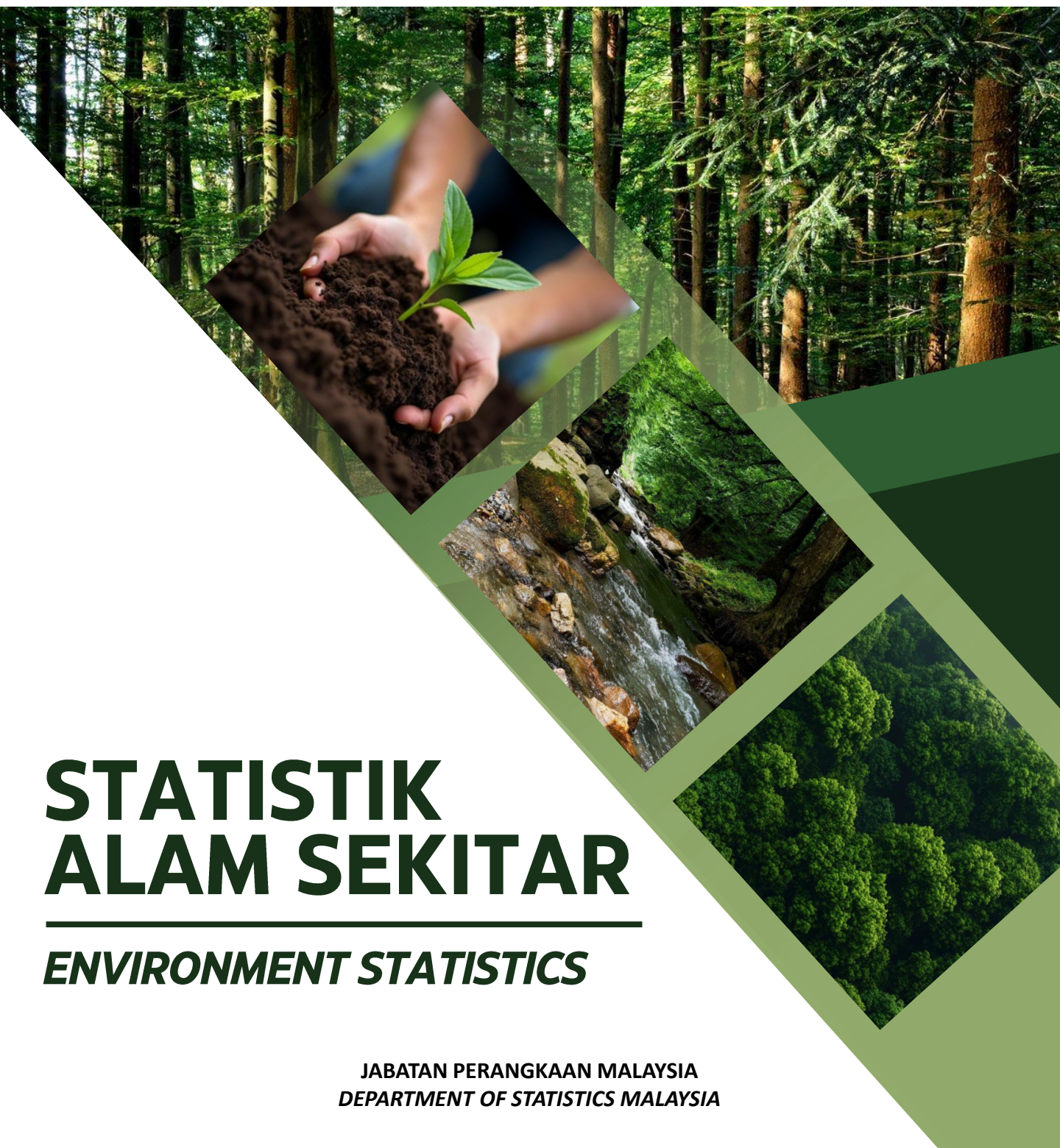




KEMENTERIAN EKONOMI
JABATAN PERANGKAAN MALAYSIA

JOHOR 
2025



STATISTIK ALAM SEKITAR

ENVIRONMENT STATISTICS

JABATAN PERANGKAAN MALAYSIA
DEPARTMENT OF STATISTICS MALAYSIA



KEMENTERIAN EKONOMI
JABATAN PERANGKAAN MALAYSIA

STATISTIK ALAM SEKITAR ENVIRONMENT STATISTICS

JOHOR 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

Diterbitkan dan dicetak oleh/ *Published and printed by:*

Jabatan Perangkaan Malaysia

Department of Statistics Malaysia

Blok C6 & C7, Kompleks C,

Pusat Pentadbiran Kerajaan Persekutuan

62514 Putrajaya,

MALAYSIA

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Harga / *Price* : RM20.00

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ISSN 2805-4806



KATA PENGANTAR

Statistik Alam Sekitar, 2025 memaparkan statistik alam sekitar negeri Johor 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 Johor 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.

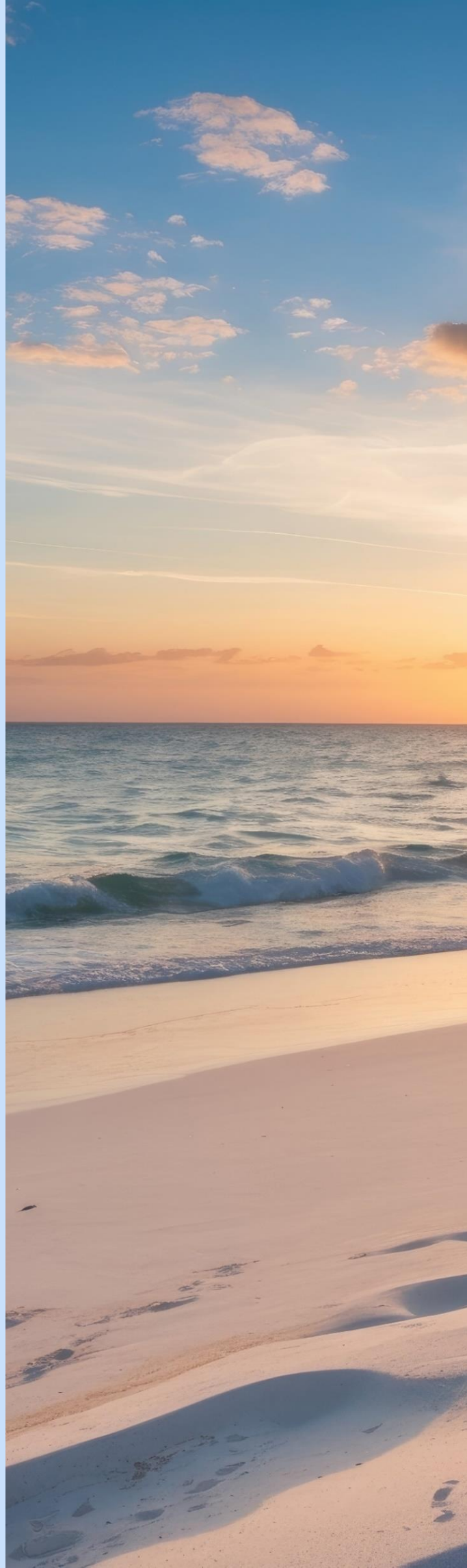
This publication consists of six parts. The first part focused on the infographics of environment statistics, followed by a summary of findings by component in the second part with the article box in the third part. The fourth part contains detailed tables on environment statistics. Appendices and glossary 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, JOHOR 2025



Hujan (mm)

2024: 2,098.0 – 3,301.6
2023: 3,035.2 – 3,884.8

Purata suhu minimum & maksimum (°C)

2024: 24.7 – 31.0
2023: 24.3 – 31.6

Kejadian banjir

2024: 68
2023: 72

Tan metrik



Buangan terjadual

2024: 644,832
2023: 1,215,751

Buangan klinikal

2024: 4,726.9
2023: 1,435.1



Penduduk ('000)

2025^P: 4,205.9
2024 : 4,184.4

'000 tan metrik



Pendaratan ikan laut

2024: 59.1
2023: 49.8



Bilangan kes demam denggi

2024: 13,190
2023: 10,794

Bekalan air mentah
Diabstrak (JLH)



Sungai

2024: 1,180
2023: 1,192

Empangan

2024: 842
2023: 754

Meter padu

Pengeluaran kayu balak

2023: 2,488
2022: 11,364

Pengeluaran kayu gergaji

2023: 188,911
2022: 174,221

Pengeluaran papan lapis

2023: 19
2022: 12,399



Hektar

Keluasan hutan yang dilesenkan untuk pengusahaan

2023: 1,012
2022: 801

Keluasan berhutan

2022: 442,771
2021: 443,129

Kejadian kebakaran (kes)

2024: 4,507
2023: 4,320

Nota:
p:awalan
JLH:Juta liter sehari





ENVIRONMENT STATISTICS, JOHOR 2025



Rainfall (mm)

2024: 2,098.0 – 3,301.6
2023: 3,035.2 – 3,884.8

Minimum & maximum mean temperature (°C)

2024: 24.7 – 31.0
2023: 24.3 – 31.6

Flood incidents

2024: 68
2023: 72

Metric tonnes



Scheduled wastes

2024: 644,832
2023: 1,215,751

Clinical wastes

2024: 4,726.9
2023: 1,435.1



Population ('000)

2025^p: 4,205.9
2024 : 4,184.4

'000 metric tonnes



Landing of marine fish

2024: 59.1
2023: 49.8



Number of dengue fever cases

2024: 13,190
2023: 10,794

Supply of abstracted
raw water (MLD)



Rivers

2024: 1,180
2023: 1,192

Storage dams

2024: 842
2023: 754

Log production

2023: 2,488
2022: 11,364

Sawn timber production

2023: 188,911
2022: 174,221

Plywood production

2023: 19
2022: 12,399



Forest area licensed for harvesting

2023: 1,012
2022: 801

Hectare

Forested area

2022: 442,771
2021: 443,129

Fire incidents (cases)

2024: 4,507
2023: 4,320

Notes:
MLD: Million litres per day
p: preliminary

Source: Environment Statistics, Johor, 2025
Department of Statistics Malaysia (DOSM)





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.

Johor mengalami pertumbuhan ekonomi yang memberangsangkan pada 2024, Keluaran Dalam Negara Kasar (KDNK) pada harga malar merekodkan RM158.0 bilion (2023: RM148.6 bilion), menunjukkan peningkatan 6.4 peratus daripada tahun sebelumnya. KDNK Johor menyumbang 9.6 peratus kepada keseluruhan KDNK Malaysia. Selain itu, KDNK per kapita pada harga semasa meningkat kepada RM44,782 berbanding RM41,847 pada 2023.

[Paparan 1.1]

Paparan 1.1: Ringkasan Ekonomi Negeri Johor, 2023 dan 2024

	2023 ^a	2024 ^p
KDNK pada harga malar 2015	RM148.6 bilion	RM158.0 bilion
Perubahan peratusan tahunan	4.1%	6.4%
Peratusan sumbangan kepada KDNK Malaysia	9.5%	9.6%
KDNK per kapita pada harga semasa	RM41,847	RM44,782

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 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, penjaan kuasa dan haba, proses perindustrian dan aktiviti pembakaran terbuka akan membawa kepada pencemaran udara yang mengancam kesihatan manusia dan tumbuhan.

Trend purata tahunan kepekatan PM_{10} dan $PM_{2.5}$ di Johor menunjukkan stesen Tangkak, Segamat, Kluang, Kota Tinggi, Pasir Gudang dan Larkin mengalami penurunan pada tahun 2024. Manakala, di stesen Batu Pahat mencatatkan sedikit peningkatan. Stesen Pengerang pula merekodkan penurunan kepekatan $PM_{2.5}$ tetapi PM_{10} mengalami peningkatan pada 2024 berbanding 2023. **[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 menurun di stesen Tangkak, Larkin dan Pasir Gudang dan kekal tidak berubah di stesen Batu Pahat, Kota Tinggi dan Pengerang. Manakala stesen Segamat mengalami kenaikan 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 pada 2024 menunjukkan peningkatan di tiga stesen iaitu di stesen Batu Pahat, Segamat dan Pasir Gudang berbanding 2023. Manakala, stesen Kota Tinggi, Larkin dan Tangkak merekodkan sedikit penurunan pada 2024. **[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 meningkat di lima stesen iaitu di stesen Batu Pahat, Kota Tinggi, Pasir Gudang, Segamat dan Tangkak. Manakala, di stesen Larkin mencatatkan penurunan namun stesen Pengerang kekal tidak berubah.

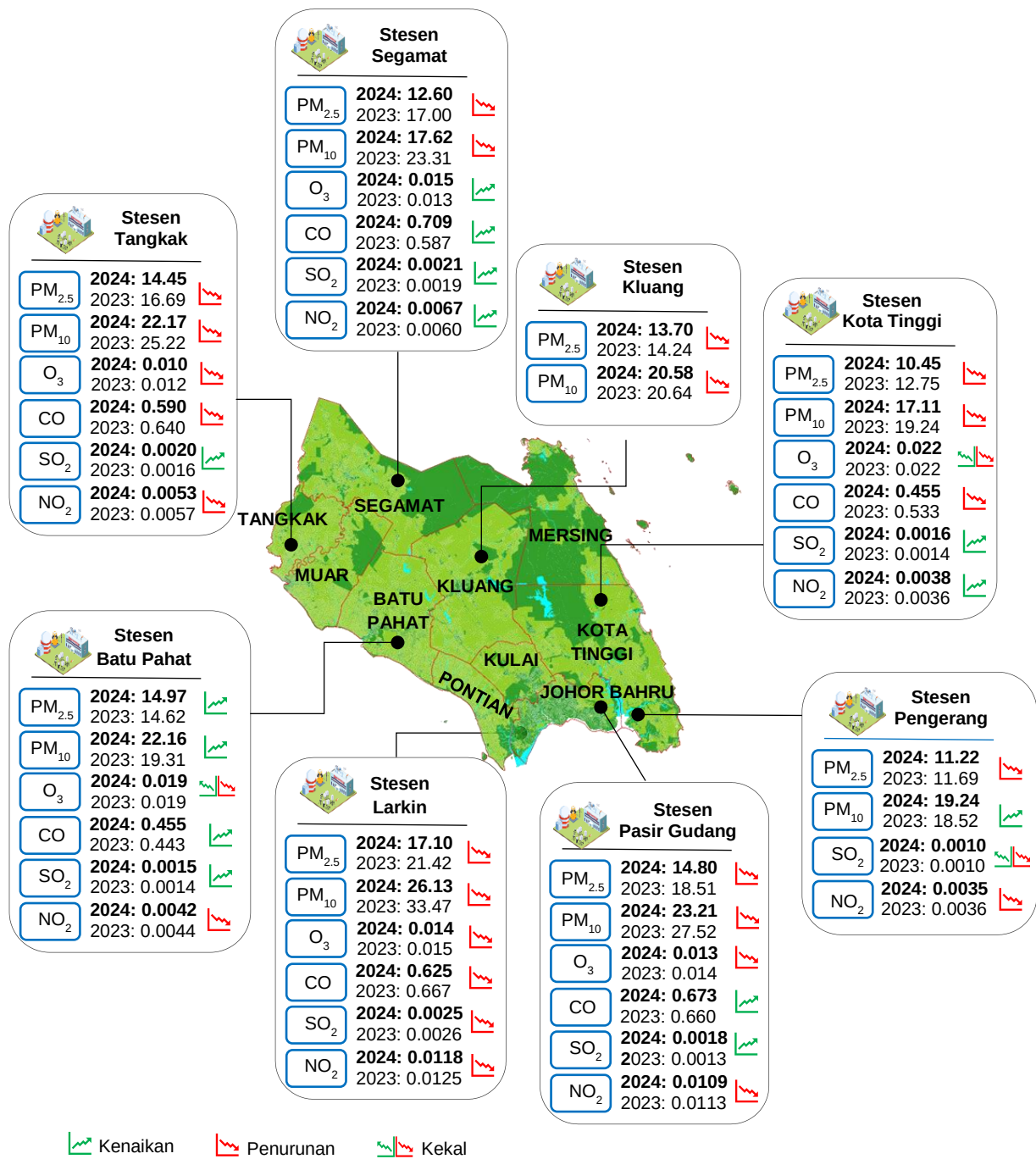
[Paparan 1.2]

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 pada 2024 menunjukkan peningkatan di semua stesen kecuali di stesen Tangkak dan Pengerang. **[Paparan 1.2]**

Paparan 1.2: Ringkasan statistik bahan pencemar udara mengikut stesen, Johor, 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.

