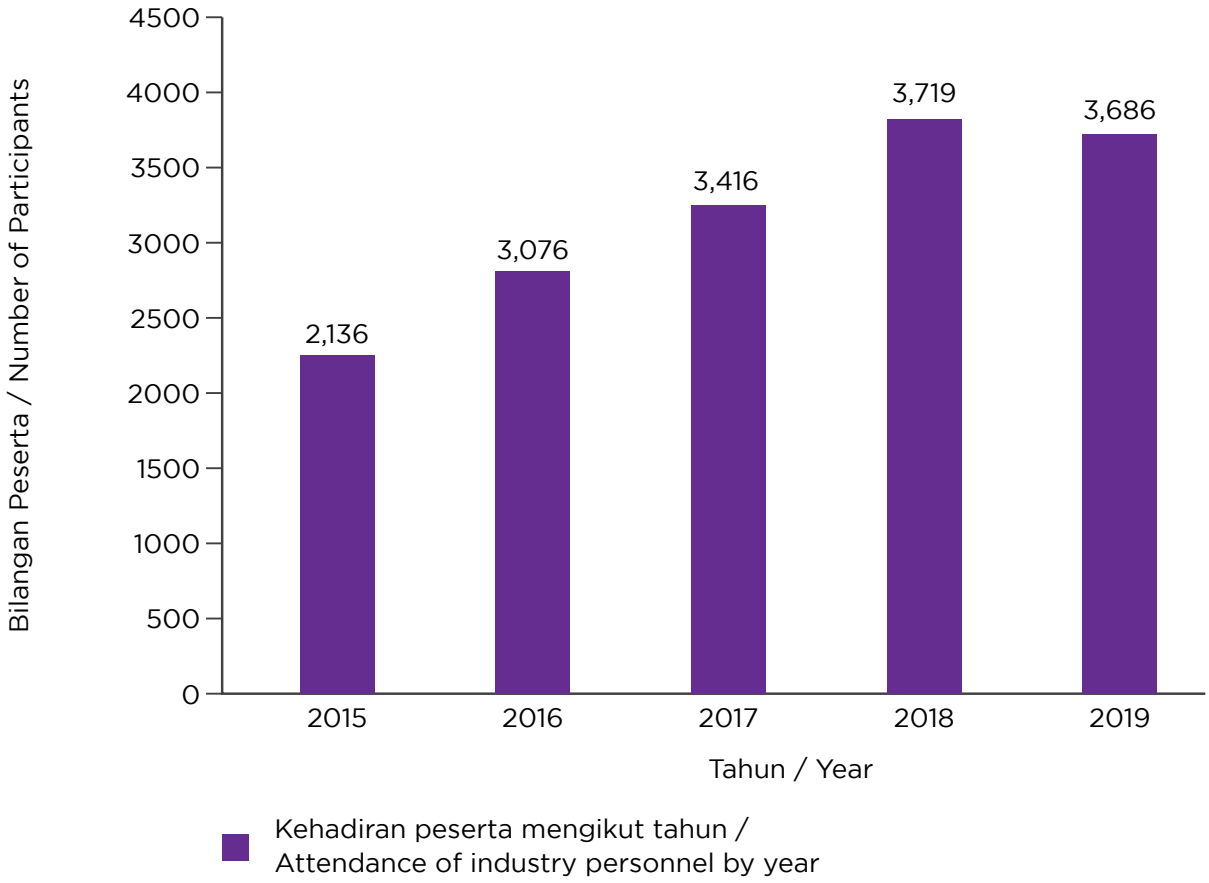
Throughout the year 2019, a total of eight (8) types of industrial certification courses were conducted with a total of 190 series of courses, as shown in **Figure 9.6**.



Rajah 9.7: Statistik Bilangan Orang Yang Berwibawa Mengikut Jenis Pensijilan Secara Keseluruhan Sehingga 31 Disember 2019
Figure 9.7: Statistics Of Competent Persons According To Type Of Certification Till 31st December 2019

Rajah 9.7 menunjukkan sehingga 31 Disember 2019, EiMAS telah berjaya mengiktiraf seramai 7,466 orang pegawai industri sebagai Orang Yang Berwibawa selaras dengan kehendak Seksyen 49A, Akta Kualiti Alam Sekeliling 1974.

