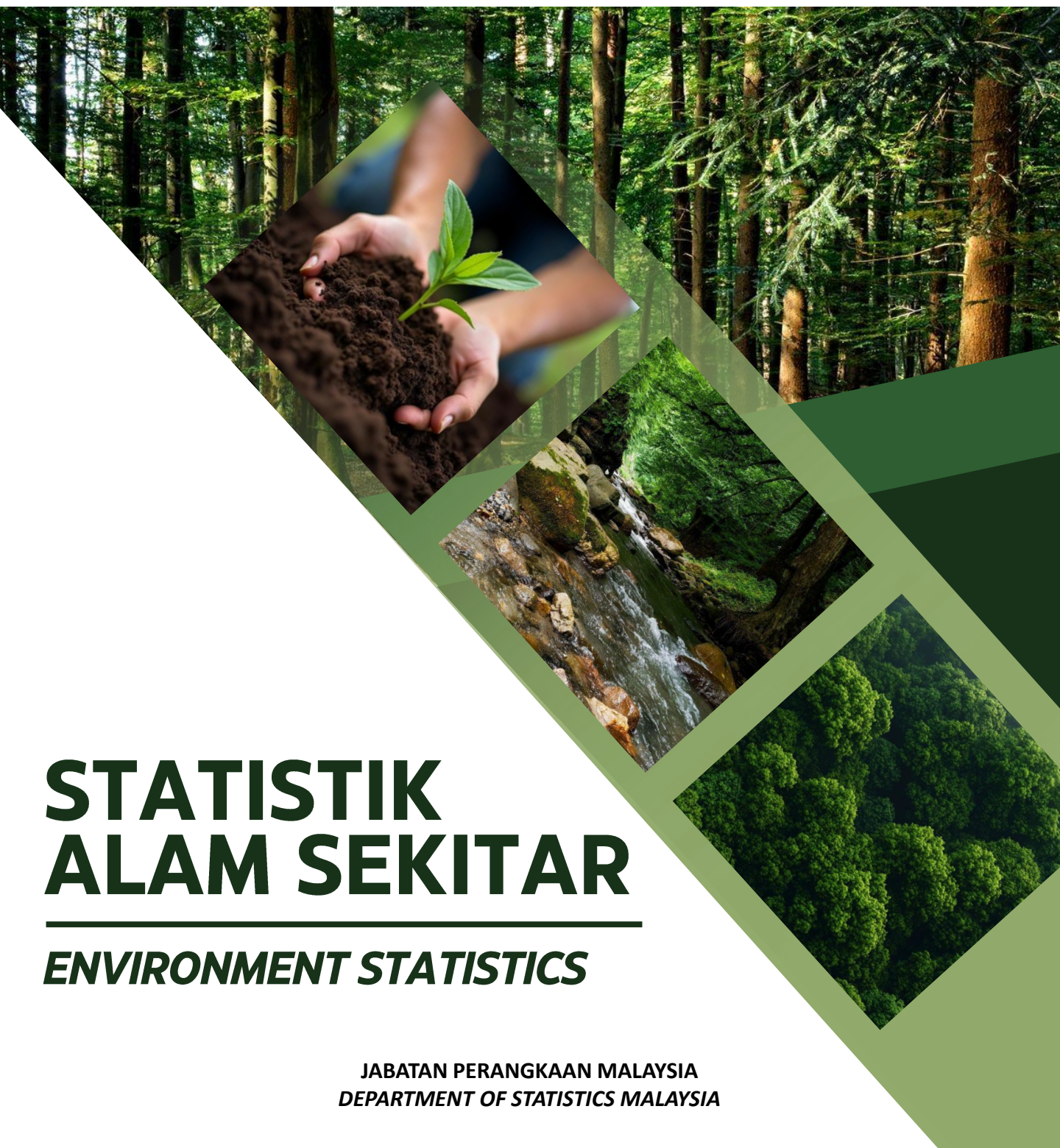




KEMENTERIAN EKONOMI
JABATAN PERANGKAAN MALAYSIA

PERAK 
2025



STATISTIK ALAM SEKITAR

ENVIRONMENT STATISTICS

JABATAN PERANGKAAN MALAYSIA
DEPARTMENT OF STATISTICS MALAYSIA



KEMENTERIAN EKONOMI
JABATAN PERANGKAAN MALAYSIA

STATISTIK ALAM SEKITAR ENVIRONMENT STATISTICS PERAK 2025

Pemakluman

Malaysia buat julung kalinya telah menduduki tangga pertama (1) di peringkat global dalam laporan dwi-tahunan *Open Data Inventory* (ODIN) 2024/25 yang dikeluarkan oleh *Open Data Watch* (ODW), mengatasi 197 negara lain. Pencapaian ini merupakan lonjakan ketara daripada kedudukan ke-67 dalam penilaian ODIN 2022/23.

OpenDOSM NextGen adalah medium yang menyediakan katalog data dan visualisasi bagi memudahkan pengguna menganalisis pelbagai data dan boleh diakses melalui portal <https://open.dosm.gov.my>.

Announcement

Malaysia, for the first time, ranked as number one (1) globally in the biennial Open Data Inventory (ODIN) 2024/25 report released by Open Data Watch (ODW), surpassing 197 other countries. This achievement marks a significant leap from its 67th position in the ODIN 2022/23 assessment.

OpenDOSM NextGen is a medium that provides data catalogue and visualisations to facilitate users' analysis and can be accessed through <https://open.dosm.gov.my>.

JABATAN PERANGKAAN MALAYSIA
DEPARTMENT OF STATISTICS MALAYSIA

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KATA PENGANTAR

Statistik Alam Sekitar, 2025 memaparkan statistik alam sekitar negeri Perak yang meliputi enam komponen iaitu Keadaan dan Kualiti Alam Sekitar; Sumber Alam Sekitar dan Kegunaannya; Sisa; Kejadian Ekstrem dan Bencana; Penempatan Penduduk dan Kesihatan Persekitaran; dan Penglibatan, Pengurusan dan Perlindungan Alam Sekitar. Penyusunan statistik ini meliputi maklumat dan keadaan alam sekitar, impak aktiviti manusia ke atas alam sekitar dan langkah yang diambil bagi mengurangkan impak tersebut.

Statistik alam sekitar ini boleh digunakan oleh agensi kerajaan negeri, sektor swasta, ahli akademik serta individu sebagai rujukan dalam menjalankan penyelidikan dan penganalisan di peringkat negeri. Rangka kerja yang digunakan dalam penerbitan ini adalah berdasarkan *Framework for the Development of Environment Statistics (FDES), United Nations, 2013*.

Penerbitan ini mengandungi enam bahagian. Bahagian pertama membentangkan infografik statistik alam sekitar, diikuti dengan ringkasan penemuan mengikut komponen di bahagian kedua serta kotak artikel di bahagian ketiga. Bahagian keempat pula memuatkan jadual terperinci mengenai statistik alam sekitar. Lampiran dan glosari disertakan di bahagian kelima dan keenam bagi membantu pengguna memahami statistik dan terma alam sekitar yang digunakan.

Jabatan merakamkan setinggi-tinggi penghargaan atas kerjasama dan sumbangan yang diberikan oleh semua pihak dalam menjayakan penerbitan ini. Setiap maklum balas dan cadangan untuk penambahbaikan penerbitan ini pada masa akan datang amatlah dihargai.

DATO' SRI DR. MOHD UZIR MAHIDIN

Ketua Perangkawan Malaysia

Disember 2025

PREFACE

Environment Statistics, 2025 presents the environment statistics of Perak which covers six components namely Environmental Conditions and Quality; Environmental Resources and their Use; Residuals; Extreme Events and Disasters; Human Settlements and Environmental Health; and Environmental Protection, Management and Engagement. The compilation of these statistics includes environment state and information, impacts of human activities on the environment and actions taken to minimise the impact.

These environment statistics can be used by state government agencies, private sectors, academicians and individuals as a reference to conduct research and analysis at the state level. The framework used in this publication is based on the Framework for the Development of Environment Statistics (FDES), United Nations, 2013.

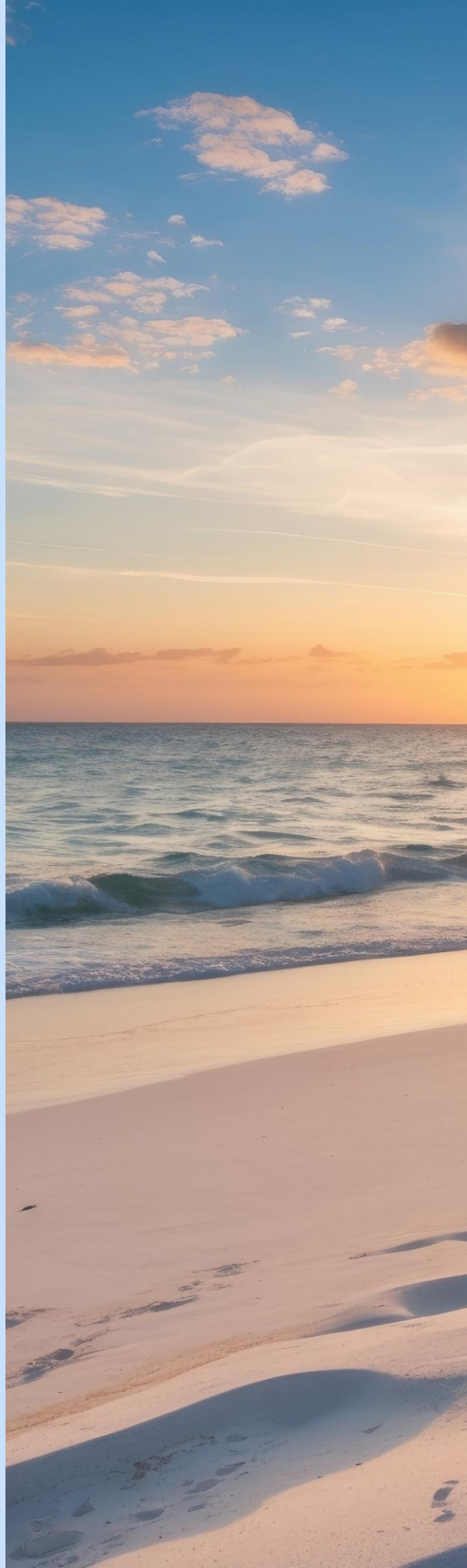
This publication consists of six parts. The first part focused on the infographics of environment statistics, followed by a summary of findings by component in the second part with the article box in the third part. The fourth part contains detailed tables on environment statistics. Appendices and glossary covered in the fifth and sixth parts are to facilitate users in understanding the statistics and environment terms used.

The Department gratefully acknowledges the co-operation and contribution rendered by all parties in making this publication a success. Every feedback and suggestion towards improving future publications is highly appreciated.

DATO' SRI DR. MOHD UZIR MAHIDIN

Chief Statistician Malaysia

December 2025





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INFOGRAFIK

INFOGRAPHICS

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STATISTIK ALAM SEKITAR, PERAK 2025



Hujan (mm)
 2024: 1,996.0 – 3,767.1
 2023: 1,617.7 – 2,987.5

Purata suhu minimum & maksimum (°C)
 2024: 23.8 – 33.2
 2023: 23.3 – 32.9

Kejadian banjir
 2024: 67
 2023: 25

Tan metrik



Buangan terjadual
 2024: 119,392
 2023: 527,892

Buangan klinikal
 2024: 2,965.7
 2023: 5,052.7



Penduduk ('000)
 2025^P: 2,574.9
 2024: 2,569.4

'000 tan metrik



Pendaratan ikan laut
 2024: 434.3
 2023: 335.9



Bilangan kes demam denggi
 2024: 6,924
 2023: 4,516

**Bekalan air mentah
Diabstrak (JLH)**



Sungai
 2024: 1,277
 2023: 1,185

Empangan
 2024: 297
 2023: 276

Meter padu

Pengeluaran kayu balak
 2023: 348,686
 2022: 353,306

Pengeluaran kayu gergaji
 2023: 102,069
 2022: 160,438

Pengeluaran papan lapis
 2023: 76,735
 2022: 75,938



Hektar

Keluasan hutan yang dilesenkan untuk pengusahaan
 2023: 6,136
 2022: 7,974

Keluasan berhutan
 2022: 1,015,684
 2021: 1,014,618

Kejadian kebakaran (kes)
 2024: 4,025
 2023: 3,372

Nota:
 p:awalan
 JLH:Juta liter sehari





ENVIRONMENT STATISTICS, PERAK

2025



Rainfall (mm)

2024: 1,996.0 – 3,767.1
2023: 1,617.7 – 2,987.5

Minimum & maximum mean temperature (°C)

2024: 23.8 – 33.2
2023: 23.3 – 32.9

Flood incidents

2024: 67
2023: 25

Metric tonnes



Scheduled wastes

2024: 119,392
2023: 527,892

Clinical wastes

2024: 2,965.7
2023: 5,052.7



Population ('000)

2025^P: 2,574.9
2024: 2,569.4

'000 metric tonnes



Landing of marine fish

2024: 434.3
2023: 335.9



Number of dengue fever cases

2024: 6,924
2023: 4,516

Supply of abstracted raw water (MLD)



Rivers

2024: 1,277
2023: 1,185

Storage dams

2024: 297
2023: 276

Log production

2023: 348,686
2022: 353,306

Sawn timber production

2023: 102,069
2022: 160,438

Plywood production

2023: 76,735
2022: 75,938



Forest area licensed for harvesting

2023: 6,136
2022: 7,974

Forested area

2022: 1,015,684
2021: 1,014,618

Fire incidents (cases)

2024: 4,025
2023: 3,372

Notes:

MLD: Million litres per day

p: preliminary





RINGKASAN PENEMUAN

SUMMARY OF FINDINGS

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PENGENALAN

Kepentingan mewujudkan kestabilan alam sekitar harus menjadi tonggak asas kepada strategi pembangunan sesebuah negara. Ia merupakan agenda penting dan strategik dalam memastikan kesejahteraan berterusan masyarakat, bukan sahaja di dalam negara tetapi juga di peringkat global.

Beberapa kejadian akibat kemusnahan alam sekitar, seperti kejadian tanah runtuh tragis yang melibatkan kehilangan nyawa dan suhu yang melampau, memerlukan sebuah negara melaksanakan tindakan proaktif untuk mengurus persekitarannya dengan berhemah dan konsisten. Di samping pencapaian ekonomi, indikator alam sekitar bertindak sebagai kayu pengukur yang penting terhadap kesejahteraan dan kelestarian.

Perak mengalami pertumbuhan ekonomi yang memberangsangkan pada 2024, Keluaran Dalam Negara Kasar (KDNK) pada harga malar merekodkan RM86.2 bilion (2023: RM82.6 bilion), menunjukkan peningkatan 4.4 peratus daripada tahun sebelumnya. KDNK Perak menyumbang 5.2 peratus kepada keseluruhan KDNK Malaysia. Selain itu, KDNK per kapita pada harga semasa meningkat kepada RM38,998 berbanding RM37,026 pada 2023.

[Paparan 1.1]

Paparan 1.1: Ringkasan Ekonomi Negeri Perak, 2023 dan 2024

	2023 ^a	2024 ^p
KDNK pada harga malar 2015	RM82.6 bilion	RM86.2 bilion
Perubahan peratusan tahunan	2.7%	4.4%
Peratusan sumbangan kepada KDNK Malaysia	5.3%	5.2%
KDNK per kapita pada harga semasa	RM37,026	RM38,998

Nota: ^a anggaran
^p awalan



A. Kualiti alam sekitar

Bahan pencemar udara merupakan bahan kimia di udara yang boleh membahayakan manusia dan alam sekitar. Bahan pencemar boleh berbentuk zarah pepejal, titisan cecair atau gas. Terdapat enam (6) bahan pencemar udara utama iaitu Ozon Permukaan Bumi (O_3), Karbon Monoksida (CO), Sulfur Dioksida (SO_2), Nitrogen Dioksida (NO_2) dan Habuk Halus (PM_{10} & $PM_{2.5}$). Pencemaran udara berlaku apabila bahan pencemar ini hadir di atmosfera. Punca dan kesan bahan pencemar udara ditunjukkan seperti di **Lampiran 2**.

Habuk Halus (PM_{10} & $PM_{2.5}$)

Habuk Halus (PM_{10} & $PM_{2.5}$) adalah istilah yang digunakan bagi zarah terampai berukuran kurang daripada diameter 10 dan 2.5 mikron. Zarah boleh berbentuk pepejal atau cecair dan ia termasuk aerosol, debu, asap dan debunga. Pembebasan PM_{10} dari ekzos kenderaan bermotor, penjana kuasa dan haba, proses perindustrian dan aktiviti pembakaran terbuka yang akan membawa kepada pencemaran udara serta mengancam kesihatan manusia dan tumbuhan.

Trend purata tahunan kepekatan PM_{10} dan $PM_{2.5}$ dalam udara di Perak menunjukkan peningkatan di semua stesen pada 2024. Namun begitu, stesen Pegoh, Ipoh dan Seri Manjung mencatatkan penurunan dalam kepekatan PM_{10} pada 2024. **[Paparan 1.2]**

Ozon Permukaan Bumi (O_3)

O_3 adalah bahan pencemar yang terjadi akibat daripada reaksi kimia dalam udara di antara sebatian organik meruap (VOCs) dan nitrogen oksida (NO_x). VOCs dan NO_x ini dihasilkan oleh punca kenderaan bermotor dan industri.

Trend purata tahunan kepekatan O_3 dalam udara meningkat di semua stesen di Perak pada 2024 berbanding pada 2023.

[Paparan 1.2]



Karbon Monoksida (CO)

CO merupakan gas yang tidak berwarna, tidak berbau dan beracun yang dihasilkan dari punca pembakaran bahan bakar fosil seperti asap kenderaan, proses perindustrian dan aktiviti pembakaran terbuka.

Trend purata tahunan kepekatan CO dalam udara pada 2024 menunjukkan penurunan di semua stesen kecuali di stesen Taiping berbanding tahun sebelumnya. **[Paparan 1.2]**



Sulfur Dioksida (SO₂)

SO₂ adalah sejenis gas reaktif yang mudah larut dalam air, tidak berwarna dan mempunyai bau yang tidak menyenangkan. SO₂ yang dilepaskan ke alam sekitar berasal daripada utiliti elektrik, terutamanya yang membakar arang batu. Beberapa sumber SO₂ lain termasuk kilang penapisan petroleum, pembuatan simen dan kemudahan peleburan dan pemprosesan logam. Pendedahan yang berlebihan terhadap kepekatan tinggi SO₂ di udara menyebabkan kerosakan sistem pernafasan dan komplikasi kardiovaskular.

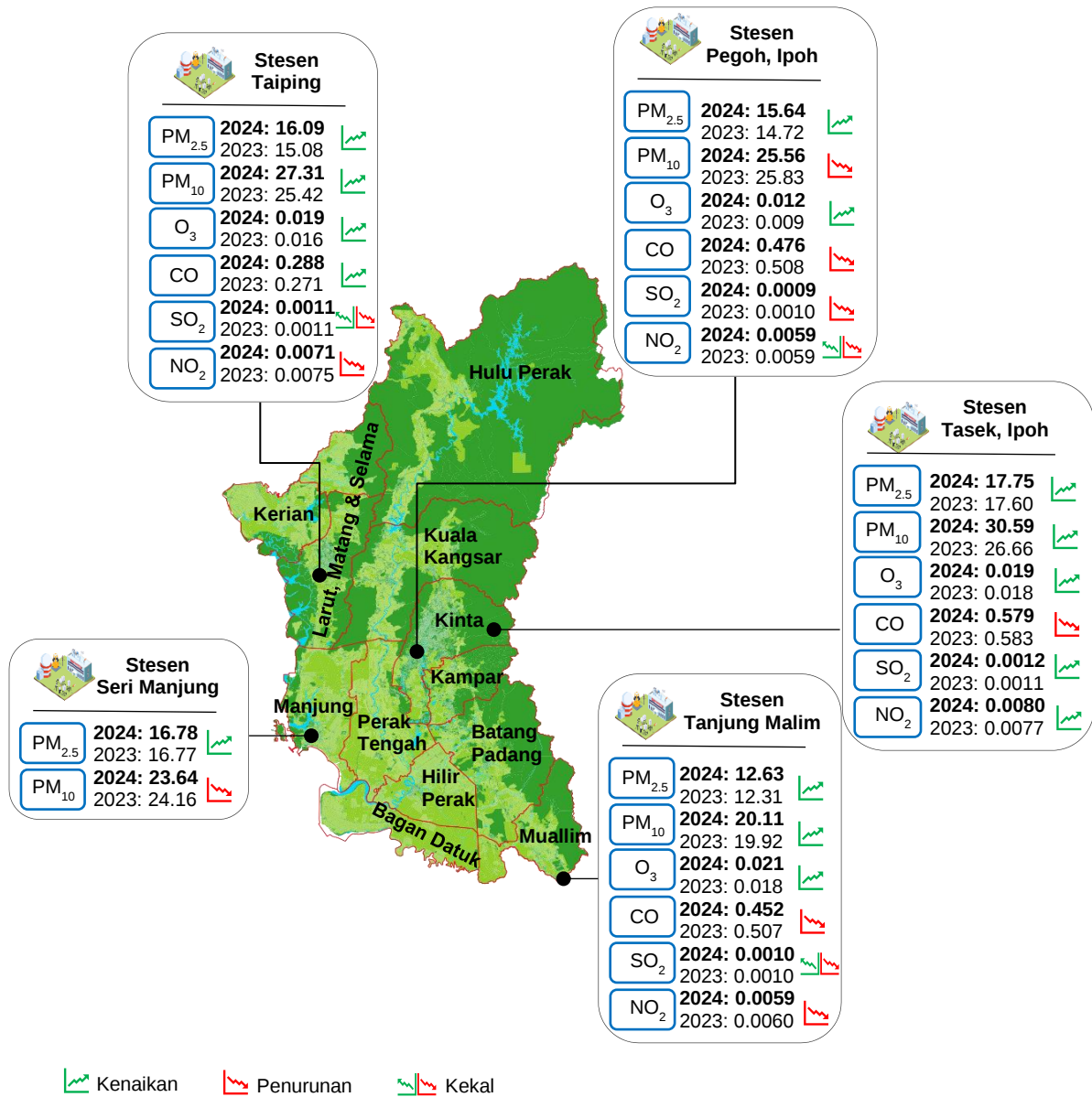
Trend purata tahunan kepekatan SO₂ pada 2024 kekal tidak berubah di stesen Taiping dan Tanjung Malim, menurun di stesen Pegoh, Ipoh dan meningkat di stesen Tasek, Ipoh berbanding 2023. **[Paparan 1.2]**

Nitrogen Dioksida (NO₂)

NO₂ terbentuk di persekitaran udara melalui pengoksidaan Nitrogen Monoksida (NO). Gas bertoksik ini berwarna merah keperangan dan mempunyai bau yang kuat dan tajam.

Trend purata tahunan kepekatan NO₂ dalam udara pada tahun 2024 menurun di stesen Taiping dan Tanjung Malim, meningkat di stesen Tasek, Ipoh dan kekal tidak berubah di stesen Pegoh, Ipoh berbanding tahun sebelumnya. **[Paparan 1.2]**

Paparan 1.2: Ringkasan statistik bahan pencemar udara mengikut stesen, Perak, 2023 dan 2024



Petunjuk:

PM _{2.5}	Habuk halus diameter 2.5 mikron (µg/m ³)	CO	Karbon monoksida (ppm)
PM ₁₀	Habuk halus diameter 10 mikron (µg/m ³)	SO ₂	Sulfur dioksida (ppm)
O ₃	Ozon permukaan Bumi (ppm)	NO ₂	Nitrogen dioksida (ppm)

Sumber: Jabatan Alam Sekitar

B. Purata suhu, hujan dan purata kelembapan relatif

Iklim Malaysia dikategorikan sebagai iklim khatulistiwa yang mempunyai suhu seragam, hujan yang banyak dan lembap sepanjang tahun. Iklim ini dipengaruhi oleh monsun Timur Laut yang bertiup dari bulan November hingga Mac dan monsun Barat Daya dari Mei hingga September. Pantai timur Semenanjung Malaysia dan kawasan pesisiran pantai Sabah dan Sarawak amat dipengaruhi oleh musim monsun Timur Laut. Manakala, pantai barat Semenanjung Malaysia tidak dipengaruhi kerana dilindungi oleh banjaran gunung yang tinggi.

Perak mempunyai tiga stesen meteorologi yang digunakan untuk memantau keadaan cuaca secara berterusan dan menyediakan data meteorologi sebagai input untuk ramalan cuaca. Stesen-stesen tersebut adalah Ipoh, Lubok Merbau, Kuala Kangsar dan Sitiawan.

Purata suhu

Stesen Sitiawan mencatatkan purata suhu tertinggi iaitu 33.2°C meningkat 0.6°C berbanding 32.6°C pada 2023. Manakala, stesen Lubok Merbau, Kuala Kangsar merekodkan purata suhu terendah iaitu 23.8°C, menurun 0.5°C berbanding pada 2023.

Taburan hujan

Stesen Ipoh merekodkan hujan tahunan tertinggi pada 2024 iaitu 3,767.1 mm berbanding tahun sebelumnya (2,987.5 mm). Namun begitu, stesen Sitiawan pula mencatatkan hujan tahunan terendah iaitu 1,996.0 mm pada 2024 berbanding tahun sebelumnya (1,945.0 mm).

Purata kelembapan relatif

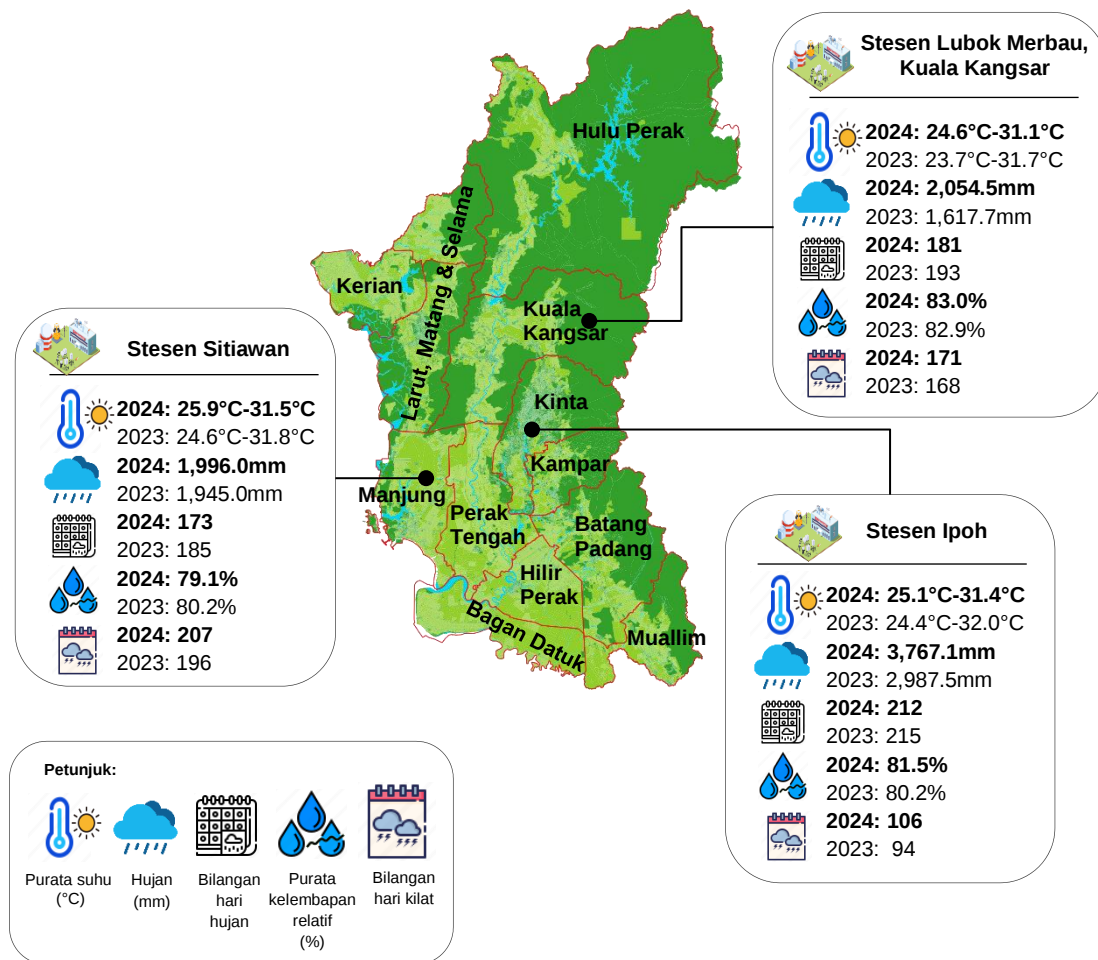
Purata kelembapan relatif di Perak adalah di antara 79.1 peratus (stesen Sitiawan) dan 83.0 peratus (stesen Lubok Merbau, Kuala Kangsar) pada 2024. Julat purata kelembapan relatif pada 2023 iaitu antara 80.2 peratus (stesen Ipoh dan Sitiawan) dan 82.9 peratus (stesen Lubok Merbau, Kuala Kangsar).

Bilangan hari kilat

Stesen Sitiawan mencatatkan bilangan hari kilat tertinggi pada 2024 iaitu 207 hari. Manakala, stesen Ipoh pula mencatatkan bilangan hari kilat terendah iaitu 106 hari.