Johor mempunyai empat stesen meteorologi untuk memantau keadaan cuaca secara berterusan dan menyediakan data meteorologi sebagai input untuk ramalan cuaca. Stesen-stesen tersebut adalah Batu Pahat, Kluang, Mersing dan Senai.

Purata suhu

Stesen Batu Pahat mencatatkan purata suhu tertinggi iaitu 31.0°C, menurun 0.5°C berbanding 31.5°C pada 2023. Manakala, stesen Kluang merekodkan purata suhu terendah iaitu 24.7°C, meningkat 0.4°C berbanding tahun sebelumnya.

Taburan hujan

Stesen Senai merekodkan hujan tahunan tertinggi pada 2024 iaitu 3,301.6 mm berbanding tahun sebelumnya (3,081.7 mm). Namun begitu, stesen Batu Pahat pula mencatatkan hujan tahunan terendah iaitu 2,098.0 mm pada 2024 berbanding tahun sebelumnya.

Purata kelembapan relatif

Purat kelembapan relatif di Johor adalah di antara 83.5 peratus (stesen Senai) dan 84.1 peratus (stesen Kluang dan Mersing) pada 2024. Julat purata kelembapan relatif di Johor pada 2024 lebih sekata berbanding 2023 iaitu antara 83.1 peratus (stesen Batu Pahat) dan 84.8 peratus (stesen Mersing).

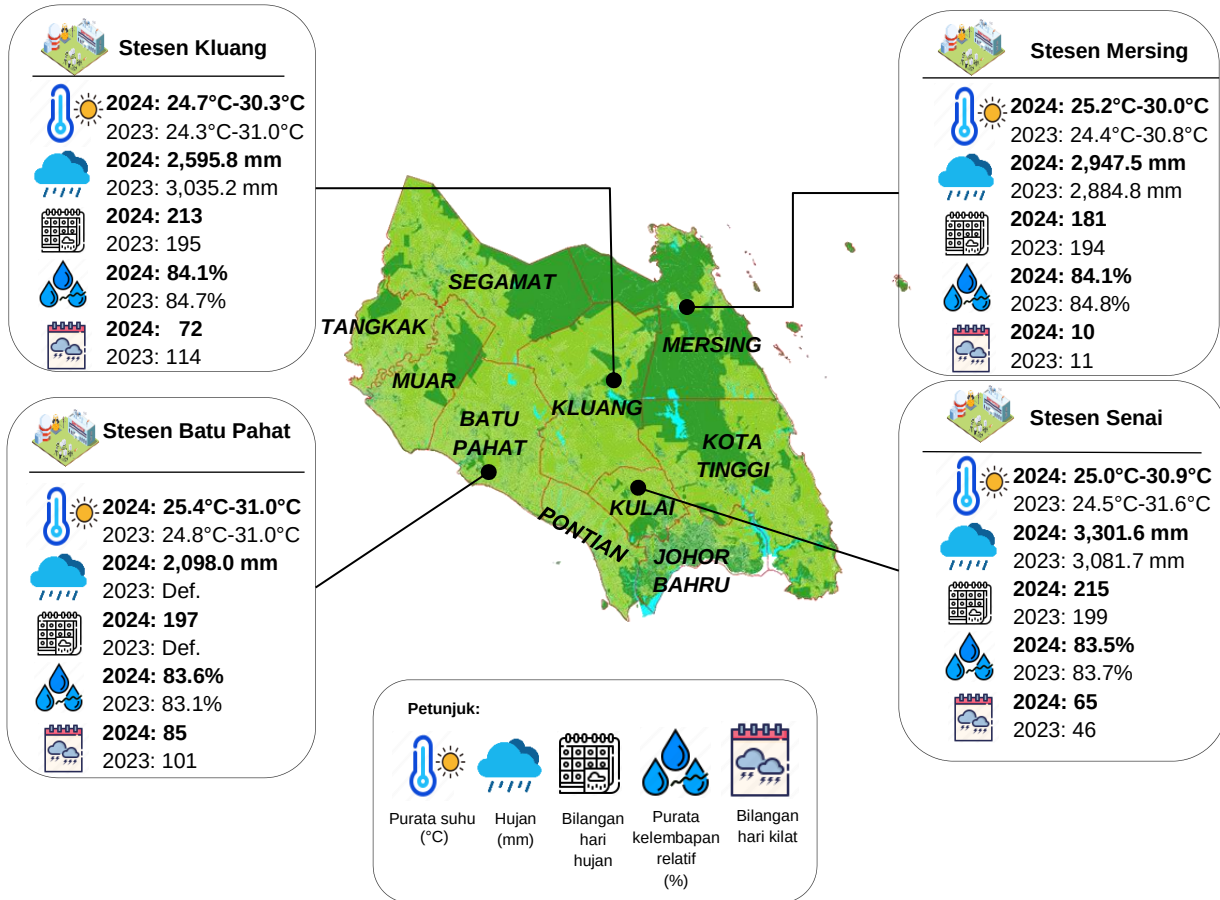
Bilangan hari kilat

Stesen Batu Pahat mencatatkan bilangan hari kilat tertinggi pada 2024 iaitu 85 hari. Manakala, stesen Mersing mencatatkan bilangan hari kilat terendah iaitu 10 hari.

[Paparan 1.3]



Paparan 1.3: Ringkasan statistik iklim di stesen meteorologi, Johor, 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

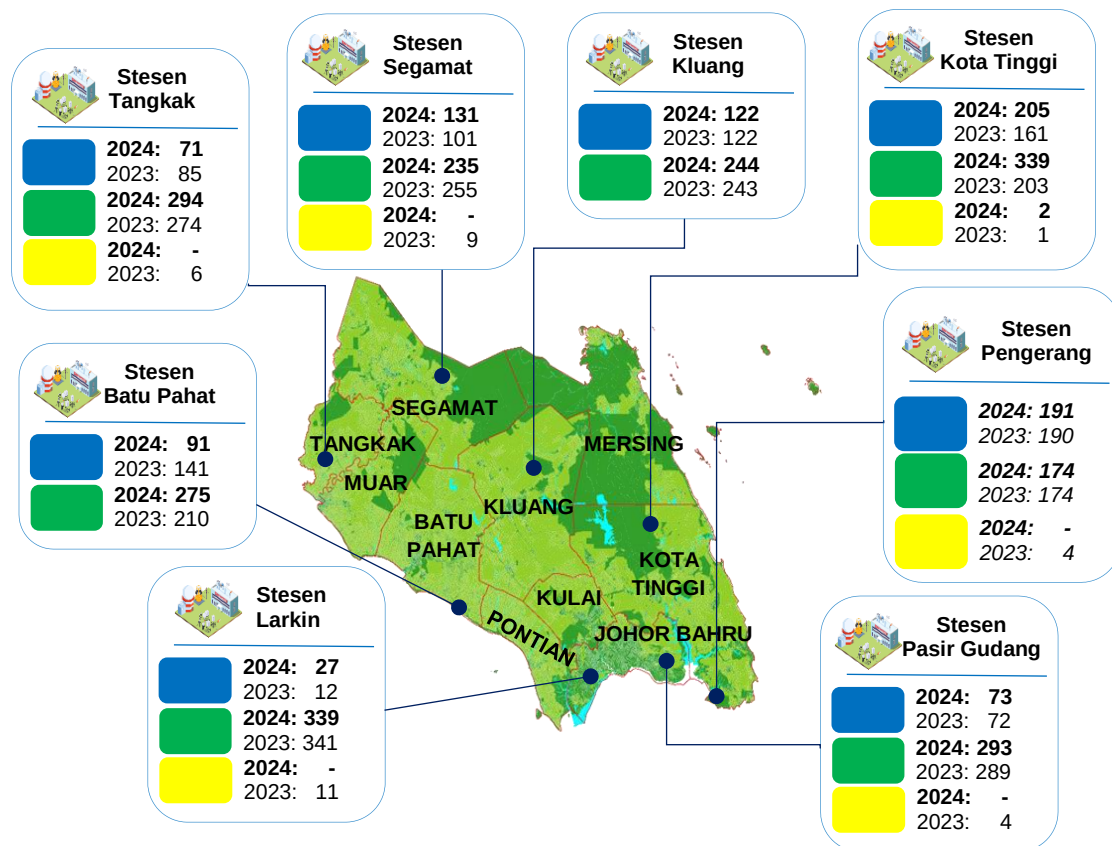
Jabatan Alam Sekitar (JAS) memantau kualiti udara negara melalui 65 stesen pengawasan yang ditempatkan di seluruh negara bagi mengawasi dan mengesan sebarang perubahan kualiti udara yang boleh memberi kesan negatif kepada kesihatan manusia dan alam sekitar. Status kualiti udara di Malaysia dilaporkan 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 ($PM_{2.5}$).

Stesen Segamat, Kluang, Kota Tinggi dan Pengerang mencatatkan kualiti udara “baik” melebihi 100 hari pada 2024. Stesen

Kota Tinggi mencatatkan bilangan hari tertinggi (205 hari) dengan kualiti udara “baik” berbanding 161 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]**

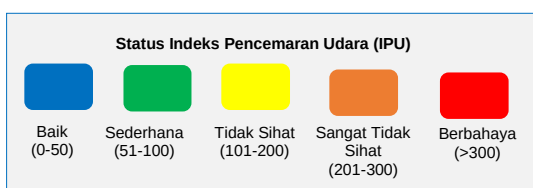
Paparan 1.4: Status kualiti udara mengikut stesen, Johor, 2023 dan 2024



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.

Johor merupakan negeri kelima terbesar di Semenanjung Malaysia yang mempunyai kawasan berhutan dengan keluasan 442,771 hektar. Daripada jumlah ini, 335,003 hektar (75.7%) 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]

Pengusahasihan hutan

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

ekonomi. Aktiviti pengusahasihan hutan dikawal melalui perundangan, dasar dan garis panduan pengoperasian. Keluasan hutan yang dilesenkan untuk pengusahasihan bagi negeri Johor meningkat kepada 1,012 hektar pada 2023 daripada 801 hektar pada 2022.

[Paparan 1.6]

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

(Hektar)



Sumber: Jabatan Perhutanan Semenanjung Malaysia

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

(Hektar)



2023: 1,012
2022: 801

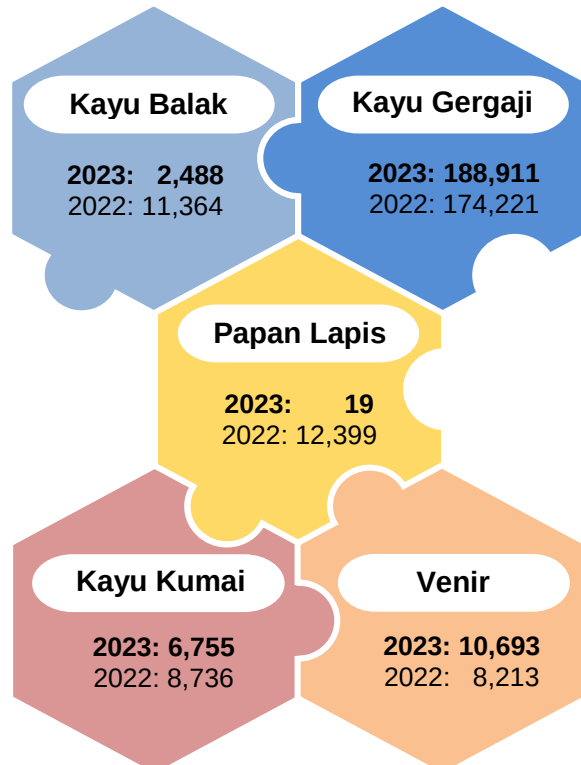
Sumber: Jabatan Perhutanan Semenanjung Malaysia



Kayu gergaji merupakan salah satu produk kayu-kayan utama di Johor. Pengeluaran kayu gergaji yang direkodkan pada 2023 meningkat kepada 188,911 m³ berbanding 174,221 m³ pada 2022. **[Paparan 1.7]**

Paparan 1.7: Pengeluaran produk kayu kayan utama, Johor, 2022 dan 2023

(Meter padu)



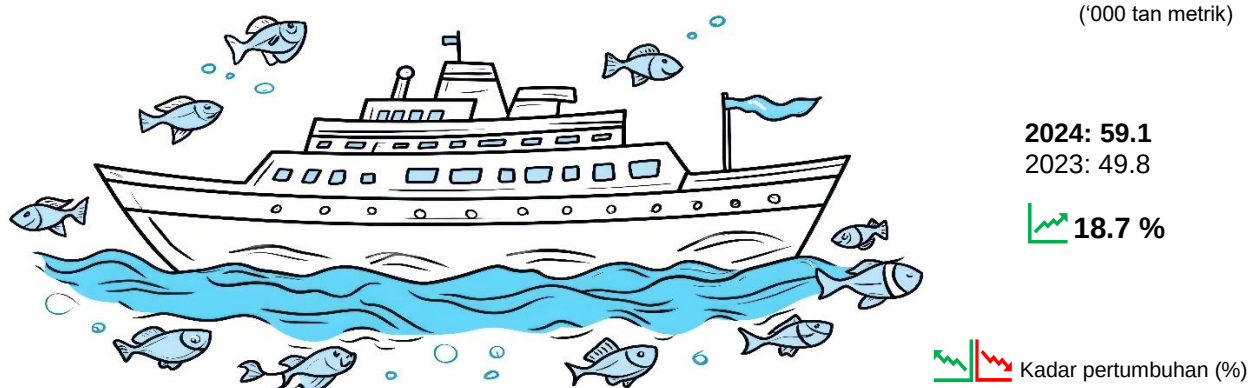
Sumber: Jabatan Perhutanan Semenanjung Malaysia

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 59.1 ribu tan metrik, meningkat 18.7 peratus berbanding 49.8 ribu tan metrik pada 2023. **[Paparan 1.8]**

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



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.

Johor mencatatkan 4,726.9 tan metrik buangan klinikal pada 2024 berbanding 1,435.1 tan metrik yang direkodkan pada 2023. **[Paparan 1.9]**

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



INTRODUCTION

The importance of establishing environmental stability should be a fundamental pillar of a country’s development strategy. It’s 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.

Johor experienced favourable economic growth in 2024, Gross Domestic Product (GDP) at constant prices recorded RM158.0 billion (2023: RM148.6 billion), indicating a 6.4 per cent increase from the previous year. Johor’s GDP contributes 9.6 per cent to Malaysia’s overall GDP. Additionally, the GDP per capita at current prices rose to RM44,782 as compared to RM41,847 in 2023. **[Exhibit 1.1]**

Exhibit 1.1: Economic Summary of Johor, 2023 and 2024

	2023 ^e	2024 ^p
GDP at constant price 2015	RM148.6 billion	RM158.0 billion
Annual Percentage change	4.1%	6.4%
Percentage contribution to Malaysia’s GDP	9.5%	9.6%
GDP per capita at current price	RM41,847	RM44,782

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 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 microns in diameter. Particles may be solid or liquid and include 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 Johor showed that Tangkak, Segamat, Kluang, Kota Tinggi, Pasir Gudang and Larkin stations experienced a decreased in 2024. Meanwhile, at Batu Pahat station recorded a slight increase. Pengerang station recorded a decrease in $PM_{2.5}$ concentration but PM_{10} increased in 2024 as compared to 2023. **[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 decreased at Tangkak, Larkin and Pasir Gudang stations and remain unchanged at Batu Pahat, Kota Tinggi and Pengerang stations. Meanwhile, Segamat station experienced an increase 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 2022 showed an increase at three stations namely Batu Pahat, Segamat and Pasir Gudang stations as compared to 2023. Meanwhile, Kota Tinggi, Larkin and Tangkak stations recorded a slight decrease in 2024. **[Exhibit 1.2]**



Sulphur Dioxide (SO₂)

SO₂ is a colourless, water-soluble reactive gas with an unpleasant 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.