Figure 9.7 shows that until 31st December 2019, EiMAS has successfully certified a total of 7,466 industry personnels as Competent Persons in accordance with the requirements of Section 49A of the Environmental Quality Act 1974.



Rajah 9.8: Bilangan Kehadiran Pegawai Industri Bagi 5 Tahun Terkini (2015 – 2019)
Figure 9.8: Attendance Of Industry Personnel For The Last 5 Years (2015 – 2019)

Bilangan kehadiran pegawai industri bagi kursus pensijilan untuk lima (5) tahun terkini dari 2015 hingga 2019 menunjukkan tren yang bagus iaitu mempunyai peningkatan yang signifikan untuk setiap tahun, sepertimana ditunjukkan di dalam **Rajah 9.8**.

The attendance of industry personnels for industry certification courses in the last five (5) years from 2015 to 2019 showed a remarkable trend with a significant increase each year, as shown in **Figure 9.8.**

Majlis Pentauliahan Orang Yang Berwibawa

Majlis Pentauliahan Orang Yang Berwibawa Siri 1/2019 telah diadakan pada 25 Jun 2019 bertempat di Hotel Bangi-Putrajaya, Bangi. Majlis ini diadakan bertujuan untuk memberi pengiktirafan kepada pegawai industri yang telah melengkapkan proses pensijilan dan seterusnya ditauliah sebagai Orang Yang Berwibawa sepertimana yang diperuntukkan di dalam Seksyen 49A, Akta Kualiti Alam Sekeliling 1974. Seramai 250 orang pegawai industri dan 50 pegawai JAS telah menerima sijil OYB pada majlis tersebut.

Convocation Ceremony For Competent Persons

The Convocation Ceremony for Competent Persons was held on 25th June 2019 at Bangi-Putrajaya Hotel, Bangi. The event was held to give recognition to industry personnels who have completed the certification process and subsequently certified as Competent Person, required under Section 49A of the Environmental Quality Act 1974. A total of 250 industry personnels and 50 DOE officers have received the Competent Person certificates at the event.

YBhg. Dato' Ketua Pengarah Alam Sekitar Menyampaikan Amanat kepada Orang Yang Berwibawa, Siri 1/2019
YBhg. Dato' Director General of Environment Convey His Message to the Competent Person, Series 1/2019

Pegawai Jabatan Alam Sekitar dan Industri Membaca Lafaz Ikrar Kod Etika sebagai Orang Yang Berwibawa, Siri 1/2019
DOE Officer and Industry Personnel Reading The Pledge of Competent Person's Code of Ethics, Series 1/2019

Pengurusan Tertinggi Jabatan Alam Sekitar bersama Penyedia Latihan bagi Tahun 2019
DOE Top Management with Training Provider for the Year 2019

Malaysian Technical Cooperation Programme (MTCP) Course on Environmental Management and Pollution Control

Program Kerjasama Teknikal Malaysia (MTCP), dengan Kementerian Luar Negeri sebagai focal point, telah dianjurkan oleh Institut Alam Sekitar Malaysia (EiMAS) pada 24 Julai hingga 6 Ogos 2019, untuk pegawai-pegawai dari luar negara yang bertugas di agensi atau Kementerian yang berkaitan pengurusan alam sekitar dan kawalan pencemaran di negara masing-masing.

Peserta-peserta kursus terdiri daripada pegawai-pegawai dari negara Sri Lanka, Nigeria, Fiji, Kenya, Uzbekistan, Ukraine, Maldives, Iran, Thailand, Azerbaijan dan Bangladesh.

Sepanjang kursus dua (2) minggu ini, peserta-peserta telah didedahkan mengenai:

- Mainstreaming of Environmental Agenda in The Regulated Community;
- Air Quality Management;
- Toxic and Hazardous Waste Management;
- Environmental Impact Assessment;
- Water Pollution Management;
- Competency Requirement in the Environmental Quality Act 1974; dan
- Promotion of Cleaner Production in Malaysia.