[Paparan 1.3]

Paparan 1.3: Ringkasan statistik iklim di stesen meteorologi, Perak, 2023 dan 2024



Sumber: Jabatan Meteorologi Malaysia

C. Status kualiti udara

Udara merupakan campuran beberapa gas yang membentuk atmosfera bumi. Ia terhasil terutamanya daripada nitrogen (lebih kurang 78.0%), oksigen (lebih kurang 21.0%) dan gas-gas lain (lebih kurang 1.0%). Udara amat penting dalam kehidupan di mana kita menggunakannya untuk bernafas dan juga untuk pembakaran bahan api bagi tujuan pemanasan, pengangkutan, penjanaan kuasa dan lain-lain.

Indeks Pencemaran Udara

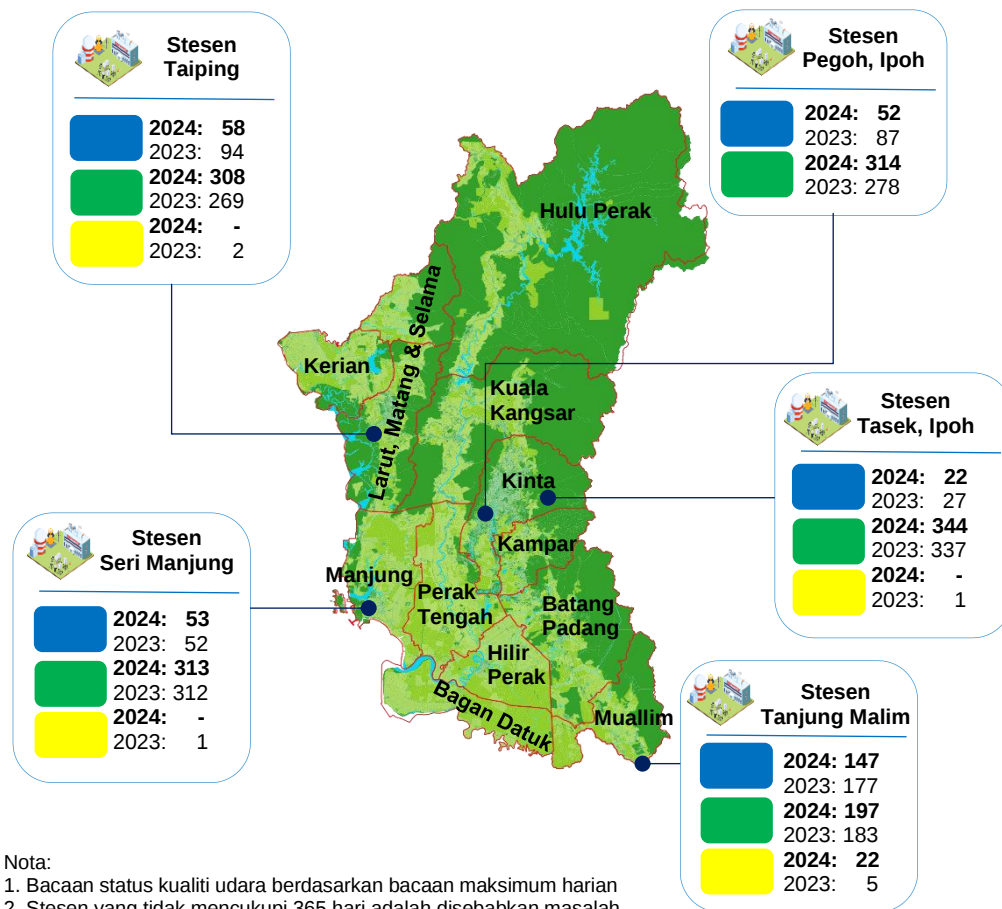
Jabatan Alam Sekitar (JAS) memantau kualiti udara negara melalui 65 stesen pengawasan yang ditempatkan di seluruh negara bagi mengawasi dan mengesan sebarang perubahan kualiti udara yang boleh memberi kesan negatif kepada kesihatan manusia dan alam sekitar. Status kualiti udara di Malaysia dilaporkan dalam Indeks Pencemaran Udara (IPU).

Bahan pencemar udara yang digunakan untuk mengira IPU adalah Ozon Permukaan Bumi (O_3), Karbon Monoksida (CO), Nitrogen Dioksida (NO_2), Sulfur Dioksida (SO_2) dan Habuk Halus bersaiz kurang dari 10 mikron (PM_{10}) dan bersaiz kurang dari 2.5 mikron ($PM_{2.5}$).

Semua stesen mencatatkan kualiti udara “baik” kurang 100 hari kecuali stesen Tanjung Malim pada 2024.

Stesen Tanjung Malim mencatatkan bilangan hari tertinggi (147 hari) dengan kualiti udara “baik” berbanding 177 hari pada 2023. Bacaan IPU menunjukkan penurunan paras pencemar udara, khususnya di bandar-bandar utama di seluruh negeri disebabkan pelepasan bahan pencemar ke udara yang lebih rendah seperti asap kenderaan bermotor, pelepasan asap cerobong industri dan aktiviti pembakaran terbuka. **[Paparan 1.4]**

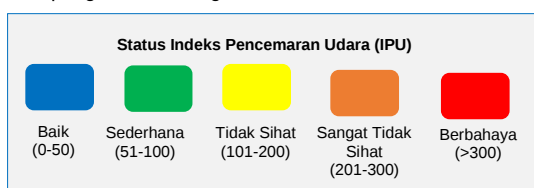
Paparan 1.4: Status kualiti udara mengikut stesen, Perak, 2023 dan 2024



Nota:

1. Bacaan status kualiti udara berdasarkan bacaan maksimum harian
2. Stesen yang tidak mencukupi 365 hari adalah disebabkan masalah teknikal

Unit pengukuran: bilangan hari



Sumber: Jabatan Alam Sekitar

D. Hutan

Hutan adalah salah satu komponen penting dalam sistem biofizikal Malaysia. Iklim dan keadaan tanah yang sesuai menggalakkan pertumbuhan hutan hujan tropika, terutamanya spesies hutan tanah rendah dan hutan dipterokarpa bukit. Hutan dianggap sebagai penyaman udara yang besar, menapis hujan dan menghalang hakisan tanah yang teruk. Ia juga berperanan sebagai span besar yang menyerap, menyimpan dan menyalurkan kembali air dengan perlahan ke sungai serta laluan air. Hutan turut membekalkan produk balak serta menjadi gedung tanaman ubatan dan kawasan simpanan pelbagai biologi. Pengelasan hutan dikategorikan mengikut perubahan ciri-ciri altitud, komposisi flora, habitat, iklim, tanah dan biotik.

Kawasan berhutan

Kawasan berhutan diklasifikasikan sebagai hutan simpanan kekal, tanah kerajaan, taman hidupan liar dan hutan lain yang terdiri daripada beberapa jenis hutan seperti hutan darat, hutan paya gambut dan hutan paya laut.

Perak merupakan negeri keempat terbesar di Semenanjung Malaysia yang mempunyai kawasan berhutan dengan keluasan 1,015,684 hektar. Daripada jumlah ini, 986,021 hektar (97.1%) telah diwartakan sebagai Hutan Simpanan Kekal (HSK) di bawah Akta Perhutanan Negara, 1984. Kawasan HSK ini diuruskan di bawah prinsip pengurusan hutan secara berkekalan untuk kepentingan ekonomi, sosial dan alam sekitar.

[Paparan 1.5]

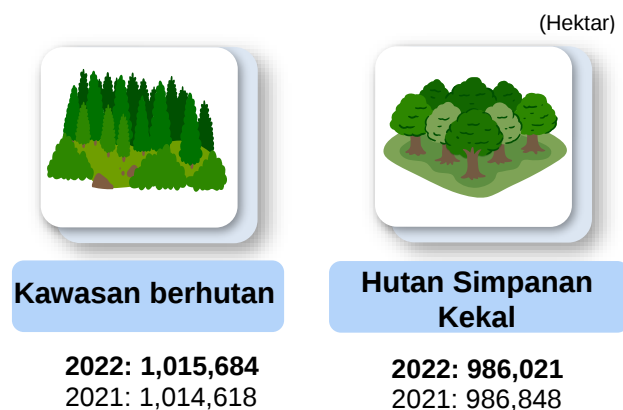
Pengusahhasilan hutan

Aktiviti pengusahhasilan hutan merujuk kepada pengambilan dan pengeluaran hasil hutan dan seterusnya menyumbang kepada perkembangan dan pertumbuhan

sosio ekonomi. Aktiviti pengusahhasilan hutan dikawal melalui perundangan, dasar dan garis panduan pengoperasian. Keluasan hutan yang dilesenkan untuk pengusahhasilan bagi negeri Perak menurun kepada 6,136 hektar pada 2023 daripada 7,974 hektar pada 2022.

[Paparan 1.6]

Paparan 1.5: Kawasan berhutan dan Hutan Simpanan Kekal, Perak, 2021 dan 2022



Sumber: Jabatan Perhutanan Semenanjung Malaysia

Paparan 1.6: Keluasan hutan yang dilesenkan untuk pengusahaan, Perak, 2022 dan 2023

(Hektar)



2023: 6,136
2022: 7,974

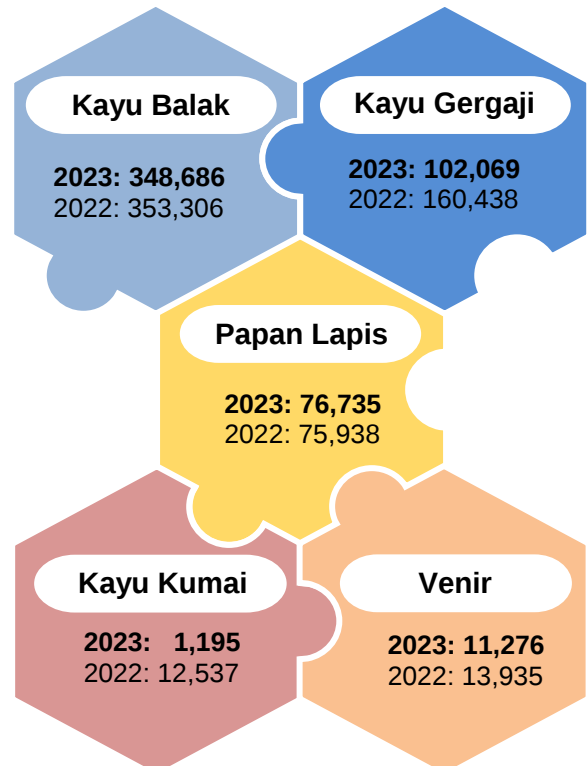
Sumber: Jabatan Perhutanan Semenanjung Malaysia



Kayu balak merupakan salah satu produk kayu-kayan utama di Perak. Pengeluaran kayu balak yang direkodkan pada 2023 menurun kepada 348,686 m³ berbanding 353,306 m³ pada 2022. **[Paparan 1.7]**

Paparan 1.7: Pengeluaran produk kayu kayu utama, Perak, 2022 dan 2023

(Meter padu)



Sumber: Jabatan Perhutanan Semenanjung Malaysia

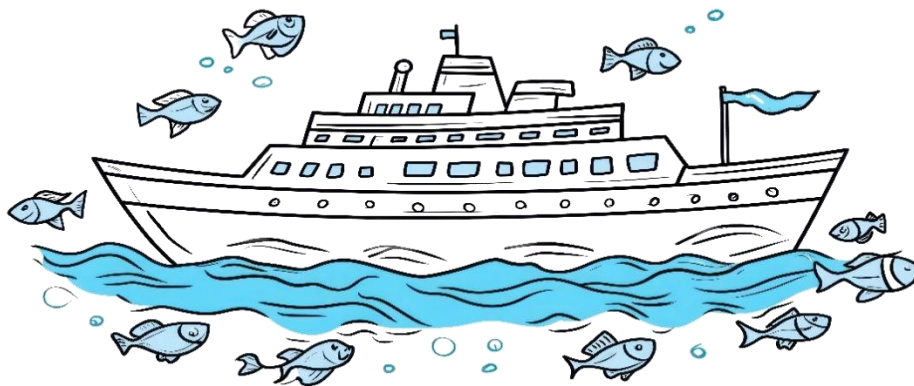
E. Sumber Biologi

Laut Malaysia adalah antara perairan yang mempunyai kepelbagaian biologi di dunia, dengan pelbagai jenis ekosistem dan sumber semula jadi yang penting kepada kehidupan dan keperluan pemakanan manusia.

Pendaratan ikan laut pada 2024 ialah 434.3 ribu tan metrik, meningkat 29.3 peratus berbanding 335.9 ribu tan metrik pada 2023. **[Paparan 1.8]**

Paparan 1.8: Pendaratan ikan laut, Perak, 2023 dan 2024

('000 tan metrik)



2024: 434.3
2023: 335.9

29.3%

Kadar pertumbuhan (%)

Sumber: Jabatan Perikanan Malaysia

F. Buangan klinikal

Buangan klinikal pula merujuk kepada buangan yang terdiri daripada keseluruhan atau sebahagian tisu manusia, darah atau bendalir badan, bahan kumuh, ubat-ubatan, produk farmaseutikal dan lain-lain. Ia diklasifikasikan sebagai buangan terjadual di bawah Jadual Pertama Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005.

Perak mencatatkan 2,965.7 tan metrik buangan klinikal pada 2024 berbanding 5,052.7 tan metrik yang direkodkan pada 2023.

[Paparan 1.9]

Paparan 1.9: Kuantiti buangan klinikal, Perak, 2023 dan 2024

(Tan metrik)

Buangan klinikal

2024: 2,965.7
2023: 5,052.7

-41.3%

Kadar pertumbuhan (%)



Sumber: Jabatan Alam Sekitar

INTRODUCTION

The importance of establishing environmental stability should be a fundamental pillar of a country's development strategy. It stands as a crucial and strategic agenda in ensuring continuous well-being of the community, not only within the nation but also globally.

Several events resulting from environmental destruction, such as tragic landslide incidents involving lost of lives and extreme temperatures, necessitate that a country implements proactive action to manage its environment with prudence and consistency. Aside from economic achievement, environment indicator serves as an important measurement towards well-being and sustainability.

Perak experienced favourable economic growth in 2024, Gross Domestic Product (GDP) at constant prices recorded RM86.2 billion (2023: RM82.6 billion), indicating a 4.4 per cent increase from the previous year. Perak's GDP contributes 5.2 per cent to Malaysia's overall GDP. Additionally, the GDP per capita at current prices rose to RM38,998 as compared to RM37,026 in 2023. **[Exhibit 1.1]**

Exhibit 1.1: Economic Summary of Perak, 2023 and 2024

	2023 ^e	2024 ^p
GDP at constant price 2015	RM82.6 billion	RM86.2 billion
Annual Percentage change	2.7%	4.4%
Percentage contribution to Malaysia's GDP	5.3%	5.2%
GDP per capita at current price	RM37,026	RM38,998

Notes: ^e estimates
^p preliminary



A. Environmental quality

Air pollutants are chemical substances in the air that can be harmful to human beings and the environment. Pollutants can be in the form of solid particles, liquid droplets or gases. There are six (6) primary pollutants namely Ground Level Ozone (O_3), Carbon Monoxide (CO), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10} & $PM_{2.5}$). Air pollution occurs when these pollutants are present in the atmosphere. The sources and effects of air pollutants are shown in **Appendix 2**.

Particulate Matter (PM_{10} & $PM_{2.5}$)

Particulate Matter (PM_{10} & $PM_{2.5}$) is the term used to describe respirable particles of less than 10 and 2.5 micron in diameter. Particles may be solid or liquid and includes aerosol, dust, smoke and pollen. Emission of PM_{10} from motor vehicle exhausts, heat and power generation, industrial processes and open burning activities will lead to air pollution and endanger human health and plants.

The annual average trend concentration of PM_{10} and $PM_{2.5}$ in the air in Perak showed an increase at all stations in 2024. However, Pegoh, Ipoh and Seri Manjung stations recorded a decreased in PM_{10} concentration in 2024. **[Exhibit 1.2]**

Ground Level Ozone (O_3)

O_3 is a pollutant formed by the chemical reaction in the air between volatile organic compounds (VOCs) and nitrogen oxide (NO_x). These VOCs and NO_x are produced by motor vehicles and industrial sources.

The annual average trend concentration of O_3 in the air increased at all stations in Perak in 2024 as compared to 2023. **[Exhibit 1.2]**



Carbon Monoxide (CO)

CO is a colourless, odourless and toxic gas produced from fossil fuel combustion sources such as vehicle exhaust, industrial processes and open burning activities.

The annual average trend concentration of CO in the air in 2024 showed a decrease at all stations except at Taiping station as compared to the previous year. **[Exhibit 1.2]**



Sulphur Dioxide (SO₂)

SO₂ is a colourless, water-soluble reactive gas with an irritating odour. SO₂ released into the environment comes from electric utilities, especially those that burn coal. Some other sources of SO₂ include petroleum refineries, cement manufacturing and metal smelting and processing facilities. Excessive exposure to high concentration of SO₂ in the atmosphere causes respiratory illnesses and cardiovascular complications.

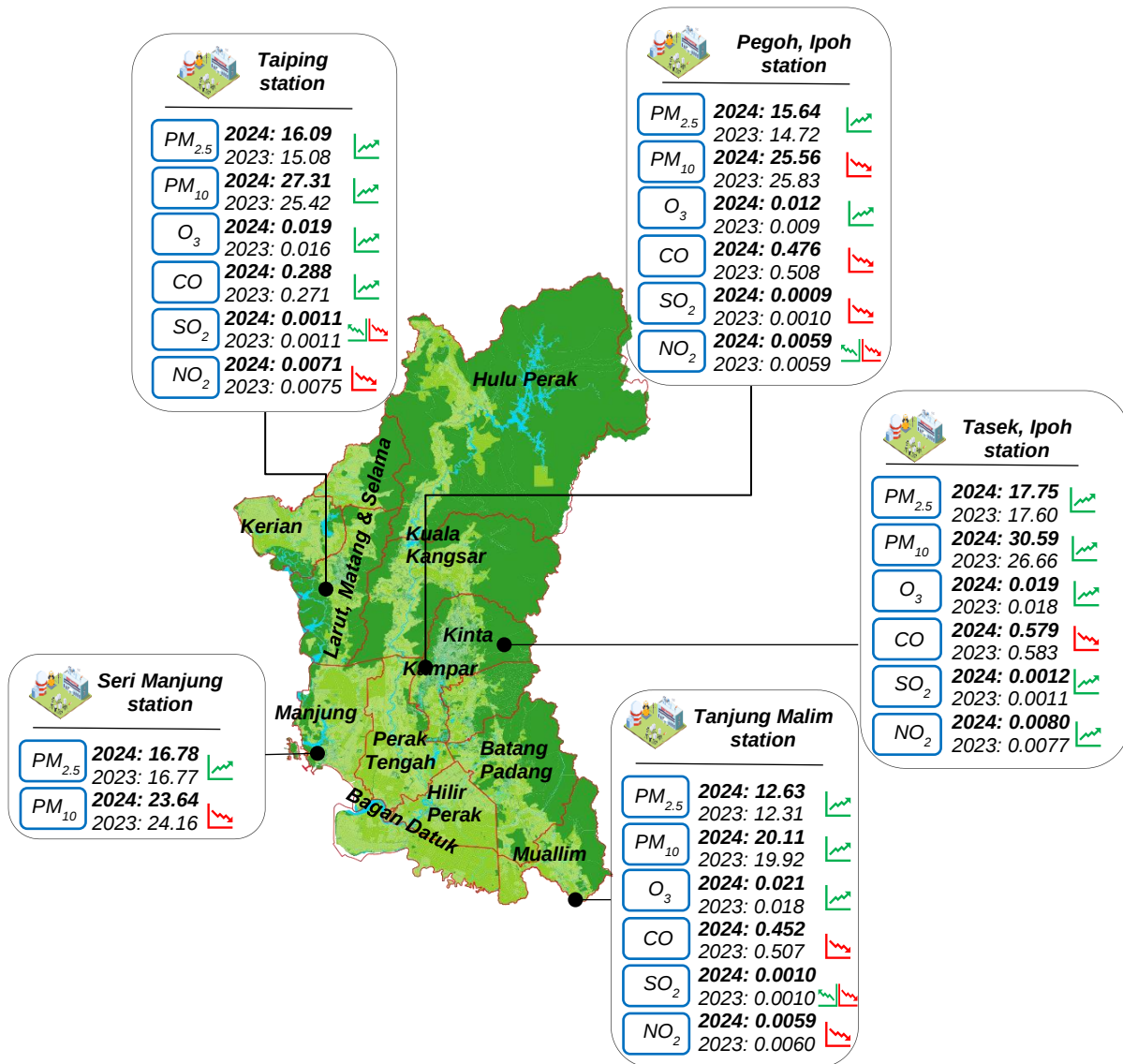
The annual average trend concentration of SO₂ in 2024 remain unchanged at Taiping and Tanjung Malim stations, decreased at Pegoh, Ipoh station and increased at Tasek, Ipoh station as compared to 2023. **[Exhibit 1.2]**

Nitrogen Dioxide (NO₂)

NO₂ is formed in the ambient air through the oxidation of Nitrogen Monoxide (NO). This reddish-brown toxic gas has a sharp and pungent odour.

The annual average trend concentration of NO₂ in the air in 2024 decreased at Taiping and Tanjung Malim stations, increased at Tasek, Ipoh station and remain unchanged at Pegoh, Ipoh station as compared to the previous year. **[Exhibit 1.2]**

Exhibit 1.2: Summary of air pollutants statistics by station, Perak, 2023 and 2024



Increased
 Decreased
 Unchanged

Legend:

PM _{2.5}	Particulate Matter 2.5 micron (µg/m ³)	CO	Carbon Monoxide (ppm)
PM ₁₀	Particulate Matter 10 micron (µg/m ³)	SO ₂	Sulphur Dioxide (ppm)
O ₃	Ground Level Ozone (ppm)	NO ₂	Nitrogen Dioxide (ppm)

Source: Department of Environment

B. Mean temperature, rainfall and mean relative humidity

Malaysia's climate is categorised as equatorial, has a uniform temperature, copious rainfall and humid throughout the year. This climate is influenced by the Northeast monsoon blows from November to March and the Southwest monsoon from May to September. The east coast of Peninsular Malaysia and the coastal areas of Sabah and Sarawak are strongly influenced by the Northeast monsoon season. However, the west coast of Peninsular Malaysia is not affected because it is protected by the soaring mountain ranges.

Perak has three meteorological stations which used to monitor the weather conditions continuously and provide meteorological data as an input for weather forecasting. The stations are Ipoh, Lubok Merbau, Kuala Kangsar and Sitiawan.

Mean temperature

Sitiawan station recorded the highest average temperature of 33.2°C, an increase of 0.6°C compared to 32.6°C in 2023. Meanwhile, Lubok Merbau, Kuala Kangsar station recorded the lowest average temperature of 23.8°C, a decrease of 0.5°C compared to 2023.

Rainfall distribution

Ipoh station recorded the highest annual rainfall in 2024 which was 3,767.1 mm as compared to the previous year (2,987.5 mm). However, Sitiawan station recorded the lowest annual rainfall of 1,996.0 mm in 2024 as compared to the previous year (1,945.0 mm).

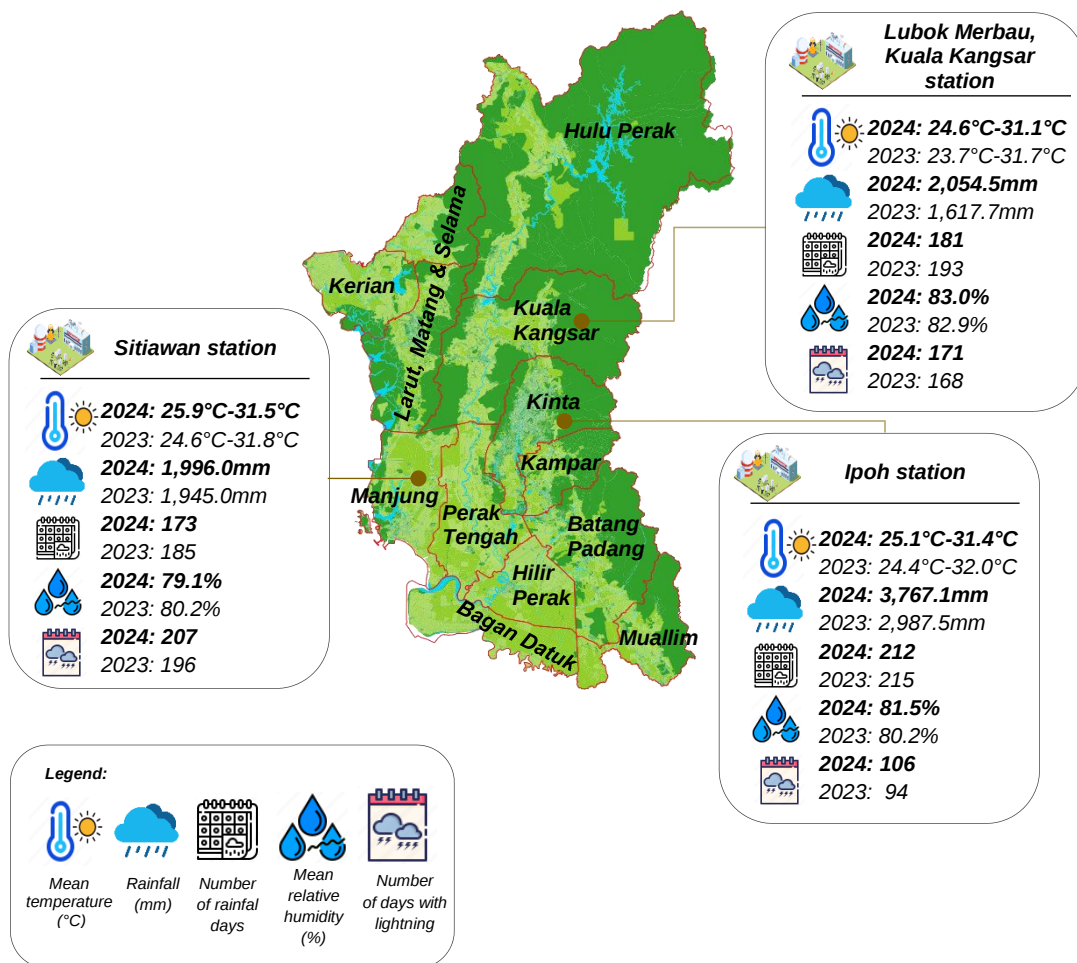
Mean relative humidity

The mean relative humidity in Perak was between 79.1 per cent (Sitiawan station) and 83.0 per cent (Lubok Merbau, Kuala Kangsar station) in 2024. The mean relative humidity in 2023 which was between 80.2 per cent (Ipoh and Sitiawan stations) and 82.9 per cent (Lubok Merbau, Kuala Kangsar station).

Number of days with lightning

Sitiawan station recorded the highest days with lightning in 2024 which was 207 days. Meanwhile, Ipoh station recorded the lowest days with lightning which was 106 days.
[Exhibit 1.3]

Exhibit 1.3: Summary of climate statistics at meteorological stations, Perak, 2023 and 2024



Source: Malaysia Meteorological Department

C. Air quality status

Air is the mixture of gases which make up the earth's atmosphere. It is mainly composed of nitrogen (about 78.0%), oxygen (about 21.0%) and other gases (about 1.0%). Air is essential for life for breathing as well as to burn fuels for heating, transportation, power generation and others.