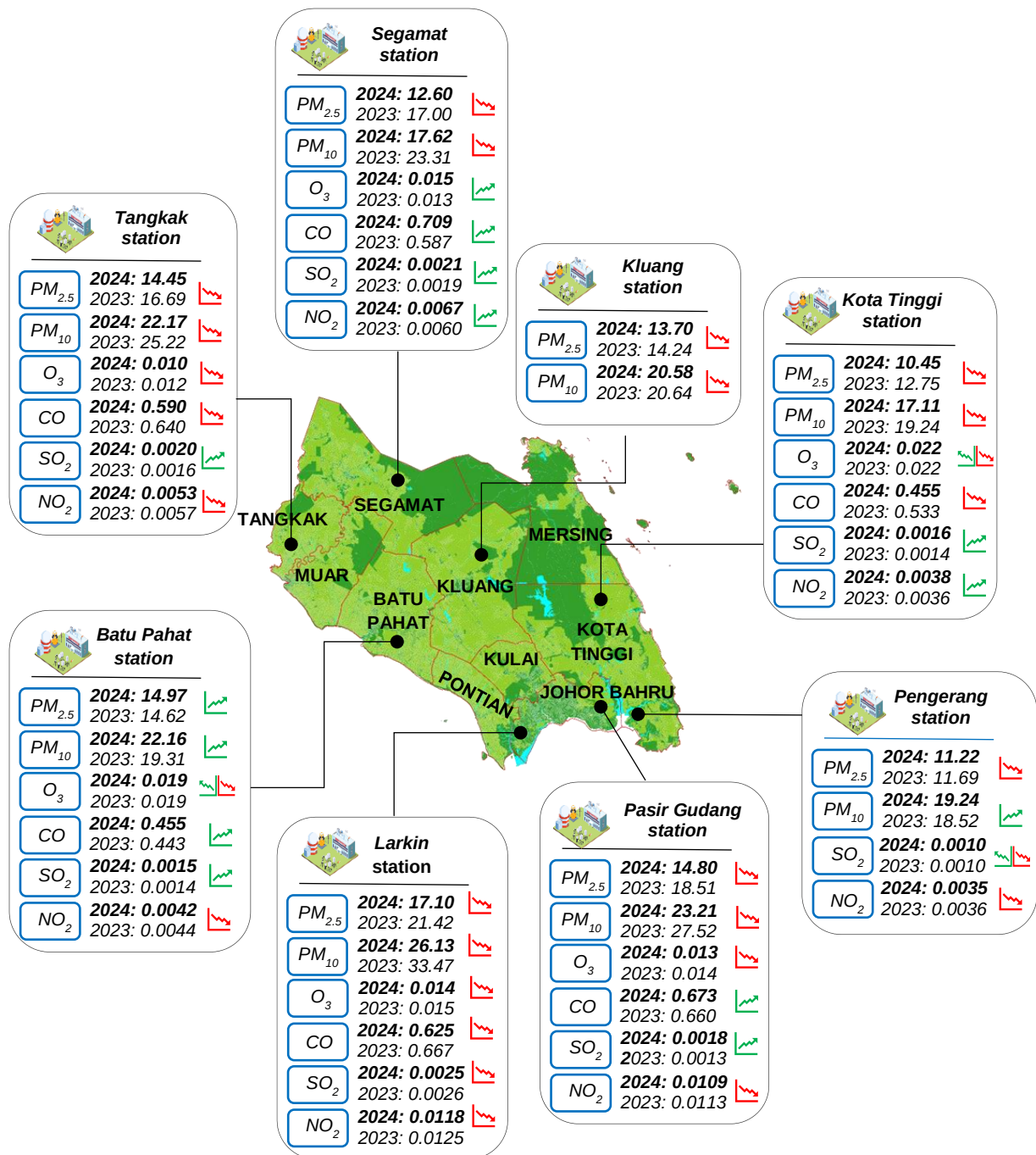
The annual average trend concentration of SO₂ in 2024 increased at five stations namely Batu Pahat, Kota Tinggi, Pasir Gudang, Segamat and Tangkak stations. Meanwhile, at Larkin station recorded a decrease but remained unchanged at Pengerang station. **[Exhibit 1.2]**

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 2024 showed an increase at all stations except at Tangkak and Pengerang stations. **[Exhibit 1.2]**

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



Increased
 Decreased
 Unchanged

Legend:	
PM _{2.5}	Particulate Matter 2.5 micron (µg/m³)
PM ₁₀	Particulate Matter 10 micron (µg/m³)
O ₃	Ground Level Ozone (ppm)
CO	Carbon Monoxide (ppm)
SO ₂	Sulphur Dioxide (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.

Johor has four meteorological stations to monitor the weather conditions continuously and provide meteorological data as an input for weather forecasting. The stations are Batu Pahat, Kluang, Mersing and Senai.

Mean temperature

Batu Pahat station recorded the highest average temperature of 31.0°C, a decrease of 0.5°C as compared to 31.5°C in 2024. Meanwhile, Kluang station recorded the lowest average temperature of 24.7°C, an increase of 0.4°C as compared to 2023.

Rainfall distribution

Senai station recorded the highest annual rainfall in 2024 with 3,301.6 mm as compared to the previous year (3,081.7 mm). However, Batu Pahat station recorded the lowest annual rainfall of 2,098.0 mm in 2024 as compared to the previous year.



Mean relative humidity

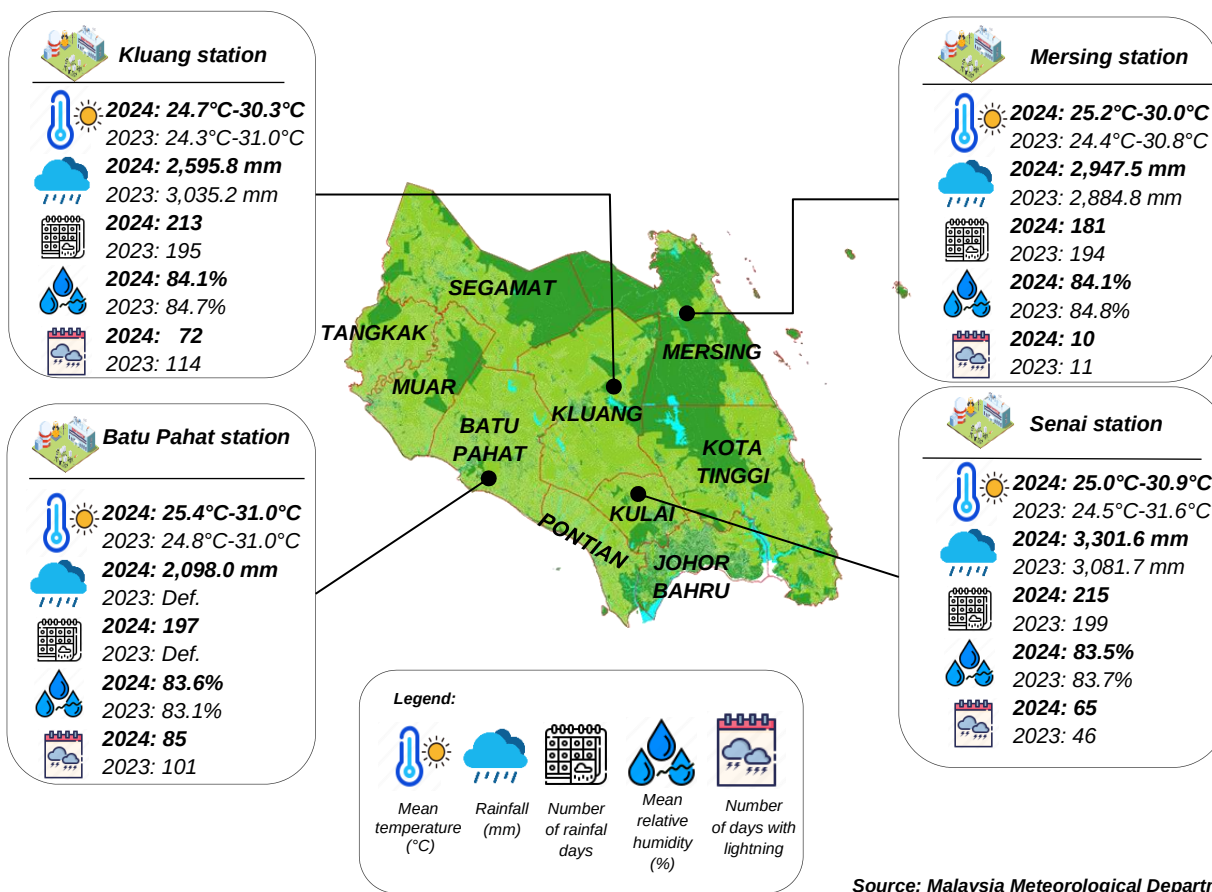
The mean relative humidity in Johor was between 83.5 per cent (Senai station) and 84.1 per cent (Kluang and Mersing stations) in 2024. The mean relative humidity range in Johor in 2024 was more uniform as compared to 2023 which was between 83.1 per cent (Batu Pahat station) and 84.8 per cent (Mersing station).

Number of days with lightning

Batu Pahat station recorded the highest days with lightning in 2024 which was 85 days. Meanwhile, Mersing station recorded the lowest days with lightning which was 10 days.

[Exhibit 1.3]

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



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

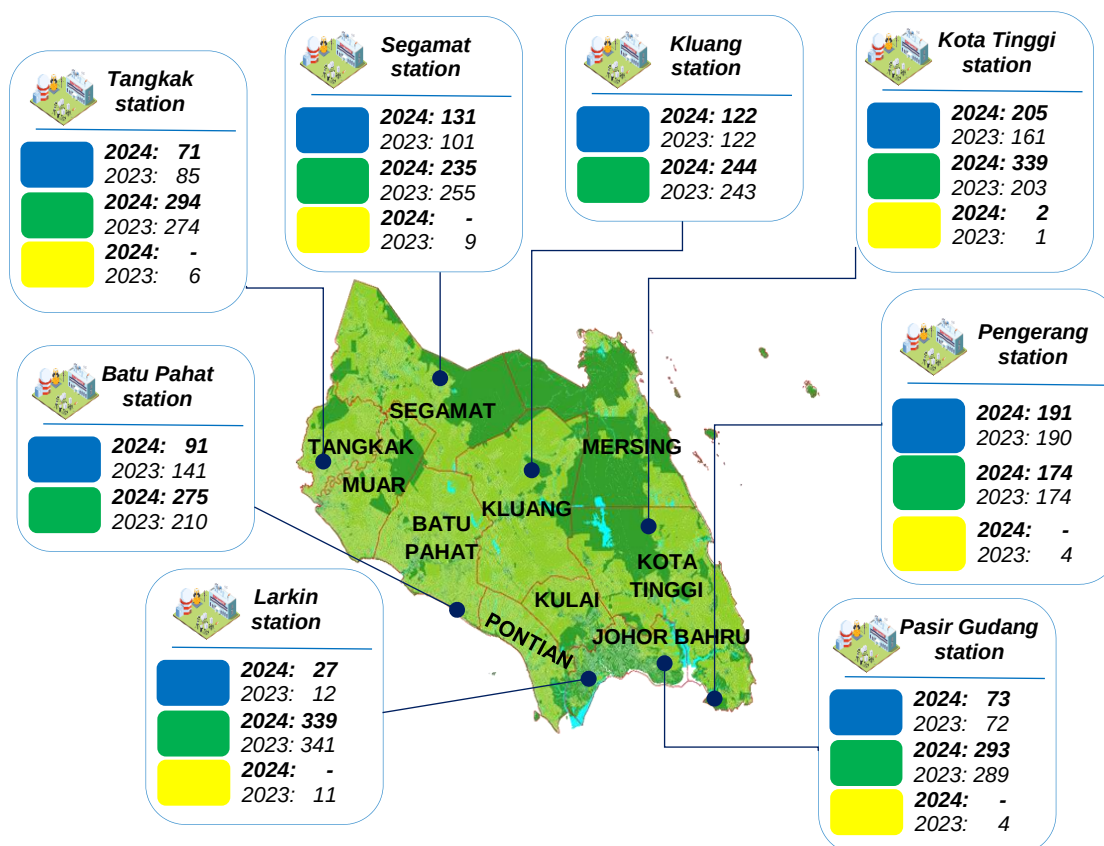
located throughout the country to monitor and detect any significant change in the air quality that can contribute to the negative impact on human health and environment. The status of air quality in Malaysia is reported as the Air Pollutant Index (API).

The air pollutants used in computing the API are Ground Level Ozone (O₃), Carbon Monoxide (CO), Nitrogen Dioxide (NO₂) Sulphur Dioxide (SO₂), Particulate Matter of less than 10 microns in size (PM₁₀) and Particulate Matter of less than 2.5 microns in size (PM_{2.5}).

Segamat, Kluang, Kota Tinggi, and Pengerang stations registered more than 100 days of “good” air quality days in 2024. Kota Tinggi station recorded the highest number of days (205 days) with “good” air quality as compared to 161 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]**

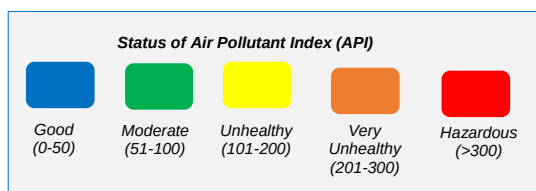
Exhibit 1.4: Status of air quality by station, Johor, 2023 and 2024



Notes:

1. Air quality status readings are based on daily maximum readings
2. Stations with inadequate 365 days is due to technical problem

Measurement unit: number of days



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

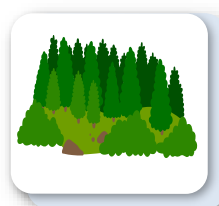
Forested areas are classified as a permanent reserve forests, government land, wildlife parks and other forests consisting of several types such as terrestrial forests, peat swamp forests and marine swamp forests.