KURSUS INDUKSI JURURUNDING EIA

Pada tahun 2019, bagi memenuhi keperluan Skim Pendaftaran Jururunding EIA, EiMAS telah menjalankan dua (2) Siri Kursus Induksi Jururunding EIA iaitu pada 22 hingga 25 April 2019 dan 23 hingga 26 September 2019. Siri 1 dihadiri oleh 55 peserta dan Siri 2 dihadiri oleh 59 peserta. Kursus induksi ini merupakan kursus yang wajib dihadiri oleh setiap Jururunding EIA sebelum pendaftaran dapat dilakukan.

Malaysian Technical Cooperation Programme (MTCP) Course on Environmental Management and Pollution Control

Malaysian Technical Cooperation Programme (MTCP), with the Ministry of Foreign Affairs as its focal point was organised by Environmental Institute of Malaysia (EiMAS) on 24th July to 6th August 2019 for personnel who is working in agencies or ministries related to environmental management and pollution control in their respective countries.

The course participants are from Sri Lanka, Nigeria, Fiji, Kenya, Uzbekistan, Ukraine, Maldives, Iran, Thailand, Azerbaijan, and Bangladesh.

During the two (2) weeks course, participants were exposed to:

- Mainstreaming of Environmental Agenda in The Regulated Community
- Air Quality Management;
- Toxic and Hazardous Waste Management;
- Environmental Impact Assessment;
- Water Pollution Management;
- Competency Requirement in the Environmental Quality Act 1974; and
- Promotion of Cleaner Production in Malaysia.

INDUCTION COURSE FOR EIA CONSULTANT

In 2019, to meet the requirements under the EIA Consultant Registration Scheme, EiMAS had conducted two (2) Series of Induction Course for EIA Consultant which were held on 22nd to 25th April 2019 and 23rd to 26th September 2019. A total of 55 participants attended the 1st Series and 59 participants attended the 2nd Series. Attendance to the induction course is compulsory before becoming a Registered Consultant.

KURSUS INDUKSI JURUAUDIT ALAM SEKITAR

Pada tahun 2019, bagi memenuhi keperluan Skim Pendaftaran Juruaudit Alam Sekitar, EiMAS telah menjalankan Kursus Induksi Juruaudit Alam Sekitar kepada 60 orang peserta pada 29 Julai hingga 1 Ogos 2019. Kursus induksi ini merupakan kursus yang wajib dihadiri oleh setiap Juruaudit Alam Sekitar sebelum pendaftaran dapat dilakukan.

INDUCTION COURSE FOR ENVIRONMENTAL AUDITOR

In 2019, to meet the requirements under the Environmental Auditors Registration Scheme, EiMAS had conducted Induction Course for Environmental Auditor to 60 participants from 29th July to 1st August 2019. Attendance to the induction course is compulsory before becoming a Registered Auditor.

KURSUS CERTIFIED PROFESSIONAL ENVIRONMENTAL OFFICER IN EIA PROJECT DEVELOPMENT AND OPERATION (CePEOEIA)

Pada tahun 2019, bagi memenuhi keperluan Seksyen 49A, Akta Kualiti Alam Sekeliling, 1974 dan Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kesan Kepada Alam Sekeliling) 2015, EiMAS telah menjalankan Kursus Certified Professional Environmental Officer in EIA Project Development and Operation (CePEOEIA) kepada 51 orang peserta pada 14 hingga 18 Oktober 2019. Kursus ini merupakan kursus yang wajib dihadiri oleh Environmental Officer (EO) sebelum diiktiraf sebagai orang yang berwibawa.

CERTIFIED PROFESSIONAL COURSE FOR ENVIRONMENTAL OFFICER IN EIA PROJECT DEVELOPMENT AND OPERATION (CePEOEIA)

In 2019, to meet the requirements under Section 49A Environmental Quality Act 1974 and Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015, EiMAS had conducted Course on Certified Professional Environmental Officer in EIA Project Development and Operation (CePEOEIA) to 60 participants from 14th to 18th October 2019. Attendance to the course is compulsory for Environmental Officer (EO) before being recognised as a Competent Person.