Air Pollutant index

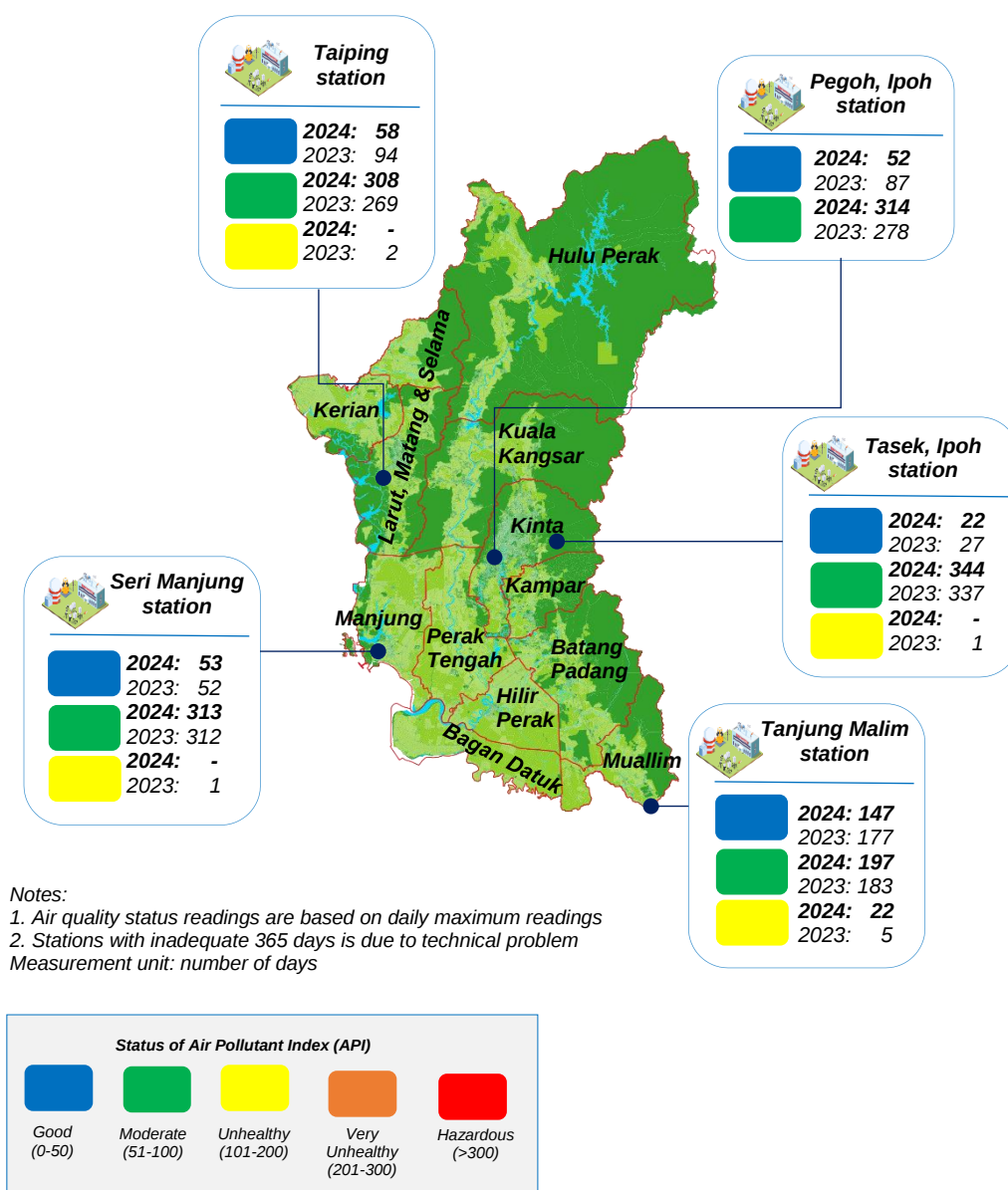
The Department of Environment (DOE) monitors the country's ambient air quality through 65 monitoring stations that are located throughout the country to monitor and to detect any significant change in the air quality that can contribute to the negative impact on human health and environment. The status of air quality in Malaysia is reported as the Air Pollutant Index (API).

The air pollutants used in computing the API are Ground Level Ozone (O_3), Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Particulate Matter of less than 10 microns in size (PM_{10}) and Particulate Matter of less than 2.5 microns in size ($PM_{2.5}$).

All stations registered less than 100 days “good” air quality days in 2024 except for Tanjung Malim station.

Tanjung Malim station recorded the highest number of days (147 days) with “good” air quality as compared to 177 days in 2023. API reading showed a decrease in air pollutants levels, especially in major cities across the state due to lower air pollutant emissions such as motor vehicles smoke, industrial chimney emissions and open burning activities. **[Exhibit 1.4]**

Exhibit 1.4: Status of air quality by station, Perak, 2023 and 2024



Source: Department of Environment

D. Forest

Forests are one of the important components in Malaysia's biophysical system. Suitable climate and soil conditions encourage the growth of tropical rainforests, especially lowland forest species and hill dipterocarp forests. Forests are considered a large air filters, filtering rain and preventing severe soil erosion. It also acts as a large sponge that absorbs, stores and slowly returns water to rivers and waterways. Forests also supply timber products as well as being a storehouse of medicinal plants and storage areas for various biology. Forest classification is categorised according to changes in altitude, flora composition, habitat, climate, soil and biotic characteristics.

Forested area

Forested areas are classified as a permanent reserve forests, government land, wildlife parks and other forests consisting of several types such as terrestrial forests, peat swamp forests and marine swamp forests.

Perak is the fourth largest state in Peninsular Malaysia with a forested area of 1,015,684 hectares. Of this total, 986,021 hectares (97.1%) have been gazetted as Permanent Forest Reserve (PFR) under National Forestry Act, 1984. These PFR areas are managed under the principle of sustainable forest management for economic, social and environmental benefits.

[Exhibit 1.5]

Forestry production

Forest exploitation activities refer to the collection and production of forest products and further contribute to the development and socio-economic growth. Forest exploitation activities are regulated through legislation, policies and operating guidelines. The area of

forest licensed for logging for the state of Perak decreased to 6,136 hectares in 2023 from 7,974 hectares in 2022. **[Exhibit 1.6]**

Exhibit 1.5: Forested and Permanent Reserve Forest, Perak, 2021 and 2022

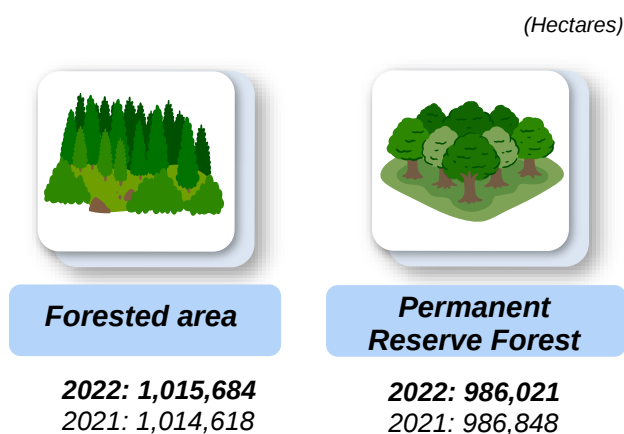
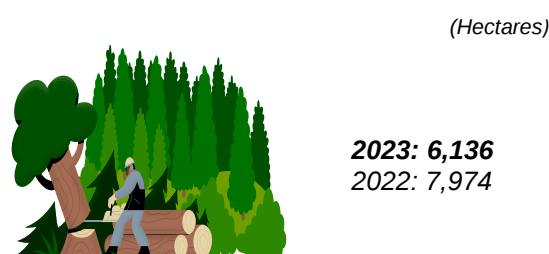


Exhibit 1.6: Forest area licensed for harvesting, Perak, 2022 and 2023



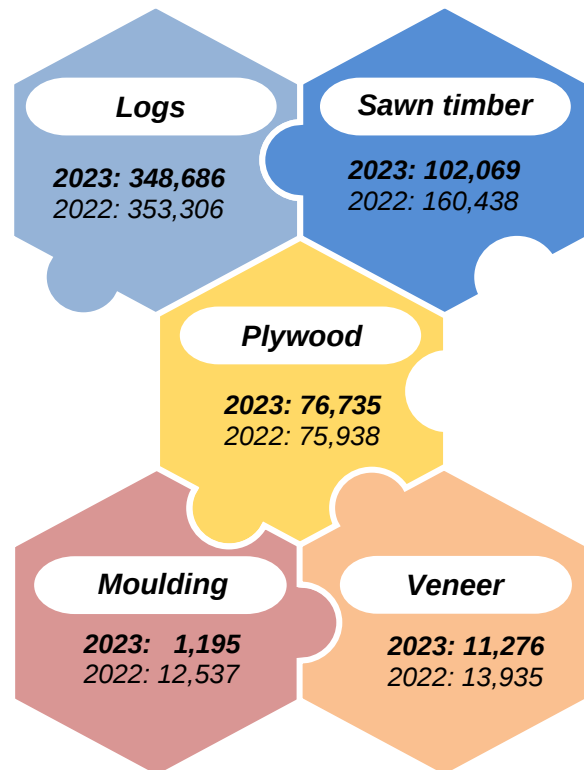
Source: Forestry Department Peninsular Malaysia

Logs is one of the main timber products in Perak. Logs production recorded in 2023 decreased to 348,686 m³ as compared to 353,306 m³ in 2022. [Exhibit 1.7]



Exhibit 1.7: Production of major timber products, Perak, 2022 and 2023

(Cubic metres)



Source: Forestry Department Peninsular Malaysia

E. Biological resources

Malaysia's sea are among the most biologically diversified in the world, with a variety of ecosystems and natural resources which are important to the livelihood and sustenance to human.

The landing of marine fish in 2024 was 434.3 thousand metric tonnes, increased 29.3 per cent as compared to 335.9 thousand metric tonnes in 2023. [Exhibit 1.8]

Exhibit 1.8: Landings of marine fish, Perak, 2023 and 2024

('000 metric tonnes)



2024: 434.3
2023: 335.9

29.3%

Growth rate (%)

Source: Department of Fisheries

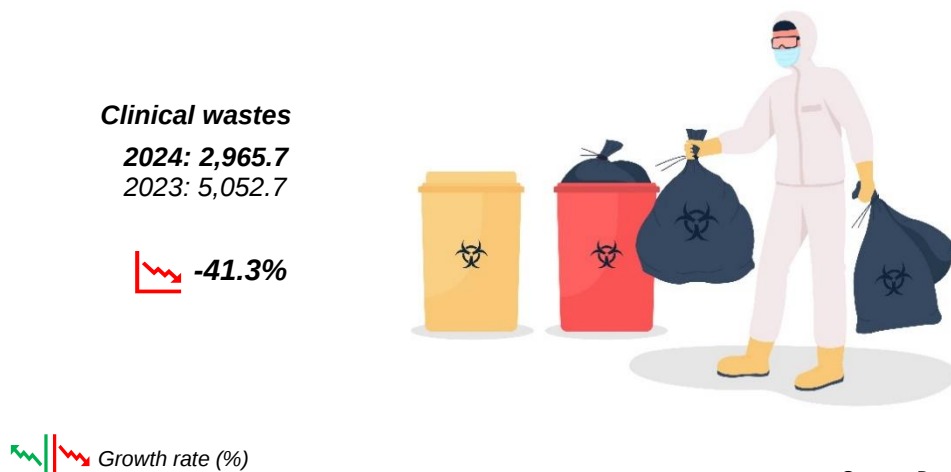
F. Clinical wastes

Clinical waste refers to any waste which consists wholly or partly of human tissues, blood or body fluids, excretions, drugs or pharmaceutical products and others. It is classified as scheduled wastes under the First Schedule Environmental Quality (Scheduled Wastes) Regulations, 2005.

Perak recorded 2,965.7 metric tonnes of clinical waste in 2024 as compared to 5,052.7 metric tonnes recorded in 2023. **[Exhibit 1.9]**

Exhibit 1.9: Quantity of clinical wastes, Perak, 2023 and 2024

(Metric tonnes)



Source: Department of Environment



ARTIKEL

ARTICLE

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Implikasi Cuaca kepada Pengeluaran Sayur-sayuran di Perak

Siti Nur Syafiqah Mohd Zulkiflee, Syed Ibrahim Mohd Jamaluddin, Latifah Mohamed Shah

Sektor pertanian Malaysia menjadi teras dalam kestabilan bekalan makanan dan antara komponen penting dalam ekonomi negara, sektor ini beroperasi dalam iklim khatulistiwa yang sebelum ini mempunyai pola cuaca yang relatif konsisten dan dapat dijangka. Walaupun keadaan ini secara umumnya sesuai untuk aktiviti pertanian, perubahan cuaca dan corak cuaca yang tidak menentu sejak kebelakangan ini memberi kesan besar terhadap pengeluaran hasil pertanian, terutamanya sayur-sayuran. Malaysia yang jelas mempunyai iklim tropika lembap, dengan hujan sepanjang tahun dan monsun menawarkan potensi yang baik untuk pertanian sayur-sayuran. Secara purata, Malaysia mendapat hujan tahunan sekitar 2,000 – 2,500 milimeter (mm) sehari atau lebih dan suhu yang hampir seragam sepanjang tahun¹. Selain itu, cuaca di Malaysia juga turut dipengaruhi besar oleh dua monsun utama iaitu Monsun Timur Laut (November – Mac) yang membawa hujan lebat di sepanjang pantai timur Semenanjung Malaysia dan Monsun barat Daya (Mei – September) yang lebih kering bagi beberapa kawasan. Secara ringkas, keadaan cuaca yang lembap dan stabil serta wujud musim hujan dan tempoh yang agak kering, semua ini memberi implikasi signifikan kepada sektor pertanian sayur-sayuran di Malaysia.

Hujan lebat dan banjir merupakan antara faktor cuaca utama yang boleh memberi kesan serius terhadap pengeluaran sayur-sayuran di Malaysia. Walaupun air hujan diperlukan untuk pertumbuhan tanaman, jumlah yang berlebihan boleh membawa pelbagai implikasi negatif kepada kesihatan tanah, sistem akar dan hasil tanaman. Malaysia sering mengalami musim hujan yang tidak menentu terutamanya semasa Monsun Timur Laut. Hujan lebat yang berterusan boleh menyebabkan banjir kilat di kawasan rendah dan merosakkan tanaman akibat tanah yang terlalu lembap menyebabkan akar sayur mudah reput, manakala nutrien yang tidak dapat diserap oleh pokok akan larut dan hilang bersama air hujan². Kesan dari situasi ini, harga sayuran akan melonjak naik sehingga 100 peratus susulan pengeluaran hasil sayuran yang terjejas teruk dan mengalami kekurangan bekalan³.

Pada 2023, cuaca panas yang melanda negara sejak Mei berlanjutan sehingga Ogos ekoran perubahan kitaran musim kepada Monsun barat Daya¹. Fenomena El Niño berlaku apabila suhu permukaan laut di kawasan Lautan Pasifik Khatulistiwa meningkat melebihi 0.5 darjah Celsius daripada purata jangka panjang¹. Di Malaysia, kesan El Niño lazimnya membawa

¹ Jabatan Meteorologi Malaysia

² <https://agrimag.my/bm/article-details/kesan-pokok-apabila-hujan-berlebihan>

³ www.bharian.com.my/hujan-lebat-punca-harga-makanan-meningkat

kepada cuaca panas dan kering berpanjangan, pengurangan taburan hujan, serta penurunan kelembapan tanah yang boleh menjejaskan pertumbuhan tanaman seperti padi dan sayur-sayuran. Walaupun tidak semua jenis tanaman sayur-sayuran terjejas akibat cuaca panas, namun apabila suhu meningkat sehingga mencecah 40 darjah Celsius, keadaan tersebut tanpa ragu akan memberikan impak negatif terhadap aktiviti pertanian secara keseluruhan⁴. Cuaca panas yang melampau boleh menjejaskan pertumbuhan optimum tanaman, sekali gus menurunkan kualiti sayur-sayuran yang dihasilkan dan seterusnya mendorong kepada peningkatan harga di pasaran⁵.

Jumlah taburan hujan di Perak menurun antara tahun 2022 dan 2023. Pada tahun 2022, jumlah hujan yang direkodkan adalah sebanyak 2,411.4 mm, manakala pada tahun 2023 ia menurun kepada 2,183.4 mm¹. Penurunan sebanyak 9.5 peratus ini menunjukkan keadaan cuaca yang kering di Perak. Pengeluaran sayur-sayuran di Perak agak terkesan dengan berkurangnya penerimaan hujan pada 2023, pengeluaran sayur-sayuran di Perak pada 2023 merekodkan sebanyak 111,782 tan metrik berbanding 116,765 tan metrik pada 2022⁶ dengan penurunan sebanyak 4.3 peratus. Situasi ini agak bertentangan dengan dapatan Keluaran Dalam Negara Kasar (KDNK) pada harga malar 2015 sayur-sayuran yang mencatatkan sebanyak RM13,148 juta dengan kadar pertumbuhan yang sederhana iaitu 0.2 peratus. Namun, pada tahun 2023, KDNK pada harga malar 2015 sayur-sayuran meningkat kepada RM13,842 juta, disertai pertumbuhan yang lebih kukuh sebanyak 5.3 peratus⁷.

¹ Jabatan Meteorologi Malaysia

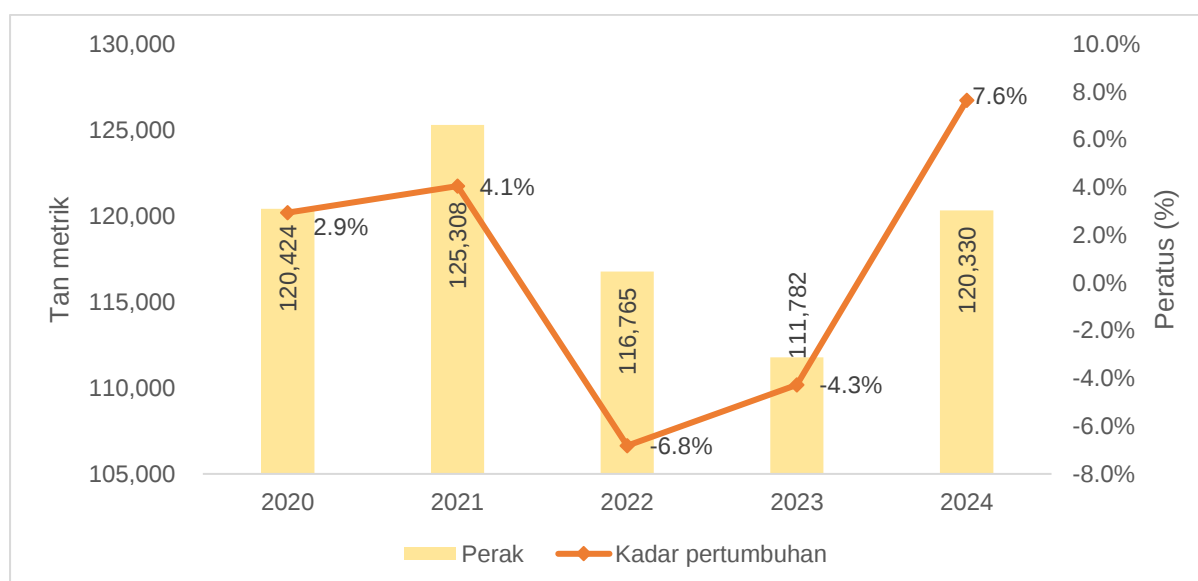
⁴ <https://bda.nres.gov.my/index.php/ms/hidden-news/1012-cuaca-panas-hasil-tanaman-lebih-banyak-berkualiti>

⁵ <https://www.mstar.com.my/lokal/semasa/2016/04/04/musim-panas-jejas-tanaman>

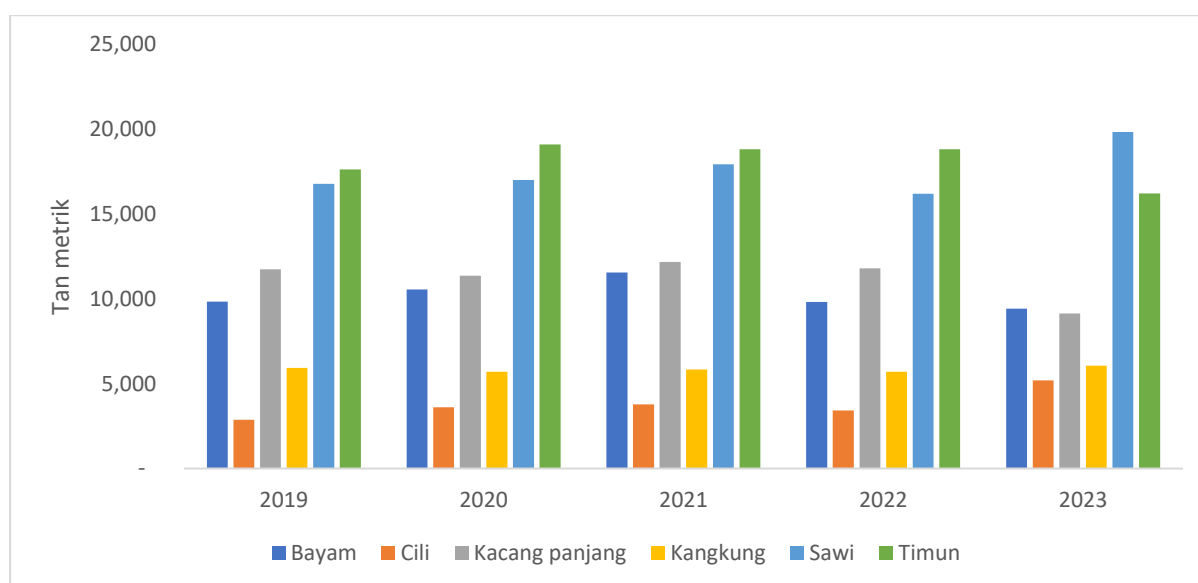
⁶ Jabatan Pertanian Malaysia

⁷ Jabatan Perangkaan Malaysia

Carta 1: Pengeluaran dan kadar pertumbuhan sayur-sayuran di Perak, 2020-2024



Carta 2: Pengeluaran tanaman sayur-sayuran utama di Perak, 2019-2023



Sumber: Jabatan Pertanian Malaysia

Pengeluaran sayur-sayuran utama di Perak pada 2023 secara keseluruhan menunjukkan peningkatan berbanding tahun 2022, walaupun mengalami cuaca yang kering. Cili, kangkung dan sawi mencatatkan peningkatan, dengan cili mencatat peningkatan yang tertinggi iaitu sebanyak 52.2 peratus dari tahun sebelumnya. Manakala bayam, kacang panjang dan timun menunjukkan penurunan. Corak ini menunjukkan bahawa keadaan cuaca yang kering pada 2023 telah memberi kesan positif terhadap tanaman cili, namun tanaman berdaun seperti kangkung yang sensitif terhadap keadaan kering terjejas sedikit dalam pengeluarannya.

Bagi mengekalkan pengeluaran sayur-sayuran yang stabil dalam keadaan cuaca yang semakin tidak menentu, pelbagai langkah perlu diambil oleh petani dan pihak berwajib. Antara tindakan utama ialah memperluas penggunaan teknologi pertanian moden seperti sistem fertigasi, rumah lindungan hujan dan irigasi titisan, yang dapat membantu mengawal kelembapan tanah dan mengurangkan risiko penyakit tanaman akibat hujan berlebihan. Selain itu, pelaksanaan amalan pertanian lestari (*Good Agricultural Practices, GAP*) serta pembangunan infrastruktur saliran dan pengurusan air yang efisien mampu meningkatkan ketahanan tanaman terhadap perubahan iklim. Kerajaan melalui Kementerian Pertanian dan Keterjaminan Makanan (KPKM) juga menyediakan bantuan teknikal, latihan, dan pembiayaan kepada petani bagi menggalakkan penggunaan teknologi hijau dan pengurusan ladang yang cekap. Langkah-langkah ini sejajar dengan aspirasi Dasar Agromakanan Negara 2.0 (DAN 2.0) yang menekankan adaptasi terhadap perubahan iklim dan kelestarian pengeluaran makanan negara⁸.

Secara keseluruhannya, perubahan corak cuaca di Malaysia seperti peningkatan suhu, hujan lebat, dan kejadian cuaca ekstrem seperti El Niño dan La Niña memberikan kesan yang ketara terhadap pengeluaran sayur-sayuran negara. Keadaan cuaca yang tidak menentu boleh menjejaskan pertumbuhan tanaman, menyebabkan kerosakan fizikal, kehilangan nutrien tanah, serta meningkatkan risiko penyakit tanaman. Walaupun begitu, sektor pertanian Malaysia menunjukkan tahap daya tahan yang baik melalui penerapan teknologi moden seperti sistem fertigasi, rumah lindungan hujan, dan pengurusan saliran yang cekap. Justeru, adaptasi terhadap perubahan iklim amat penting bagi memastikan pengeluaran sayur-sayuran kekal stabil dan mampu memenuhi keperluan makanan negara secara berterusan.

Penafian:

Pandangan yang dinyatakan adalah pandangan penulis dan tidak mewakili pandangan DOSM.

⁸ Kementerian Pertanian dan Keterjaminan Makanan (KPKM)

Implications of Weather on Vegetable Production in Perak

Siti Nur Syafiqah Mohd Zulkiflee, Syed Ibrahim Mohd Jamaluddin, Latifah Mohamed Shah

Malaysia's agricultural sector is a key pillar in ensuring food supply stability and is one of the important components of the national economy, this sector operates in an equatorial climate that previously exhibited relatively consistent and predictable weather patterns. Although such conditions are generally favourable for agricultural activities, recent changes in weather patterns and increasing climatic variability have significantly impacted crop production, particularly vegetables. Malaysia's humid tropical climate, characterised by year-round rainfall and monsoon seasons, offers strong potential for vegetable cultivation. On average, Malaysia receives about 2,000–2,500 millimetres (mm) of rainfall annually, accompanied by fairly uniform temperatures throughout the year¹. In addition, the country's weather is significantly influenced by two major monsoon seasons which is the Northeast Monsoon (November–March), which brings heavy rainfall to the east coast of Peninsular Malaysia and the Southwest Monsoon (May–September), which is relatively drier in certain areas. In summary, the combination of humid and stable weather conditions along with distinct wet and moderately dry seasons creates significant implications for Malaysia's vegetable agriculture sector.

Heavy rainfall and flooding are among the main weather factors that can adversely affect vegetable production in Malaysia. While rainwater is essential for plant growth, excessive rainfall can bring various negative impacts on soil health, root systems and crop yields. Malaysia often experiences unpredictable wet seasons, particularly during the Northeast Monsoon. Prolonged heavy rainfall can trigger flash floods in low-lying areas and damage crops due to overly saturated soils that cause root rot, meanwhile essential nutrients are washed away and unable to be absorbed by plants². As a result, vegetable prices can surge by up to 100 percent due to severely disrupted production and reduced supply³.

In 2023, Malaysia experienced prolonged hot weather from May to August due to the shift to the Southwest Monsoon¹. The El Niño phenomenon occurs when sea surface temperatures in the equatorial Pacific Ocean rise by more than 0.5 degrees Celsius above the long-term average¹. In Malaysia, El Niño typically brings prolonged hot and dry conditions, reduced rainfall and decreased soil moisture which can adversely affect crop growth, including rice and vegetables. Although not all vegetable crops are affected by hot weather, temperatures rising up to 40 degrees Celsius undoubtedly impose negative impacts on agricultural activities as a

¹ Malaysian Meteorological Department

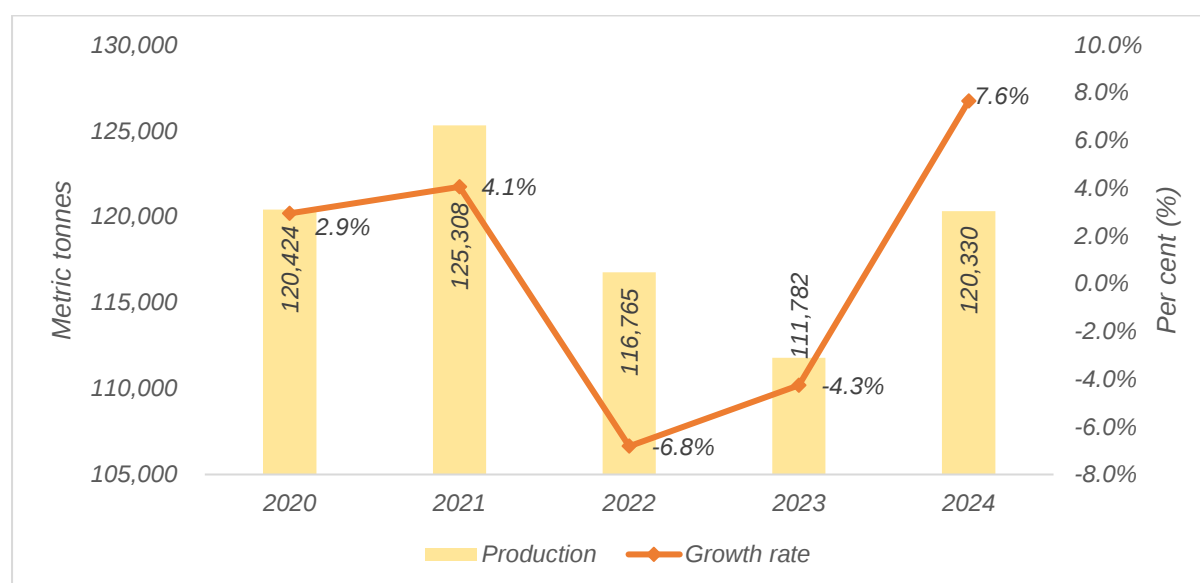
² <https://agrimag.my/bm/article-details/kesan-pokok-apabila-hujan-berlebihan>

³ www.bharian.com.my/hujan-lebat-punca-harga-makanan-meningkat

whole⁴. Extreme heat can hinder optimal plant growth, reduce the quality of harvested vegetables and consequently contribute to rising market prices⁵.

The amount of rainfall in Perak decreased between 2022 and 2023. In 2022, total recorded rainfall was 2,411.4 mm, whereas in 2023 it decreased to 2,183.4 mm¹. The decrease of 9.5 per cent reflects a drier weather in Perak. The production of vegetables in Perak was quite affected by the decrease amount of rainfall received in 2023, Perak recorded 111,782 metric tonnes of vegetable production in 2023 as compared to 116,765 metric tonnes in 2022⁶, marking a decrease of 4.3 per cent. This situation is quite the opposite with the Gross Domestic Product (GDP) at constant 2015 prices for the vegetable subsector, which amounted to RM13,148 million with a modest growth rate of 0.2 per cent in 2022. In 2023, however, vegetable GDP at constant 2015 increased to RM13,842 million, accompanied by a stronger growth of 5.3 per cent⁷.