Johor is the fifth largest state in Peninsular Malaysia with a forested area of 442,771 hectares. Of this total, 335,003 hectares (75.7%) 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]**

Johor increased to 1,012 hectares in 2023 from 801 hectares in 2022. **[Exhibit 1.6]**

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

(Hectares)



Forested area

2022: 442,771
2021: 443,129



Permanent Reserve Forest

2022: 335,003
2021: 334,502

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

(Hectares)



2023: 1,012
2022: 801

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

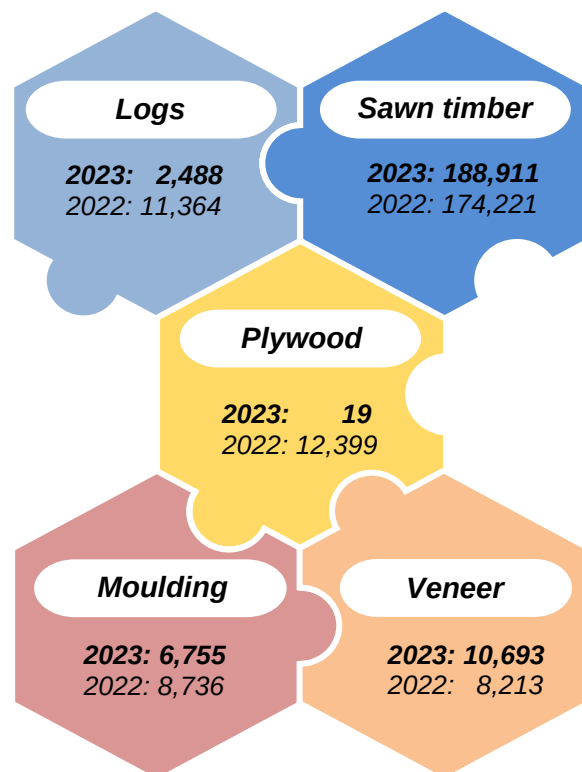
Source: Forestry Department Peninsular Malaysia

Sawn timber is one of the main timber products in Johor. Sawn timber production recorded in 2023 increased to 188,911 m³ as compared to 174,221 m³ in 2022. **[Exhibit 1.7]**



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

(Cubic metres)



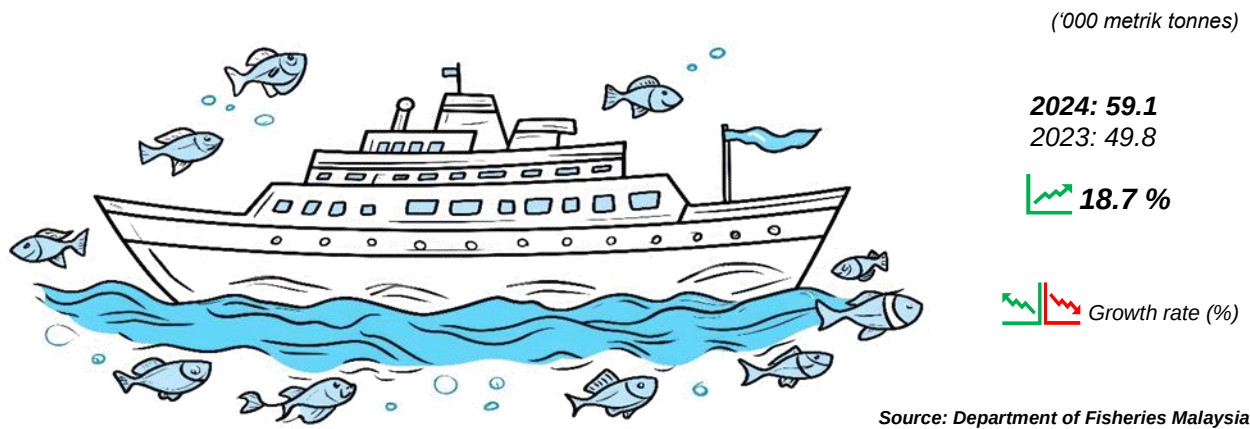
Source: Forestry Department Peninsular Malaysia

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 59.1 thousand metric tonnes, increased 18.7 per cent as compared to 49.8 thousand metric tonnes in 2023. **[Exhibit 1.8]**

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



F. Clinical wastes

Clinical wastes refers to any wastes 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.

Johor recorded 4,726.9 metric tonnes of clinical wastes in 2024 as compared to 1,435.1 metric tonnes recorded in 2023. **[Exhibit 1.9]**

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





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Implikasi Cuaca kepada Pengeluaran Sayur-sayuran di Johor

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 Johor meningkat dengan ketara antara tahun 2022 dan 2023. Pada tahun 2022, jumlah hujan yang direkodkan adalah sebanyak 2,708.8 mm, manakala pada tahun 2023, ia meningkat kepada 3,333.9 mm¹. Peningkatan sebanyak lebih 600 mm ini menunjukkan berlakunya keadaan cuaca yang lebih lembap, berkemungkinan disebabkan oleh pengaruh fenomena seperti La Niña. Namun, pengeluaran sayur-sayuran di Johor kekal positif walaupun menerima hujan yang lebih banyak pada 2023, pengeluaran sayur-sayuran di Johor pada 2023 merekodkan sebanyak 247,228 tan metrik berbanding 245,330 tan metrik pada 2022⁶ dengan peningkatan sebanyak 0.8 peratus. Situasi ini selari 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

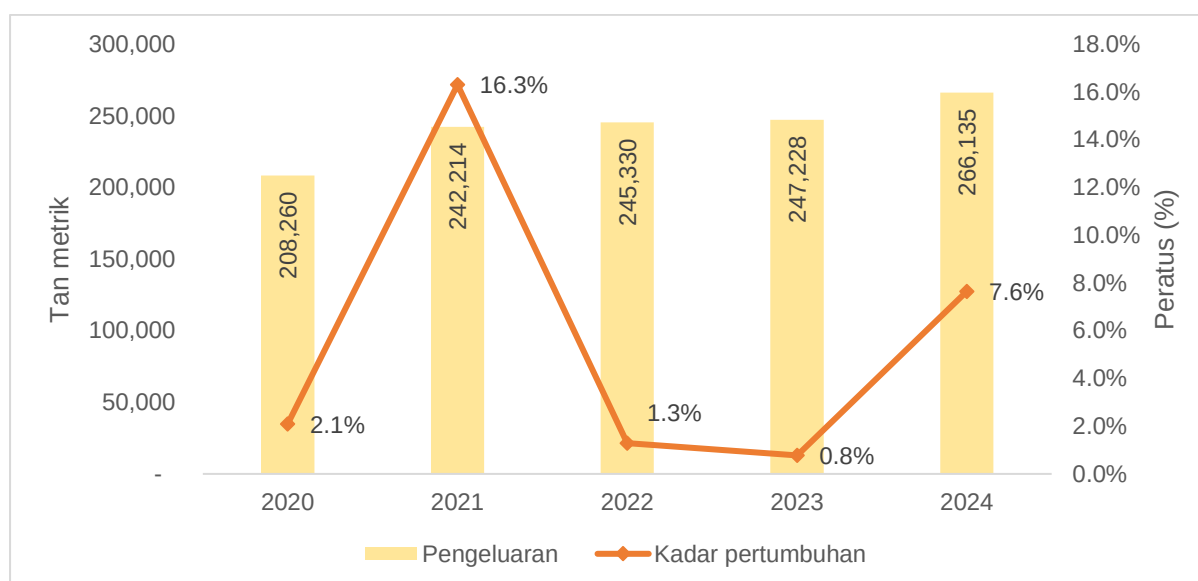
⁴ <https://bda.nres.gov.my/index.php/ms/hidden-news/1012-cuaca-panas-hasil-tanaman-lebih-banyak-berkualiti>

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

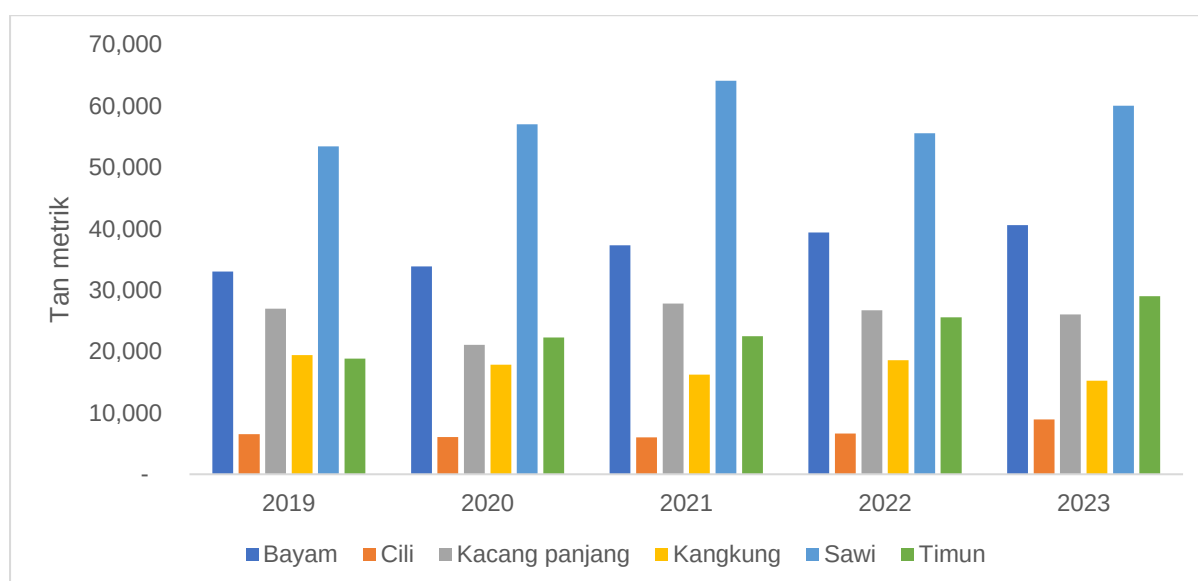
⁶ Jabatan Pertanian Malaysia

⁷ Jabatan Perangkaan Malaysia

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



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



Sumber: Jabatan Pertanian Malaysia

Pengeluaran sayur-sayuran utama di Johor pada 2023 secara keseluruhan menunjukkan peningkatan berbanding tahun 2022, sejajar dengan peningkatan jumlah hujan dan pertumbuhan positif sektor pertanian. Bayam, cili, sawi dan timun mencatat peningkatan ketara, dengan cili meningkat paling tinggi sebanyak 34.5 peratus, manakala kacang panjang dan kangkung menunjukkan sedikit penurunan. Corak ini menunjukkan bahawa keadaan cuaca yang lebih lembap pada 2023 telah memberi kesan positif terhadap kebanyakan tanaman berdaun dan berbuah, namun tanaman seperti kangkung yang sensitif terhadap kelembapan berlebihan 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 Johor

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

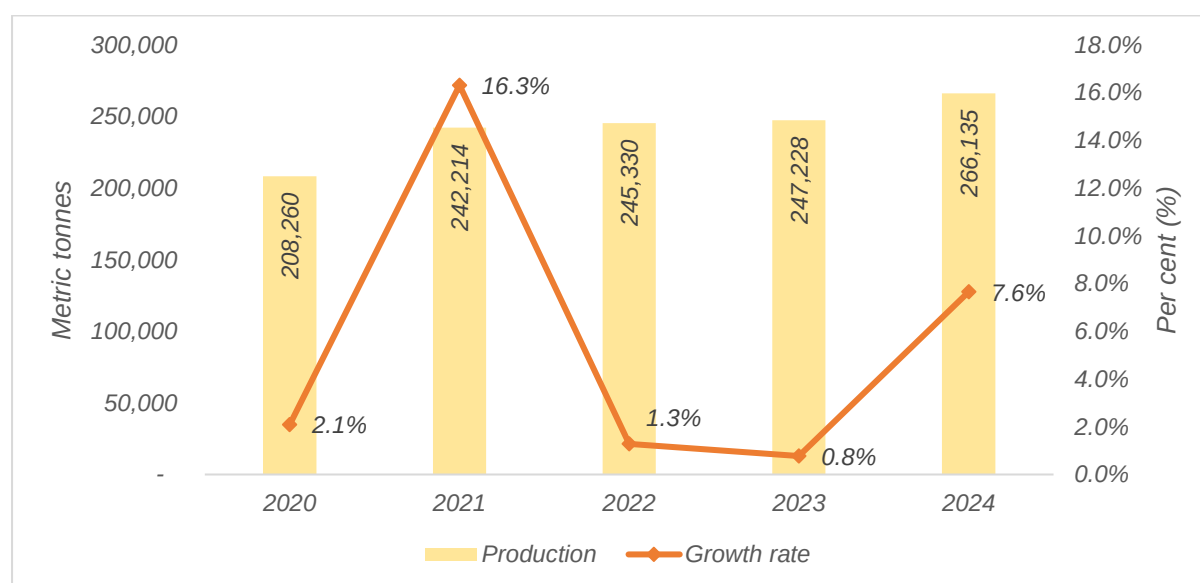
² <https://agrimag.my/bm/article-details/kesan-pokok-apabila-hujan-berlebihan>

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 Johor increased significantly between 2022 and 2023. In 2022, total recorded rainfall was 2,708.8 mm, whereas in 2023 it rose to 3,333.9 mm¹. The increase of more than 600 mm reflects a wetter climate, possibly influenced by phenomena such as La Niña. However, the production of vegetables in Johor remained positive despite higher rainfall in 2023, Johor recorded 247,228 metric tonnes of vegetable production in 2023 as compared to 245,330 metric tonnes in 2022⁶, marking an increase of 0.8 per cent. This situation aligns 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 Johor, 2020–2024



Source: Department of Agriculture Malaysia

¹ Malaysian Meteorological Department

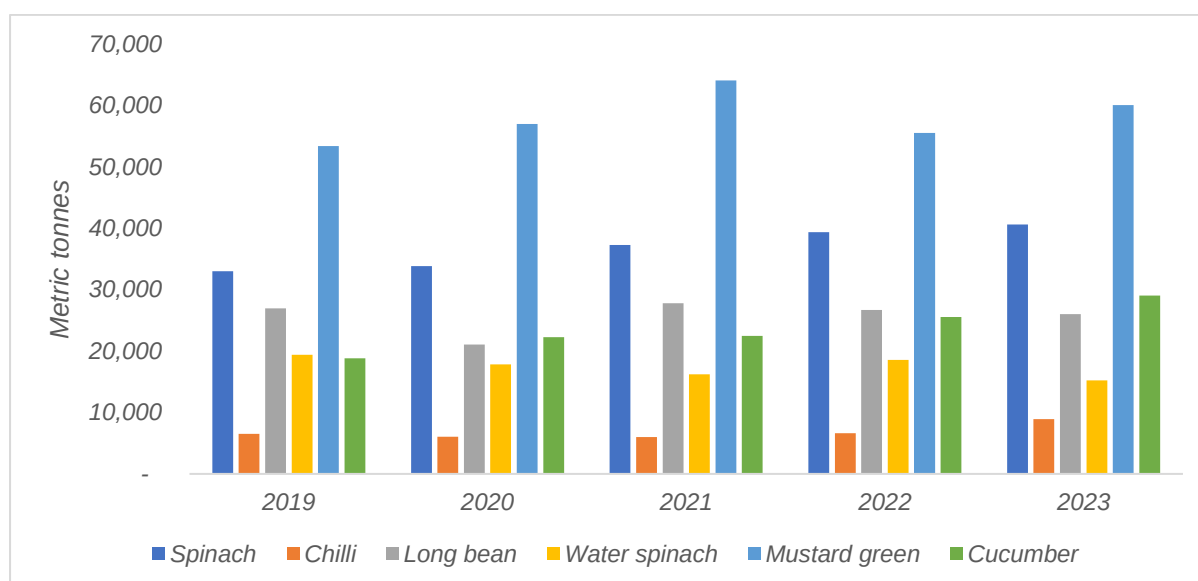
⁴ <https://bda.nres.gov.my/index.php/ms/hidden-news/1012-cuaca-panas-hasil-tanaman-lebih-banyak-berkualiti>

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 Johor, 2019–2023



Source: Department of Agriculture Malaysia

Overall, main vegetable production in Johor in 2023 showed an increase compared to 2022, in line with higher rainfall and positive growth in the agricultural sector. Spinach, chilli, mustard greens and cucumber recorded significant increases, with chilli showing the highest rise of 34.5 per cent, while long beans and water spinach saw slight declines. This pattern suggests that the wetter conditions in 2023 benefitted most leafy and fruit-bearing crops, whereas crops such as water spinach, which are sensitive to excessive moisture 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, Johor, 2020-2024

Table 1.1: Mean temperature, total rainfall and mean relative humidity, Johor, 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>	
Batu Pahat (6.3m)	2020	24.4	32.4	2,089.6	197	82.3
	2021	24.2	32.1	2,668.4	193	82.5
	2022	24.2	32.0	2,864.2	227	83.1
	2023	24.8	31.5	Def.	Def.	83.1
	2024	25.4	31.0	2,098.0	197	83.6
Kluang (88.1 m)	2020	24.1	31.9	2,574.8	196	82.8
	2021	23.8	31.7	2,682.1	185	82.6
	2022	23.8	31.7	2,663.7	197	83.4
	2023	24.3	31.0	3,035.2	195	84.7
	2024	24.7	30.3	2,595.8	213	84.1
Mersing (43.6 m)	2020	24.2	31.6	2,392.8	177	78.3
	2021	23.9	31.4	2,317.7	172	84.2
	2022	24.1	31.5	2,817.8	200	83.9
	2023	24.4	30.8	3,884.8	194	84.8
	2024	25.2	30.0	2,947.5	181	84.1
Senai (37.8 m)	2020	24.2	32.4	2,778.0	208	84.0
	2021	23.9	32.1	2,872.6	202	83.7
	2022	23.9	32.2	2,489.4	205	83.6
	2023	24.5	31.6	3,081.7	199	83.7
	2024	25.0	30.9	3,301.6	215	83.5