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Jadual 9.4 : Aktiviti Dan Program Perpustakaan EiMAS Sepanjang Tahun 2019
Table 9.4 : EiMAS Library Activities And Programmes For The Year 2019

BIL./ NO.	AKTIVITI/PROGRAM ACTIVITIES/PROGRAMME	TARIKH DATE
1.	Program Ikon Membaca EiMAS	Jun dan Disember 2019
2.	Program Bersama Penulis Buku: Mr. Jerald S.Fifield	12 Mac 2019
3.	Program Jom baca 10 Minit	23 April 2019
4.	Program Pameran Buku Teknikal Bidang Alam Sekitar	26 Jun 19
5.	Pertandingan Fotografi Kemerdekaan	Ogos/September 2019
6.	Bengkel Infografik sebagai bahan Hebahan dan Promosi	10 hingga 12 September 2019
7.	Bengkel Penulisan Artikel dan Rencana	8 hingga 10 Oktober 2019
8.	Program Ceria Cuti Sekolah	24 Disember 2019

Course on Understanding The Procedure and Execution of CEMS in Industries – Series 1/2019 pada 24 hingga 27 Jun 2019 di Pusat Latihan Amali SKPU, EiMAS, Bandar Baru Bangi.
Course on Understanding The Procedure and Execution of CEMS in Industries – Series 1/2019 from 24th to 2nd June 2019 at Pusat Latihan Amali SKPU, EiMAS, Bandar Baru Bangi.

ASP Shahriman Shaari Menerangkan Persiapan Tindakan Sebelum Tangkapan kepada Peserta Kursus Pemahaman dan Kemahiran Tangkapan Mengikut Undang-Undang Peringkat Lanjutan pada 23 hingga 27 September 2019 di EiMAS.
ASP Shahriman Shaari Explaining the Preparation to be Taken before Arrest to the Participants of Course on Understanding and Arrest Skills in Accordance with Law for Advanced Level on from 23rd to 27th September 2019 at EiMAS.

Course on Certified Environmental Professional in Bag Filter (CEPBFI) - Series 1/2019 pada 8 hingga 11 Julai 2019 di Pusat Latihan Amali SKPU, EiMAS, Bandar Baru Bangi.
Course on Certified Environmental Professional in Bag Filter (CEPBFI) - Series 1/2019 from 8th to 11th Julai 2019 at Pusat Latihan Amali SKPU, EiMAS, Bandar Baru Bangi.

Tn. Hj. Mohd Sani Mat Daud Menerangkan Perundangan yang Berkaitan dengan Pembakaran Terbuka dalam Kursus Penyiasatan dan Penguatkuasaan Pembakaran Terbuka pada 17 hingga 20 Jun di EiMAS.
Tn. Hj. Mohd Sani Mat Daud explains the legislation related to open burning in the Course of Investigation & Enforcement of Open Burning from 17th to 20th June at EiMAS.

Bengkel Kajian Keperluan Training Need Analysis (TNA) dan Pelan Operasi Latihan EiMAS pada 5 hingga 8 November 2019 di Eagle Ranch Resort, Port Dickson
Workshop on Training Need Analysis (TNA) from 5th to 8th November 2019 at Eagle Ranch Resort Port Dickson

Kursus Kawalan Import dan Eksport Buangan Terjadul pada 23 hingga 27 September 2019 di Hotel Dorsett, Putrajaya.
Course on Control of Import and Export of Scheduled Wastes from 23rd to 27th September 2019 at Dorsett Hotel, Putrajaya.

Kursus Kompetensi Persampelan Buangan Terjadual pada 26 hingga 30 Ogos 2019 di EiMAS.
Competency Course on Scheduled Waste Sampling from 26th to 30th August 2019 at EiMAS.

BAB 10
CHAPTER 10

PERKHIDMATAN PERPUSTAKAAN
LIBRARY SERVICES

PERPUSTAKAAN JAS
DOE LIBRARY

Perpustakaan JAS telah melaksanakan beberapa program dan aktiviti sepanjang Tahun 2019 termasuklah penyediaan perkhidmatan kepada pengguna secara offline dan online.

In 2019, DOE Library implemented several programs and activities throughout the year including the provision of services to users offline and online.