Chart 3: Vegetable production and growth rate in Perak, 2020-2024



Source: Department of Agriculture Malaysia

¹ Malaysian Meteorological Department

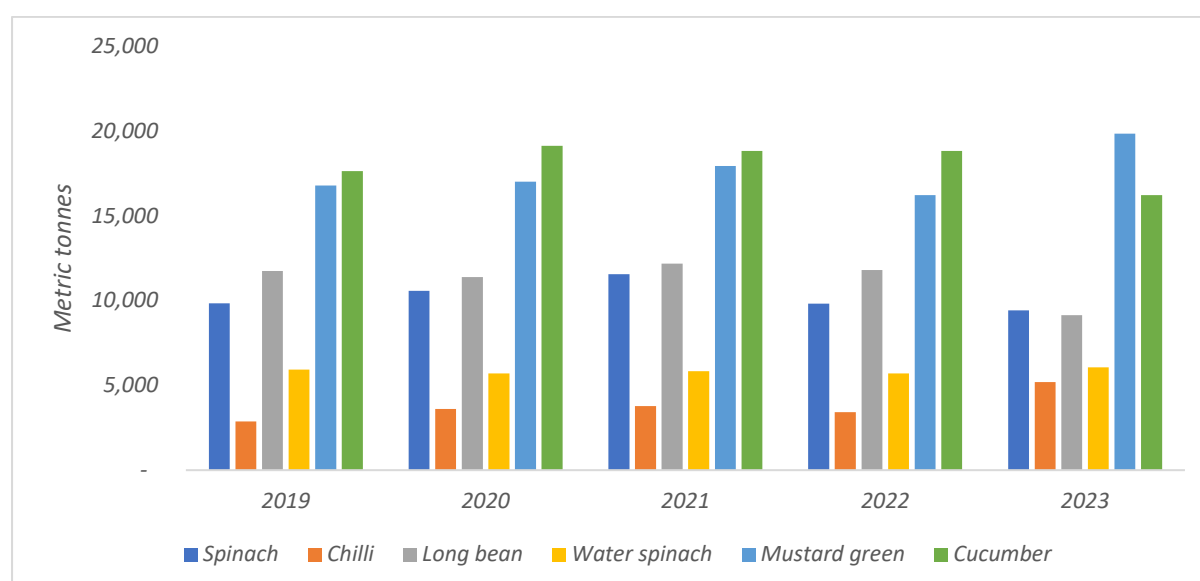
⁴ <https://bda.nres.gov.my/index.php/ms/hidden-news/1012-cuaca-panas-hasil-tanaman-lebih-banyak-berkualiti>

⁵ <https://www.mstar.com.my/lokal/semasa/2016/04/04/musim-panas-jejas-tanaman>

⁶ Department of Agriculture Malaysia

⁷ Department of Statistics Malaysia

Chart 4: Main vegetables production in Perak, 2019-2023



Source: Department of Agriculture Malaysia

Overall, main vegetable production in Perak in 2023 showed an increase as compared to 2022, despite experiencing a drier weather. Chilli, water spinach and mustard green recorded increases, with chilli showing the highest rise of 52.2 per cent from the previous year, while spinach, long bean and cucumber saw slight declines. This pattern suggests that the drier conditions in 2023 has benefitted chilli plant, whereas leafy crops such as water spinach which are sensitive to dryness experienced minor reductions in output.

To maintain stable vegetable production amid increasingly unpredictable weather, various measures must be implemented by farmers and relevant authorities. Key actions include expanding the use of modern agricultural technologies such as fertigation systems, rain shelters and drip irrigation, which can help regulate soil moisture and reduce the risk of crop diseases caused by excessive rainfall. Additionally, implementing sustainable agricultural practices (Good Agricultural Practices, GAP) and improving water management and drainage infrastructure can enhance crop resilience to climate variability. The government, through the Ministry of Agriculture and Food Security (KPKM) will continue providing technical assistance, training and financial support to farmers to promote the adoption of green technologies and efficient farm management. These measures align with the aspirations of the National Agrofood Policy 2.0 (NAP 2.0), which emphasises climate adaptation and the sustainability of national food production⁸.

⁸ Ministry of Agriculture and Food Security (KPKM)

In conclusion, changes in Malaysia's weather patterns such as rising temperatures, heavy rainfall and extreme weather events like El Niño and La Niña pose significant impacts on vegetable production nationwide. Unpredictable weather can hinder plant growth, cause physical damage, reduce soil nutrient availability and increase crop disease risks. Nevertheless, Malaysia's agricultural sector has demonstrated strong resilience through the adoption of modern technologies such as fertigation systems, rain shelters and efficient drainage management. Therefore, climate adaptation is crucial to ensuring stable vegetable production and sustaining the nation's food supply.

Disclaimer:

The views expressed are those of the author and do not represent the views of DOSM.



JADUAL STATISTIK

STATISTICAL TABLES



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Jadual 1.1: Purata suhu, jumlah hujan dan purata kelembapan relatif, Perak, 2020-2024

Table 1.1: Mean temperature, total rainfall and mean relative humidity, Perak, 2020-2024

Stesen meteorologi (ketinggian dari purata paras laut dalam meter) <i>Meteorological station (height above mean sea level in metres)</i>	Tahun <i>Year</i>	Purata suhu (°C) <i>Mean temperature</i>		Hujan <i>Rainfall</i>		Purata kelembapan relatif <i>Mean relative humidity (%)</i>
		Min.	Maks. <i>Max.</i>	Jumlah <i>Total (mm)</i>	Bil. Hari <i>No. of days</i>	
Ipoh (40.1 m)	2020	24.3	33.0	3,269.4	210	79.9
	2021	23.9	32.8	2,965.4	213	79.2
	2022	24.1	33.1	3,345.5	220	77.3
	2023	24.1	32.9	2,987.5	215	80.2
	2024	24.4	33.2	3,767.1	212	81.5
Lubok Merbau, Kuala Kangsar (77.5 m)	2020	24.0	33.3	2,053.1	213	82.1
	2021	23.3	32.8	1,988.2	174	81.8
	2022	23.4	32.5	1,945.6	207	82.5
	2023	23.3	32.6	1,617.7	193	82.9
	2024	23.8	33.1	2,054.5	181	83.0
Sitiawan (6.8 m)	2020	24.5	32.6	2,115.0	186	83.9
	2021	24.1	32.7	2,057.0	167	81.6
	2022	24.2	32.7	1,943.0	181	81.1
	2023	24.5	32.6	1,945.0	185	80.2
	2024	25.1	33.2	1,996.0	173	79.1

Jadual 1.2: Purata tekanan aras laut, kelajuan angin permukaan, sinaran global, penyejatan dan bilangan hari kilat, Perak, 2020-2024

Table 1.2: Mean sea level pressure, surface wind speed, global radiation, evaporation and number of days with lightning, Perak, 2020-2024

Stesen meteorologi (ketinggian dari purata paras laut dalam meter) <i>Meteorological station (height above mean sea level in metres)</i>	Tahun <i>Year</i>	Purata tekanan aras laut <i>Sea level pressure (hPa)</i>	Purata kelajuan angin permukaan <i>Mean surface wind speed (m/s)</i>	Purata sinaran global <i>Mean global radiation (MJ/m³)</i>	Purata penyejatan <i>Mean evaporation (mm)</i>	Bil. hari kilat <i>No. of days with lightning</i>
Ipoh (40.1 m)	2020	1,009.6	1.7	18.45	4.20	151
	2021	1,009.6	1.7	18.20	4.20	145
	2022	1,009.1	1.7	17.90	4.86	155
	2023	1,010.2	1.7	Def.	Def.	94
	2024	1,009.7	1.8	18.13	Def.	106
Lubok Merbau, Kuala Kangsar (77.5 m)	2020	1,009.6	1.3	17.63	4.20	n.a.
	2021	1,009.7	1.2	18.80	3.70	150
	2022	1,009.2	1.1	18.19	3.79	189
	2023	1,010.3	1.1	Def.	3.67	168
	2024	1,009.8	1.3	18.62	4.06	171
Sitiawan (6.8 m)	2020	1,009.5	1.2	17.52	3.80	207
	2021	1,009.5	1.2	17.00	3.60	209
	2022	1,009.0	1.2	16.95	3.53	214
	2023	1,010.1	1.2	Def.	Def.	196
	2024	1009.5	1.1	16.93	Def.	207

Sumber: Jabatan Meteorologi Malaysia
Source: Malaysia Meteorological Department

Jadual 1.3: Purata bulanan tekanan aras laut, Perak, 2024

Table 1.3: Monthly mean sea level pressure, Perak, 2024

hPa

Stesen Station	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Ipoh	1,011.2	1,011.5	1,010.4	1,008.4	1,008.4	1,009.8	1,008.9	1,010.2	1,009.3	1,010.1	1,009.1	1,009.2
Lubok Merbau	1,011.3	1,011.6	1,010.5	1,008.5	1,008.4	1,009.9	1,008.9	1,010.3	1,009.4	1,010.2	1,009.2	1,009.3
Sitiawan	1,011.0	1,011.4	1,010.2	1,008.2	1,008.2	1,009.6	1,008.6	1,010.0	1,009.0	1,009.9	1,008.8	1,009.0

Jadual 1.4: Purata bulanan kelajuan angin permukaan, Perak, 2024

Table 1.4: Monthly mean surface wind speed, Perak, 2024

m/s

Stesen Station	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Ipoh	1.6	1.8	1.8	1.7	1.8	1.7	1.9	1.8	1.8	1.8	1.7	1.9
Lubok Merbau	1.1	1.5	1.4	1.4	1.4	1.2	1.3	1.3	1.1	1.2	1.1	1.1
Sitiawan	1.1	1.4	1.3	1.3	1.3	1.3	1.4	1.3	1.2	1.2	1.10.	1.0

Jadual 1.5: Purata bulanan sinaran global, Perak, 2024

Table 1.5: Monthly mean global radiation, Perak, 2024

MJ/m²

Stesen Station	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Ipoh	17.73	21.24	20.76	19.19	19.07	17.40	18.56	17.60	17.53	18.75	15.07	14.61
Lubok Merbau	19.08	22.24	22.71	21.18	21.03	18.63	18.42	11.62	18.38	18.65	16.45	15.09
Sitiawan	16.15	19.30	19.18	18.41	17.47	16.89	17.13	16.50	17.55	16.49	14.45	13.69

Jadual 1.6: Purata bulanan penyejatan, Perak, 2024

Table 1.6: Monthly mean evaporation, Perak, 2024

mm

Stesen Station	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Ipoh	4.35	6.2	n.a.	n.a.	4.4	Def.	Def.	3.4	4.3	4.4	3.8	4.0
Lubok Merbau	4.08	5.2	n.a.	n.a.	4.4	4.1	4.3	4.2	3.9	3.8	3.2	3.3
Sitiawan	3.12	4.4	n.a.	n.a.	4.3	3.6	4.4	3.4	3.4	Def.	2.6	2.6

Sumber: Jabatan Meteorologi Malaysia
Source: Malaysia Meteorological Department

Jadual 1.7: Senarai lembangan sungai utama di Perak

Table 1.7: List of major river basins in Perak

Bil. No.	Nama lembangan sungai River basins name	Luas (km ²) Area	Kategori Category	Negeri State
1	Sg. Kerian	1,420.23	2	Pulau Pinang/ Kedah/ Perak
2	Sg. Perak	14,907.64	1	Perak
3	Sg. Kurau	740.13	1	Perak
4	Sg. Manjung	595.11	1	Perak
5	Sg. Larut/Sg. Jaha	340.68	1	Perak
6	Sg. Beruas	310.92	1	Perak
7	Sg. Sangga Besar/ Sg. Sepetang	248.32	1	Perak
8	Sg. Temerloh	244.95	1	Perak
9	Sg. Jarum Mas	213.96	1	Perak
10	Sg. Tiram	91.33	1	Perak
11	Sg. Bernam	2,836.33	2	Perak/ Selangor

Nota: Kajian Persempadanan Lembangan Sungai Malaysia Fasa I oleh Bahagian Pengurusan Lembangan Sungai (2009)

Notes: Malaysia River Basin Boundary Study Phase I by the River Basin Management Division (2009)

Kategori 1: Lembangan sungai dalam 1 negeri

Category 1: River basin within the state

Kategori 2: Lembangan sungai melibatkan lebih dari 1 negeri

Category 2: River basin shared with more than 1 state

Lembangan sungai utama: Lembangan yang berkeluasan melebihi 80 km²

Main river basins: An area of over 80 km²

Jadual 1.8: Panjang pesisiran pantai, Perak

Table 1.8: Coastal length, Perak

Negeri State	Panjang pantai (km) Coastal length	Peratus Per cent
Malaysia	8,840.00	100.0
Perak	397.5	4.5

Nota/ Notes: National Coastal Erosion Study for Malaysia (2015)

Sumber: Jabatan Pengairan dan Saliran

Source: Department of Irrigation and Drainage

Jadual 1.9: Empangan dan kolam takungan di Perak

Table 1.9: Dams and reservoirs in Perak

Bil. No.	Nama empangan (Tahun siap dibina) <i>Name of dam (Year of completion)</i>	Lokasi (Negeri) <i>Location (State)</i>	Empangan <i>Dams</i>					Kolam takungan <i>Reservoirs</i>		
			Tinggi <i>Height (m)</i>	Panjang puncak <i>Peak length (m)</i>	Aras puncak <i>Top peak (m)</i>	Kawasan tadahan <i>Catchment area (km²)</i>	Kapasiti <i>Capacity (Mm³)</i>	Luahan alur limpah maksimum <i>Maximum flood flow (cumecs)</i>	Luas permukaan <i>Surface area (km²)</i>	Aras biasa <i>Ordinary level (m)</i>
1	Bukit Merah (1906)	Perak	9.10	579.09	11.28	480.00	74.98	424.80	41.00	8.69
2	Gopeng (1961)	Perak	8.54	85.34	70.71	10.60	0.00	129.82	n.a.	n.a.
3	Jor (1968)	Perak	45.00	209.00	497.00	275.00	308.00	1,104.00	0.30	493.00
4	Mahang (1968)	Perak	20.00	229.00	73.00	359.00	0.40	50.00	0.10	72.00
5	Temenggor (1977)	Perak	127.00	537.00	257.00	3,506.00	6,050.0	2,830.00	174.00	248.00
6	Bersia (1983)	Perak	35.50	252.00	143.30	3,550.00	57.70	5,280.00	5.70	141.50
7	Kenering (1984)	Perak	45.50	540.00	113.70	5,713.00	352.00	96.00	40.50	111.30
8	Chederoh (1930)	Perak	20.10	390.00	60.50	6,688.00	95.00	14,700.00	20.50	60.40
9	Air Kuning (1991)	Perak	18.00	520.00	44.00	16.13	1.80	7.70	0.02	42.50
10	Sultan Azlan Shah/ Sg. Kinta (2006)	Perak	90.00	797.00	250.00	145.00	29.55	2,250.00	1.01	245.00

Sumber: Jabatan Pengairan dan Saliran

Source: Department of Irrigation and Drainage

Jadual 1.10: Keluasan tanah mengikut daerah, Perak, 2024

Table 1.10: Land area by district, Perak, 2024

Bil. No.	Negeri/ Daerah <i>State/ Districts</i>	Keluasan (km ²) <i>Area</i>
MALAYSIA		331,579.95
Perak		21,226.10
1	Batang Padang	1,795.72
2	Muallim	935.48
3	Manjung	1,158.01
4	Kinta	1,297.62
5	Kerian	986.60
6	Kuala Kangsar	2,549.65
7	Larut dan Matang	1,432.08
8	Hilir Perak	792.58
9	Hulu Perak	6,581.91
10	Selama	762.08
11	Perak Tengah	1,289.50
12	Kampar	664.85
13	Bagan Datuk	980.04

Sumber: Jabatan Ukur dan Pemetaan Malaysia

Source: Department of Survey and Mapping Malaysia

Jadual 1.11: Kawasan perlindungan yang digazet, Perak

Table 1.11: Gazetted protected area, Perak

Kawasan perlindungan <i>Protected area</i>	Keluasan (Hektar) <i>Area (Hectares)</i>	Bilangan spesis <i>Number of species</i>				
		Fauna				
		Mamalia <i>Mammals</i>	Burung <i>Birds</i>	Reptilia <i>Reptiles</i>	Amfibia <i>Amphibians</i>	Moluska <i>Molluscs</i>
Rizab Tuntung Bota Kanan	6.30 ^r	-	-	-	-	-
Rizab Hidupan Liar Chior	401.00 ^r	-	-	-	-	-
Rizab Hidupan Liar Sungkai	3,305.00 ^r	-	-	-	-	-
Rizab Hidupan Liar Batu Gajah (Perak)	4.00 ^r	-	-	-	-	-
Taman Negeri Royal Belum	117,500.00	144	247	23	24	-
Pulau Sembilan State Park	182.00	-	-	-	-	-

Kawasan perlindungan <i>Protected area</i>	Bilangan spesis <i>Number of species</i>					
	Fauna			Flora		
	Ikan <i>Fish</i>	Cnidarians	Spesies invertebrata yang lain ¹ <i>Other invertebrate species</i>	Rumpai laut <i>Seaweeds</i>	Rumput laut <i>Sea grass</i>	Tumbuhan <i>Plants</i>
Rizab Tuntung Bota Kanan	-	-	-	-	-	-
Rizab Hidupan Liar Chior	-	-	-	-	-	-
Rizab Hidupan Liar Sungkai	-	-	-	-	-	-
Rizab Hidupan Liar Batu Gajah (Perak)	-	-	-	-	-	-
Taman Negeri Royal Belum	23	-	507	-	-	3,215
Pulau Sembilan State Park	-	-	-	-	-	51

Nota: ¹Lain-lain invertebrat seperti Serangga, Arthropods dan Echinoderms

Notes: Other invertebrates like Insects, Arthropods and Echinoderms

Meliputi maklumat daripada Jabatan Perlindungan Hidupan Liar dan Taman Negara, Jabatan Perhutanan Semenanjung Malaysia, Jabatan Perikanan dan Perbadanan Taman Negeri Johor

Includes information from Department of Wildlife and National Parks, Department of Forestry Peninsular Malaysia, Department of Fisheries, Johor National Parks Corporation,

- : Tidak diliputi oleh agensi semasa tahun rujukan Banci Kawasan Perlindungan dan Kepelbagaian Biologi 2014
Not covered by the agency during Biodiversity and Protected Areas Census 2014 reference year

- ^r Data telah disemak semula yang melibatkan nama kawasan perlindungan di bawah seliaan Jabatan PERHILITAN dan keluasan kawasan sahaja.

The data have been revised, involving only the names of protected areas under the supervision of the Department of Wildlife and National Parks (PERHILITAN) and the size of the areas.

Jadual 1.12: Kawasan berhutan dan tidak berhutan, Perak, 2019-2022

Table 1.12: Forested and non-forested areas, Perak, 2019-2022

Tahun Year	Berhutan Forested		Tidak Berhutan Non-Forested	
	Hektar Hectares	(%)	Hektar Hectares	(%)
2019	1,013,156	47.91	1,101,476	52.09
2020	1,010,289	47.78	1,104,343	52.22
2021	1,014,618	47.98	1,100,015	52.02
2022	1,015,684	48.03	1,098,949	51.97

Jadual 1.13: Keluasan hutan simpanan kekal¹, Perak, 2019-2022

Table 1.13: Area of permanent reserved forest, Perak, 2019-2022

Tahun Year	2019	2020	2021	2022
Keluasan Area	988,591	987,632	986,848	986,021

Nota: ¹ Hutan Simpanan Kekal di Semenanjung Malaysia terdiri daripada hutan darat, paya gambut, paya laut dan ladang hutan

Notes: Permanent reserved forest in Peninsular Malaysia consists of inland forest, peat swamp forest, mangrove forest and forest plantation

² Mulai 2017 pelaporan keluasan Hutan Simpanan Kekal (HSK) di Semenanjung Malaysia adalah berdasarkan keluasan HSK yang diwartakan sahaja (tidak termasuk cadangan HSK).

Since 2017, Permanent Reserve Forest (PRF) data in Peninsular Malaysia were reported based on gazetted PRF only (proposed PRF not included)

Jadual 1.14: Keluasan hutan paya laut, Perak, 2019-2022

Table 1.14: Area of peat mangrove forest, Perak, 2019-2022

Tahun Year	2019	2020	2021	2022
Keluasan Area	42,216	42,216	42,212	42,411

Nota : Bagi Semenanjung Malaysia merujuk kepada hutan paya laut di dalam Hutan Simpanan Kekal (HSK)

Notes: For Peninsular Malaysia refer to mangrove forests in the Permanent Reserved Forest (PRF)

Sumber: Kementerian Sumber Asli dan Kelestarian Alam,
Jabatan Perhutanan Semenanjung Malaysia

Source: Ministry of Natural Resources and Environmental Sustainability,
Forestry Department Peninsular Malaysia

Jadual 1.15: Status kualiti udara mengikut stesen, Perak, 2020-2024

Table 1.15: Air quality status by station, Perak, 2020-2024

Bilangan hari
Number of days

Negeri/ Stesen State/ Station	Tahun Year	Baik Good (0-50)	Sederhana Moderate (51-100)	Tidak Sihat Unhealthy (101-200)	Sangat Tidak Sihat Very Unhealthy (201-300)	Berbahaya Hazardous (>300)
Pegoh, Ipoh	2020	48	318	-	-	-
	2021	61	304	-	-	-
	2022	58	307	-	-	-
	2023	87	278	-	-	-
	2024	52	314	-	-	-
Seri Manjung	2020	69	297	-	-	-
	2021	104	261	-	-	-
	2022	136	229	-	-	-
	2023	52	312	1	-	-
	2024	53	313	-	-	-
Taiping	2020	89	277	-	-	-
	2021	120	245	-	-	-
	2022	172	193	-	-	-
	2023	94	269	2	-	-
	2024	58	308	-	-	-
Tanjung Malim	2020	308	57	-	-	-
	2021	254	111	-	-	-
	2022	185	179	1	-	-
	2023	177	183	5	-	-
	2024	147	197	22	-	-
Tasek, Ipoh	2020	59	307	1	-	-
	2021	34	331	-	-	-
	2022	56	309	-	-	-
	2023	27	337	1	-	-
	2024	22	344	-	-	-

Nota: Stesen yang tidak mencukupi 365 hari adalah disebabkan masalah teknikal
Notes: Stations with inadequate 365 days is due to technical problem

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 1.16: Bacaan minimum dan maksimum bulanan Indeks Pencemaran Udara (IPU)1, Perak, 2024

Table 1.16: Monthly minimum and maximum Air Pollutant Index (API), Perak, 2024

Stesen Station	Jan.		Feb.		Mac Mar.		Apr.		Mei May		Jun June	
	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.
Pegoh, Ipoh	32	69	50	66	40	70	46	74	30	65	27	77
Seri Manjung	36	73	52	75	43	80	45	83	41	75	28	82
Taiping	26	82	34	69	31	76	38	72	30	77	23	76
Tanjung Malim	22	61	34	61	24	66	30	69	25	132	20	124
Tasek, Ipoh	35	78	52	69	48	78	37	83	42	72	28	77

Stesen Station	Julai July		Ogos Aug.		Sept.		Okt. Oct.		Nov.		Dis. Dec.	
	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.	Min.	Maks. Max.
Pegoh, Ipoh	38	82	35	86	25	80	28	66	26	60	30	62
Seri Manjung	33	86	20	71	15	74	28	72	27	58	26	70
Taiping	36	98	21	83	18	68	22	66	21	60	21	68
Tanjung Malim	22	142	28	151	24	124	23	104	15	80	17	56
Tasek, Ipoh	35	89	36	86	30	84	30	67	25	68	28	68

Nota: ¹ Bacaan status kualiti udara berdasarkan bacaan maksimum harian
Notes: Air quality status readings are based on daily maximum readings

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Status Indeks Pencemaran Udara (IPU)
Air Pollutant Index (API) status

IPU/ API	Status IPU / API status
0-50	Baik / Good
51-100	Sederhana / Moderate
101-200	Tidak Sihat / Unhealthy
201-300	Sangat Tidak Sihat / Very Unhealthy
>300	Berbahaya / Hazardous

Jadual 1.17: Purata tahunan kepekatan berdasarkan jenis bahan pencemar di udara, Perak, 2020-2024Table 1.17: *Annually average concentration based on the type of air pollutants in the air, Perak, 2020-2024*

Stesen Station	Tahun Year	Habuk Halus (PM _{2.5}) <i>Particulate Matter</i> (µg/m ³)	Habuk Halus (PM ₁₀) <i>Particulate Matter</i> (µg/m ³)	Ozon Permukaan Bumi (O ₃) <i>Ground Level Ozone</i> (ppm)	Karbon Monoksida (CO) <i>Carbon Monoxide</i> (ppm)	Sulfur Dioksida (SO ₂) <i>Sulphur Dioxide</i> (ppm)	Nitrogen Dioksida (NO ₂) <i>Nitrogen Dioxide</i> (ppm)
Pegoh, Ipoh	2020	15.01	21.50 ^r	0.019 ^r	0.454	0.0007	0.0073
	2021	15.13 ^r	24.03 ^r	0.015	0.524	0.0008	0.0074
	2022	14.35 ^r	23.87	0.011	0.493	0.0010	0.0072
	2023	14.72 ^r	25.83	0.009 ^r	0.508	0.0010 ^r	0.0059
	2024	15.64	25.56	0.012	0.476	0.0009	0.0059
Seri Manjung	2020	15.48	23.66	-	-	-	-
	2021	14.08 ^r	22.37 ^r	-	-	-	-
	2022	12.66 ^r	19.80 ^r	-	-	-	-
	2023	16.77 ^r	24.16 ^r	-	-	-	-
	2024	16.78	23.64	-	-	-	-
Taiping	2020	14.75 ^r	24.38 ^r	0.017	0.271	0.0009	0.0069
	2021	13.84 ^r	22.85 ^r	0.016	0.303 ^r	0.0010	0.0075
	2022	11.90 ^r	20.48 ^r	0.013	0.279 ^r	0.0009	0.0078
	2023	15.08	25.42	0.016	0.271	0.0011	0.0075
	2024	16.09	27.31	0.019	0.288	0.0011	0.0071
Tanjung Malim	2020	7.52 ^r	11.21	0.018	0.495	0.0008	0.0049
	2021	9.30	14.36 ^r	0.017	0.497 ^r	0.0010 ^r	0.0044
	2022	10.84 ^r	16.43 ^r	0.017	0.503	0.0011	0.0057
	2023	12.31 ^r	19.92 ^r	0.018	0.507	0.0010	0.0060
	2024	12.63	20.11	0.021	0.452	0.0010	0.0059
Tasek, Ipoh	2020	15.59 ^r	23.51 ^r	0.02	0.552	0.0010	0.0079
	2021	16.48 ^r	26.22 ^r	0.018	0.542	0.0010	0.0070
	2022	15.03	24.27 ^r	0.016	0.543 ^r	0.0012	0.0079 ^r
	2023	17.60 ^r	26.66 ^r	0.018	0.583	0.0011	0.0077
	2024	17.75	30.59	0.019	0.579	0.0012	0.0080

Sumber: Jabatan Alam Sekitar

Source: Department of Environment

Jadual 1.18: Purata bulanan kepekatan Habuk Halus (PM_{2.5}) di udara, Perak, 2020-2024

Table 1.18: Monthly average concentration of Particulate Matter (PM_{2.5}) in the air, Perak, 2020-2024

µg/m³

Stesen Station	Tahun Year	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Pegoh, Ipoh	2020	17.86	15.64	19.31	15.07	11.16	15.28	13.73	15.95	14.86	15.31	12.35	13.57
	2021	16.07	20.38	20.68	15.47	15.17	13.83	18.12	12.58	14.65	12.68	10.23	11.77
	2022	19.35	14.51	15.47	14.62	13.88	12.06	15.39	13.39	11.41	11.91	15.78	14.45
	2023	13.06	13.03	16.04	18.59	14.57	15.42	15.69	13.87	17.11	17.83	11.41	10.04
	2024	13.86	16.28	18.99	18.39	14.93	14.65	21.14	17.00	15.13	12.74	11.29	13.28
Seri Manjung	2020	17.66	17.33	19.44	15.23	11.80	16.31	15.26	23.31	12.96	13.88	10.31	12.25
	2021	14.35	21.89	17.15	14.01	14.79	13.22	16.23r	11.51	12.36	11.70	9.15	12.59
	2022	19.07	12.69	13.97	12.12	12.85	9.86	16.00	15.02	11.50	10.13	8.87	9.85
	2023	12.29	12.55	18.58	20.38	15.23	17.47	18.27	16.19	19.57	22.30	16.07	12.31
	2024	16.14	19.43	21.01	21.49	18.13	17.35	24.21	15.29	12.69	12.07	10.87	12.73
Taiping	2020	18.96	16.69	22.47	11.88	9.91	16.60	14.24	21.73	13.22	12.13	8.65	10.51
	2021	12.26	20.71	17.03	12.03	13.41	12.83	18.68	12.70	14.69	11.30	8.08	12.34
	2022	18.21	10.97	12.58	12.07	11.10	8.80	15.55	15.95	9.09	8.78	8.77	10.95
	2023	11.81	12.21	15.54	17.74	15.19	19.40	15.57	15.15	19.47	16.46	11.17	11.21
	2024	14.11	17.18	20.12	18.66	17.50	14.64	26.01	15.70	12.63	11.12	11.53	13.89
Tanjung Malim	2020	7.40	6.78	10.11	6.99	5.95	8.29	7.60	10.58	7.97	7.51	5.17	5.91
	2021	6.23	9.78	8.52	7.80	8.40	8.39	11.75	9.84	10.58	12.23	7.55	10.50
	2022	12.58	9.18	12.51	11.82	9.06	9.97	14.64	12.68	11.90	10.57	7.20	7.97
	2023	9.17	8.31	11.03	15.94	11.41	15.07	13.16	13.36	17.14	17.78	7.79	7.57
	2024	9.09	12.11	13.93	13.74	13.19	12.01	18.68	16.40	13.82	11.27	8.69	8.59
Tasek, Ipoh	2020	17.92	14.61	20.30	12.75	11.18	17.08	17.41	21.89	15.49	14.53	12.01	11.96
	2021	15.97	21.40	21.28	16.68	16.73	15.11	18.64	15.16	15.63	15.16	12.32	13.68
	2022	18.70	15.09	16.87	16.75	16.58	13.86	17.27	16.24	13.50	10.84	11.90	12.77
	2023	15.28	13.14	18.94	21.18	16.78	18.61	21.01	18.27	21.59	20.50	13.13	12.80
	2024	16.20	18.08	22.09	22.50	17.72	17.04	24.66	18.89	16.84	13.43	11.73	13.79