Sumber: Jabatan Meteorologi Malaysia
Source: Malaysia Meteorological Department

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

Table 1.2: Mean sea level pressure, surface wind speed, global radiation, evaporation and number of days with lightning, Johor, 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>
Batu Pahat (6.3 m)	2020	1,009.8	1.0	n.a.	3.80	n.a.
	2021	1,009.8	0.9	n.a.	3.80	n.a.
	2022	1,009.3	0.7	n.a.	3.60	134
	2023	1,010.4	0.8	n.a.	3.28	101
	2024	1,009.9	0.9	n.a.	Def.	85
Kluang (88.1 m)	2020	1,010.3	1.8	n.a.	3.70	n.a.
	2021	1,010.2	1.7	16.90	3.40	n.a.
	2022	1,009.7	1.3	16.27	3.04	166*
	2023	1,010.7	1.4	Def.	Def.	114
	2024	1,010.1	1.4	14.71	Def.	72
Mersing (43.6 m)	2020	1,009.8	2.9	n.a.	3.70	n.a.
	2021	1,009.7	2.9	n.a.	3.40	n.a.
	2022	1,009.2	2.6	n.a.	3.10	25*
	2023	1,010.3	3.1	n.a.	3.13	11
	2024	1,009.7	3.2	n.a.	2.70	10
Senai (37.8 m)	2020	1,009.5	1.6	16.33	3.30	186
	2021	1,009.4	1.5	16.00	3.50	187
	2022	1,008.9	1.4	16.11	3.85	149
	2023	1,010.0	1.5	Def.	Def.	46
	2024	1,009.6	1.5	15.23	Def.	65

Nota: *April - Disember 2022, tiada bacaan direkodkan sepanjang Januari - Mac 2022
Notes: April - December 2022, no readings were recorded between January - March 2022

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

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

Stesen <i>Station</i>	Jan.	Feb.	Mac <i>Mar.</i>	Apr.	Mei <i>May</i>	Jun <i>June</i>	Julai <i>July</i>	Ogos <i>Aug.</i>	Sept.	Okt. <i>Oct.</i>	Nov.	Dis. <i>Dec.</i>
Batu Pahat	1,011.5	1,012.0	1,010.7	1,008.6	1,008.7	1,010.1	1,009.3	1,010.3	1,009.4	1,010.0	1,009.1	1,009.2
Kluang	1,011.8	1,012.2	1,011.0	1,008.9	1,008.9	1,010.3	1,009.4	1,010.4	1,009.6	1,010.1	1,009.3	1,009.3
Mersing	1,011.4	1,012.0	1,010.8	1,008.4	1,008.3	1,009.7	1,008.9	1,009.9	1,009.0	1,009.6	1,008.8	1,009.0
Senai	1,011.1	1,011.7	1,010.4	1,008.3	1,008.3	1,009.7	1,009.0	1,009.9	1,009.0	1,009.6	1,008.7	1,008.8

Sumber: Jabatan Meteorologi Malaysia
Source: Malaysia Meteorological Department

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

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

Stesen Station	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Batu Pahat	0.6	0.9	0.9	0.8	0.9	0.8	1.2	0.9	0.9	0.8	0.6	0.7
Kluang	2.0	2.5	2.1	1.1	0.9	0.9	1.2	1.0	1.1	0.9	1.1	1.9
Mersing	4.2	4.5	3.6	2.8	2.8	2.8	3.2	3.1	3.0	2.6	2.5	3.2
Senai	2.0	2.3	1.9	1.4	1.1	1.1	1.6	1.3	1.4	1.1	1.1	1.7

Jadual 1.5: Purata bulanan sinaran global, Johor, 2024

Table 1.5: Monthly mean global radiation, Johor, 2024

Stesen Station	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Kluang	13.02	19.34	19.22	17.19	15.72	13.89	16.37	0.74	16.56	15.88	13.83	14.73
Senai	14.69	19.11	20.15	16.84	13.10	13.83	16.20	10.23	16.46	14.53	12.97	14.70

Jadual 1.6: Purata bulanan penyejatan, Johor, 2024

Table 1.6: Monthly mean evaporation, Johor, 2024

Stesen Station	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
Batu Pahat	2.7	3.9	n.a.	n.a.	3.7	Def.	3.9	3.2	3.9	Def.	3.1	2.9
Kluang	2.2	3.7	n.a.	n.a.	2.9	2.8	Def.	2.7	2.7	2.4	2.1	2.3
Mersing	1.8	4.4	n.a.	n.a.	3.3	3.2	3.4	3.4	3.2	3.5	3.3	2.9
Senai	Def.	4.0	n.a.	n.a.	3.4	Def.	3.7	4.1	4.2	3.8	2.5	3.4

Sumber: Jabatan Meteorologi Malaysia
Source: Malaysia Meteorological Department

Jadual 1.7: Bacaan maksimum harian Indeks Ultra Ungu (UV), Senai, 2024

Table 1.7: Daily maximum reading of the Ultra Violet (UV) Index, Senai, 2024

Senai												
Stesen/ Station												
Bulan/ Monthly Hari/ Days	Jan.	Feb.	Mac Mar.	Apr.	Mei May	Jun June	Julai July	Ogos Aug.	Sept.	Okt. Oct.	Nov.	Dis. Dec.
1	8	11+	11+	11+	11+	5	n.a.	11+	10	10	11+	11+
2	11+	11+	11+	11+	10	9	n.a.	11+	11+	11+	7	11
3	11+	11+	9	11+	8	11+	n.a.	11+	9	11+	11+	9
4	5	11+	11+	11+	3	10	n.a.	10	6	8	4	11
5	11+	11+	11+	11+	11+	10	n.a.	10	11+	6	9	9
6	11+	11+	11+	11+	11+	7	n.a.	11+	9	10	9	11+
7	2	11+	11+	11+	11+	9	n.a.	11+	11+	10	11+	11+
8	11+	11+	10	11+	6	5	n.a.	11+	11+	8	11+	12
9	11+	11+	11+	11+	11+	10	n.a.	11+	11+	11+	10	9
10	11+	11+	11+	11+	5	8	n.a.	10	9	8	11+	6
11	11+	11+	11+	11+	11+	10	n.a.	8	11+	8	8	11+
12	6	9	11+	2	11+	9	n.a.	11+	11+	11+	11+	7
13	11+	11+	11+	11+	11+	9	n.a.	11	11+	11+	7	4
14	11+	11+	11+	7	11+	n.a.	7	11+	11+	3	11+	11+
15	11+	11+	11+	11+	8	n.a.	10	9	11+	11+	10	11+
16	11+	11+	11+	9	11+	n.a.	8	11+	11+	7	10	11+
17	11+	11+	11+	11+	11+	n.a.	9	10	11+	7	10	11+
18	7	11+	11+	11+	6	n.a.	11+	11+	11+	7	11	4
19	11+	11+	11+	11+	11+	n.a.	9	11+	8	10	6	7
20	5	Def.	11+	8	11+	n.a.	10	11+	11+	8	5	7
21	11+	11+	11+	11+	9	n.a.	9	11+	9	11+	11+	11+
22	11+	11+	11+	11+	7	n.a.	11+	11+	11+	10	11+	11+
23	11+	11+	11+	11+	11+	n.a.	10	11+	10	11+	11+	9
24	11+	11+	11+	9	9	n.a.	11+	11+	11+	10	11+	8
25	11+	11+	11+	11+	9	n.a.	9	11+	11+	11+	9	9
26	11+	11+	11+	11+	11	n.a.	10	11+	6	11+	9	8
27	11+	8	11+	11+	9	n.a.	10	11+	11+	10	11+	10
28	11+	11+	11+	10	n.a.	n.a.	10	11+	11+	11+	6	10
29	11+	11+	11+	11+	9	n.a.	10	11+	11+	7	2	12
30	11+		11+	10	11	n.a.	9	11+	11+	10	11+	11+
31	11+		11+		9		11+	11+		11+		11+

Nota: Def. Nilai defektif/
Notes: Defective value

Sumber: Jabatan Meteorologi Malaysia
Source: Malaysia Meteorological Department

n.a. Tiada penceraipan data disebabkan masalah instrumentasi
No data observation due to instrumentation problems

Status Indeks Ultra Ungu (UV)
Ultra Violet Index (UV) status

0 to 2	Rendah / Low
3 to 5	Sederhana / Moderate
6 to 7	Tinggi / High
8 to 10	Sangat Tinggi / Very High
11 +	Melampau / Extreme

Jadual 1.8: Senarai lembangan sungai utama di Johor

Table 1.8: List of major river basins in Johor

Bil. No.	Nama lembangan sungai <i>River basins name</i>	Luas (km ²) <i>Area</i>	Kategori <i>Category</i>	Negeri/ Negara <i>State/ Country</i>
1	Sg. Kesang	658.26	2	Melaka /Johor/ Negeri Sembilan
2	Sg. Johor	2,285.64	1	Johor
3	Sg. Batu Pahat	2,048.79	1	Johor
4	Sg. Sedeli Besar	1,424.61	1	Johor
5	Sg. Benut	614.56	1	Johor
6	Sg. Lebam	365.46	1	Johor
7	Sg. Pontian Besar	362.05	1	Johor
8	Sg. Pulai	345.51	1	Johor
9	Sg. Skudai	293.33	1	Johor
10	Sg. Sarang Buaya	291.83	1	Johor
11	Sg. Sedeli Kechil	1,424.61	1	Johor
12	Sg. Mersing	273.46	1	Johor
13	Sg. Tebrau	256.97	1	Johor
14	Pt. Botak	150.21	1	Johor
15	Sg. Jemaluang	140.56	1	Johor
16	Sg. Sanglang	119.69	1	Johor
17	Sg. Santi	117.36	1	Johor
18	Sg. Ayer Baloi	81.66	1	Johor
19	Sg. Muar	6,137.80	2	Johor/ Pahang/ Melaka/ Negeri Sembilan
20	Sg. Endau	4,739.06	2	Johor/ Pahang

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

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 1.9: Panjang pesisiran pantai, Johor

Table 1.9: Coastal length, Johor

Negeri State	Panjang pantai (km) Coastal length	Peratus (%) Per cent
Malaysia	8,840.00	100.0
Johor	813.6	9.2

Nota: National Coastal Erosion Study for Malaysia (2015)

Jadual 1.10: Empangan dan kolam takungan di Johor

Table 1.10: Dams and reservoirs in Johor

Bil. No.	Nama empangan (Tahun siap dibina) Name of dam (Year of completion)	Lokasi (Negeri) Location (State)	Empangan Dams					Kolam takungan Reservoirs		
			Tinggi Height (m)	Panjang puncak Peak length (m)	Aras puncak Top peak (m)	Kawasan tadahan Catchment area (km ²)	Kapasiti Capacity (Mm ³)	Luahan alir limpah maksimum Maximum flood flow (cumecs)	Luas permukaan Surface area (km ²)	Aras biasa Ordinary level (m)
1	Labong (1949)	Johor	10.67	259.00	10.67	16.00	12.80	85.00	6.05	8.03
2	Bekok (1990)	Johor	20.30	3,460.0	23.00	326.00	32.00	5,341.00	12.00	13.30
3	Sembrong (1984)	Johor	11.00	1,770.0	15.00	130.00	18.00	640.00	8.50	8.50
4	Macap (1982)	Johor	11.50	550.00	19.81	77.00	30.60	306.00	9.09	15.85
5	Congok (1960)	Johor	7.00	660.00	7.50	15.50	1.00	n.a.	4.52	5.30
6	Juaseh (1992)	Johor	30.00	86.50	86.50	29.47	30.00	382.00	2.71	82.50
7	Lebam (1979)	Johor	9.00	400.00	16.00	19.39	13.60	212.20	3.95	14.00
8	Gunung Ledang (1959)	Johor	10.50	79.40	n.a.	n.a.	0.30	n.a.	n.a.	n.a.
9	Layang (Lower) 1985	Johor	8.00	700.00	9.00	25.00	15.00	9.00	3.40	3.0 - 5.0
10	Layang (Upper) -1985	Johor	20.00	600.00	29.20	30.50	45.00	191.00	6.50	22.0-25.0

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

Jadual 1.11: Keluasan tanah mengikut daerah, Johor, 2025

Table 1.11: Land area by districts, Johor, 2025

Bil. No.	Daerah State/ District	Keluasan (km ²) Area
MALAYSIA		331,579.95
Johor		19,322.44
1	Batu Pahat	1,985.95
2	Johor Bahru	1,041.18
3	Kluang	2,872.73
4	Kota Tinggi	3,509.05
5	Mersing	2,909.40
6	Muar	1,408.93
7	Pontian	992.77
8	Segamat	2,865.67
9	Kulai	755.22
10	Tangkak	981.53

Sumber: Jabatan Ukur dan Pemetaan Malaysia
Source: Department of Survey and Mapping Malaysia

Jadual 1.12: Kawasan perlindungan yang digazet, Johor

Table 1.12: Gazetted protected area, Johor

Kawasan perlindungan Protected area	Keluasan (Hektar) Area (Hectares)	Bilangan spesies Number of species				
		Fauna				
		Mamalia Mammals	Burung Birds	Reptilia Reptiles	Amfibia Amphibians	Moluska Molluscs
Taman Negara (Johor) Endau Rompin	48,905.00	65	257	26	46	2
Taman Negara Gunung Ledang	8,611.90	38	169	9	9	-
Taman Negara Johor Pulau Kukup	647.50	7	81	7	1	64
Taman Negara Johor Tanjung Piai	325.00	7	43	7	1	64
Tapak Ramsar Sungai Pulai	9,126.00	7	81	7	1	64
Endau-Kluang Wildlife Reserve	101,107.15 ^f	-	-	-	-	-
Endau-Kota Tinggi Wildlife Reserve	43,520.10 ^f	-	-	-	-	-
Four Islands Wildlife Sanctuary	12.18 ^f	-	-	-	-	-
Segamat Wildlife Reserve	12979.54 ^f	-	-	-	-	-

Jadual 1.12: Kawasan perlindungan yang digazet, Johor (samb.)