PENGGUNA

Sebanyak 515 rekod kemasukan pengguna ke Perpustakaan JAS telah dicatatkan pada Tahun 2019 meliputi:

- 410 pengguna adalah dari luar seperti Pelajar IPT, Pensyarah, Perunding EIA, orang awam
- 105 pengguna terdiri dari warga JAS.

USERS

A total of 515 library user entry records to the DOE library were recorded in year 2019 including:

- 410 external users such as students of IPT, lecturers, EIA consultants and the public
- 105 users comprising of DOE staffs.

PINJAMAN

Sebanyak 123 buah bahan rujukan telah dipinjam oleh warga JAS yang melibatkan buku berkaitan dengan:

- Akta
- Peraturan
- Undang-undang
- Buku ilmiah berkenaan alam sekitar.

LOANED BOOKS

Total of 123 reference reading materials were borrowed by DOE Staff such as:

- Act
- Regulations
- Law
- Books about environment

PINJAMAN ANTARA PERPUSTAKAAN

Perpustakaan JAS juga menyediakan perkhidmatan Pinjaman Antara Perpustakaan dan ianya dilakukan oleh Pegawai JAS bagi meminjam buku diluar perpustakaan JAS. Keseluruhan bahan bacaan yang dipinjam dalah sebanyak lima (5) naskah dengan melibatkan beberapa perpustakaan iaitu:

- Perpustakaan UM
- Perpustakaan KATS
- Perpustakaan JPS

LENDING SERVICES BETWEEN LIBRARIES

DOE Library also provides lending services between libraries. This service is done by the DOE library officers by borrowing books from other libraries. Five (5) books were borrowed using this service involving several libraries such as:

- UM Library
- KATS Library
- JPS Library

PERKHIDMATAN RUJUKAN

Berdasarkan rekod pada Tahun 2019, pengguna Perpustakaan JAS telah membuat rujukan sebanyak 737 bahan dengan melibatkan 183 Pengguna. Pertanyaan rujukan ini adalah melalui email, telefon dan perkhidmatan kaunter yang melibatkan bahan bacaan tertentu seperti EIA, Akta, buku panduan dan juga perkhidmatan online.

REFERENCE SERVICES

Based on 2019 record, the DOE library users made 737 references of materials by involving 183 users. This reference enquiry was done via email, telephone and counter services involving certain reading materials such as EIA Report, Act, Handbook and Online Services.

PERKHIDMATAN ATAS TALIAN (ONLINE)

Perpustakaan JAS menyediakan tiga (3) platform perkhidmatan atas talian (online) iaitu :

- EKMC
- EMUSEUM
- ELIBRARY

Perkhidmatan ini menjadi pilihan utama bagi pengguna Perpustakaan JAS dalam mengakses maklumat. Statistik 2019 menunjukkan jumlah pengguna bagi perkhidmatan atas talian (online) ini adalah :

- Enviro Knowledge Management Centre (EKMC) - 153,454
- Enviro Museum (EMUSEUM) - 51,454
- Enviro Library (ELIBRARY) - 16,211

Sehingga hari ini EKMC telah mencapai tahap akses paling tinggi sejak 2014 iaitu 2.9 juta pengguna berbanding dengan EMUSEUM dan ELIBRARY. Usaha berterusan telah dibuat bagi menambah lagi koleksi bahan rujukan digital di EKMC bagi membantu pengguna memenuhi keperluan maklumat mereka.

Sehingga 31 Disember 2019, jumlah kandungan maklumat digital Perpustakaan JAS adalah seperti berikut :

- Enviro Knowledge Management Centre (EKMC) - 19,160
- Enviro Museum (EMUSEUM) - 49,137
- Enviro Library (ELIBRARY) - 20,000

Semua maklumat ini boleh diakses melalui atas talian sama ada dalam pejabat JAS mahupun di luar JAS.