Nota: Garis Panduan Kualiti Udara Malaysia: PM_{2.5} tidak melebihi 50 µg/m³
Notes: Malaysian Ambient Air Quality Guidelines: PM_{2.5} not exceeding 50 µg/m³

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 1.19: Purata bulanan kepekatan Habuk Halus (PM₁₀) di udara, Perak, 2020-2024

Table 1.19: Monthly average concentration of Particulate Matter (PM₁₀) in the air, Perak, 2020-2024

µg/m³

Stesen Station	Tahun Year	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Pegoh, Ipoh	2020	28.36	26.02	28.21	20.24	17.63	24.80	20.60	22.26	18.07	19.35	15.75	16.76
	2021	26.47	32.17	33.02	27.53	26.32	21.52	29.18	21.84	22.80	18.65	14.21	14.63
	2022	30.36	26.22	26.77	25.00	24.86	21.01	25.70	19.02	14.15	22.30	25.75	25.31
	2023	23.56	25.45	29.59	31.91	28.74	27.12	28.47	22.34	22.89	25.40	22.45	22.07
	2024	27.35	27.05	30.51	30.00	20.60	22.55	32.37	25.08	23.27	22.88	21.03	24.03
Seri Manjung	2020	26.43	26.95	28.85	22.58	18.87	25.22	23.01	31.81	20.68	21.89	17.18	20.46
	2021	22.83	32.00	25.20	22.31	23.32	20.22	25.92	18.32	19.87	20.25	16.83	21.38
	2022	28.36	20.50	23.11	20.10	21.35	16.50	26.19	22.14	18.42	14.85	10.31	15.79
	2023	16.58	14.40	27.48	29.01	23.96	25.92	29.41	24.11	27.83	28.72	22.22	20.33
	2024	24.96	27.85	30.26	26.64	21.58	21.26	30.02	23.96	20.21	19.71	17.40	19.77
Taiping	2020	32.96	30.27	34.67	22.22	18.48	27.07	22.51	31.37	21.59	20.24	14.86	16.34
	2021	19.58	30.21	27.17	21.71	22.66	20.64	30.96	19.76	22.56	20.08	16.75	22.12
	2022	29.80	18.46	21.15	21.22	20.35	16.82	27.64	25.45	13.86	15.74	15.61	19.70
	2023	20.59	23.00	25.80	28.41	25.83	30.99	28.85	23.81	29.73	27.21	20.82	20.03
	2024	24.46	28.52	31.98	30.71	28.49	25.40	41.28	25.21	20.75	21.09	25.23	24.68
Tanjung Malim	2020	11.14	10.75	13.99	10.35	8.18	10.67	10.26	12.96	12.70	12.62	9.95	10.92
	2021	10.58	14.35	13.58	13.80	13.08	12.35	15.95	17.12	17.00	17.91	12.95	13.70
	2022	15.57	12.94	20.19	19.45	16.21	14.09	17.59	17.97	19.16	17.53	13.63	12.77
	2023	13.36	15.56	18.67	25.03	19.34	22.17	21.73	21.37	26.34	25.80	14.76	14.92
	2024	16.01	18.71	19.66	23.42	22.16	19.47	28.45	24.30	19.35	17.17	16.22	16.42
Tasek, Ipoh	2020	25.54	23.02	27.51	16.80	14.75	24.43	28.03	32.76	24.71	22.21	20.07	22.35
	2021	26.54	33.56	32.83	28.84	23.96	20.13	27.93	25.16	25.64	27.47	20.91	21.71
	2022	28.86	25.25	27.76	27.77	24.19	19.27	28.31	25.65	22.59	19.15	20.84	21.57
	2023	21.98	20.71	27.29	30.78	25.59	24.86	33.56	29.18	32.36	29.29	22.51	21.81
	2024	23.99	26.48	33.99	36.19	31.29	33.15	40.46	36.13	30.11	25.17	23.63	26.48

Nota: Garis Panduan Kualiti Udara Malaysia: PM₁₀ tidak melebihi 120 µg/m³
Notes: Malaysian Ambient Air Quality Guidelines: PM₁₀ not exceeding 120 µg/m³ within

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 1.20: Purata bulanan kepekatan Ozon Permukaan Bumi (O₃) di udara, Perak, 2020-2024

Table 1.20: Monthly average concentration of Ground Level Ozone (O₃) in the air, Perak, 2020-2024

ppm

Stesen Station	Tahun Year	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Pegoh, Ipoh	2020	0.027	0.025	0.024	0.021	0.019	0.021	0.020	0.022	0.016	0.014	0.013	0.014
	2021	0.016	0.023	0.017	0.015	0.014	0.015	0.018	0.015	0.014	0.014	0.011	0.014
	2022	0.017	0.012	0.014	0.014	0.014	0.012	0.012	0.008	0.009	0.004	0.007	0.007
	2023	0.010	0.010	0.012	0.011	0.012	0.012	0.010	0.009	0.010	0.006	0.005	0.008
	2024	0.010	0.011	0.013	0.011	0.013	0.010	0.011	0.010	0.010	0.010	0.014	0.017
Taiping	2020	0.017	0.019	0.020	0.018	0.017	0.018	0.017	0.021	0.014	0.013	0.014	0.015
	2021	0.015	0.020	0.018	0.016	0.017	0.016	0.019	0.015	0.016	0.015	0.013	0.015
	2022	0.017	0.015	0.016	0.016	0.014	0.014	0.015	0.015	0.010	0.008	0.009	0.009
	2023	0.011	0.012	0.013	0.013	0.017	0.019	0.018	0.017	0.019	0.019	0.017	0.016
	2024	0.017	0.022	0.024	0.019	0.024	0.018	0.020	0.019	0.017	0.016	0.014	0.017
Tanjung Malim	2020	0.019	0.020	0.019	0.014	0.018	0.021	0.018	0.023	0.017	0.016	0.014	0.014
	2021	0.015	0.021	0.017	0.017	0.017	0.018	0.021	0.018	0.017	0.018	0.014	0.015
	2022	0.017	0.014	0.016	0.017	0.018	0.017	0.021	0.018	0.016	0.015	0.016	0.015
	2023	0.016	0.015	0.016	0.018	0.017	0.022	0.019	0.019	0.022	0.020	0.014	0.013
	2024	0.014	0.016	0.019	0.018	0.026	0.024	0.030	0.025	0.024	0.023	0.016	0.015
Tasek, Ipoh	2020	0.020	0.021	0.025	0.020	0.015	0.018	0.026	0.024	0.028	0.018	0.015	0.018
	2021	0.023	0.023	0.024	0.020	0.021	0.021	0.019	0.023	0.017	0.015	0.016	0.016
	2022	0.018	0.025	0.021	0.018	0.020	0.019	0.021	0.016	0.017	0.017	0.013	0.015
	2023	0.016	0.010	0.020	0.021	0.020	0.022	0.020	0.019	0.018	0.018	0.013	0.013
	2024	0.017	0.020	0.024	0.019	0.022	0.019	0.023	0.021	0.018	0.018	0.014	0.016

Nota: Garis Panduan Kualiti Udara Malaysia: O₃ tidak melebihi 0.1 ppm

Notes: Malaysian Ambient Air Quality Guidelines: O₃ not exceeding 0.1 ppm

Sumber: Jabatan Alam Sekitar

Source: Department of Environment

Jadual 1.21: Purata bulanan kepekatan Karbon Monoksida (CO) di udara, Perak, 2020-2024

Table 1.21: Monthly average concentration of Carbon Monoxide (CO) in the air, Perak, 2020-2024

ppm

Stesen Station	Tahun Year	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Pegoh, Ipoh	2020	0.487	0.549	0.372	0.372	0.316	0.467	0.492	0.575	0.454	0.433	0.393	0.538
	2021	0.623	0.521	0.649	0.590	0.527	0.433	0.443	0.427	0.512	0.488	0.539	0.540
	2022	0.557	0.457	0.500	0.609	0.496	0.534	0.528	0.534	0.422	0.451	0.418	0.410
	2023	0.535	0.603	0.518	0.481	0.422	0.432	0.467	0.416	0.446	0.610	0.570	0.596
	2024	0.616	0.466	0.500	0.491	0.529	0.444	0.465	0.422	0.541	0.428	0.344	0.462
Taiping	2020	0.360	0.344	0.262	0.210	0.151	0.287	0.249	0.265	0.284	0.300	0.226	0.308
	2021	0.362	0.367	0.297	0.219	0.210	0.212	0.307	0.236	0.346	0.346	0.371	0.358
	2022	0.306	0.208	0.260	0.206	0.304	0.244	0.319	0.331	0.330	0.288	0.271	0.277
	2023	0.301	0.261	0.281	0.199	0.223	0.302	0.291	0.264	0.300	0.259	0.259	0.310
	2024	0.339	0.324	0.308	0.284	0.221	0.285	0.364	0.260	0.278	0.236	0.280	0.277
Tanjung Malim	2020	0.485	0.518	0.513	0.413	0.472	0.505	0.459	0.577	0.510	0.456	0.478	0.555
	2021	0.520	0.466	0.382	0.426	0.533	0.482	0.509	0.558	0.485	0.527	0.479	0.600
	2022	0.575	0.491	0.553	0.593	0.557	0.553	0.498	0.541	0.509	0.411	0.392	0.365
	2023	0.549	0.485	0.502	0.546	0.518	0.531	0.446	0.448	0.480	0.594	0.484	0.499
	2024	0.522	0.553	0.575	0.277	0.348	0.442	0.483	0.469	0.415	0.448	0.386	0.501
Tasek, Ipoh	2020	0.715	0.556	0.556	0.469	0.495	0.568	0.548	0.501	0.470	0.576	0.516	0.652
	2021	0.555	0.554	0.657	0.584	0.498	0.512	0.494	0.460	0.544	0.501	0.531	0.610
	2022	0.611	0.593	0.530	0.638	0.482	0.387	0.630	0.576	0.519	0.444	0.539	0.561
	2023	0.618	0.526	0.625	0.560	0.514	0.601	0.592	0.604	0.602	0.650	0.517	0.590
	2024	0.509	0.668	0.680	0.519	0.575	0.541	0.612	0.521	0.651	0.619	0.429	0.621

Nota: Garis Panduan Kualiti Udara Malaysia: CO tidak melebihi 9 ppm
Notes: Malaysian Ambient Air Quality Guidelines: CO not exceeding 9 ppm

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 1.22: Purata bulanan kepekatan Sulfur Dioksida (SO₂) di udara, Perak, 2020-2024

Table 1.22: Monthly average concentration of Sulphur Dioxide (SO₂) in the air, Perak, 2020-2024

ppm

Stesen Station	Tahun Year	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Pegoh, Ipoh	2020	0.0009	0.0011	0.0005	0.0009	0.0004	0.0007	0.0007	0.0007	0.0008	0.0009	0.0008	0.0005
	2021	0.0006	0.0009	0.0009	0.0009	0.0008	0.0010	0.0009	0.0007	0.0007	0.0005	0.0005	0.0008
	2022	0.0011	0.0012	0.0005	0.0006	0.0009	0.0011	0.0007	0.0010	0.0016	0.0010	0.0010	0.0012
	2023	0.0012	0.0009	0.0009	0.0004	0.0009	0.0011	0.0013	0.0010	0.0010	0.0010	0.0008	0.0010
	2024	0.0011	0.0009	0.0009	0.0010	0.0010	0.0009	0.0006	0.0009	0.0009	0.0009	0.0008	0.0010
Taiping	2020	0.0009	0.0010	0.0011	0.0010	0.0009	0.0008	0.0009	0.0010	0.0010	0.0006	0.0008	0.0010
	2021	0.0011	0.0013	0.0010	0.0006	0.0008	0.0009	0.0011	0.0008	0.0011	0.0011	0.0009	0.0007
	2022	0.0012	0.0008	0.0011	0.0009	0.0008	0.0007	0.0009	0.0010	0.0006	0.0010	0.0006	0.0009
	2023	0.0010	0.0010	0.0008	0.0009	0.0010	0.0013	0.0009	0.0013	0.0014	0.0013	0.0010	0.0007
	2024	0.0010	0.0008	0.0010	0.0014	0.0010	0.0011	0.0008	0.0012	0.0010	0.0011	0.0012	0.0010
Tanjung Malim	2020	0.0008	0.0008	0.0006	0.0007	0.0008	0.0007	0.0009	0.0009	0.0010	0.0010	0.0007	0.0006
	2021	0.0010	0.0012	0.0007	0.0005	0.0006	0.0007	0.0010	0.0013	0.0015	0.0010	0.0009	0.0010
	2022	0.0011	0.0010	0.0011	0.0009	0.0011	0.0014	0.0015	0.0012	0.0013	0.0008	0.0009	0.0011
	2023	0.0009	0.0012	0.0010	0.0010	0.0013	0.0011	0.0006	0.0009	0.0012	0.0014	0.0010	0.0009
	2024	0.0013	0.0010	0.0012	0.0009	0.0009	0.0008	0.0008	0.0009	0.0013	0.0015	0.0008	0.0009
Tasek, Ipoh	2020	0.0008	0.0010	0.0008	0.0008	0.0011	0.0013	0.0009	0.0009	0.0012	0.0012	0.0012	0.0011
	2021	0.0012	0.0012	0.0012	0.0008	0.0009	0.0012	0.0012	0.0009	0.0011	0.0008	0.0011	0.0009
	2022	0.0008	0.0010	0.0013	0.0014	0.0011	0.0011	0.0014	0.0016	0.0015	0.0009	0.0008	0.0010
	2023	0.0008	0.0011	0.0012	0.0013	0.0013	0.0011	0.0011	0.0011	0.0011	0.0012	0.0011	0.0011
	2024	0.0012	0.0012	0.0014	0.0013	0.0015	0.0009	0.0011	0.0010	0.0013	0.0009	0.0009	0.0013

Nota: Garis Panduan Kualiti Udara Malaysia: SO₂ tidak melebihi 0.035 ppm

Notes: Malaysian Ambient Air Quality Guidelines: SO₂ not exceeding 0.035 ppm

Sumber: Jabatan Alam Sekitar

Source: Department of Environment

Jadual 1.23: Purata bulanan kepekatan Nitrogen Dioksida (NO₂) di udara, Perak, 2020-2024Table 1.23: Monthly average concentration of Nitrogen Dioxide (NO₂) in the air, Perak, 2020-2024

ppm

Stesen Station	Tahun Year	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Pegoh, Ipoh	2020	0.0079	0.0078	0.0052	0.0036	0.0059	0.0077	0.0092	0.0087	0.0088	0.0081	0.0068	0.0084
	2021	0.0076	0.0061	0.0085	0.0091	0.0076	0.0045	0.0061	0.0064	0.0070	0.0082	0.0088	0.0088
	2022	0.0085	0.0072	0.0087	0.0095	0.0078	0.0073	0.0073	0.0056	0.0070	0.0054	0.0063	0.0057
	2023	0.0056	0.0055	0.0058	0.0066	0.0065	0.0068	0.0062	0.0057	0.0062	0.0053	0.0051	0.0050
	2024	0.0053	0.0051	0.0055	0.0061	0.0065	0.0063	0.0058	0.0058	0.0050	0.0057	0.0064	0.0072
Taiping	2020	0.0086	0.0086	0.0075	0.0039	0.0040	0.0066	0.0075	0.0078	0.0069	0.0072	0.0064	0.0075
	2021	0.0085	0.0092	0.0090	0.0079	0.0065	0.0044	0.0063	0.0059	0.0071	0.0079	0.0078	0.0090
	2022	0.0100	0.0073	0.0075	0.0075	0.0077	0.0069	0.0082	0.0092	0.0073	0.0068	0.0071	0.0076
	2023	0.0080	0.0080	0.0076	0.0057	0.0059	0.0083	0.0089	0.0083	0.0084	0.0064	0.0078	0.0072
	2024	0.0061	0.0076	0.0082	0.0063	0.0062	0.0073	0.0100	0.0073	0.0074	0.0069	0.0055	0.0061
Tanjung Malim	2020	0.0049	0.0051	0.0045	0.0026	0.0035	0.0048	0.0051	0.0060	0.0054	0.0057	0.0060	0.0050
	2021	0.0049	0.0045	0.0053	0.0054	0.0041	0.0035	0.0034	0.0033	0.0043	0.0047	0.0045	0.0044
	2022	0.0060	0.0050	0.0055	0.0056	0.0055	0.0057	0.0061	0.0057	0.0055	0.0053	0.0058	0.0061
	2023	0.0058	0.0059	0.0070	0.0066	0.0057	0.0057	0.0054	0.0055	0.0059	0.0061	0.0058	0.0066
	2024	0.0054	0.0056	0.0050	0.0053	0.0057	0.0056	0.0068	0.0070	0.0060	0.0064	0.0055	0.0061
Tasek, Ipoh	2020	0.0097	0.0083	0.0074	0.0032	0.0056	0.0090	0.0098	0.0089	0.0084	0.0083	0.0067	0.0098
	2021	0.0075	0.0068	0.0086	0.0083	0.0067	0.0043	0.0069	0.0058	0.0070	0.0069	0.0072	0.0077
	2022	0.0097	0.0069	0.0082	0.0086	0.0066	0.0076	0.0072	0.0087	0.0073	0.0077	0.0087	0.0080
	2023	0.0088	0.0066	0.0083	0.0084	0.0070	0.0074	0.0077	0.0071	0.0083	0.0082	0.0078	0.0069
	2024	0.0076	0.0075	0.0080	0.0075	0.0092	0.0090	0.0097	0.0080	0.0073	0.0069	0.0070	0.0079

Nota: Garis Panduan Kualiti Udara Malaysia: NO₂ tidak melebihi 0.16 ppmNotes: Malaysian Ambient Air Quality Guidelines: NO₂ not exceeding 0.16 ppm**Sumber: Jabatan Alam Sekitar**

Source: Department of Environment

Jadual 1.24: Status kualiti air marin di kawasan pantai, muara sungai dan pulau berdasarkan Indeks Kualiti Air Marin, Perak, 2020-2024

Table 1.24: Status of marine water quality in coastal, estuary and island areas based on Marine Water Quality Index, Perak, 2020-2024

Kawasan Area	Kategori Category															
	2020				2021				2022				2023			
	E	G	M	P	E	G	M	P	E	G	M	P	E	G	M	P
Pantai Coastal	5	3	-	-	7	-	1	-	6	2	-	-	7	1	-	-
Muara Estuary	-	-	4	2	-	-	5	1	-	1	5	-	-	1	5	-
Pulau Island	4	-	1	-	4	1	-	-	4	1	-	-	5	-	-	-

Bilangan stesen
Number of stations

Nota/ Notes:

Klasifikasi Indeks Kualiti Air Marin:

Marine Water Quality Index Classification:

Sumber: Jabatan Alam Sekitar

Source: Department of Environment

Kategori Category	Nilai indeks Index value
E	Terbaik/ Excellent (90 -100)
G	Baik/ Good (80 - <90)
M	Sederhana/ Moderate (50 - <80)
P	Tercemar/ Poor (0 - <50)

Jadual 2.1: Keluasan hutan yang dilesenkan untuk pengusahaan, Perak, 2019-2023

Table 2.1: Forest area licensed for harvesting, Perak, 2019-2023

Hektar
Hectares

Tahun Year	2019	2020	2021	2022	2023
Keluasan Area	8,838	10,052	6,333	7,974	6,136

Sumber: Jabatan Perhutanan Semenanjung Malaysia
Source: Forest Department Peninsular Malaysia

Jadual 2.2: Pengeluaran produk kayu-kayan utama, Perak, 2019-2023

Table 2.2: Production of major timber products, Perak, 2019-2023

Meter padu
Cubic metres

Tahun Year	Kayu balak ¹ Logs	Kayu gergaji Sawn timber	Papan lapis Plywood	Venir Veneer	Kayu kumai Moulding
2019	417,932	266,267	67,301	22,698	10,301
2020	329,233	180,909	79,821	6,142	8,935
2021	260,240	157,994	71,861	16,284	12,226
2022	353,306	160,438	75,938	13,935	12,537
2023	348,686	102,069	76,735	11,276	1,195

Sumber: Jabatan Perhutanan Semenanjung Malaysia
Source: Forest Department Peninsular Malaysia

Nota: ¹ Tidak termasuk pengeluaran kayu getah, kayu jaras, batang kelapa dan batang kelapa sawit

Notes: Exclude production of hevea logs, poles, coconut trunks and oil palm trunks

Data merujuk kepada syarikat yang berdaftar dengan Jabatan Perhutanan Semenanjung Malaysia
Data refers to establishment registered with Forest Department Peninsular Malaysia only

Jadual 2.3: Pendaratan ikan laut, Perak, 2020-2024

Table 2.3: Landings of marine fish, Perak, 2020-2024

Tan metrik ('000)
Metric tonnes

Negeri Year	2020		2021		2022		2023		2024	
	Kuantiti Quantity	%	Kuantiti Quantity	%	Kuantiti Quantity	%	Kuantiti Quantity	%	Kuantiti Quantity	%
Malaysia	1,383.3	100.0	1,328.0	100.0	1,308.4	100.0	1,270.3	100.0	1,392.1	100.0
Perak	328.3	23.7	358.4	27.0	301.4	23.0	335.9	26.4	434.3	31.2

Sumber: Jabatan Perikanan Malaysia
Source: Department of Fisheries Malaysia

Jadual 2.4: Bilangan ternakan, Perak, 2020-2024

Table 2.4: Number of livestock, Perak, 2020-2024

Bilangan
Number

Negeri State	Tahun Year	Jenis ternakan Type of livestock						
		Kerbau Buffalo	Lembu Cattle	Kambing Goat	Bebiri Sheep	Babi Swine	Ayam Chicken	Itik Duck
Perak	2020	6,764	56,492	15,119	2,314	562,288	40,844,500	6,972,200
	2021	7,739	55,708	18,569	3,204	555,705	42,031,500	7,063,200
	2022	7,324	64,945	18,392	3,346	508,786	41,894,500	7,063,200
	2023	7,953	70,442	20,741	4,860	412,072	41,097,500	6,863,200
	2024	7,726	71,536	20,196	4,627	415,989	42,866,242	7,008,905

Sumber: Jabatan Perkhidmatan Veterinar
Source: Department of Veterinary Service

Jadual 2.5: Rekabentuk kapasiti loji rawatan air, Perak, 2020-2024Table 2.5: *Water treatment plants design capacity, Perak, 2020-2024*Juta liter sehari (JLH)
Million litres per day (MLD)

Negeri State	2020	2021	2022	2023	2024
Perak	1,886	1,891	1,951	1,977	1,977

Jadual 2.6: Pengeluaran air yang dibekalkan, Perak, 2020-2024Table 2.6: *Production of water supplied, Perak, 2020-2024*Juta liter sehari (JLH)
Million litres per day (MLD)

Negeri State	2020	2021	2022	2023	2024
Perak	1,392	1,386	1,418	1,416	1,470

Jadual 2.7: Bekalan air mentah diabstrak dari sungai dan empangan, Perak, 2020-2024Table 2.7: *Supply of abstracted raw water from rivers and storage dams, Perak, 2020-2024*Juta liter sehari (JLH)
Million litres per day (MLD)

Tahun Year	2020	2021	2022	2023	2024
Sungai Rivers	1,033	1,144	1,186	1,185	1,277
Empangan Dams	333	274	278	276	297

Jadual 2.8: Penggunaan air bermeter mengikut sektor, Perak, 2020-2024Table 2.8: *Metered water consumption by sector, Perak, 2020-2024*Juta liter sehari (JLH)
Million litres per day (MLD)

Negeri State	Sektor Sector									
	Domestik Domestic					Bukan domestik Non-domestic				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Perak	706	703	699	600	601	266	266	289	387	398

Sumber: Suruhanjaya Perkhidmatan Air Negara

Source: National Water Services Commission

Jadual 3.1: Loji rawatan pembetungan awam, Perak, 2022-2024

Table 3.1: Public sewerage treatment plant, Perak, 2022-2024

Tahun Year	LRP multipoint Multipoint STP ¹			Loji serantau Regional plant ²			Jumlah Total		
	2022	2023 ^p	2024	2022	2023 ^p	2024	2022	2023 ^p	2024
Population equivalent (PE)	2,097,573	2,147,221	2,183,975	77,169	77,169	170,633	2,174,742	2,224,390	2,354,608

Sumber: Suruhanjaya Perkhidmatan Air Negara

Source: National Water Services Commission

Nota/ Notes:

¹ LRP multipoint: STP untuk memenuhi pembangunan yang sporadis dan bertaburan oleh pemaaju yang berbeza

Multipoint STP: STPs to cater for sporadic and scattered development by different developers

² Loji serantau: STP yang dikenal pasti dalam Kajian Pengawasan Pembetungan untuk menampung kawasan tadahan pembetungan

Regional plant: STPs identified in the Sewerage Catchment Study to cater for a sewerage catchment area

Jadual 3.2: Senarai dan kapasiti kemudahan rawatan dan pelupusan sisa perbandaran, Perak, 2024

Table 3.2: List and capacity of municipal waste treatment and disposal facilities, Perak, 2024

Tapak pelupusan Disposal site			Loji rawatan termal Thermal treatment plant		
Nama tapak Site name	Kapasiti muatan sisa sehari (tan/ hari) Residual load capacity daily (tonnes/day)	Luas (Hektar) Area (Hectares)	Nama loji Plant name	Kapasiti muatan sisa sehari (tan/ hari) Residual load capacity daily (tonnes/day)	Luas (Hektar) Area (Hectares)
TPS Lahat	650.0	226.7	Insinerator Pulau Pangkor	15	2.0
TP Jalan Gerik	28.0	8.1	-	-	-
TP Jln. Air Ganda Gerik	15.0	18.0	-	-	-
TP Ayer Kala	25.0	1.5	-	-	-
TP Jln. Tmn Merdeka	90.0	4.0	-	-	-
TP Bagan Serai	120.0	2.4	-	-	-
TP Jebong	250.0	9.3	-	-	-
TP Jln. Kuala Kangsar	180.0	13.4	-	-	-
TP Parit	80.0	1.5	-	-	-
TP Teluk Mengkudu	330.0	47.0	-	-	-
TP Sg. Siput Selatan	80.0	26.7	-	-	-
TP Batu Gajah	60.0	24.3	-	-	-
TP Bidor, Pekan Pasir	100.0	56.7	-	-	-
TP Changkat Jong	200.0	9.0	-	-	-
TP Penderas	70.0	8.0	-	-	-
TP Teluk Cempedak	15.0	3.4	-	-	-

Nota/ Notes:

Sumber: Kementerian Perumahan dan Kerajaan Tempatan

Source: Ministry of Housing and Local Government

TP: Tapak pelupusan bukan sanitari/ Non-sanitary landfill

TPS: Tapak pelupusan sanitari/ Sanitary landfill

TPI: Tapak pelupusan lengai/ Inert landfill

LRT: Loji Rawatan Termal/ Thermal treatment plant (Incinerator)

Jadual 3.3: Sisa perbandaran yang dihantar ke kemudahan pengurusan sisa pepejal, Perak, 2024

Table 3.3: Municipal waste sent to solid waste management facilities, Perak, 2024

Nama Kemudahan/ Tapak Pelupusan Facility Name/ Disposal Site	Purata sisa yang diterima (tan/ hari) Average residue received (tonnes/ day)
LRT Pulau Pangkor	12.1

Sumber: Kementerian Perumahan Kerajaan Tempatan
Source: Ministry of Housing and Local Government

Nota/ Notes:

Merujuk kepada negeri yang mengguna pakai peraturan di bawah Akta Pengurusan Sisa Pepejal dan Pembersihan Awam 2007 (Akta 672) yang berkuatkuasa di Johor, Kedah, Melaka, Negeri Sembilan, Pahang, Perlis, W.P. Kuala Lumpur dan W.P. Putrajaya
Refer to the States adopting regulations under Solid Waste and Public Cleansing Management Act 2007 (Act 672) enforced in Johor, Kedah, Melaka, Negeri Sembilan, Pahang, Perlis, W.P. Kuala Lumpur and W.P. Putrajaya

TP: Tapak pelupusan bukan sanitari/ Non-sanitary landfill
TPS: Tapak pelupusan sanitari/ Sanitary landfill
LRT: Loji Rawatan Termal/ Thermal treatment plant (Incinerator)
SP: Stesen Pemindahan/ Transfer Station

Jadual 3.4: Bilangan kemudahan rawatan dan pelupusan sisa perbandaran, Perak, 2024

Table 3.4: Number of municipal waste treatment and disposal facilities, Perak, 2024

Tapak pelupusan di bawah seliaan SWCorp Disposal site under SWCorp	Tapak pelupusan bukan di bawah seliaan SWCorp Disposal site not under SWCorp
1	16

Sumber: Kementerian Perumahan Kerajaan Tempatan
Source: Ministry of Housing and Local Government