Table 1.12: *Gazetted protected area, Johor (cont'd)*

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>
Taman Negara (Johor) Endau Rompin	129	-	587	-	-	824
Taman Negara Gunung Ledang	18	-	67	-	-	473
Taman Negara Johor Pulau Kukup	111	-	-	-	1	56
Taman Negara Johor Tanjung Piai	105	-	-	-	-	45
Tapak Ramsar Sungai Pulai	111	15	10	22	5	56
Endau-Kluang Wildlife Reserve	-	-	-	-	-	-
Endau-Kota Tinggi Wildlife Reserve	-	-	-	-	-	-
Four Islands Wildlife Sanctuary	-	-	-	-	-	-
Segamat Wildlife Reserve	-	-	-	-	-	-

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 1.13: Kawasan perlindungan yang digazet di bawah taman laut, Johor

Table 1.13: Gazetted protected area of marine park, Johor

Kawasan perlindungan <i>Protected area</i>	Keluasan (Hektar) <i>Area (Hectares)</i>	Bilangan spesies <i>Number of species</i>			
		Fauna		Flora	
		Cnidarians ¹	Ikan <i>Fish</i>	Rumpai laut <i>Seaweeds</i>	Rumput laut <i>Sea grass</i>
Pulau Aur	9,745.0	51	-	-	-
Pulau Besar	8,414.0	43	-	-	7
Pulau Gaol	4,570.0	-	-	-	-
Pulau Harimau	4,900.0	-	-	-	-
Pulau Hujung	5,235.0	-	-	-	-
Pulau Mensirip	4,660.0	-	-	-	-
Pulau Mentinggi	4,399.0	-	-	-	-
Pulau Pemanggil	8,790.0	47	121	-	-
Pulau Rawa	5,080.0	-	-	-	-
Pulau Sibul	4,260.0	45	-	-	4
Pulau Sibul Hujung	1,183.0	-	-	-	-
Pulau Tengah	5,149.0	-	-	-	4
Pulau Tinggi	10,180.0	155	218	-	6

Nota: ¹ Termasuk batu karang, anemone, obor-obor, sea fans, sea whips dan zooplankton
Notes: Includes corals, anemones, jellyfish, sea fans, sea whips and zooplankton

Meliputi maklumat daripada Jabatan Taman Laut
Includes information from Department of Marine Park

- : 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

Jadual 1.14: Kawasan berhutan dan tidak berhutan, Johor, 2019-2022

Table 1.14: Forested and non-forested areas, Johor, 2019-2022

Tahun <i>Year</i>	Berhutan <i>Forested</i>		Tidak Berhutan <i>Non-Forested</i>	
	Hektar <i>Hectares</i>	(%)	Hektar <i>Hectares</i>	(%)
2019	442,884	23.11	1,473,700	76.89
2020	442,884	23.11	1,473,700	76.89
2021	443,129	23.12	1,473,457	76.88
2022	442,771	23.10	1,473,815	76.90

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: Keluasan hutan simpanan kekal¹, Johor, 2019-2022

Table 1.15: Area of permanent reserved forest, Johor, 2019-2022

				Hektar Hectares
Tahun Year	2019	2020	2021	2022
Keluasan Area	334,292	334,292	334,502	335,003

Nota: ¹ Hutan Simpanan Kekal di Semenanjung Malaysia terdiri daripada hutan darat, paya gambut, paya laut dan ladang hutan yang diwarta sahaja (tidak termasuk cadangan HSK)
Notes: Permanent reserved forest in Peninsular Malaysia consists of inland forest, peat swamp forest, mangrove forest and forest plantation

Mulai 2017 pelaporan keluasan Hutan Simpanan Kekal (HSK) di Semenanjung Malaysia adalah berdasarkan keluasan HSK yang diwarta 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 1.16: Keluasan hutan paya gambut, Johor, 2019-2022

Table 1.16: Area of peat swamp forest, Johor, 2019-2022

				Hektar Hectares
Tahun Year	2019	2020	2021	2022
Keluasan Area	3,796	3,796	3,796	3,796

Nota: Bagi Semenanjung Malaysia merujuk kepada hutan paya gambut di dalam Hutan Simpanan Kekal (HSK)
Notes: For Peninsular Malaysia refer to peat swamp forests in the Permanent Reserved Forest (PRF)

Jadual 1.17: Keluasan hutan paya laut, Johor, 2019-2022

Table 1.17: Area of mangrove forest, Johor, 2019-2022

				Hektar Hectares
Tahun Year	2019	2020	2021	2022
Keluasan Area	18,198	18,198	18,367	18,076

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 Kelestaraian Alam,
Jabatan Perhutanan Semenanjung Malaysia
Source: Ministry of Natural Resources and Environmental Sustainability,
Forestry Department Peninsular Malaysia

Jadual 1.18: Status kualiti udara mengikut stesen, Johor, 2020-2024

Table 1.18: Air quality status by station, Johor, 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)
Batu Pahat	2020	191	175	-	-	-
	2021	144	221	-	-	-
	2022	198	166	-	-	-
	2023	141	210	14	-	-
	2024	91	275	-	-	-
Kluang	2020	277	89	-	-	-
	2021	203	162	-	-	-
	2022	216	149	-	-	-
	2023	122	243	-	-	-
	2024	122	244	-	-	-
Kota Tinggi	2020	293	73	-	-	-
	2021	209	154	2	-	-
	2022	231	131	3	-	-
	2023	161	203	1	-	-
	2024	205	159	2	-	-
Larkin	2020	47	319	-	-	-
	2021	34	328	3	-	-
	2022	49	315	1	-	-
	2023	12	341	11	-	-
	2024	27	339	-	-	-
Pasir Gudang	2020	122	244	-	-	-
	2021	95	269	1	-	-
	2022	89	269	-	-	-
	2023	72	289	4	-	-
	2024	73	293	-	-	-
Pengerang	2020	274	92	-	-	-
	2021	177	188	-	-	-
	2022	168	196	-	-	-
	2023	190	174	1	-	-
	2024	191	174	-	-	-
Segamat	2020	127	239	-	-	-
	2021	123	241	1	-	-
	2022	112	253	-	-	-
	2023	101	255	9	-	-
	2024	131	235	-	-	-
Tangkak	2020	137	229	-	-	-
	2021	96	265	1	-	-
	2022	105	260	-	-	-
	2023	85	274	6	-	-
	2024	71	294	-	-	-

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 1.19: Bacaan minimum dan maksimum bulanan Indeks Pencemaran Udara (IPU)¹, Johor, 2024

Table 1.19: Monthly minimum and maximum Air Pollutant Index (API), Johor, 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.
Batu Pahat	15	53	35	59	34	66	33	90	30	64	27	76
Kluang	22	53	32	58	34	62	32	66	35	65	41	68
Kota Tinggi	10	51	19	55	19	60	18	109	19	54	18	111
Larkin	23	70	41	68	35	75	45	90	34	69	36	75
Pasir Gudang	18	55	29	61	25	60	26	69	35	71	36	67
Pengerang	14	52	16	53	17	61	19	62	24	58	15	64
Tangkak	30	60	39	66	28	78	25	78	31	56	32	70
Segamat	11	54	29	77	27	76	26	90	22	62	18	72

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.
Batu Pahat	25	84	43	72	25	81	21	77	23	67	25	63
Kluang	47	94	30	62	25	67	21	68	14	64	17	55
Kota Tinggi	22	80	23	62	26	64	22	84	16	97	19	60
Larkin	44	74	41	76	41	75	38	83	36	80	36	63
Pasir Gudang	37	69	29	78	38	75	38	93	22	93	23	62
Pengerang	24	68	34	64	27	72	24	72	15	66	21	73
Tangkak	29	72	39	65	47	69	25	70	24	63	17	62
Segamat	30	75	24	80	23	64	19	67	14	63	17	52

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 1.20: Purata tahunan kepekatan berdasarkan jenis bahan pencemar di udara, Johor, 2020-2024

Table 1.20: Annually average concentration based on the type of air pollutants in the air, Johor, 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)
Batu Pahat	2020	10.65 ^f	16.93 ^f	0.016	0.521 ^f	0.0017 ^f	0.0045
	2021	12.72 ^f	18.77 ^f	0.018	0.520 ^f	0.0016	0.0045
	2022	10.75 ^f	16.06 ^f	0.017	0.463 ^f	0.0016	0.0044
	2023	14.54 ^f	19.30 ^f	0.019	0.443	0.0014	0.0044
	2024	14.97	22.16	0.019	0.455	0.0015	0.0042
Kluang	2020	8.65 ^f	14.00 ^f	-	-	-	-
	2021	10.62 ^f	16.71 ^f	-	-	-	-
	2022	10.05 ^f	15.32 ^r	-	-	-	-
	2023	14.24 ^f	20.64 ^f	-	-	-	-
	2024	13.7	20.58	-	-	-	-
Kota Tinggi	2020	8.27 ^f	15.15 ^f	0.018	0.458 ^f	0.0011	0.003
	2021	10.17 ^f	15.71 ^f	0.021	0.386	0.0012	0.0033
	2022	9.36 ^f	13.53 ^f	0.019	0.352	0.0013	0.0041
	2023	12.75 ^f	19.24 ^f	0.022	0.533	0.0014	0.0035
	2024	10.45	17.11	0.022	0.455	0.0016	0.0038
Larkin	2020	14.79	22.98	0.014	0.363	0.0018	0.0089
	2021	16.59 ^f	24.26 ^f	0.016	0.429	0.0019	0.0097
	2022	16.98 ^f	25.20 ^f	0.013	0.647 ^f	0.002	0.0112 ^f
	2023	21.42 ^f	33.47 ^f	0.015	0.667	0.0026	0.0125
	2024	17.1	26.13	0.014	0.625	0.0025	0.0118
Pasir Gudang	2020	12.69 ^f	20.62 ^f	0.013	0.579	0.0011	0.0094
	2021	13.73 ^f	21.15 ^f	0.013	0.571	0.0014	0.0104
	2022	14.63 ^f	22.73 ^f	0.011	0.525 ^f	0.0012	0.0122
	2023	18.51 ^f	27.52 ^f	0.014	0.66	0.0013	0.0113
	2024	14.8	23.21	0.013	0.673	0.0018	0.0109
Pengerang	2020	9.16 ^f	14.41 ^f	-	-	0.0013	0.0038
	2021	11.54 ^f	17.57 ^f	-	-	0.0014	0.0035
	2022	11.69	15.96	-	-	0.0012	0.0045
	2023	11.66 ^f	18.51 ^f	-	-	0.001	0.0036
	2024	11.22	19.24	-	-	0.001	0.0035
Segamat	2020	12.97	19.13 ^f	0.015	0.562	0.0017	0.0046 ^f
	2021	13.33 ^f	18.85 ^f	0.016	0.605	0.0021	0.0048 ^f
	2022	14.42 ^f	19.46 ^f	0.014	0.567	0.002	0.0053
	2023	17.00 ^f	23.31 ^f	0.013	0.587	0.0019	0.006
	2024	12.6	17.62	0.015	0.709	0.0021	0.0067
Tangkak	2020	12.36 ^f	20.71 ^f	0.014	0.482 ^f	0.0011	0.0039
	2021	13.99 ^f	23.45 ^f	0.016	0.601 ^f	0.0014	0.0045
	2022	13.39 ^f	20.09 ^f	0.015	0.540 ^f	0.0015	0.0055
	2023	16.69 ^f	25.22 ^f	0.012	0.639	0.0016	0.0057
	2024	14.45	22.17	0.01	0.59	0.002	0.0053

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 1.21: Purata bulanan kepekatan Habuk Halus (PM_{2.5}) di udara, Johor, 2020-2024

Table 1.21: Monthly average concentration of Particulate Matter (PM_{2.5}) in the air, Johor, 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.
Batu Pahat	2020	9.49	9.12	12.80	10.19	10.34	10.55	9.80	14.00	9.88	12.03	9.26	10.30
	2021	8.57	16.67	15.66	14.98	12.02	15.21	16.57	10.16	10.79	13.39	9.78	8.86
	2022	9.15	8.40	10.30	11.24	13.04	9.76	14.38	12.62	12.68	8.96	9.23	9.22
	2023	11.65	7.2	9.35	18.2	12.18	14.6	13.4	14.24	19.39	37.79	9.32	7.22
	2024	8.21	12.37	14.89	15.94	14.70	17.80	20.11	18.92	20.71	13.97	10.01	12.04
Kluang	2020	6.74	6.93	10.42	7.60	8.57	9.36	9.59	11.02	7.71	10.43	6.72	8.67
	2021	6.83	11.83	10.76	12.62	10.83	13.56	13.52	9.17	9.19	12.93	8.26	8.01
	2022	7.77	6.81	9.09	10.08	12.98	10.35	12.63	11.82	10.20	9.17	9.35	10.32
	2023	10.13	7.85	11.46	18.92	13.11	16.72	15.45	15.24	20.09	23.47	10.64	7.80
	2024	8.36	11.41	13.33	14.20	14.75	17.67	26.72	13.41	13.78	13.87	8.49	8.38
Kota Tinggi	2020	6.95	7.15	7.85	7.76	9.39	8.53	7.32	9.58	7.86	12.07	7.51	7.32
	2021	7.75	11.08	9.29	13.15	9.01	13.35	11.75	9.15	9.84	11.77	9.11	6.79
	2022	6.22	4.92	6.74	11.06	11.36	10.77	9.95	10.38	13.02	11.78	8.52	7.61
	2023	7.71	8.19	10.19	16.76	12.33	11.76	12.53	15.88	17.6	23.91	10.44	5.75
	2024	5.91	8.29	9.60	9.18	8.90	10.39	14.22	11.20	13.87	14.04	10.28	9.55
Larkin	2020	12.80	13.38	14.98	13.03	15.03	15.31	14.27	17.19	16.30	16.79	14.95	13.40
	2021	11.45	16.12	16.05	20.77	18.49	19.52	18.01	14.45	14.97	19.85	15.48	13.88
	2022	12.51	13.14	14.53	18.69	18.66	21.09	20.33	21.43	20.64	15.09	14.23	13.39
	2023	16.26	13.41	15.32	27.34	19.69	20.8	20.85	24.1	28.03	37.3	18.83	15.14
	2024	12.63	14.36	15.52	19.23	16.43	17.59	18.85	19.04	19.41	21.13	16.57	14.40
Pasir Gudang	2020	8.54	8.78	11.52	11.23	13.72	14.63	13.97	16.54	14.20	16.18	12.70	10.30
	2021	7.88	13.59	12.53	16.54	15.19	16.37	15.29	12.57	14.15	15.78	14.29	10.65
	2022	10.48	9.71	13.19	18.86	18.28	17.76	16.07	16.46	18.44	14.84	11.36	10.10
	2023	9.94	7.89	12.06	24.51	17.90	19.54	18.69	21.25	30.77	30.93	17.07	11.62
	2024	9.20	12.48	11.96	14.79	15.39	14.58	16.80	16.68	17.93	21.43	14.74	11.64
Pengerang	2020	9.26	7.60	12.67	10.59	9.17	6.99	7.19	10.38	8.26	10.89	7.80	9.09
	2021	9.26	17.99	13.66	12.06	9.23	11.52	11.10	9.45	12.09	12.97	10.54	8.65
	2022	9.87	9.06	9.04	15.04	16.74	13.52	12.85	11.21	13.19	13.77	9.80	6.23
	2023	6.60	7.31	8.77	15.23	10.33	10.77	12.15	16.29	16.38	20.26	9.57	6.32
	2024	6.83	8.57	9.70	10.78	9.90	11.30	14.73	12.99	16.47	12.87	8.85	11.66
Segamat	2020	9.92	10.15	15.95	16.35	13.50	14.05	11.13	14.68	12.30	16.60	10.02	10.94
	2021	8.53	13.72	16.27	16.15	13.50	16.03	16.45	12.52	12.20	15.01	10.19	9.40
	2022	8.55	7.59	12.37	14.43r	15.06	15.71	19.71	16.59	22.99	20.52	11.84	7.65
	2023	9.18	7.85	14.19	28.22	23.35	15.89	17.41	19.01	23.99	27.66	10.34	6.94
	2024	7.43	12.25	15.69	15.13	12.67	14.18	17.81	13.77	12.86	13.16	8.20	8.06
Tangkak	2020	11.86	11.12	15.72	11.31	10.75	12.43	10.87	13.74	12.12	13.78	11.22	13.43
	2021	11.66r	21.01r	18.14r	16.51r	12.20r	14.43r	14.49r	10.17r	11.62r	14.12r	12.56r	10.91r
	2022	11.16	8.36	13.65	13.36	14.30	16.00	16.70	14.08	14.13	13.01	12.49	13.42
	2023	11.77	9.77	13.01	22.25	17.38	18.89	13.75	16.56	22.58	32.21	11.86	10.20
	2024	11.03	14.04	17.13	16.62	11.86	14.73	17.68	15.31	17.88	14.20	10.84	12.07

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 1.22: Purata bulanan kepekatan Habuk Halus (PM₁₀) di udara, Johor, 2020-2024