ONLINE DATABASED SERVICES

DOE Library provides three (3) platforms of Online Services which are:

- EKMC
- EMUSEUM
- ELIBRARY

This service becomes the main choice for DOE library users to access information. Statistics 2019 indicates the number of users using this online service as follows:

- Enviro Knowledge Management Centre (EKMC) - 153,454
- Enviro Museum (EMUSEUM) - 51,454
- Enviro Library (ELIBRARY) - 16,211

As to date, EKMC has reached the highest level of 2.9 million users of access since 2014 compared to EMUSEUM and ELIBRARY. Continuous activities have been made to enhance the digital collection references materials in EKMC to help users meet their information needs.

Until 31st December 2019, the amount of digital information content of DOE library was:

- Enviro Knowledge Management Centre (EKMC) - 19,160
- Enviro Museum (EMUSEUM) - 49,137
- Enviro Library (ELIBRARY) - 20,000

All of this information can be accessed through online, whether in office or outside DOE area.

LAWATAN

Perpustakaan JAS telah menerima lawatan beberapa Kementerian, Jabatan, IPT iaitu:

a. Tiga (3) buah Jabatan

i. Jabatan Kemajuan Islam Malaysia (JAKIM)
ii. Institut Kanser Negara
iii. Jabatan Peguam Negara

b. Empat (4) Kementerian

i. Kementerian Wilayah Persekutuan
ii. Kementerian Air, Tanah dan Sumber Asli
iii. Kementerian Asas Tani
iv. Kementerian Pendidikan Malaysia

c. Tiga (3) IPT

i. UiTM
ii. UKM
iii. UNISEL

PANGKALAN DATA ATAS TALIAN

Selain daripada perkhidmatan atas talian ini, terdapat dua (2) perkhidmatan baru yang diperkenalkan oleh Perpustakaan JAS untuk warga JAS iaitu:

- Pangkalan Data Open Athens (https://my.openathens.net/my) Pangkalan Data Open Athens merupakan langganan dari MESTECC

- U-Pustaka (https://www.u-library.gov.my/)

Pangkalan Data U-Pustaka adalah langganan dari Perpustakaan Negara yang boleh diakses secara percuma

Perkhidmatan ini adalah untuk membolehkan warga JAS mengakses maklumat berbentuk e-Jurnal , e-book , e-surat khabar, e-majalah, e-artikel, e-berita, Buku Audio, Akta dan Perundangan.

LIBRARY VISITOR

DOE Library have received several visits from several agencies such as:

a. Three (3) Agencies

i. Department of Islamic Development Malaysia (JAKIM)
ii. National Cancer Insitute
iii. Attorney General Chambers of Malaysia

b. Four (4) Ministries

i. Ministry of Federal Territories
ii. Ministry of Water, Land and Natural Resources
iii. Ministry of Agriculture
iv. Ministry of Education

c. Three (3) local universities

i. UiTM
ii. UKM
iii. UNISEL

ONLINE DATABASE SERVICE

There are two (2) new services introduced by DOE Library for DOE staff members:

- Open Athens online database (https://my.openathens.net/my) Open Athens online database, which is a subscription sharing from MESTECC

- U-Pustaka (https://www.u-library.gov.my/)

U-Pustaka online database is subscription from the National Library that can be accessed free-of-charge

These services are to enable DOE staffs to access information on e-journals, e-books, e-newspapers, e-magazines, e-articles, e-news, audiobooks, acts and legislation.

AKTIVITI PERPUSTAKAAN

Pada tahun 2019, sebanyak sembilan (9) aktiviti telah dilaksanakan oleh Perpustakaan JAS yang melibatkan warga JAS iaitu:

- Aktiviti Jom Baca 10 Minit
- Bacaan Buku Pilihan Saya
- Peminjam buku terbanyak
- Bengkel Fotofon
- Bengkel EKMC dan EMUSEUM
- *Quran Hour*
- Lawatan Pesta Buku Antarabangsa PWTC
- Lawatan ke Perpustakaan Istana Kehakiman
- Kem ICT Bersama Anak-Anak Warga JAS
- Penyampaian Sijil Penghargaan kepada Penyelaras EKMC dan EMUSEUM