Nota: Merujuk kepada peraturan di bawah Akta Pengurusan Sisa Pepejal dan Pembersihan Awam 2007 (Akta 672) yang berkuatkuasa di Johor, Kedah, Melaka, Negeri Sembilan, Pahang, Perlis, W.P. Kuala Lumpur dan W.P. Putrajaya
Notes: Refer to regulations under Solid Waste and Public Cleansing Management Act 2007 (Act 672) enforced in Johor, Kedah, Melaka, Negeri Sembilan, Pahang, Perlis, W.P. Kuala Lumpur and W.P. Putrajaya

Jadual 3.5: Buangan terjadual, Perak, 2020-2024

Table 3.5: Scheduled waste, Perak, 2020-2024

					Tan metrik Metric tonnes
Tahun Year	2020	2021	2022	2023	2024
Kuantiti Quantity	438,911	1,957,521	579,736	527,892	119,392

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 3.6: Kuantiti buangan klinikal, Perak, 2020-2024

Table 3.6: Quantity of clinical waste, Perak, 2020-2024

Tan metrik Met.
tonnes

Tahun Year	2020	2021	2022	2023	2024
Kuantiti Quantity	792.8	4,326.4	820.8	5,052.7	2,965.7

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 3.7: Bilangan tapak pelupusan sisa pepejal yang beroperasi, Perak, 2020-2024

Table 3.7: Number of operating solid waste landfills, Perak, 2020-2024

Tahun Year	Sanitari Sanitary	Bukan sanitari Non-sanitary	Lengai Inert
2020	1	15	-
2021	1	15	-
2022	1	15	-
2023	1	15	-
2024	2	14	-

Sumber: Kementerian Perumahan Kerajaan Tempatan
Source: Ministry of Housing and Local Government

Jadual 4.1: Kejadian bencana, Perak, 2020-2024

Table 4.1: Disaster events, Perak, 2020-2024

Tahun Year	Bilangan kejadian Number of events	Mangsa Victim	Keluarga Family	Pusat pemindahan Evacuation center	Kematian Death	Rumah rosak House damaged
2020	8	1,878	543	43	-	-
2021	9	2,939	851	40	-	-
2022	12	3,015	841	53	-	-
2023	21	2,266	609	35	-	-
2024	28	6,195	1759	65	-	-

Sumber: Agensi Pengurusan Bencana Negara

Source: National Disaster Management Agency

Nota: Bilangan kejadian bencana adalah berdasarkan keluarga dan mangsa yang dengan bencana dan telah ditempatkan di Pusat Pemindahan Sementara (PPS)

Notes: Number of disaster events is based on families and victims affected by disaster and placed at the Temporary Evacuation Centers (PPS)

Jadual 4.2: Bilangan kejadian banjir yang dilaporkan, Perak, 2020-2024

Table 4.2: Number of flood incidents reported, Perak, 2020-2024

Tahun Year	2019	2020	2021	2022	2023
Bilangan Number	100	119	7	25	67

Sumber: Jabatan Pengairan dan Saliran

Source: Department of Irrigation and Drainage

Jadual 4.3: Bilangan kemalangan jalan raya dan kecederaan yang dilaporkan, Perak, 2020-2024

Table 4.3: Number of road accidents and casualties reported, Perak, 2020-2024

Tahun Year	Kemalangan jalan raya Road accidents	Kecederaan Casualties		
		Kecederaan ¹ Injury	Kematian Death	Jumlah Total
2020	30,669	1,903	491	2,394
2021	28,148	2,231	575	2,806
2022	40,281	2,183	703	2,886
2023	41,659	1,368	641	2,009
2024	43,638	1,984	669	2,653

Sumber: Jabatan Siasatan dan Penguatkuasaan Trafik, Polis Diraja Malaysia

Source: Investigation and Enforcement of the Traffic Department, Royal Malaysia Police

Nota: ¹Kecederaan merujuk kepada kecederaan ringan dan parah

Notes: Injury refer to minor and serious injuries

Jadual 4.4: Bilangan kejadian kebakaran, Perak, 2020-2024

Table 4.4: Number of fire incidents, Perak, 2020-2024

Tahun Year	2020	2021	2022	2023	2024
Bilangan Number	3,596	4,105	3,246	3,372	4,025

Sumber: Kementerian Perumahan Kerajaan Tempatan
Source: Ministry of Housing and Local Government

Jadual 4.5: Bilangan kematian, kecederaan dan anggaran kerugian akibat kebakaran yang dilaporkan, Perak, 2020-2024

Table 4.5: Number of deaths, injuries and estimated losses caused by fire reported, Perak, 2020-2024

Tahun Year	Kematian Death	Kecederaan Injury	Kerugian (RM juta) Loss (Millions)
2020	16	49	57.0
2021	9	42	70.4
2022	14	43	240.4
2023	16	42	135.4
2024	15	37	112.9

Sumber: Kementerian Perumahan Kerajaan Tempatan
Source: Ministry of Housing and Local Government

Jadual 4.6: Statistik nilai kerugian banjir, Perak, 2022 dan 2023

Table 4.6: Statistics on value of flood losses, Perak, 2022 and 2023

Negeri State	*Bilangan tempat kediaman Number of living quarters	Nilai kerugian banjir Value of flood losses					
		(A) Tempat Kediaman Living quarters (RM '000)		(B) Kenderaan Vehicles (RM '000)		(C) Premis Perniagaan Business Premises (RM '000)	
		2022	2023	2022	2023	2022	2023
Malaysia	8,046,946	168,258	372,232	22,327	17,298	53,197	54,059
Perak	672,855	497	12,172	120	720	102	637

Negeri State	Nilai kerugian banjir Value of flood losses						Jumlah kerugian Total loss (RM '000)	
	(D) Pembuatan Manufacturing (RM '000)		(E) Pertanian Agriculture (RM '000)		(F) Infrastruktur Infrastructure (RM '000)			
	2022	2023	2022	2023	2022	2023	2022	2023
	2022	2023	2022	2023	2022	2023	2022	2023
Malaysia	10,260	1,163	120,629	185,222	380,742	303,380	755,413	933,354
Perak	-	-	768	312	45,368	43,398	46,854	57,239

Nota: * Bilangan Tempat Kediaman merujuk kepada data Banci Penduduk dan Perumahan Malaysia 2020.

Notes: Number of Living Quarters refers to the data of Population and Housing Census Malaysia 2020.

"-" Tidak terkesan banjir
Not affected by the flood

Data mengikut negeri bagi Pertanian dan Infrastruktur bagi tahun 2021 tidak diterbitkan
Data by state for Agriculture and Infrastructure for year 2021 were not published

"n.a" - Data tidak tersedia
Data not available

Jadual 4.7: Taburan kawasan hakisan pantai, Perak, 2024

Table 4.7: Distribution of coastal erosion areas, Perak, 2024

Panjang (km)
Length

Negeri State	Jumlah (km) Total	Pantai yang mengalami hakisan mengikut kategori Coastal erode by category						Jumlah hakisan (km) Total erosion	%
		Kategori 1 Category 1		Kategori 2 Category		Kategori 3 Category			
		Bil. kawasan No. of area	Panjang agregat (km) Aggregate length	Bil. kawasan No. of area	Panjang agregat (km) Aggregate length	Bil. kawasan No. of area	Panjang agregat (km) Aggregate length		
Malaysia	8,840.00	44	55.4	309	375.9	2,344	916.3	1,347.60	15.2
Perak	397.5	1	0.3	21	33.6	105	61.2	95.1	23.9

Sumber: Jabatan Pengairan dan Saliran
Source: Department of Irrigation and Drainage

Nota/ Notes:

Kategori 1: Pengunduran garis pantai yang cepat dengan kadar melebihi 4 meter/ tahun umumnya di kawasan dengan penduduk yang agak padat bersama aktiviti komersial/industri yang mendapat perkhidmatan infrastruktur dan kemudahan awam.

Category 1: Fast retreating coastline at the rate of more than 4 metre/ year with generally fairly dense human settlement, with some commercial/ industrial activities being served by significant public infrastructure and facilities.

Kategori 2: Pengunduran garis pantai dengan kadar lebih dari 1 meter/ tahun tetapi kurang dari 4 meter/tahun umumnya di kawasan berpenduduk tidak padat dengan sedikit aktiviti pertanian yang mendapat perkhidmatan infrastruktur dan kemudahan awam yang kurang sempurna.

Category 2: Retreating coastline at the rate of between more than 1 metre/ year but less than 4m/ year with generally sparsely-populated area, with some agricultural activities being served by relatively minor public infrastructure and facilities

Kategori 3: Pengunduran garis pantai dengan kadar kurang dari 1 meter/ tahun umumnya di kawasan tanpa penduduk dengan aktiviti pertanian yang minimum yang tidak mendapat perkhidmatan infrastruktur dan kemudahan awam.

Category 3: Slowly retreating coastline of less than 1 metre/ year with generally no human settlement and minimal agricultural activities, and not served by public infrastructure and facilities.

Berdasarkan National Coastal Erosion Study for Malaysia (2015)
Based on National Coastal Erosion Study for Malaysia (2015)

Jadual 5.1: Anggaran penduduk pertengahan tahun, Perak, 2021-2025

Table 5.1: Mid-year population estimates, Perak, 2021-2025

Tahun Year	2021	2022	2023	2024	2025 ^p	Kadar pertumbuhan penduduk tahunan Annual population growth rate (%)	
	('000)					2023/2024	2024/2025
Penduduk Population	2,515.8	2,514.4	2,541.2	2,569.4	2,574.9	1.1	0.2

Nota/ Notes:**Berdasarkan Anggaran Penduduk Pertengahan Tahun berasaskan data Banci Penduduk dan Perumahan 2020**

Mid-Year Population Estimates based on Population and Housing Census of Malaysia 2020

^p **Permulaan/ Preliminary****Hasil tambah mungkin berbeza kerana pembundaran**

The added total may differ due to rounding

Jadual 5.2: Kepadatan penduduk, Perak, 2021-2025

Table 5.2: Population density, Perak, 2021-2025

Tahun Year	2021	2022	2023	2024	2025 ^p	Bilangan orang bagi setiap km ² Number of persons per km ²
Kepadatan penduduk Population density	119	119	120	122	122	

Nota/ Notes:**Berdasarkan Anggaran Penduduk Pertengahan Tahun berasaskan data Banci Penduduk dan Perumahan 2020**

Mid-Year Population Estimates based on Population and Housing Census of Malaysia 2020

^p **Permulaan/ Preliminary****Hasil tambah mungkin berbeza kerana pembundaran**

The added total may differ due to rounding

Jadual 5.3: Penduduk dengan air paip yang dirawat mengikut strata, Perak, 2021-2024

Table 5.3: Population with treated piped water by state, Perak, 2021-2023

Tahun Year	2021			2022			2023			2024		
Strata	Bandar Urban	Luar bandar Rural	Purata negeri State average	Bandar Urban	Luar bandar Rural	Purata negeri State average	Bandar Urban	Luar bandar Rural	Purata negeri State average	Bandar Urban	Luar bandar Rural	Purata negeri State average
Peratus Per cent	100.0	99.2	99.6	100.0	99.2	99.6	100.0	99.2	99.6	100.0	99.2	99.6

Jadual 5.4: Kadar tarif air bagi domestik, Perak, 2024

Table 5.4 : Water tariff rates for domestic, Perak, 2024

RM/m³

Negeri State	Semakan tarif terakhir Last tariff review	Purata tarif air Average water tariff		
		20m ³ pertama first 20m ³	30m ³ pertama first 30m ³	35m ³ pertama first 35m ³
Perak	2024	0.75	0.86	0.89

Jadual 5.5: Kadar tarif air bagi industri, Perak, 2024

Table 5.5: Water tariff rates for industry, Perak, 2024

RM/m³

Negeri State	Semakan tarif terakhir Last tariff review	Purata tarif air Average water tariff		
		80m ³ pertama first 80m ³	120m ³ pertama first 120m ³	500m ³ pertama first 500m ³
Perak	2024	1.61	1.64	1.69

Sumber: Kementerian Peralihan Tenaga dan Transformasi Air,
Suruhanjaya Perkhidmatan Air Negara

Source: Ministry of Energy Transition and Water Transformation,
National Water Services Commission

Jadual 5.6: Peratus isi rumah dengan kemudahan bekalan elektrik mengikut strata, Perak, 2022

Table 5.6: Percentage of households with the accessibility to electricity supply by strata, Perak, 2022

	Kemudahan bekalan elektrik Accessible to electricity		
	Jumlah	Bandar	Luar bandar
	Total	Urban	Rural
Malaysia	99.7	99.9	99.0
Perak	100.0	100.0	99.9

Nota: Berdasarkan Laporan Survei Kemudahan Asas 2022

Note: Based on Basic Amenities Survey Report 2022

Jadual 5.7: Kadar insiden keracunan makanan, kolera dan tifoid, Perak, 2020-2024

Table 5.7: Incidence rate of food poisoning, cholera and typhoid, Perak, 2020-2024

Bagi setiap 100,000 penduduk
Per 100,000 population

Insiden Incidence	2020	2021	2022	2023	2024
Keracunan makanan Food poisoning	16.8	16.0	41.9	82.8	91.8
Kolera Cholera	-	-	-	-	-
Tifoid ¹ Typhoid	0.0	0.2	0.2	0.3	0.4

Nota: ¹ Mulai tahun 2019, penyakit Tifoid termasuk Paratyphi

Notes: Starting from year 2019, Typhoid also include Paratyphi

Sumber: Kementerian Kesihatan Malaysia

Source: Ministry of Health Malaysia

Jadual 5.8: Bilangan kes demam denggi, demam denggi berdarah dan malaria, Perak, 2020-2024

Table 5.8: Number of dengue fever, dengue haemorrhagic fever and malaria cases, Perak, 2020-2024

Kes Cases	2020	2021	2022	2023	2024
Demam denggi Dengue fever	2,658	554	1,381	4,516	6,924
Demam denggi berdarah Dengue haemorrhagic fever	7	3	3	-	5
Malaria	99	94	84	134	76

Sumber: Kementerian Kesihatan Malaysia

Source: Ministry of Health Malaysia

Jadual 6.1: Perbelanjaan perlindungan alam sekitar mengikut jenis perbelanjaan, Perak, 2018-2022

Table 6.1: *Environmental protection expenditure by type of expenditure, Perak, 2018-2022*

RM '000

Negeri States	Tahun Year	Jumlah Total	Pengurusan pencemaran Pollution management	Perlindungan hidupan liar & habitat Protection of wildlife & habitats	Penilaian dan caj alam sekitar Environmental assessment and charges	Pengurusan sisa Waste management	Perbelanjaan lain untuk perlindungan alam sekitar Other environmental protection expenditure
Jumlah Total	2018	71,625	52,035	14	1,511	17,406	659
	2019	93,303	69,561	-	2,127	20,529	1,086
	2020	122,630	88,600	877	3,451	28,551	1,150
	2021	121,367	85,945	455	2,428	31,288	1,251
	2022	123,326	91,033	308	2,295	27,948	1,743
Modal Capital	2018	17,632	17,289	-	66	240	37
	2019	29,087	37,019	-	383	1,664	21
	2020	32,821	30,993	201	226	1,279	122
	2021	24,073	22,412	182	456	945	77
	2022	21,485	19,341	72	336	1,278	458
Operasi Operation	2018	53,933	34,746	14	1,445	17,166	622
	2019	64,216	42,542	-	1,744	18,864	1,065
	2020	89,809	57,607	676	3,225	27,272	1,028
	2021	97,295	63,532	273	1,973	30,343	1,174
	2022	101,841	71,692	235	1,959	26,671	1,285

Nota: Berdasarkan kepada Survei Ekonomi Tahunan 2022 - Perbelanjaan Perlindungan Alam Sekitar

Notes: Based on the Annual Economic Survey 2022 - Environmental Protection Expenditure



LAMPIRAN

APPENDICES

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**Framework for the Development of Environment Statistics (FDES) dan hubung kait dengan rangka kerja
Daya Penggerak-Tekanan-Keadaan-Impak-Respon (DPSIR)**

The FDES and its relationship with the Driving Force-Pressure-State-Impact-Response (DPSIR) framework



Daya Penggerak: Sosio-ekonomi dan sosio-kultur yang memacu aktiviti manusia bagi meningkatkan atau mengurangkan tekanan terhadap alam sekitar

Driving Force: The socioeconomic and sociocultural forces driving human activities, which increase or mitigate pressures on the environment

Tekanan: Tekanan aktiviti manusia kepada alam sekitar
Pressure: The stresses that human activities place in the environment

Keadaan: Situasi terkini alam sekitar
State: The current condition of the environment

Impak: Kesan degradasi alam sekitar
Impact: The effects of environmental degradation

Respon: Tindak balas oleh masyarakat terhadap keadaan alam sekitar
Response: Responses by society to the environmental situation

Sumber: Framework for the Development of Environment Statistics (FDES 2013)
Source:

Punca dan kesan bahan pencemar udara kepada manusia dan tumbuhan*Sources and effects of air pollutants on human and plants*

Bahan pencemar udara <i>Air pollutant</i>	Punca <i>Source</i>	Kesan kepada kesihatan manusia dan ekologi <i>Human health and ecological effects</i>
Ozon (O ₃) <i>Ozone</i>	Motosikal dua lejang, kenderaan bermotor dan punca-punca industri. <i>Two-stroke motorcycles, motor vehicles and industrial sources.</i>	Manusia/ Human Menjejaskan fungsi pernafasan dan penurunan prestasi atlet yang melakukan senaman lasak dan bahaya penyakit barah kulit <i>Impairment of respiratory function and decreasing performance by some athletes exercising heavily and skin cancer risks</i> Tumbuhan/ Plants Memusnahkan tumbuhan dan mengurangkan pengeluaran tanaman <i>Damage vegetation and reduces crop production</i>
Plumbum (Pb) <i>Lead</i>	Sektor pengangkutan <i>Transport sector</i>	Manusia/ Human Pendedahan yang berlarutan boleh mengakibatkan gangguan sistem saraf <i>Long-term exposure can lead to nervous disorders</i>
Karbon Monoksida (CO) <i>Carbon Monoxide</i>	Sektor pengangkutan <i>Transport sector</i>	Manusia/ Human Menjejaskan mereka yang merokok dan yang menghidap masalah peredaran darah dan anemia <i>Affects smokers and people with circulatory and anaemic problems</i>
Sulfur Dioksida (SO ₂) <i>Sulphur Dioxide</i>	Industri minyak dan gas, pengeluaran tenaga, pembakaran arang, proses industri dan industri berasaskan pembakaran <i>Oil and gas industry, energy production, coal burning, industrial combustion and industrial process</i>	Manusia/ Human Menambahkan derita pesakit yang menghidap asma dan bronkitis <i>Aggravates asthmatic and bronchitis patients</i> Tumbuhan/Plants Memusnahkan tumbuhan <i>Damages vegetation</i>
Nitrogen Dioksida (NO ₂) <i>Nitrogen Dioxide</i>	Pengangkutan, penjanaan kuasa dan industri berasaskan pembakaran <i>Transport, power generation and industrial combustion</i>	Manusia/ Human Menjejaskan fungsi pernafasan <i>Affects respiratory function</i> Tumbuhan/ Plants Menyekat pertumbuhan tanaman <i>Suppresses vegetation growth</i>
Habuk Halus (PM ₁₀) <i>Particulate Matter</i>	Pembakaran terbuka <i>Open burning</i>	Manusia/ Human Melemahkan fungsi pernafasan <i>Impairs respiratory function</i> Tumbuhan/ Plants Memusnahkan tumbuhan <i>Damages vegetation</i>

Sumber: Kementerian Kesihatan Malaysia
Source: Ministry of Health Malaysia

Perbandingan nilai IPU dengan tahap pencemaran dan kawalan kesihatan*Comparison of API values with level of pollution and health measures*

Indeks Pencemaran Udara (IPU) <i>Air Pollutant Index (API)</i>	Status	Tahap pencemaran <i>Level of pollution</i>	Kawalan kesihatan <i>Health measures</i>
0 – 50	Baik	Pencemaran rendah yang tidak ada kesan buruk terhadap kesihatan	Tidak ada sekatan aktiviti bagi semua lapisan orang. Amalkan gaya hidup yang sihat seperti tidak merokok, kerap bersenam dan mengamalkan pemakanan yang sesuai
	<i>Good</i>	<i>Low pollution and has no ill-effects on health</i>	<i>No restriction of activities for all groups of people. To practice healthy lifestyle e.g. not to smoke, exercise regularly and to observe proper nutrition</i>
51 – 100	Sederhana	Pencemaran sederhana dan tidak ada kesan buruk terhadap kesihatan	Tidak ada sekatan aktiviti bagi semua lapisan orang. Amalkan gaya hidup yang sihat seperti tidak merokok, kerap bersenam dan mengamalkan pemakanan yang sesuai
	<i>Moderate</i>	<i>Moderate pollution and has no ill-effects on health</i>	<i>No restriction of activities for all groups of people. To practice healthy lifestyle e.g. not to smoke, exercise regularly and to observe proper nutrition</i>
101 – 200	Tidak Sihat	Tanda-tanda sederhana yang menyebabkan bertambah teruk di kalangan orang berisiko tinggi, iaitu mereka yang menghidap sakit jantung dan paru-paru	Sekatan aktiviti kegiatan luar terhadap bagi orang yang berisiko tinggi. Penduduk amnya perlu mengurangkan aktiviti yang lasak
	<i>Unhealthy</i>	<i>Mild aggravation of symptoms among high risk persons, i.e. those with heart or lung disease</i>	<i>Restriction of outdoor activities for high risk persons. The population should reduce vigorous outdoor activity</i>
201 – 300	Sangat Tidak Sihat	Tanda-tanda ketara yang menyebabkan bertambah teruk dan toleransi senaman rendah di kalangan orang yang mengidap sakit jantung atau paru-paru	Warga tua dan orang yang menghidap penyakit jantung atau paru-paru dilarang keluar dan kurangkan aktiviti fizikal. Penduduk amnya mesti mengelakkan dari aktiviti luar yang lasak. Sesiapa yang menghadapi masalah kesihatan perlu merujuk kepada doktor
	<i>Very Unhealthy</i>	<i>Significant aggravation of symptoms and decreased exercise tolerance in person with heart or lung disease</i>	<i>Elderly and persons with known heart or lung disease should stay indoors and reduce physical activity. Population should avoid vigorous outdoor activity. Those with any health problems to consult a doctor</i>
301 – 500	Berbahaya	Tanda-tanda yang menyebabkan bertambah teruk dan membahayakan kesihatan	Warga tua dan orang yang menghidap penyakit jantung atau paru-paru dilarang keluar dan kurangkan aktiviti lasak. Penduduk amnya mesti menghindari aktiviti luar yang lasak
	<i>Hazardous</i>	<i>Severe aggravation of symptoms and endangers health</i>	<i>Elderly and persons with existing heart or lung disease should stay indoors and reduce physical activity. General population should avoid vigorous outdoor activity</i>
Melebihi 500	Kecemasan	Tanda-tanda yang menyebabkan bertambah teruk dan membahayakan kesihatan	Penduduk amnya dinasihatkan mengikut peraturan oleh Majlis Keselamatan Negara dan sentiasa mengikut pengumuman melalui media massa
<i>Above 500</i>	<i>Emergency</i>	<i>Severe aggravation of symptoms and endangers health</i>	<i>General population are advised to follow the orders of the National Security Council and follow the announcements through the mass media</i>

Sumber: Kementerian Kesihatan Malaysia
Source: Ministry of Health Malaysia

Klasifikasi kualiti air berdasarkan Indeks Kualiti Air*Water quality classification based on Water Quality Index*

Parameter	Indeks Index		
	Bersih (B) Clean (C)	Sederhana Tercemar (ST) Slightly Polluted (SP)	Tercemar (T) Polluted (P)
Indeks Kualiti Air (IKA) <i>Water Quality Index (WQI)</i>	81 – 100	60 – 80	0 – 59
Keperluan Oksigen Biokimia (BOD ₅) <i>Biochemical Oxygen Demand</i>	91 – 100	80 – 90	0 – 79
Ammoniakal Nitrogen (NH ₃ -N) <i>Ammoniacal Nitrogen</i>	92 – 100	71 – 91	0 – 70
Pepejal Terampai (SS) <i>Suspended Solids</i>	76 – 100	70 – 75	0 – 69

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Klasifikasi Indeks Kualiti Air*Water Quality Index classification*

Parameter	Unit	Kelas Class				
		I	II	III	IV	V
Ammoniakal Nitrogen (NH ₃ -N) <i>Ammoniacal Nitrogen</i>	mg/l	< 0.1	0.1 - 0.3	0.3 - 0.9	0.9 - 2.7	> 2.7
Keperluan Oksigen Biokimia (BOD ₅) <i>Biochemical Oxygen Demand</i>	mg/l	< 1	1 - 3	3 - 6	6 - 12	> 12
Keperluan Oksigen Kimia (COD) <i>Chemical Oxygen Demand</i>	mg/l	< 10	10 - 25	25 - 50	50 - 100	> 100
Oksigen Terlarut <i>Dissolved Oxygen</i>	mg/l	> 7	5 - 7	3 - 5	1 - 3	< 1
pH	-	> 7.0	6.0 - 7.0	5.0 - 6.0	< 5.0	< 5.0
Jumlah Pepejal Terampai (SS) <i>Total Suspended Solid</i>	mg/l	< 25	25 - 50	50 - 150	150 - 300	> 300
Indeks Kualiti Air (IKA) <i>Water Quality Index (WQI)</i>		> 92.7	76.5 - 92.7	51.9 - 76.5	31.0 - 51.9	< 31.0

Kelas air dan kegunaan*Water classes and uses*

Kelas Class	Kegunaan Uses
Kelas I Class I	Pemuliharaan alam semula jadi <i>Conservation of natural environment</i> Bekalan Air I – Hampir tiada rawatan diperlukan <i>Water Supply I – Practically no treatment necessary</i> Perikanan I – Spesis akuatik yang sangat sensitif <i>Fishery I – Very sensitive aquatic species</i>
Kelas IIA Class IIA	Bekalan Air II – Memerlukan rawatan secara konvensional sahaja <i>Water Supply II – Conventional treatment required</i> Perikanan II – Spesis akuatik yang sensitif <i>Fishery II – Sensitive aquatic species</i>
Kelas IIB Class IIB	Kegunaan rekreasi yang melibatkan persentuhan badan dengan air <i>Recreational use with body contact</i>
Kelas III Class III	Bekalan Air III – Memerlukan rawatan yang ekstensif <i>Water Supply III – Extensive treatment required</i> Perikanan III – Spesis tertentu yang mempunyai nilai ekonomi biasa Bekalan air minum haiwan ternakan <i>Fishery III – Tolerant species with common economic value</i> <i>Livestock drinking</i>
Kelas IV Class IV	Pengairan <i>Irrigation</i>
Kelas V Class V	Tiada seperti di atas. <i>None of the above</i>

Sumber: Jabatan Alam Sekitar
 Source: Department of Environment

Standard dan kriteria kualiti air marin*Marine water quality criteria and standards*

	Parameter	KELAS 1 CLASS 1	KELAS 2 CLASS 2	KELAS 3 CLASS 3	KELAS E CLASS E
	Kegunaan	Pemeliharaan, kawasan dilindungi, Taman Laut	Kehidupan laut, Perikanan, Terumbu Karang, Rekreasi dan Marikultur	Pelabuhan, Lapangan Minyak & Gas	Paya Bakau & Muara Sungai
	Uses	<i>Preservation, marine protected areas, Marine Parks</i>	<i>Marine Life, Fisheries, Coral Reefs, Recreational and Mariculture</i>	<i>Ports, Oil & Gas Fields</i>	<i>Mangroves, Estuarine & River-mouth Water</i>
1	Suhu (°C) Temperature	$\leq 2^\circ\text{C}$ peningkatan terhadap ambien maksimum $\leq 2^\circ\text{C}$ increase over maximum ambient			
2	Oksigen Terlarut (mg/L) Dissolved Oxygen	>80% tepu >80% saturation	5	3	4
3	Jumlah Pepejal Terampai* (mg/L) Total Suspended Solid	25 mg/L atau $\leq 10\%$ peningkatan dalam purata bermusim, yang mana lebih rendah 25 mg/L or $\leq 10\%$ increase in seasonal average, whichever is lower	50 mg/L (25 mg/L) atau $\leq 10\%$ peningkatan dalam purata bermusim, yang mana lebih rendah 50 mg/L (25 mg/L) or $\leq 10\%$ increase in seasonal average, whichever is lower	100 mg/L atau $\leq 10\%$ peningkatan dalam purata bermusim, yang mana lebih rendah 100 mg/L or $\leq 10\%$ increase in seasonal average, whichever is lower	100 mg/L atau $\leq 30\%$ peningkatan dalam purata bermusim, yang mana lebih rendah 100 mg/L or $\leq 30\%$ increase in seasonal average, whichever is lower
4	Minyak dan Geris (mg/L) Oil and Grease	0.01	0.14	5	0.14
5	Raksa* (µg/L) Mercury	0.04	0.16 (0.04)	50	0.5
6	Kadmium* (µg/L) Cadmium	0.5	2 (3)	10	2
7	Kromium (VI) (µg/L) Chromium	5	10	48	10
8	Kuprum (µg/L) Copper	1.3	2.9	10	2.9
9	Arsenik (III)* (µg/L) Arsenic	3	20(3)	50	20(3)
10	Plumbum (µg/L) Lead	4.4	8.5	50	8.5
11	Zink (µg/L) Zinc	15	50	100	50
12	Sianida (µg/L) Cyanide	2	7	20	7
13	Ammonia (tidak terion) (µg/L) Ammonia (unionized)	35	70	320	70
14	Nitrit (NO ₂) (µg/L) Nitrite (NO ₂)	10	55	1,000	55
15	Nitrat (NO ₃) (µg/L) Nitrate (NO ₃)	10	60	1,000	60
16	Fosfat (µg/L) Phosphate	5	75	670	75
17	Fenol (µg/L) Phenol	1	10	100	10
18	Tributyltin (TBT) (µg/L)	0.001	0.01	0.05	0.01
19	Faecal Coliform	70 faecal coliform 100mL ⁻¹	70 faecal coliform 100mL ⁻¹ & (70 faecal coliform 100mL ⁻¹)	200 faecal coliform 100mL ⁻¹	100 faecal coliform 100mL ⁻¹ & (70 faecal coliform 100mL ⁻¹)
20	Polycyclic Aromatic Hydrocarbon (PAHs) µg/L	100	200	1,000	1,000