Table 1.22: Monthly average concentration of Particulate Matter (PM₁₀) in the air, Johor, 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.
Batu Pahat	2020	16.90	16.84	19.49	16.27	17.35	17.92	16.36	20.30	14.07	14.14	16.51	17.03
	2021	16.04	24.22	22.35	21.51	17.50	20.69	22.90	15.71	15.86	18.70	15.10	14.62
	2022	15.36	13.14	15.86	16.39	18.88	14.66	19.80	16.90	17.19	12.89	15.78	15.92
	2023	16.85	13.23	14.91	23.05	14.08	18.31	17.81	17.93	22.01	43.30	16.57	13.60
	2024	14.99	19.70	23.48	24.38	22.23	26.61	28.02	25.84	27.55	20.35	15.48	17.30
Kluang	2020	13.62	13.79	16.20	12.00	14.44	16.61	15.15	14.78	10.15	14.48	11.10	15.72
	2021	14.64	21.35	17.55	20.01	17.07	19.33	19.78	14.28	14.18	18.47	13.42	10.48
	2022	13.65	11.68	14.82	15.91	19.12	15.53	18.20	15.39	12.66	15.25	14.78	16.88
	2023	17.78	16.46	17.29	25.80	18.65	22.72	23.11	21.56	26.36	28.65	16.51	12.75
	2024	14.89	18.32	20.19	21.04	23.21	25.93	36.50	20.15	20.61	20.40	13.30	12.47
Kota Tinggi	2020	15.84	16.64	16.20	14.18	18.46	15.14	12.32	15.51	13.47	17.70	12.97	13.38
	2021	15.78	20.30	14.09	18.27	13.84	18.34	16.69	13.44	14.00	16.80	13.84	13.09
	2022	7.91	6.75	11.61	16.32	16.77	16.04	14.84	14.78	16.89	13.70	12.84	13.92
	2023	13.55	16.01	18.37	22.47	17.20	18.00	19.76	24.27	25.37	29.73	15.08	11.07
	2024	12.59	15.71	15.61	13.65	15.50	17.50	22.82	19.71	21.43	20.58	15.06	15.21
Larkin	2020	22.95	24.36	22.57	18.21	21.71	23.21	22.33	26.23	24.68	24.70	23.12	21.72
	2021	21.30	29.17	25.16	30.59	27.92	27.54	22.31	17.59	17.96	27.43	22.50	21.60
	2022	20.27	20.58	22.46	24.58	23.11	28.11	30.33	32.22	30.81	23.54	23.38	22.98
	2023	26.88	25.00	27.78	40.23	30.54	33.31	32.52	38.80	43.82	51.81	28.07	22.88
	2024	20.93	23.29	24.03	28.24	25.74	27.02	29.13	28.97	28.67	31.01	24.58	21.99
Pasir Gudang	2020	16.86	18.44	18.16	15.93	19.29	23.31	22.87	27.13	23.05	25.82	19.74	16.77
	2021	16.09	24.57	19.96	24.75	22.12	13.69	23.32	18.77	20.45	21.25	20.07	18.53
	2022	18.94	15.56	20.41	26.35	26.42	26.77	27.25	27.18	28.55	21.58	17.31	16.44
	2023	14.08	12.08	20.28	33.01	25.96	29.95	30.31	35.48	47.08	40.95	24.32	16.74
	2024	16.07	21.26	20.53	21.57	25.55	21.97	23.90	26.26	28.47	31.68	22.27	18.97
Pengerang	2020	17.23	15.06	18.09	14.19	13.37	11.35	11.46	15.70	12.28	14.52	13.86	15.83
	2021	17.95	28.98	19.49	18.17	13.75	16.86	17.25	13.62	15.97	18.08	15.63	15.07
	2022	15.75	12.98	13.38	18.20	20.37	16.03	15.85	13.95	16.53	17.88	16.47	14.19
	2023	12.39	16.44	19.58	22.74	15.45	16.51	18.15	23.65	22.70	25.89	15.55	13.02
	2024	15.18	17.36	16.53	16.49	15.80	19.12	25.37	23.14	25.66	20.82	16.14	19.25
Segamat	2020	18.75	19.41	21.83	20.16	19.04	20.13	17.07	20.81	15.93	23.34	16.02	17.10
	2021	15.44	22.08	21.94	22.54	18.61	21.50	22.21	16.74	15.81	19.84	14.82	14.72
	2022	14.28	11.60	17.11	17.35	18.01	21.33	26.13	22.14	28.04	25.61	17.37	14.52
	2023	14.65	15.31	20.58	34.12	27.93	21.67	24.98	26.13	32.47	34.92	15.59	11.37
	2024	13.87	15.43	17.87	20.78	18.46	20.21	25.40	19.30	18.26	17.33	11.90	12.62
Tangkak	2020	21.27	20.14	26.40	20.09	18.85	21.96	17.82	19.87	17.42	18.40	21.98	24.32
	2021	21.11	33.43	28.71	30.92	21.62	21.66	21.41	17.04	18.77	23.31	23.58	19.85
	2022	17.79	11.65	18.48	17.63	16.77	24.84	25.74	22.13	22.33	21.28	20.78	21.64
	2023	18.78	20.79	24.53	34.18	28.65	27.38	21.57	22.47	27.49	39.28	19.89	17.64
	2024	19.60	21.75	26.12	24.76	19.41	23.17	26.58	22.05	25.27	21.63	15.90	19.78

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 1.23: Purata bulanan kepekatan Ozon Permukaan Bumi (O₃) di udara, Johor, 2020-2024

Table 1.23: Monthly average concentration of Ground Level Ozone (O₃) in the air, Johor, 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.
Batu Pahat	2020	0.017	0.019	0.021	0.016	0.017	0.013	0.015	0.014	0.015	0.016	0.016	0.018
	2021	0.020	0.025	0.018	0.022	0.017	0.018	0.015	0.014	0.017	0.018	0.016	0.019
	2022	0.019	0.015	0.018	0.019	0.020	0.017	0.014	0.015	0.015	0.015	0.016	0.018
	2023	0.019	0.016	0.018	0.022	0.019	0.016	0.014	0.016	0.020	0.027	0.021	0.015
	2024	0.014	0.017	0.019	0.021	0.021	0.019	0.019	0.017	0.018	0.020	0.017	0.021
Kota Tinggi	2020	0.025	0.027	0.023	0.022	0.021	0.011	0.011	0.014	0.012	0.016	0.014	0.025
	2021	0.031	0.033	0.022	0.020	0.016	0.019	0.017	0.014	0.017	0.019	0.017	0.027
	2022	0.025	0.019	0.020	0.020	0.021	0.017	0.016	0.015	0.016	0.018	0.017	0.024
	2023	0.027	0.025	0.024	0.022	0.021	0.017	0.018	0.018	0.021	0.022	0.023	0.024
	2024	0.025	0.025	0.024	0.019	0.016	0.017	0.024	0.017	0.021	0.023	0.022	0.029
Larkin	2020	0.017	0.019	0.018	0.018	0.016	0.010	0.009	0.012	0.010	0.013	0.011	0.017
	2021	0.019	0.026	0.015	0.018	0.013	0.014	0.014	0.010	0.014	0.015	0.013	0.018
	2022	0.018	0.012	0.013	0.015	0.017	0.012	0.012	0.011	0.012	0.013	0.013	0.015
	2023	0.019	0.016	0.016	0.019	0.016	0.012	0.011	0.012	0.016	0.018	0.015	0.009
	2024	0.012	0.016	0.016	0.015	0.011	0.014	0.016	0.011	0.014	0.014	0.012	0.019
Pasir Gudang	2020	0.018	0.020	0.018	0.018	0.015	0.008	0.008	0.011	0.009	0.011	0.010	0.016
	2021	0.018	0.023	0.014	0.014	0.011	0.012	0.012	0.008	0.011	0.013	0.010	0.014
	2022	0.014	0.010	0.013	0.014	0.014	0.008	0.009	0.009	0.009	0.011	0.011	0.015
	2023	0.019	0.016	0.016	0.018	0.016	0.011	0.011	0.012	0.015	0.016	0.013	0.011
	2024	0.012	0.015	0.015	0.014	0.010	0.012	0.017	0.011	0.013	0.013	0.010	0.018
Segamat	2020	0.018	0.019	0.016	0.015	0.015	0.013	0.013	0.013	0.012	0.015	0.012	0.016
	2021	0.020	0.024	0.015	0.018	0.014	0.016	0.016	0.014	0.015	0.016	0.013	0.017
	2022	0.016	0.012	0.014	0.015	0.016	0.014	0.014	0.015	0.015	0.013	0.012	0.016
	2023	0.017	0.015	0.013	0.010	0.009	0.006	0.010	0.014	0.012	0.014	0.018	0.014
	2024	0.012	0.017	0.019	0.017	0.018	0.018	0.016	0.013	0.013	0.014	0.012	0.014
Tangkak	2020	0.020	0.021	0.017	0.011	0.013	0.012	0.012	0.014	0.013	0.013	0.010	0.014
	2021	0.019	0.022	0.012	0.012	0.012	0.013	0.014	0.011	0.019	0.021	0.019	0.023
	2022	0.023	0.015	0.016	0.014	0.018	0.018	0.018	0.015	0.014	0.011	0.011	0.013
	2023	0.017	0.016	0.014	0.015	0.013	0.011	0.008	0.011	0.014	0.014	0.008	0.007
	2024	0.008	0.011	0.009	0.008	0.008	0.009	0.014	0.013	0.010	0.010	0.007	0.012

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 1.24: Purata bulanan kepekatan Karbon Monoksida (CO) di udara, Johor, 2020-2024

Table 1.24: Monthly average concentration of Carbon Monoxide (CO) in the air, Johor, 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.
Batu Pahat	2020	0.550	0.516	0.541	0.515	0.498	0.450	0.498	0.483	0.410	0.646	0.566	0.573
	2021	0.481	0.554	0.553	0.604	0.502	0.508	0.544	0.590	0.571	0.551	0.356	0.429
	2022	0.500	0.442	0.416	0.481	0.503	0.450	0.477	0.452	0.476	0.412	0.453	0.499
	2023	0.492	0.321	0.333	0.540	0.466	0.342	0.402	0.448	0.539	0.613	0.437	0.382
	2024	0.427	0.465	0.469	0.533	0.337	0.385	0.551	0.547	0.572	0.459	0.360	0.353
Kota Tinggi	2020	0.429	0.372	0.438	0.455	0.539	0.418	0.510	0.516	0.489	0.520	0.398	0.412
	2021	0.427	0.397	0.351	0.492	0.466	0.368	0.326	0.313	0.432	0.400	0.398	0.263
	2022	0.311	0.269	0.301	0.413	0.316	0.303	0.294	0.289	0.431	0.439	0.418	0.440
	2023	0.629	0.540	0.504	0.716	0.421	0.527	0.477	0.440	0.591	0.624	0.453	0.478
	2024	0.364	0.388	0.505	0.353	0.434	0.477	0.562	0.494	0.481	0.496	0.410	0.493
Larkin	2020	0.355	0.375	0.372	0.328	0.356	0.509	0.350	0.371	0.353	0.400	0.317	0.267
	2021	0.217	0.189	0.280	0.381	0.412	0.571	0.503	0.506	0.450	0.396	0.680	0.558
	2022	0.579	0.532	0.625	0.706	0.640	0.766	0.645	0.700	0.723	0.656	0.610	0.586
	2023	0.572	0.491	0.557	0.770	0.728	0.765	0.635	0.744	0.768	0.865	0.490	0.615
	2024	0.530	0.414	0.511	0.707	0.848	0.754	0.724	0.580	0.542	0.853	0.508	0.533
Pasir Gudang	2020	0.410	0.511	0.503	0.449	0.584	0.688	0.588	0.594	0.629	0.638	0.700	0.650
	2021	0.513	0.566	0.610	0.764	0.679	0.578	0.460	0.549	0.505	0.491	0.587	0.554
	2022	0.446	0.327	0.365	0.486	0.589	0.576	0.503	0.524	0.592	0.588	0.704	0.604
	2023	0.579	0.601	0.629	0.569	0.593	0.836	0.706	0.748	0.768	0.631	0.609	0.654
	2024	0.562	0.533	0.682	0.632	0.798	0.832	0.509	0.617	0.763	0.806	0.698	0.639
Segamat	2020	0.637	0.643	0.540	0.520	0.487	0.550	0.517	0.585	0.499	0.448	0.685	0.635
	2021	0.660	0.562	0.625	0.615	0.627	0.578	0.670	0.527	0.612	0.584	0.544	0.652
	2022	0.482	0.538	0.581	0.588	0.550	0.645	0.608	0.575	0.573	0.608	0.529	0.531
	2023	0.615	0.553	0.585	0.621	0.498	0.723	0.482	0.644	0.691	0.574	0.476	0.586
	2024	0.732	0.561	0.720	0.833	0.875	0.767	0.341	0.890	0.956	0.894	0.596	0.348
Tangkak	2020	0.644	0.585	0.685	0.520	0.539	0.480	0.361	0.479	0.304	0.293	0.371	0.517
	2021	0.633	0.681	0.620	0.644	0.581	0.699	0.417	0.543	0.562	0.682	0.606	0.547
	2022	0.539	0.536	0.639	0.623	0.511	0.335	0.543	0.493	0.601	0.522	0.509	0.624
	2023	0.595	0.488	0.548	0.706	0.698	0.676	0.610	0.618	0.737	0.691	0.685	0.612
	2024	0.620	0.705	0.768	0.768	0.681	0.668	0.472	0.527	0.447	0.293	0.396	0.736

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 1.25: Purata bulanan kepekatan Sulfur Dioksida (SO₂) di udara, Johor, 2020-2024

Table 1.25: Monthly average concentration of Sulphur Dioxide (SO₂) in the air, Johor, 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.
Batu Pahat	2020	0.0015	0.0017	0.0019	0.0019	0.0019	0.0015	0.0018	0.0019	0.0018	0.0015	0.0016	0.0019
	2021	0.0018	0.0020	0.0018	0.0019	0.0019	0.0014	0.0015	0.0017	0.0020	0.0010	0.0012	0.0013
	2022	0.0014	0.0016	0.0017	0.0016	0.0018	0.0017	0.0013	0.0016	0.0013	0.0017	0.0013	0.0016
	2023	0.0015	0.0019	0.0014	0.0015	0.0011	0.0013	0.0013	0.0015	0.0015	0.0011	0.0014	0.0013
	2024	0.0013	0.0013	0.0016	0.0012	0.0017	0.0014	0.0018	0.0019	0.0016	0.0015	0.0015	0.0014
Kota Tinggi	2020	0.0013	0.0012	0.0009	0.0011	0.0013	0.0013	0.0009	0.0010	0.0012	0.0015	0.0008	0.0010
	2021	0.0009	0.0012	0.0008	0.0010	0.0010	0.0015	0.0012	0.0012	0.0009	0.0012	0.0016	0.0015
	2022	0.0013	0.0012	0.0012	0.0010	0.0009	0.0015	0.0011	0.0014	0.0017	0.0014	0.0015	0.0010
	2023	0.0014	0.0015	0.0009	0.0012	0.0016	0.0016	0.0017	0.0012	0.0013	0.0015	0.0011	0.0013
	2024	0.0016	0.0012	0.0017	0.0013	0.0017	0.0017	0.0014	0.0018	0.0014	0.0019	0.0014	0.0016
Larkin	2020	0.0015	0.0016	0.0018	0.0019	0.0020	0.0014	0.0012	0.0017	0.0020	0.0021	0.0019	0.0020
	2021	0.0021	0.0021	0.0018	0.0019	0.0018	0.0019	0.0024	0.0019	0.0019	0.0018	0.0017	0.0017
	2022	0.0018	0.0021	0.0023	0.0023	0.0024	0.0021	0.0005	0.0012	0.0022	0.0022	0.0023	0.0024
	2023	0.0027	0.0024	0.0026	0.0025	0.0031	0.0031	0.0028	0.0026	0.0027	0.0027	0.0025	0.0020
	2024	0.0019	0.0023	0.0025	0.0023	0.0025	0.0027	0.0026	0.0028	0.0030	0.0029	0.0022	0.0021
Pasir Gudang	2020	0.0009	0.0010	0.0010	0.0011	0.0011	0.0010	0.0010	0.0011	0.0012	0.0013	0.0012	0.0012
	2021	0.0013	0.0014	0.0015	0.0015	0.0013	0.0013	0.0015	0.0011	0.0013	0.0021	0.0012	0.0011
	2022	0.0011	0.0011	0.0012	0.0012	0.0013	0.0015	0.0012	0.0010	0.0009	0.0009	0.0015	0.0018
	2023	0.0015	0.0009	0.0010	0.0010	0.0012	0.0011	0.0011	0.0013	0.0013	0.0020	0.0017	0.0016
	2024	0.0017	0.0017	0.0018	0.0017	0.0019	0.0017	0.0016	0.0017	0.0021	0.0024	0.0020	0.0013
Pengerang	2020	0.0010	0.0010	0.0014	0.0015	0.0015	0.0015	0.0015	0.0011	0.0010	0.0012	0.0014	0.0017
	2021	0.0010	0.0025	0.0015	0.0012	0.0010	0.0012	0.0014	0.0015	0.0016	0.0012	0.0015	0.0011
	2022	0.0013	0.0013	0.0011	0.0014	0.0013	0.0010	0.0010	0.0013	0.0013	0.0010	0.0013	0.0008
	2023	0.0010	0.0010	0.0010	0.0009	0.0012	0.0009	0.0010	0.0008	0.0008	0.0009	0.0011	0.0009
	2024	0.0009	0.0012	0.0012	0.0011	0.0012	0.0010	0.0011	0.0005	0.0010	0.0011	0.0007	0.0009
Segamat	2020	0.0009	0.0014	0.0012	0.0014	0.0012	0.0017	0.0020	0.0023	0.0025	0.0019	0.0012	0.0026
	2021	0.0023	0.0023	0.0023	0.0031	0.0031	0.0032	0.0011	0.0009	0.0013	0.0014	0.0023	0.0023
	2022	0.0019	0.0018	0.0020	0.0021	0.0018	0.0020	0.0015	0.0020	0.0022	0.0024	0.0025	0.0018
	2023	0.0021	0.0023	0.0009	0.0016	0.0020	0.0019	0.0022	0.0023	0.0023	0.0024	0.0013	0.0013
	2024	0.0017	0.0022	0.0026	0.0013	0.0014	0.0022	0.0027	0.0024	0.0022	0.0022	0.0023	0.0017
Tangkak	2020	0.0013	0.0012	0.0009	0.0009	0.0010	0.0010	0.0009	0.0012	0.0015	0.0012	0.0009	0.0011
	2021	0.0012	0.0015	0.0015	0.0013	0.0009	0.0014	0.0013	0.0011	0.0016	0.0018	0.0017	0.0009
	2022	0.0010	0.0014	0.0016	0.0011	0.0015	0.0016	0.0015	0.0020	0.0015	0.0012	0.0018	0.0018
	2023	0.0019	0.0017	0.0018	0.0014	0.0015	0.0014	0.0014	0.0018	0.0022	0.0010	0.0014	0.0019
	2024	0.0018	0.0018	0.0023	0.0025	0.0023	0.0020	0.0019	0.0021	0.0015	0.0022	0.0019	0.0020