LIBRARY ACTIVITIES

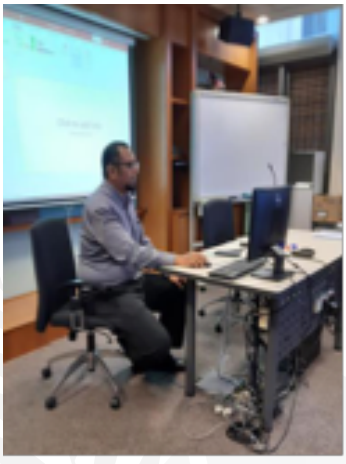
In 2019, a total of nine (9) activities were conducted by DOE Library that involved DOE staff members which were:

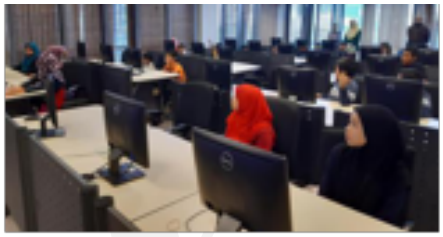
- Jom Baca 10 Minit Programme
- Bacaan Buku Pilihan Saya
- DOE Library Most Active users
- Fotofon Workshop
- EKMC and EMUSEUM Workshop
- Quran Hour
- Library Visit to International Books Exhibition at PWTC
- Library Benchmarking Visit to Palace of Justice Library
- ICT Camp with DOE staff's children
- Certificate of Appreciation to the Coordinator EKMC & EMUSEUM

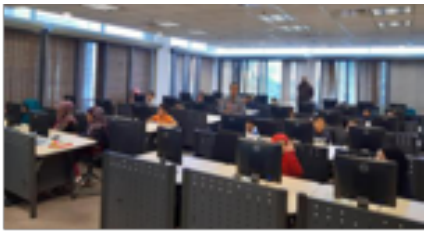
Lawatan dan Sesi Perkongsian Maklumat di antara Pelajar UNISEL dengan Pustakawan Perpustakaan Jabatan Alam Sekitar Mengenai Perpustakaan Digital Pada 24 Jun 2019
Visit and Information Sharing Session between UNISEL Students and DOE Librarian on Digital Library on 24th June 2019

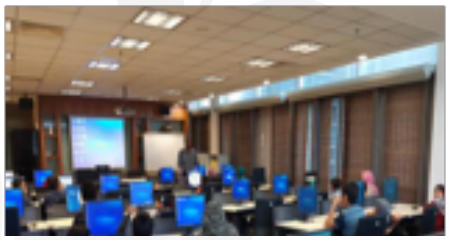
Program Jom Kongsi Ilmu oleh Pustakawan JAS Bersempena Program Jom Baca 10 Minit pada 23 April 2019 di Perpustakaan JAS, Putrajaya
Knowledge Sharing Programme by the DOE Librarian in conjunction with Read for 10 Minutes Programme on 23rd April 2019 at DOE Library

Lawatan Ahli Jawatankuasa Perpustakaan Undang-Undang (JKPUU) pada 13 Mac 2019 di Perpustakaan Jabatan Alam Sekitar, Putrajaya
Visit by Committee Member of Law Library (JKPUU) to DOE Library on 13th March 2019









Kem ICT Bersama Anak-Anak sfaf JAS Ibu Pejabat pada 27 hingga 28 November 2019 di Bilik ICT BTM JAS.
ICT Camp for DOE Headquarters Staff's Children from 27th to 28th November 2019 at DOE ICT Room.




Penganugerahan Sijil Kepada Penyelaras Terbaik Sistem EKMC 2019 diadakan bersempena Majlis Perhimpunan Bulanan JAS Bilangan 1 Tahun 2020 pada 15 Januari 2020
Certificate of Award to Best Coordinator of EKMC System 2019 held in conjunction with DOE First Monthly Assembly of 2020 on 15th January, 2020


Anugerah EKMC Terbaik Bagi Bahagian Ibu Pejabat JAS
EKMC 2019 Award DOE Headquarters

JABATAN ALAM SEKITAR
Kementerian Alam Sekitar dan Air

Aras 1 - 4, Podium 2 & 3,
Wisma Sumber Asli,
No.25, Persiaran Perdana, Presint 4,
Pusat Pentadbiran Kerajaan
Persekutuan, 62574 Putrajaya,
Malaysia.

www.doe.gov.my