Sumber: Jabatan Alam Sekitar

Source: Department of Environment

*Nilai Standard dan Kriteria Kualiti Air Marin (SKKAM) dalam kurungan digunakan untuk kawasan air marin yang menjadi sumber makanan laut
Marine Water Quality Criteria and Standard (MWQCS) in parentheses are for coastal and marine water areas where seafood for human consumption is applicable

Status kualiti air sungai mengikut stesen, Perak, 2020-2022*Water quality status by stations, Perak, 2020-2022*

Negeri State	Lembangan Basin	Sungai River	Nombor stesen Station number	Nilai IKA / WQI value			Kategori IKA/ WQI category (2022)
				2020	2021	2022	
Perak	Sg. Bernam	Sg. Bernam	1ABNM001	64	73	74	ST/SP
		Sg. Bernam	1ABNM002	72	66	63	ST/SP
		Sg. Bernam	1ABNM003	80	81	82	B/C
		Sg. Bernam	1ABNM004	86	93	93	B/C
		Sg. Bernam	1ABNM005	86	93	93	B/C
		Sg. Bernam	1ABNM006	90	97	96	B/C
		Sg. Gelinting	1ABNM015	92	96	96	B/C
		Sg. Inki	1ABNM012	94	97	97	B/C
		Sg. Slim	1ABNM007	87	94	95	B/C
		Sg. Slim	1ABNM008	88	94	95	B/C
		Sg. Slim	1ABNM011	89	94	91	B/C
		Sg. Trolak	1ABNM009	91	96	96	B/C
		Sg. Trolak	1ABNM010	92	97	95	B/C
		Sg. Trolak	1ABNM014	93	96	96	B/C
	Sg. Bruas	Sg. Bruas	1ABRU001	72	75	69	ST/SP
		Sg. Bruas	1ABRU004	91	94	95	B/C
		Sg. Bruas	1ABRU005	96	97	97	B/C
		Sg. Dandang	1ABRU006	91	94	95	B/C
		Sg. Licin	1ABRU007	96	97	97	B/C
		Sg. Rotan	1ABRU002	92	96	94	B/C
	Sg. Kerian	Sg. Selama	1AKER011	86	88	86	B/C
		Sg. Selama	1AKER012	87	88	89	B/C
		Sg. Selama	1AKER016	94	97	97	B/C
		Sg. Semang	1AKER013	81	80	81	B/C
		Sg. Terusan Bagan Serai	1AKER015	93	93	93	B/C
		Sg. Terusan Bagan Serai	1AKER015	91	93	93	B/C
	Sg. Kurau	Sg. Air Hitam	1AKRU007	95	98	97	B/C
		Sg. Ara	1AKRU001	92	96	94	B/C
		Sg. Ara	1AKRU006	95	97	97	B/C
		Sg. Kurau	1AKRU002	77	76	78	ST/SP
		Sg. Kurau	1AKRU003	77	78	79	ST/SP
		Sg. Kurau	1AKRU004	91	94	93	B/C
		Sg. Kurau	1AKRU005	91	91	90	B/C
	Sg. Perak	Sg. Batang Padang	1APRK003	83	86	87	B/C
		Sg. Batang Padang	1APRK006	90	95	96	B/C
		Sg. Batang Padang	1APRK009	87	90	90	B/C
		Sg. Behrang	1APRK077	97	97	98	B/C

Status kualiti air sungai mengikut stesen, Perak, 2020-2022 (samb.)*Water quality status by stations, Perak, 2020-2022 (cont'd)*

Negeri State	Lembangan Basin	Sungai River	Nombor stesen Station number	Nilai IKA / WQI value			Kategori IKA/ WQI category (2022)
				2020	2021	2022	
Perak	Sg. Perak	Sg. Berok	1APRK068	96	97	97	B/C
		Sg. Bidor	1APRK002	71	84	87	B/C
		Sg. Bidor	1APRK004	88	89	91	B/C
		Sg. Bidor	1APRK005	91	88	87	B/C
		Sg. Chenderiang	1APRK012	94	95	94	B/C
		Sg. Chenderiang	1APRK013	92	93	94	B/C
		Sg. Chepor	1APRK056	96	97	96	B/C
		Sg. Cuar	1APRK046	87	96	95	B/C
		Sg. Ibol	1APRK066	94	97	96	B/C
		Sg. Kampar	1APRK031	93	95	96	B/C
		Sg. Kampar	1APRK032	90	94	93	B/C
		Sg. Kangsar	1APRK043	89	93	94	B/C
		Sg. Kangsar	1APRK044	90	91	93	B/C
		Sg. Kangsar	1APRK079	96	97	97	B/C
		Sg. Kepayang	1APRK037	79	86	78	ST/SP
		Sg. Kepayang	1APRK038	78	83	78	ST/SP
		Sg. Kerbau	1APRK064	94	96	95	B/C
		Sg. Kerbau	1APRK078	93	94	91	B/C
		Sg. Kerdah	1APRK041	74	73	69	ST/SP
		Sg. Kerdah	1APRK053	86	85	86	B/C
		Sg. Kinjang	1APRK055	96	97	97	B/C
		Sg. Kinta	1APRK019	78	86	83	B/C
		Sg. Kinta	1APRK022	90	95	96	B/C
		Sg. Kinta	1APRK024	86	85	67	ST/SP
		Sg. Kinta	1APRK025	75	79	78	ST/SP
		Sg. Kinta	1APRK033	78	84	84	B/C
		Sg. Kinta	1APRK034	81	85	83	B/C
		Sg. Kinta	1APRK057	80	83	80	ST/SP
		Sg. Kinta	1APRK058	82	83	85	B/C
		Sg. Kinta	1APRK063	92	95	96	B/C
		Sg. Klah	1APRK014	91	95	90	B/C
		Sg. Klah	1APRK015	91	95	91	B/C
		Sg. Klian Baru	1APRK016	82	84	80	ST/SP
		Sg. Klian Baru	1APRK017	78	84	77	ST/SP
		Sg. Klian Gunong	1APRK081	96	97	96	B/C
		Sg. Kuang	1APRK042	81	88	85	B/C

Status kualiti air sungai mengikut stesen, Perak, 2020-2022 (samb.)*Water quality status by stations, Perak, 2020-2022 (cont'd)*

Negeri State	Lembangan Basin	Sungai River	Nombor stesen Station number	Nilai IKA / WQI value			Kategori IKA/ WQI category (2022)
				2020	2021	2022	
Perak	Sg. Perak	Sg. Manong	1APRK060	95	97	97	B/C
		Sg. Nyamok	1APRK052	76	77	74	ST/SP
		Sg. Pari	1APRK023	79	83	87	B/C
		Sg. Pari	1APRK028	80	79	83	B/C
		Sg. Pelus	1APRK039	82	86	89	B/C
		Sg. Pelus	1APRK040	89	91	87	B/C
		Sg. Perak	1APRK001	84	86	88	B/C
		Sg. Perak	1APRK018	87	90	92	B/C
		Sg. Perak	1APRK020	90	92	94	B/C
		Sg. Perak	1APRK045	88	94	95	B/C
		Sg. Perak	1APRK047	86	88	86	B/C
		Sg. Perak	1APRK048	90	94	94	B/C
		Sg. Perak	1APRK049	86	92	92	B/C
		Sg. Perak	1APRK051	87	94	94	B/C
		Sg. Perak	1APRK059	95	97	97	B/C
		Sg. Perak	1APRK065	88	95	95	B/C
		Sg. Perak	1APRK069	88	91	86	B/C
		Sg. Perak	1APRK070	89	92	93	B/C
		Sg. Perak	1APRK071	88	92	92	B/C
		Sg. Perak	1APRK072	86	93	94	B/C
		Sg. Perak	1APRK074	87	92	92	B/C
		Sg. Perak	1APRK080	95	97	97	B/C
		Sg. Perak	1APRK082	95	96	96	B/C
		Sg. Perak	1APRK086	96	94	96	B/C
		Sg. Pinji	1APRK021	75	75	77	ST/SP
		Sg. Pinji	1APRK036	72	78	79	ST/SP
		Sg. Pulau	1APRK067	95	97	97	B/C
		Sg. Raia	1APRK030	89	90	93	B/C
		Sg. Raia	1APRK035	86	89	89	B/C
		Sg. Rui	1APRK084	95	96	93	B/C
		Sg. Rui	1APRK085	86	91	88	B/C
		Sg. Seluang	1APRK050	72	62	62	ST/SP
		Sg. Serokai	1APRK026	71	71	77	ST/SP
		Sg. Serokai	1APRK027	77	86	87	B/C
		Sg. Sintang	1APRK054	72	72	67	ST/SP
		Sg. Sungkai	1APRK007	95	95	94	B/C

Status kualiti air sungai mengikut stesen, Perak, 2020-2022 (samb.)*Water quality status by stations, Perak, 2020-2022 (cont'd)*

Negeri State	Lembangan Basin	Sungai River	Nombor stesen Station number	Nilai IKA / WQI value			Kategori IKA/ WQI category (2022)
				2020	2021	2022	
Perak	Sg. Perak	Sg. Sungkai	1APRK008	90	91	91	B/C
		Sg. Sungkai	1APRK073	92	93	92	B/C
		Sg. Sungkai	1APRK075	91	93	93	B/C
		Sg. Sungkai Mati	1APRK010	57	65	67	ST/SP
		Sg. Sungkai Mati	1APRK011	92	87	89	B/C
		Sg. Tapah	1APRK076	96	97	96	B/C
		Sg. Teja	1APRK083	82	88	85	B/C
		Sg. Tesong	1APRK062	96	97	97	B/C
		Sg. Tumboh	1APRK029	73	73	76	ST/SP
		Sg. Woh	1APRK061	96	97	98	B/C
	Sg. Raja Hitam	Sg. Derhaka	1ARHT004	79	78	74	ST/SP
		Sg. Derhaka	1ARHT006	76	79	75	ST/SP
		Sg. Manjong	1ARHT001	85	88	87	B/C
		Sg. Manjong	1ARHT002	86	86	85	B/C
		Sg. Nyior	1ARHT007	96	97	97	B/C
		Sg. Raja Hitam	1ARHT003	76	81	78	B/C
		Sg. Raja Hitam	1ARHT005	72	84	78	B/C
		Sg. Raja Hitam	1ARHT008	52	39	30	T/P
	Sg. Sepetang	Sg. Batu Tegoh	1ASPT006	85	87	84	B/C
		Sg. Batu Tegoh	1ASPT007	87	92	91	B/C
		Sg. Batu Tegoh	1ASPT009	87	90	89	B/C
		Sg. Batu Tegoh	1ASPT012	96	97	97	B/C
		Sg. Batu Tegoh	1ASPT016	95	97	97	B/C
		Sg. Jana	1ASPT004	72	68	72	ST/SP
		Sg. Jana	1ASPT013	95	97	97	B/C
		Sg. Lidin	1ASPT008	84	86	84	B/C
		Sg. Limau	1ASPT014	91	96	96	B/C
		Sg. Malai	1ASPT002	77	82	77	ST/SP
		Sg. Malai	1ASPT019	73	77	73	ST/SP
		Sg. Nyior	1ASPT018	97	97	98	B/C
		Sg. Nyior	1ASPT020	88	94	92	B/C
		Sg. Sepetang	1ASPT001	76	75	72	ST/SP
		Sg. Sepetang	1ASPT003	83	84	83	B/C
		Sg. Temerloh	1ASPT010	90	96	95	B/C
		Sg. Temerloh	1ASPT011	86	92	92	B/C
		Sg. Trong	1ASPT015	92	96	94	B/C
		Sg. Trong	1ASPT017	96	97	97	B/C

Status kualiti air sungai mengikut stesen, Perak, 2020-2022 (samb.)*Water quality status by stations, Perak, 2020-2022 (cont'd)*

Negeri State	Lembangan Basin	Sungai River	Nombor stesen Station number	Nilai IKA / WQI value			Kategori IKA/ WQI category (2022)
				2020	2021	2022	
Perak	Sg. Wangi	Sg. Deralik	1AWGI001	71	70	74	ST/SP
		Sg. Deralik	1AWGI002	76	79	77	ST/SP
		Sg. Wangi	1AWGI003	82	82	75	ST/SP
		Sg. Wangi	1AWGI004	79	68	65	ST/SP

Nota:*Notes:***B/C: Bersih/ Clean****ST/SP: Sederhana tercemar/ Slightly polluted****T/P: Tercemar/ Polluted****Sumber: Jabatan Alam Sekitar***Source: Department of Environment*

Status kualiti air marin di kawasan pantai, Perak, 2020-2022*Marine water quality status for coastal, Perak, 2020-2022*

Negeri State	Kawasan Area	Nilai IKAM MWQI Value			Kategori Category (2022)
		2020	2021	2022	
Perak	Pantai Pasir Bogak	93	95	94	Terbaik/ Excellent
	Pantai Teluk Dalam	89	94	92	Terbaik/ Excellent
	Pantai Teluk Batik	84	78	89	Baik/Good
	Pantai Tanjung Batu	83	93	94	Terbaik/ Excellent
	Pantai Teluk Rubiah	92	90	81	Baik/Good
	Pantai Damai Laut	93	94	91	Terbaik/ Excellent
	Pantai Teluk Senangin	90	90	93	Terbaik/ Excellent
	Pantai Pasir Panjang	94	91	95	Terbaik/ Excellent
	Pantai Seri Purnama	80	90	94	Terbaik/ Excellent

Sumber: Jabatan Alam Sekitar*Source: Department of Environment*

Status kualiti air marin di kawasan muara sungai, Perak, 2020-2022*Marine water quality status for estuary, Perak, 2020-2022*

Negeri State	Kawasan Area	Nilai IKAM MWQI Value			Kategori Category (2022)
		2020	2021	2022	
Perak	Kuala Sungai Manjung	75	73	85	Baik/Good
	Kuala Sungai Gula	53	54	79	Sederhana/ Moderate
	Kuala Sungai Kurau	53	54	64	Sederhana/ Moderate
	Kuala Sungai Tanjung Piandang	38	45	50	Sederhana/ Moderate
	Kuala Sungai Sepetang	48	55	53	Sederhana/ Moderate
	Kuala Sungai Perak	58	55	75	Sederhana/ Moderate

Sumber: Jabatan Alam Sekitar*Source: Department of Environment*

Status kualiti air marin di kawasan pulau, Perak, 2020-2022*Marine water quality status for island, Perak, 2020-2022*

Negeri State	Kawasan Area	Nilai IKAM MWQI Value			Kategori Category (2022)
		2020	2021	2022	
Perak	Pantai Teluk Gedong	79	88	84	Baik/Good
	Pantai Puteri Dewi	95	95	94	Terbaik/ Excellent
	Pangkor Laut	93	96	95	Terbaik/ Excellent
	Sembilan	91	94	96	Terbaik/ Excellent
	Tukun Perak	93	96	96	Terbaik/ Excellent

Sumber: Jabatan Alam Sekitar*Source: Department of Environment*

NOTA DAN SIMBOL
NOTES AND SYMBOLS

-	tiada/kosong/tiada kes <i>nil/blank/no cases</i>
..	tidak diperoleh <i>not available</i>
n.a.	tidak berkenaan <i>not applicable</i>
Def.	nilai defektif <i>defective value</i>
0.0	kurang daripada setengah unit terkecil yang ditunjukkan <i>less than half the smallest unit shown</i>
r	pindaan <i>revised</i>
e	anggaran <i>estimate</i>
p	awalan <i>preliminary</i>
i.e.	iaitu <i>that is</i>
PM	Habuk Halus <i>Particulate Matter</i>
CO	Karbon Monoksida <i>Carbon Monoxide</i>
NO ₂	Nitrogen Dioksida <i>Nitrogen Dioxide</i>
O ₃	Ozon <i>Ground Level Ozone</i>
SO ₂	Sulfur Dioksida <i>Sulphur Dioxide</i>
m/s	meter per saat <i>metre per second</i>
hPa	hektopascal <i>hectopascals</i>
MJ/m ²	megajoule per meter persegi <i>megajoule per square metre</i>
µg/m ³	mikrogram setiap meter padu <i>microgram per cubic metre</i>
ppm	bahagian setiap juta <i>parts per million</i>
ppb	bahagian setiap bilion <i>parts per billion</i>
km ²	kilometer persegi <i>square kilometres</i>
mg/l	miligram setiap liter <i>milligram per litres</i>

JKPS <i>MMscf</i>	juta kaki padu standard <i>million standard cubic feet</i>
bil. <i>no.</i>	bilangan <i>number</i>
max.	maksimum <i>maximum</i>
min.	minimum
RM	Ringgit Malaysia
FDES	Rangka Kerja untuk Pembangunan Perangkaan Alam Sekitar <i>Framework for the Development of Environment Statistics</i>
ILP	Institut Latihan Perindustrian <i>Industrial Training Institute</i>
IPD	Ibu Pejabat Polis Daerah
LPG	Gas Asli Cecair <i>Liquefied Petroleum Gas</i>
MPOB	Lembaga Minyak Sawit Malaysia <i>Malaysian Palm Oil Board</i>
PERHILITAN <i>DWNP</i>	Jabatan Perlindungan Hidupan Liar dan Taman Negara <i>Department of Wildlife and National Parks</i>
UNEP	Program Alam Sekitar Bangsa-Bangsa Bersatu <i>United Nations Environment Programme</i>
W.P.	Wilayah Persekutuan

NOTA
NOTE

Pembundaran:	Jumlah bagi komponen mungkin berbeza dengan jumlah besar dalam jadual penerbitan disebabkan oleh pembundaran angka
<i>Rounding:</i>	<i>The sum of components may not add up to the totals in the tables presented in this publication due to rounding</i>



GLOSARI

GLOSSARY

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TERMA	PENERANGAN	TERMS	EXPLANATIONS
A			
Air payau	Air yang mengandungi garam yang mana kepekatan garamnya kurang daripada kepekatan garam dalam air laut. Kepekatan jumlah garam yang terlarut biasanya dalam lingkungan 1,000-10,000 miligram per liter (mg/l).	Brackish water	Water containing salts at a concentration significantly lower than that of sea water. The concentration of total dissolved salts is usually in the range of 1,000-10,000 milligrams per litre (mg/l).
Air tawar	Air bersih semula jadi yang mengandungi kurang kepekatan garam. Pada amnya ia sesuai untuk pengeluaran dan dirawat supaya menjadi air bersih yang sesuai untuk minum.	Freshwater	Naturally occurring water has a low concentration of salts. It is generally accepted as suitable for abstraction and treatment to produce potable water.
Aktiviti perlindungan alam sekitar	Tujuan utama adalah pencegahan, pengurangan dan penghapusan pencemaran atau lain-lain bentuk degradasi alam sekitar.	Environmental protection activities	Primary purpose is the prevention, reduction and elimination of pollution and other forms of degradation of the environment.
Ammoniakal Nitrogen (NH₃-N)	Komponen nitrogen yang digunakan sebagai penunjuk untuk menentukan pencemaran oleh kumbahan. Ia terhasil daripada aktiviti mikrobiologi dan biasanya wujud di dalam air permukaan dan air bawah tanah. Sumber utama bagi bahan pencemar NH ₃ -N adalah kumbahan domestik dan ladang ternakan.	Ammoniacal Nitrogen	A component of nitrogen which is adopted as an indicator to determine pollution by sewage. It is formed from microbiology activity and usually exists inside surface water and groundwater. The main sources of NH ₃ -N were domestic sewage and livestock farming.
Akuakultur	Akuakultur ialah proses pengeluaran yang melibatkan pengkulturan (termasuk tuaian) organisma akuatik (ikan, moluska, krustasia, tumbuhan) dengan menggunakan teknik yang direka bentuk untuk meningkatkan pengeluaran organisma tersebut melebihi kapasiti persekitaran semula jadinya.	Aquaculture	Aquaculture refer to the production process involving the culturing or farming (including harvesting) of aquatic organisms (fish, molluscs, crustaceans, plant) using techniques designed to increase the production of the organism beyond the natural capacity of the environment.
Atmosfera	Jisim udara yang mengelilingi bumi yang sebahagian besarnya terdiri daripada oksigen dan nitrogen.	Atmosphere	Mass of air surrounding the earth, composed largely of oxygen and nitrogen.
B			
Bahan pencemar udara	Bahan yang terkandung di dalam udara pada kepekatan yang cukup tinggi, boleh memudaratkan kesihatan manusia, haiwan, tanaman dan harta benda. Pencemar udara adalah termasuk bahan yang hampir kepada bentuk asal atau kandungan tiruan yang wujud terapung di udara. Ia boleh terdiri daripada pepejal, titisan cecair, gas atau gabungan kesemuanya.	Air pollutants	Substances in air that could, at high enough concentrations, harm human beings, animals, vegetation or material. Air pollutants may thus include forms of matter of almost any natural or artificial composition capable of being airborne. They may consist of solid particles, liquid droplets or gases or combination of these forms.

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Bahan pencemar	Bahan yang terdapat dalam kepekatan yang boleh membahayakan organisma (manusia, tumbuhan dan haiwan) atau melebihi standard kualiti alam sekitar. Istilah ini sering digunakan seiring dengan pencemar.	Pollutant	<i>Substance that is present in concentration that may harm organisms (humans, plants and animals) or exceed an environmental quality standard. The term is frequently used synonymously with contaminant.</i>
Banjir	Kuantiti air yang melimpah keluar dari tebing sungai, tasik atau sistem perparitan sedia ada yang disebabkan oleh curahan hujan yang lebat, air laut pasang dan halangan pada sistem saliran.	Flood	<i>A body of water, rising, swelling and overflowing land not usually thus covered. It is also, overflowing of the bank of a stream, lake or drainage system of water onto adjacent land due to storm tidal action and channel obstruction.</i>
Bencana	Bencana merupakan peristiwa luar jangka dan berlaku secara tiba-tiba yang boleh menyebabkan kerosakan, kemusnahan dan penderitaan manusia. Bencana sering digambarkan sebagai kesan daripada pendedahan kepada peristiwa melampau dan boleh dikelaskan sebagai semula jadi dan teknologi bergantung kepada punca.	Disasters	<i>Disasters are unforeseen and often sudden events that cause great damage, destruction and human suffering. A disaster is often described as a result of exposure to and extreme event and can be both natural and technological depending on their cause.</i>
Bencana teknologi	Mungkin disebabkan oleh niat, kecuaiian dan kesilapan manusia, atau daripada aplikasi teknologi yang rosak atau gagal. Tiga jenis bencana teknologi: kemalangan industri, kemalangan pengangkutan dan pelbagai kemalangan.	Technological disasters	<i>May arise as a result of human intent, negligence or error, or from faulty or failed technological applications. Three types of technological disasters: industrial accidents, transport accidents and miscellaneous accidents.</i>
Buangan terjadual	Merupakan buangan toksik dan berbahaya yang dihasilkan oleh industri, pertanian, bengkel, kontraktor buangan terjadual, aktiviti domestik dan buangan klinikal dari hospital. Kategori sisa adalah yang tersenarai dalam Jadual Pertama Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005.	Scheduled waste	<i>Defined as toxic waste and hazardous generated by industries, agriculture, workshop, scheduled waste contractors, domestic activities and clinical wastes from hospitals. The waste category listed in the First Schedule Environmental Quality Regulation (Scheduled Waste) 2005.</i>
D			
Rangka Kerja Driving Force-Pressure-State-Impact-Response (DPSIR)	Rangka analitikal yang berdasarkan hubungan di antara komponen D-P-S-I-R.	Driving Force-Pressure-State-Impact-Response (DPSIR) framework	<i>An analytical framework that is based on the casual relationship between its D-P-S-I-R components.</i>
Demam denggi	Penyakit jangkitan virus yang merebak melalui gigitan nyamuk Aedes aegypti yang telah dijangkiti.	Dengue fever	<i>A type of viral infection that spreads through infected Aedes aegypti mosquito bites.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Disentri	Disentri adalah cirit-birit akut yang mengandungi darah di dalam najis. Disentri kebanyakannya disebabkan oleh spesies <i>Shigella</i> (<i>disentri bacillary</i>) atau <i>Entamoeba histolytica</i> (<i>disentri amoebic</i>).	Dysentery	<i>Dysentery is acute diarrhoea with visible blood in the stool. Dysentery is most often caused by Shigella species (bacillary dysentery) or Entamoeba histolytica (amoebic dysentery).</i>
F			
Fauna	Semua kehidupan haiwan.	Fauna	<i>All animal life.</i>
Flora	Semua kehidupan tumbuhan.	Flora	<i>All plant life.</i>
H			
Habuk Halus (PM)	Partikel pepejal atau titisan cecair dalam udara atau pelepasan yang saiznya 0.01-100µm, contohnya habuk, asap, wasap, semburan dan kabut.	Particulate Matter (PM)	<i>Solid particles or liquid droplets in the air or emission 0.01-100µm size, eg: dust, smoke, fume, spray and mist.</i>
Habuk Halus (PM₁₀)	Partikel terampai berukuran kurang daripada diameter 10 mikron. PM ₁₀ boleh berbentuk pepejal atau cecair dan ia termasuk aerosol, debu, asap dan debunga. Partikel ini berpunca daripada stesen janakuasa, proses industri dan aktiviti pembakaran terbuka.	Particulate Matter (PM₁₀)	<i>Respirable particles of less than 10 micron in diameter. PM₁₀ can be in solid or liquid form and it includes aerosol, dust, smoke and pollen. These particles originate from power plants, industrial processes and open burning activities.</i>
Halaju angin	Suatu kuantiti vektor di mana ia mempunyai magnitud dan arah. Magnitud halaju angin dipanggil laju angin manakala arah angin merujuk dari mana angin bertiup.	Wind velocity	<i>A quantity of vectors in which it has magnitude and direction. The magnitude of the wind velocity is called the wind speed while the wind direction refers to where the wind blows.</i>
Hakisan	Proses penghausan permukaan fizikal. Biasanya dikaitkan dengan kehilangan tanah disebabkan air, salji atau angin. Hakisan berlaku secara semula jadi dan menyebabkan bertambah buruk akibat pembersihan tanah yang berkaitan dengan aktiviti manusia seperti pertanian, perumahan atau perindustrian.	Erosion	<i>Wearing away and transport of the soil by wind or running water, glaciers or waves. Erosion occurs naturally but is often intensified by human land-clearing activities related to farming, residential or industrial development.</i>
Hutan	Tanah merangkumi lebih daripada 0.5 hektar dengan ketinggian pokok lebih daripada 5 meter dan penutup kanopi lebih daripada 10 peratus, atau pokok yang dapat mencapai ambang in situ. Ia tidak termasuk tanah yang didominasi oleh penggunaan tanah pertanian atau bandar.	Forest	<i>Land spanning more than 0.5 hectares with tree higher than 5 metres and a canopy cover of more than 10 per cent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Hutan bandar	Menanam, memelihara dan mengurus pokok di kawasan awam seperti taman rekreasi, taman permainan dan kawasan lapang termasuk sepanjang lebuh raya.	Urban forest	<i>Planting, protecting and managing trees in public areas such as recreational parks, playgrounds and open spaces includes the route along the highway.</i>
Hutan Simpanan Kekal (HSK)	Mana-mana tanah (tanah berhutan dan tidak berhutan) yang diwartakan atau disifatkan sebagai HSK untuk tujuan perhutanan di bawah Seksyen 7, 8 dan 9, Akta Perhutanan Negara.	Permanent Reserved Forest (PRF)	<i>Any land (forested and non-forested land) that has been enacted or deemed PRF for forestry purposes under Sections 7, 8 and 9, the National Forestry Act.</i>

I

Indeks Kualiti Air	Purata pemberat bagi kepekatan ambien bahan pencemar terpilih biasanya berkait kepada pengelasan kualiti air.	Water Quality Index	<i>Weighted average of selected ambient concentrations of pollutants usually linked to water quality classes.</i>
Indeks Pencemaran Udara (IPU)	Satu indikator yang dicipta berdasarkan kepada penilaian saintifik bagi memaklumkan dengan cara yang mudah difahami kehadiran pencemaran udara dan impaknya terhadap kesihatan manusia. Nilai IPU dikira berdasarkan kepekatan purata setiap pencemar udara iaitu SO ₂ , NO ₂ , CO, O ₃ dan PM ₁₀ . Pencemar udara yang dominan dengan kepekatan tertinggi diambil kira sebagai pencemar yang akan menentukan nilai IPU. Pada lazimnya, kepekatan PM ₁₀ adalah yang tertinggi berbanding dengan pencemar yang lain dan ini menentukan bacaan IPU.	Air Pollutant Index (API)	<i>An indicator which is created based on scientific assessment to provide user friendly information about the presence of air pollution and its impact on human health. API value is calculated based on the average concentration of each air pollutant SO₂, NO₂, CO, O₃ and PM₁₀. Dominant of air pollutant with the highest concentrations of pollutants are accounted for as that will determine the value of the API. In general, concentrations of PM₁₀ are the highest compared to other concentrations and this determines the API readings.</i>
Indeks UV Suria (UVI)	Menerangkan tentang sinaran UV di permukaan Bumi. Nilai indeks tersebut mempunyai julat dari sifar ke atas – semakin tinggi nilai indeks, semakin besar potensi berlaku kerosakan pada kulit dan mata, semakin cepat kesan tersebut boleh berlaku.	Solar UV Index (UVI)	<i>Describes the UV rays on the Earth's surface. The value of the index has a range from zero upwards - the higher the value of the index, the greater the potential for damage to the skin and eyes and the faster the effect can occur.</i>
Insinerator	Relau untuk membakar bahan buangan di bawah keadaan terkawal.	Incinerator	<i>Furnace for burning wastes under controlled conditions.</i>

K

Kadar mortaliti bayi	Nisbah bilangan kematian bayi di bawah umur 1 tahun dalam sesuatu tahun kepada jumlah bilangan kelahiran hidup dalam tahun itu (bagi setiap seribu kelahiran hidup).	Infant mortality rate	<i>The ratio number of deaths of infants under 1 year of age in a given year to the total number of live births in that year (per thousand live births).</i>
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TERMA	PENERANGAN	TERMS	EXPLANATIONS
Kawasan tadahan	Kawasan di mana hujan mengalir ke dalam sungai, tasik atau takungan.	Catchment area	<i>The area from which rainfall flows into a river, lake or reservoir.</i>
Kapasiti pengeluaran	Keupayaan pengeluaran air bagi loji yang beroperasi sepenuhnya dalam tahun berkenaan. Kapasiti pengeluaran berbeza setiap tahun tertakluk kepada reka bentuk loji.	Production capacity	<i>The ability to produce water by fully operated plants in the respective year. The production capacity varies every year according to the design of the plants.</i>
Karbon Monoksida	Tidak berwarna, tidak berbau dan gas beracun yang dihasilkan oleh pembakaran bahan api dan fosil yang tidak lengkap.	Carbon Monoxide	<i>Colourless, odourless and poisonous gas produced by incomplete fossil fuel combustion.</i>
Kawasan bandar	Kawasan yang diwartakan serta kawasan tepubina yang bersempadan dengannya dan gabungan kedua-dua kawasan ini mempunyai penduduk seramai 10,000 atau lebih. Kawasan tepubina didefinisikan sebagai kawasan yang terletak bersebelahan kawasan yang diwartakan dan mempunyai sekurang-kurangnya 60 peratus (berumur 15 tahun dan lebih) yang terlibat dalam aktiviti bukan pertanian.	Urban area	<i>Gazetted areas with their adjoining built-up areas which had a combined population of 10,000 or more. Built-up areas were defined as more. Built-up areas were defined as areas contiguous to a gazetted area and had at least 60 per cent of their population (aged 15 years and over) engaged in non-agricultural activities.</i>
Kawasan perlindungan/ simpanan	Kawasan tanah dan/ atau laut khususnya bagi perlindungan dan pemuliharaan kepelbagaian biologi, yang berkaitan dengan sumber semula jadi dan diurus melalui perundangan ataupun cara lain yang berkesan. Definisi ini diadaptasi daripada <i>The International Union for Conservation of Nature</i> (IUCN).	Protected/preserved area	<i>An area of land and/ or sea especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources and managed through legal or other effective means. This definition is adopted by The International Union for Conservation of Nature (IUCN).</i>
Kemalangan jalan raya	Kemalangan atau kejadian yang mana kerosakan berlaku ke atas mana-mana orang, harta, kenderaan, struktur atau haiwan dan berlaku di mana-mana jalan awam termasuklah jambatan, terowong, hentian sebelah, jalan bertingkat, jejambat, plaza tol dan sebagainya.	Road traffic crash	<i>Accidents or occurrences whereby damage or injury is caused to any person, property, vehicle, structure or animal and occurs in any public road including bridge, tunnels, lay-bye, interchanges, overpasses, toll plazas and so on.</i>
Kelajuan angin permukaan	Merujuk kepada laju angin pada ketinggian piawai 10m di atas tanah.	Surface wind speed	<i>Refers to the wind speed at a standard altitude of 10m above ground.</i>
Kepadatan penduduk	Jumlah bilangan penduduk setiap unit per segi di kawasan muka bumi.	Population density	<i>Total number of inhabitants per square unit of surface area.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Kepelbagaian biologi	Kepelbagaian biologi bermaksud variasi di antara organisma hidup daripada pelbagai sumber termasuk daratan, marin serta ekosistem akuatik lain; ia termasuklah kepelbagaian di dalam peringkat genetik, spesies dan ekosistem. Definisi ini diadaptasi daripada <i>United Nations Convention on Biological Diversity</i> .	<i>Biological diversity</i>	<i>Biological diversity means the variability among living organisms from various sources including terrestrial, marine and other aquatic ecosystems; this includes diversity at the genetic, species and ecosystem level. This definition is adopted by the United Nations Convention on Biological Diversity.</i>
Keperluan Oksigen Biokimia (BOD₅)	Ukuran jumlah oksigen terlarut yang diperlukan oleh organisma untuk mengurai bahan organik yang terdapat di dalam air. Biasanya bacaan diambil dalam tempoh 5 hari.	<i>Biochemical Oxygen Demand (BOD₅)</i>	<i>Dissolved oxygen required by organisms for the aerobic decomposition of organic matter present in water. This measurement is usually taken within 5 days.</i>
Keperluan Oksigen Kimia (COD)	Indeks pencemaran air yang digunakan sebagai ukuran kepekatan jisim oksigen yang diperlukan untuk mengurai bahan organik dan bukan organik.	<i>Chemical Oxygen Demand (COD)</i>	<i>Index of water pollution measuring the mass concentration of oxygen consumed by the chemical breakdown of organic and inorganic matter.</i>
Kolera	Penyakit usus pada umumnya disebabkan oleh pencemaran najis daripada air dan makanan.	<i>Cholera</i>	<i>Intestinal disease generally caused by faecal contamination of water and food.</i>
Kuasa hidro	Tenaga primer yang disimpulkan tersedia untuk pengeluaran elektrik dan ditunjukkan dari segi konvensional setara dengan bahan api fosil menggunakan kecekapan purata penukaran haba untuk tahun tersebut.	<i>Hydropower</i>	<i>Is the inferred primary energy available for electricity production and is shown in terms of conventional fossil fuel equivalent using the average thermal efficiency of conversion for the year.</i>
Kutipan biji benih	Biji benih pokok hutan yang dikutip secara terus dari atas pokok.	<i>Seeds collections</i>	<i>Seeds of forest trees collected directly from the tree.</i>
L			
Ladang hutan	Kawasan yang ditanam dengan pokok atau tumbuh-tumbuhan hutan, sama ada daripada spesies tempatan atau dagang, dengan kaedah tanaman secara terbuka yang luasnya tidak kurang daripada 50 ha. Ladang hutan boleh merangkumi kawasan yang terletak di dalam atau di luar HSK.	<i>Forest plantation</i>	<i>Area planted with trees or forest plants, whether from local or foreign species, the method of cultivation as wide open no less than 50 ha. Forest plantations can include areas that are located within or outside the PRF.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Latar belakang	Stesen yang tidak terpengaruh dengan faktor-faktor pencemaran udara dari industri dan kenderaan bermotor. Stesen ini biasanya ditempatkan di kawasan yang jauh dari punca pencemar dan dijadikan bacaan rujukan bagi kategori stesen yang lain.	Background	<i>Stations that is not affected by air pollution factors from industry and motor vehicles. The station is usually located in a remote area of interest and is a reference point for other categories of stations.</i>
Logam berat	Logam bertoksik yang digunakan dalam proses industri, sebagai contoh, arsenik, kadmium, kromium, tembaga, plumbum, raksa, nikel dan zink. Ia boleh merosakkan kehidupan tumbuhan dan haiwan pada kepekatan yang rendah dan cenderung untuk berkumpul dalam rantaian makanan.	Heavy metals	<i>Potentially toxic metals used in industrial processes, for example, arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc. They may damage plant and animal life at low concentrations and tend to accumulate in the food chain.</i>
M			
Megakepelbagaian	Konsep megakepelbagaian melibatkan anggaran jumlah bilangan semua organisma hidup di dalam ekosistem dan ini bermakna sesuatu kawasan itu mempunyai sekurang-kurangnya 60.0 peratus daripada spesis yang diketahui di dunia. Sebahagian besar daripada kepelbagaian tersebut adalah endemisme dan ini menggambarkan keunikan kawasan tersebut.	Megadiversity	<i>The concept of megadiversity involves an estimate of the total number of all the organisms in an ecosystem and is represented by an area that comprises at least 60.0 per cent of the world's known species. A major part of diversity is endemism as this reflects the uniqueness of an area.</i>
N			
Nilai defektif	Nilai yang diragui atau nilai yang tidak diterima setelah menjalani proses semakan kualiti data.	Defective value	<i>A doubtful value or an unacceptable value after undergoing a data quality review process.</i>
Nilai pH	Ukuran kepada keasidan untuk nilai alkali dalam cecair. Nilai pH di antara lingkungan 0 ke 7 menunjukkan asid, nilai pH di antara lingkungan 7 ke 14 menunjukkan alkali dan nilai pH 7 menandakan neutral.	pH Value	<i>Measure of the acidity or alkalinity of a liquid. A pH value in the range of 0 to 7 indicates acidity, a pH value in the range of 7 to 14 indicates alkalinity and a pH value of 7 signifies neutrality.</i>
Nitrogen Dioksida (NO₂)	Nitrogen Dioksida terbentuk di persekitaran udara melalui pengoksidaan Nitrogen Monoksida (NO). Gas bertoksik berwarna merah keperangan ini mempunyai bau yang kuat dan tajam.	Nitrogen Dioxide (NO₂)	<i>Nitrogen Dioxide is formed in the ambient air through the oxidation of Nitrogen Monoxide (NO). This reddish brown toxic gas has a sharp and pungent odour.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
O			
Oksigen Terlarut (DO)	Jumlah gas oksigen (O ₂) yang berada dalam air, dikira mengikut kandungannya dalam isi padu air (miligram O ₂ seliter) atau jumlah peratusnya dalam air tepu.	<i>Dissolved Oxygen (DO)</i>	<i>Amount of gaseous oxygen (O₂) actually present in water expressed in terms either of its presence in the volume of water (milligrams of O₂ per litre) or of its share in saturated water (percentage).</i>
Ozon (O₃)	Gas yang mengeluarkan bau yang tidak menyenangkan, tidak berwarna dan bertoksik yang menyumbang kepada fotokimia asbut (campuran asap dan kabut). O ₃ terbentuk hasil daripada reaksi kimia antara Sebatian Organik Meruap (VOC) dan Nitrogen Oksida (NO _x). Pada lewat tengah hari atau awal petang, lazimnya kepekatan ozon adalah tinggi dan mendominasi bacaan IPU di sesetengah kawasan. Di bawah pengaruh cahaya matahari, NO _x dan VOC yang dilepaskan dari ekzos kenderaan bermotor dan industri ia bertindak balas bagi membentuk ozon di permukaan bumi.	<i>Ground Level Ozone (O₃)</i>	<i>A pungent, colourless and toxic gas that contributes to photochemical smog. O₃ is formed as a result of chemical reaction in the air between Volatile Organic Compounds (VOCs) and Nitrogen Oxide (NO_x). By the late afternoon or early evening, usually O₃ concentration is high and dominating API readings in some areas. Under the sunlight influence, and reaction between NO_x and VOC that released from motor vehicles exhaust and industrial which form the O₃ in the earth's surface. Under the influence of sunlight, nitrogen oxide (NO_x) and volatile organic compounds (VOCs) emitted from motor vehicle exhaust and industry reacts to form O₃ in the earth's surface.</i>
P			
Pelepasan	Pembuangan bahan pencemar ke atmosfera dari punca tetap seperti cerobong asap dan lain-lain, kawasan komersial atau perindustrian dan juga berpunca daripada punca bergerak seperti kenderaan bermotor, lokomotif dan pesawat.	<i>Emission</i>	<i>Discharge of pollutants into the atmosphere from stationary sources such as smokestacks, other vents, surface areas of commercial or industrial facilities and mobile sources, for example, motor vehicles, locomotives and aircraft.</i>
Pemantauan kualiti udara	Bacaan <i>standard</i> dan pemerhatian terhadap udara yang diambil secara berterusan atau kerap yang digunakan sebagai peringatan dan kawalan.	<i>Air quality monitoring</i>	<i>Continuous or frequent standardised measurement and observation of the air, often used for warning and control.</i>
Pencemaran marin	Pengenalan langsung atau tidak langsung oleh manusia atau tenaga ke dalam alam sekitar marin (termasuk muara), menghasilkan kemusnahan kepada sumber kehidupan, berbahaya kepada kesihatan hidupan, halangan kepada kegiatan marin termasuk memancing, merosakkan kualiti air laut dan mengurangkan keselesaan.	<i>Marine pollution</i>	<i>Direct or indirect introduction by humans of substances or energy into the marine environment (including estuaries), resulting in harm to living resources, hazards to human health, hindrances to marine activities including fishing, impairment of the quality of sea water and reduction of amenities.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Pencemaran marin	Pengenalan langsung atau tidak langsung oleh manusia atau tenaga ke dalam alam sekitar marin (termasuk muara), menghasilkan kemusnahan kepada sumber kehidupan, berbahaya kepada kesihatan hidupan, halangan kepada kegiatan marin termasuk memancing, merosakkan kualiti air laut dan mengurangkan keselesaan.	Marine pollution	<i>Direct or indirect introduction by humans of substances or energy into the marine environment (including estuaries), resulting in harm to living resources, hazards to human health, hindrances to marine activities including fishing, impairment of the quality of sea water and reduction of amenities.</i>
Pencemaran udara	Kandungan sesuatu gas, cecair atau zarah yang terampai di udara ambien yang boleh menjejaskan kehidupan atau memberi kesan negatif kepada manusia, tumbuh-tumbuhan dan haiwan.	Air pollution	<i>Content of a gas, liquid or particles suspended in the ambient air that could affect life or a negative impact on humans, plants and animals.</i>
Penempatan penduduk	Konsep penyatuan yang terdiri daripada (a) komponen fizikal tempat berteduh dan infrastruktur dan (b) perkhidmatan yang mana menyokong penyediaan elemen fizikal. Ini boleh dikatakan seperti perkhidmatan komuniti seperti pendidikan, kesihatan, kebudayaan, kebajikan, rekreasi dan pemakanan.	Human settlements	<i>Integrative concept that comprises (a) physical components of shelter and infrastructure and (b) services to which the physical elements provide support, that is to say, community services such as education, health, culture, welfare, recreation and nutrition.</i>
Pengawasan kualiti air	Bacaan <i>standard</i> dan pemerhatian terhadap air yang diambil secara berterusan atau kerap yang digunakan sebagai peringatan dan kawalan.	Water quality monitoring	<i>Continuous or frequent standardised measurement and observation of the water often used for warning and control.</i>
Penyejatan	Suatu proses yang melibatkan perubahan fasa cecair kepada gas apabila cecair terdedah kepada atmosfera. Dalam meteorologi ia diukur sebagai jumlah sejatan iaitu jumlah air yang disejat daripada tangki sejatan.	Evaporation	<i>A process that involves the phase change of a liquid to a gas when the liquid is exposed to the atmosphere. In meteorology, it is measured as the amount of evaporation i.e. the amount of water evaporated from the evaporation tank.</i>
Penyiasatan migrasi	Mengumpul maklumat responden di tempat kediaman pada dua titik masa (tarikh tertentu), di mana tempoh antaranya genap satu tahun. Pertukaran lokaliti tempat kediaman pada dua titik masa ini dianggap sebagai migrasi. Penduduk yang bertukar lokaliti tempat kediaman serta selalu merentasi sempadan negeri adalah migran antara negeri.	Migration survey	<i>Collects information on respondents' usual place of residence at two specific points of time (different date) which are exactly one year apart. Changes in the usual place of residence locality at these two points in time constitute migration. Population that changes its usual place of residence across state boundaries is known as inter-state migrant.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Pepejal Terampai (SS)	Pepejal Terampai (SS) berpunca daripada hakisan tanah dan mendapan daripada pembangunan kawasan tanah tinggi dan pembukaan tanah untuk pembalakan dan perlombongan. Ia akan mengakibatkan peningkatan SS dan perubahan kepada kualiti air di dalam lembangan sungai.	<i>Suspended Solids</i>	<i>Suspended Solids (SS) is caused by soil erosion and sedimentation from the development in highlands and clearance of land for logging and mining. It is resulted in the increase of SS and affects water quality in the river basins.</i>
Perangkaan alam sekitar	Statistik yang menerangkan keadaan dan arah aliran alam sekitar, meliputi media alam sekitar semula jadi (udara/iklim, air, tanah), biota dalam media dan penempatan penduduk. Perangkaan alam sekitar mengukur aktiviti manusia dan kejadian semula jadi yang membawa kesan kepada alam sekitar, kesan daripada aktiviti-aktiviti dan kejadian ini, reaksi masyarakat kepada kesan alam sekitar dan kualiti kesediaan aset semula jadi. Definisi luas termasuk petunjuk alam sekitar, indeks dan perakaunan.	<i>Environment statistics</i>	<i>Statistics that describe the state and trends of the environment, covering the media of the natural environment (air/climate, water, land/soil), the biota within the media, and human settlements. Environment statistics are integrative in nature, measuring human activities and natural events that affect the environment, the impacts of these activities and events, social responses to the environmental impacts, and the quality and availability of natural assets. Broad definitions include environmental indicators, indices and accounting.</i>
Perubahan iklim	Istilah yang kerap digunakan merujuk kepada kepanasan sejagat berkaitan pelepasan gas rumah kaca hasil kegiatan manusia.	<i>Climate change</i>	<i>Term frequently used in reference to global warming due to greenhouse gas emissions from human activities.</i>
R			
Rangka Kerja Pembangunan Perangkaan Alam Sekitar	Konsep rangka kerja bagi membantu membangunkan, menyelaraskan dan menguruskan perangkaan alam sekitar dan perangkaan berkaitan dengan sosial ekonomi dan demografi. Ia dibangunkan oleh <i>United Nations Statistics Division</i> dalam tahun 1984 dan ianya berdasarkan kepada prinsip tekanan-tindak balas impak alam sekitar.	<i>Framework for the Development of Environment Statistics (FDES)</i>	<i>Conceptual framework that assists in development, coordination and organisation of environment statistics and related socio-economic and demographic statistics. It was developed by the United Nations Statistics Division in 1984 and is based on stress-response principles of environmental impacts.</i>
S			
Sinaran global	Jumlah sinaran radiasi elektromagnet yang dipancarkan oleh matahari ke permukaan bumi.	<i>Global radiation</i>	<i>The amount of electromagnetic radiation emitted by the sun to the earth's surface.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Sisa	Aliran bahan pepejal, cecair dan gas, serta tenaga, yang dibuang, dilepaskan atau dikeluarkan oleh pertubuhan dan isi rumah melalui proses pengeluaran, penggunaan atau pengumpulan.	Residuals	<i>Flows of solid, liquid and gaseous materials, and energy, discarded, discharged or emitted by establishments and households through production, consumption or accumulation processes.</i>
Sistem bekas lombong	Sistem untuk menternak ikan di mana-mana tanah yang pernah (tetapi tidak lagi) diberi atau dikeluarkan pajakan lombong atau sijil lombong di bawah mana-mana undang-undang bertulis mengenai perlombongan.	Ex-mining culture system	<i>System of fish culture on any land in respect of which a mining lease or certificate (were once but no longer) granted or issued under any written law relating to mining.</i>
Sistem kandang	Sistem yang merupakan suatu kepungan yang dibuat daripada bahan pengadang yang dilekatkan pada tiang yang ditanam ke dasar laut.	Pen culture system	<i>System of fish culture in an enclosure made of any screening material attached to poles staked to the seabed.</i>
Sistem kolam	Sistem ternakan ikan di dalam kolam.	Culture system	<i>System of fish culture in ponds.</i>
Sistem sangkar	Sistem untuk menternak ikan di dalam suatu kepungan yang dibuat daripada apa-apa bahan saringan yang diikat pada struktur yang dilabuhkan pada dasar perairan sungai atau mana-mana tempat di darat.	Cage culture system	<i>System of fish culture in an enclosure on whatever shape or size made of any screening material and attached to floating structures which are anchored to the sea-bed.</i>
Sistem tangki	Sistem ternakan ikan di dalam tangki di atas tanah.	Tank culture system	<i>System of fish culture in tanks on land.</i>
Standard kualiti udara	Kepekatan sesuatu bahan cemar yang dibenarkan dalam atmosfera oleh undang-undang untuk meminimumkan kesan mudarat.	Air quality standards	<i>Levels of air pollutants prescribed by regulations that may not be exceeded during a specified time in a defined area.</i>
Subbandar	Stesen pengawasan kualiti udara yang terletak di kawasan pinggir bandar.	Suburban	<i>Air quality monitoring stations located in the suburban areas.</i>
Sulfur Dioksida (SO₂)	Berat, tajam, gas tidak berwarna terbentuk terutamanya oleh pembakaran bahan api fosil. Ia adalah berbahaya kepada manusia dan tumbuh-tumbuhan dan menyumbang kepada keasidan dalam hujan.	Sulphur Dioxide (SO₂)	<i>Heavy, pungent, colourless gas formed primarily by the combustion of fossil fuels. It is harmful to human beings and vegetation and contributes to the acidity in precipitation.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
T			
Taman Laut	Kawasan perairan laut yang dizonkan sejauh dua batu nautika dari tikas air surut terendah, kecuali Pulau Kapas di Terengganu, Pulau Kuraman, Pulau Rusukan Besar dan Pulau Rusukan Kecil di W.P. Labuan yang dizonkan sejauh satu batu nautika dari tikas air surut terendah. Taman Laut ditubuhkan untuk melindungi dan memulihara pelbagai habitat dan hidupan marin akuatik.	Marine Park	<i>Sea zoned area for a distance of two nautical miles from the lowest sea level, except in Kapas Island in Terengganu, Kuraman Island, Rusukan Besar Island and Rusukan Kecil Island in W.P. Labuan. These areas are zoned for a distance of one nautical mile from the lowest sea level. Marine Park is established to protect and conserve various habitats and aquatic marine life.</i>
Tanah Bencah-Ramsar	Kawasan yang berpayau, fen, tanah gambut atau berair samada semula jadi atau buatan manusia, kekal atau sementara, mengandungi air yang tidak mengalir, mengalir, air bersih, air tawar atau masin termasuk kawasan perairan laut, di mana dalamannya tidak melebihi enam meter.	Wetland-Ramsar	<i>Areas of marshes, fen, peatland or water, whether natural or artificial, permanent or temporary, static water, flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres.</i>
Tanah bencah	Kawasan dari lapisan tanah rendah yang mana aras air bumi yang berada atau berhampiran dengan permukaan tanah pada kebanyakan masa. Tanah bencah termasuk semua tanah berpayau, tanah berlumpur, fen dan muara.	Wetland	<i>Area of low-lying land where the water table is at or near the surface most of the time. Wetlands include swamps, bogs, fens, marshes and estuaries.</i>
Tanah berhutan	Tanah yang merangkumi lebih daripada 0.5 hektar. Pokok-pokok mencapai tinggi sekurang-kurangnya lima meter dengan litupan kanopi melebihi 10 peratus, atau pokok yang mampu untuk mencapai tahap in-situ (FAO 1998; FRA 2000). Ia tidak termasuk tanah di bawah penggunaan tanah pertanian atau bandar (dirian pokok di kawasan pertanian, taman dan sebagainya). Keluasan kawasan berhutan ini dibahagikan kepada Hutan Simpanan Kekal (HSK), Hutan Tanah Kerajaan (HTK), Hutan Hidupan Liar di luar kawasan HSK, lain-lain Rizab Berhutan dan Tanah Bermilik.	Forested land	<i>A land area of more than 0.5 hectares. The trees should be able to reach a minimum height of five metres with a tree canopy cover of more than 10 per cent, or the trees that are capable to reach in-situ level (FAO 1998; FRA 2000). It does not include land under agricultural or urban land use (stand of trees in agricultural areas, parks, etc.). Forested land is divided into permanent forest reserve (PRF), forest land government (FLG), forest wildlife outside the (PRF), others forested reserve and alienated land. (FAO 1998; FRA 2000)</i>
Tanaman	Tanaman merujuk kepada tumbuhan atau hasil pertanian yang ditanam untuk makanan atau keperluan ekonomi lain seperti pakaian atau makanan ternakan.	Crops	<i>Crops refer to plants or agricultural produce grown for food or other economic purposes, such as clothes or livestock fodder.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Tanaman buluh	Buluh digunakan secara meluas dalam industri pembuatan perabot, kraftangan, bekas barangan, tikar, pulpa, kertas, bahan bakar, pembinaan dan peralatan rumah.	Bamboo plantation	<i>Bamboo is a widely used in the furniture manufacturing industry, handicrafts, container products, matting, pulp, paper, fuel, and construction as well as home appliances.</i>
Tanaman mengaya	Merupakan suatu rawatan pemulihan hutan ke atas kawasan hutan miskin dan kawasan lapang yang dilaksanakan ke atas kawasan di dalam HSK yang telah diusahailah bagi membantu meningkatkan isi kandungan hutan tersebut supaya mencapai tahap yang dikehendaki.	Enrichment planting	<i>Forest restoration treatments on poor forest areas and open spaces that are performed on the areas in PRF which has been harvested to help improve the content of the forest to reach the desired level.</i>
Tanaman rotan	Salah satu hasil hutan bukan kayu utama. Bertujuan untuk meningkatkan stok tumbuhan dalam kawasan HSK yang sesuai bagi memastikan pengeluaran sumber ini secara berkekalan untuk menampung keperluan industri perabot rotan tempatan.	Rattan plantation	<i>One of the main non-timber forest products. The plantation is to increase the stock of this plant in the PRF appropriate to ensure sustainable production of these resources to meet the needs of the local rattan furniture industry.</i>
Tanaman tumbuhan ubatan	Spesies tumbuhan yang mempunyai nilai perubatan dan ditanam secara ladang.	Planting of medicinal plants	<i>Species of plants that have medicinal value and cultivated fields.</i>
Tapak pelupusan	Pemindahan terakhir bahan sisa di dalam atau di atas tanah yang dikawal atau tidak dikawal mengikut cara kebersihan yang berbeza, perlindungan alam sekitar dan keperluan keselamatan yang lain.	Landfill	<i>Final replacement of waste in or on the land in a controlled or uncontrolled way according to different sanitary, environmental protection and other safety requirements.</i>
Tapak pelupusan sanitari	Kaedah untuk melupuskan sisa pepejal di atas tanah tanpa menimbulkan gangguan atau bahaya kepada kesihatan awam dan alam sekitar. Berdasarkan prinsip kejuruteraan, sisa pepejal dihadkan kepada kawasan kecil, dikurangkan kepada jumlah yang terkecil dan ditutup dengan lapisan tanah pada penghujung waktu operasi (ditutup setiap hari), atau pada jangka masa yang lebih kerap mengikut keperluan.	Sanitary landfill	<i>A method of disposing of solid wastes on land without creating nuisances or hazards to public health or the environment. Using the principles of engineering, the solid waste is confined to the smallest practical area, reduced to the smallest practical volume and covered with a layer of earth at the conclusion of operation (daily cover), or at more frequent intervals as may be necessary.</i>
Tapak semaian	Menghasilkan anak benih dan anak pokok untuk digunakan bagi projek-projek penghutan semula, penyelidikan, perhutanan bandar dan aktiviti landskap.	Nursery	<i>Produce seedlings and saplings to be used for reforestation projects, research, urban forestry and landscape activities.</i>

TERMA	PENERANGAN	TERMS	EXPLANATIONS
Tekanan aras laut	Tekanan udara yang diukur berdasarkan jarak ketinggian dari paras purata aras laut (mengikut ICAO Standard Atmosphere).	Sea level pressure	<i>The air pressure measured based on the altitude distance from the mean sea level (according to the ICAO Standard Atmosphere).</i>
Tidak diperoleh	Tiada pencerapan dilaksanakan.	Not available	<i>No observations are performed</i>
Topografi	Bentuk fizikal kawasan permukaan, termasuk muka bumi atau ketinggian relatif dan kedudukan bentuk muka bumi buatan manusia dan semula jadi.	Topography	<i>Physical feature of a surface area, including its relief or relative elevations, and the position of human-made and natural features.</i>
V			
Viral Hepatitis A	Penyakit akut biasanya termasuk demam, dedar, keletihan melampau, anoreksia, loya, jaundis akut dan kuadran atas kanan abdomen dengan pertambahan lebihan alanine aminotransferase melebihi 2.5 kali kadar biasa.	Viral Hepatitis A	<i>Acute illness typically including fever, malaise, extreme fatigue, anorexia, nausea, acute jaundice and right upper quadrant of abdomen tenderness with raised alanine aminotransferase more than 2.5 times normal rate.</i>

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