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 1.26: Purata bulanan kepekatan Nitrogen Dioksida (NO₂) di udara, Johor, 2020-2024

Table 1.26: Monthly average concentration of Nitrogen Dioxide (NO₂) in the air, Johor, 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.
Batu Pahat	2020	0.0031	0.0029	0.0040	0.0027	0.0043	0.0050	0.0057	0.0059	0.0057	0.0064	0.0043	0.0044
	2021	0.0029	0.0039	0.0043	0.0054	0.0051	0.0051	0.0055	0.0037	0.0049	0.0051	0.0044	0.0036
	2022	0.0032	0.0033	0.0046	0.0051	0.0065	0.0046	0.0043	0.0046	0.0041	0.0044	0.0044	0.0035
	2023	0.0035	0.0024	0.0030	0.0053	0.0048	0.0045	0.0049	0.0052	0.0056	0.0058	0.0040	0.0033
	2024	0.0025	0.0030	0.0038	0.0047	0.0051	0.0053	0.0055	0.0041	0.0046	0.0048	0.0039	0.0036
Kota Tinggi	2020	0.0010	0.0010	0.0015	0.0018	0.0036	0.0039	0.0040	0.0040	0.0046	0.0060	0.0033	0.0017
	2021	0.0013	0.0012	0.0025	0.0050	0.0041	0.0040	0.0028	0.0037	0.0040	0.0051	0.0043	0.0018
	2022	0.0013	0.0017	0.0025	0.0049	0.0048	0.0058	0.0038	0.0053	0.0063	0.0055	0.0044	0.0023
	2023	0.0020	0.0013	0.0016	0.0044	0.0054	0.0049	0.0048	0.0040	0.0040	0.0043	0.0037	0.0021
	2024	0.0014	0.0010	0.0015	0.0035	0.0044	0.0056	0.0036	0.0050	0.0051	0.0075	0.0050	0.0024
Larkin	2020	0.0070	0.0077	0.0068	0.0039	0.0090	0.0102	0.0106	0.0111	0.0111	0.0111	0.0105	0.0083
	2021	0.0065	0.0059	0.0091	0.0139	0.0118	0.0100	0.0095	0.0092	0.0107	0.0116	0.0106	0.0070
	2022	0.0062	0.0068	0.0103	0.0138	0.0123	0.0127	0.0141	0.0143	0.0136	0.0110	0.0105	0.0092
	2023	0.0089	0.0064	0.0079	0.0144	0.0134	0.0138	0.0142	0.0156	0.0158	0.0165	0.0138	0.0095
	2024	0.0076	0.0053	0.0064	0.0135	0.0164	0.0148	0.0132	0.0132	0.0139	0.0160	0.0133	0.0084
Pasir Gudang	2020	0.0038	0.0039	0.0048	0.0047	0.0110	0.0133	0.0121	0.0120	0.0130	0.0155	0.0112	0.0077
	2021	0.0046	0.0040	0.0082	0.0154	0.0134	0.0134	0.0110	0.0113	0.0129	0.0123	0.0114	0.0070
	2022	0.0054	0.0063	0.0091	0.0151	0.0136	0.0160	0.0142	0.0161	0.0156	0.0142	0.0116	0.0093
	2023	0.0068	0.0058	0.0068	0.0145	0.0155	0.0133	0.0126	0.0125	0.0127	0.0137	0.0131	0.0080
	2024	0.0062	0.0037	0.0060	0.0124	0.0151	0.0162	0.0115	0.0116	0.0126	0.0160	0.0120	0.0069
Pengerang	2020	0.0020	0.0022	0.0028	0.0030	0.0053	0.0048	0.0041	0.0039	0.0047	0.0068	0.0036	0.0023
	2021	0.0012	0.0014	0.0030	0.0045	0.0028	0.0044	0.0039	0.0049	0.0046	0.0047	0.0044	0.0021
	2022	0.0017	0.0020	0.0026	0.0049	0.0049	0.0058	0.0040	0.0067	0.0066	0.0069	0.0053	0.0027
	2023	0.0022	0.0013	0.0017	0.0043	0.0054	0.0041	0.0042	0.0051	0.0047	0.0043	0.0038	0.0021
	2024	0.0013	0.0014	0.0018	0.0027	0.0041	0.0040	0.0040	0.0041	0.0048	0.0065	0.0046	0.0026
Segamat	2020	0.0035	0.0039	0.0027	0.0029	0.0038	0.0055	0.0055	0.0061	0.0056	0.0064	0.0046	0.0052
	2021	0.0040	0.0036	0.0042	0.0064	0.0058	0.0045	0.0048	0.0053	0.0050	0.0055	0.0052	0.0037
	2022	0.0043	0.0036	0.0044	0.0054	0.0062	0.0063	0.0061	0.0063	0.0062	0.0052	0.0050	0.0041
	2023	0.0044	0.0034	0.0042	0.0070	0.0068	0.0067	0.0073	0.0079	0.0072	0.0068	0.0058	0.0050
	2024	0.0061	0.0062	0.0062	0.0068	0.0077	0.0073	0.0065	0.0071	0.0076	0.0070	0.0061	0.0058
Tangkak	2020	0.0031	0.0029	0.0044	0.0028	0.0021	0.0043	0.0037	0.0037	0.0050	0.0065	0.0038	0.0046
	2021	0.0028	0.0038	0.0048	0.0052	0.0039	0.0037	0.0041	0.0039	0.0051	0.0062	0.0061	0.0043
	2022	0.0045	0.0038	0.0049	0.0053	0.0060	0.0069	0.0055	0.0052	0.0057	0.0057	0.0067	0.0053
	2023	0.0047	0.0036	0.0043	0.0069	0.0072	0.0063	0.0060	0.0066	0.0065	0.0071	0.0045	0.0041
	2024	0.0039	0.0047	0.0062	0.0057	0.0045	0.0049	0.0050	0.0060	0.0057	0.0062	0.0052	0.0053

Nota: Garis Panduan Kualiti Udara Malaysia: NO₂ tidak melebihi 0.16 ppm
Notes: Malaysian Ambient Air Quality Guidelines: NO₂ not exceeding 0.16 ppm

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

Jadual 1.27: Status kualiti air marin di kawasan pantai, muara sungai dan pulau berdasarkan Indeks Kualiti Air Marin, Johor, 2020-2024

Table 1.27: Status of marine water quality in coastal, estuary and island areas based on Marine Water Quality Index, Johor, 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	12	7	7	3	17	5	7	-	14	8	7	-	19	3	7	-
Muara Estuary	-	1	3	2	1	-	5	-	1	-	4	1	-	1	5	-
Pulau Island	5	1	2	-	5	1	2	-	7	1	-	-	7	-	1	-

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, Johor, 2019-2023

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

Hektar
Hectares

Tahun Year	2019	2020	2021	2022	2023
Keluasan Area	1,528	2,240	1,745	801	1,012

Sumber: Jabatan Perhutanan Semenanjung Malaysia

Source: Forest Department Peninsular Malaysia

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

Table 2.2: Production of major timber products, Johor, 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	35,007	450,215	13,290	12,028	4122
2020	21,307	324,876	12,096	9930	7,470
2021	4,202	129,592	14,278	4,302	5,932
2022	11,364	174,221	12,399	8,213	8,736
2023	2,488	188,911	19	10,693	6,755

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, Johor, 2020-2024

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

Tan metrik ('000)
Metric tonnes

Negeri Year	2020		2021		2022		2023		2024	
	Kuantiti	%	Kuantiti	%	Kuantiti	%	Kuantiti	%	Kuantiti	%
	Quantity		Quantity		Quantity		Quantity		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
Johor	70.2	5.1	51.4	3.9	57.7	4.4	49.8	3.9	59.1	4.2

Sumber: Jabatan Perikanan Malaysia

Source: Department of Fisheries Malaysia

Jadual 2.4: Bilangan ternakan, Johor, 2020-2024

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

Bilangan
Number

Negeri State	Tahun Year	Jenis ternakan Type of livestock						
		Kerbau	Lembu	Kambing	Bebiri	Babi	Ayam	Itik
		Buffalo	Cattle	Goat	Sheep	Swine	Chicken	Duck
Johor	2020	3,544	95,581	33,195	17,576	283,800	62,132,805	1,010,173
	2021	3,936	103,936	35,731	18,135	240,752	51,862,940	1,015,063
	2022	4,503	107,799	38,458	20,251	207,912	54,170,061	1,015,063
	2023	4,512	112,812	41,453	26,356	129,539	53,192,051	1,015,063
	2024	4,588	115,402	42,260	25,993	128,232	55,103,317	1,022,269

Sumber: Jabatan Perkhidmatan Veterinar

Source: Department of Veterinary Services

Jadual 2.5: Rekabentuk kapasiti loji rawatan air, Johor, 2020-2024

Table 2.5: Water treatment plants design capacity, Johor, 2020-2024

Negeri State	Juta liter sehari (JLH) Million litres per day (MLD)				
	2020	2021	2022	2023	2024
Johor	2,098	2,133	2,133	2,313	2,352

Nota/ Notes:

Mulai 2016, rekabentuk kapasiti untuk Johor, Perlis dan Terengganu adalah termasuk pengendali swasta di mana kapasiti yang ditetapkan berdasarkan kepada perjanjian kedua-dua belah pihak

Beginning of 2016, design capacity for Johor, Perlis and Terengganu include private operator where the designated capacity based on agreement both parties

Jadual 2.6: Pengeluaran air yang dibekalkan, Johor, 2020-2024

Table 2.6: Production of water supplied, Johor, 2020-2024

Negeri State	Juta liter sehari (JLH) Million litres per day (MLD)				
	2020	2021	2022	2023	2024
Johor	1,831	1,848	1,837	1,867	2,001

Note: Mulai 2016, pengeluaran air untuk Johor, Perlis dan Terengganu adalah termasuk pengendali swasta

Notes: Beginning of 2016, production of water for Johor, Perlis and Terengganu include private operator

Jadual 2.7: Bekalan air mentah diabstrak dari sungai dan empangan, Johor, 2020-2024

Table 2.7: Supply of abstracted raw water from rivers and storage dams, Johor, 2020-2024

Tahun Year	Juta liter sehari (JLH) Million litres per day (MLD)				
	2020	2021	2022	2023	2024
Sungai Rivers	1,162	1,142	1,145	1,192	1,180
Empangan Dams	749	729	751	754	842

Jadual 2.8: Penggunaan air bermeter mengikut sektor, Johor, 2020-2024

Table 2.8: Metered water consumption by sector, Johor, 2020-2024

Negeri State	Sektor Sector									
	Domestik Domestic					Bukan domestik Non-domestic				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Johor	867	879	867	883	901	526	505	536	572	610

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

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

Jadual 3.1: Loji rawatan pembetulan awam, Johor, 2022-2024

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

Tahun Year	LRP multipoint ¹ Multipoint STP			Loji serantau ² Regional plant			Jumlah Total		
	2022	2023	2024	2022	2023	2024	2022	2023	2024
Population equivalent (PE)	4,055,962	4,184,213	4,830,547	1,074,398	1,074,398 ^f	629,746	5,130,360	5,258,611 ^f	5,460,293

Sumber: Suruhanjaya Perkhidmatan Air Negara
Source: National Water Services Commission

Nota/ Notes:

- ¹ LRP multipoint: STP untuk memenuhi pembangunan yang sporadis dan bertaburan oleh pemaju 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 Pembetulan untuk menampung kawasan tadahan pembetulan
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, Johor, 2024

Table 3.2: List and capacity of municipal waste treatment and disposal facilities, Johor, 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 Seelong	2,101.9	108.0	-	-	-
TP Buluh Kasap	438.6	31.6	-	-	-
TP Maokil, Labis	428.4	12.0	-	-	-
TP Jemaluang	50.9	4.3	-	-	-
TP Batu 4	696.4	14.6	-	-	-
TP Tanjung Langsung	429.5	10.5	-	-	-
TP Bandar Penawar	5.8	11.5	-	-	-

Nota/ Notes:

- 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)

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

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

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

Nama Kemudahan/ Tapak Pelupusan Facility Name/ Disposal Site	Purata sisa yang diterima (tan/ hari) Average residue received (tonnes/ day)
TP Buluh Kasap	438.6
TP Maokil, Labis	428.4
TP Jemaluang	50.9
TP Batu 4	696.4
TP Pekan Nenas	1,554.8

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, Johor, 2024

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

Tapak pelupusan di bawah seliaan SWCorp Disposal site under SWCorp	Tapak pelupusan bukan di bawah seliaan SWCorp Disposal site not under SWCorp
5	2

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, Johor, 2020-2024

Table 3.5: Scheduled waste, Johor, 2020-2024

Tahun Year	2020	2021	2022	2023	2024
Kuantiti Quantity	1,209,294	1,031,128	1,324,255	1,215,751	644,832

Tan metrik
Metric tonnes

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

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

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

Tahun Year	2020	2021	2022	2023	2024
Kuantiti Quantity	3,989.6	5,567.5	4,652.6	1,435.1	4,726.9

Tan metrik
Metric tonnes

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

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

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

Tahun Year	Sanitari Sanitary	Bukan sanitari Non-sanitary	Lengai Inert
2020	1	8	-
2021	1	7	-
2022	1	7	-
2023	1	6	-
2024	1	6	-

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

Jadual 4.1: Kejadian bencana, Johor, 2020-2024

Table 4.1: Disaster events, Johor, 2020-2024

Tahun Year	Bilangan kejadian Number of events	Mangsa Victim	Keluarga Family	Pusat pemindahan Evacuation center	Kematian Death	Rumah rosak House damaged
2020	5	4,336	1,308	63	3	-
2021	5	17,530	4,530	119	-	-
2022	16	11,592	1,799	159	1	-
2023	24	97,214	27,396	489	5	-
2024	21	16,096	4,498	120	2	-

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, Johor, 2020-2024

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

Tahun Year	2020	2021	2022	2023	2024
Bilangan Number	35	92	92	72	68

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

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

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

Tahun Year	Kemalangan jalan raya Road accidents	Kecederaan Casualties		
		Kecederaan ¹ Injury	Kematian Death	Jumlah Total
2020	58,207	1,038	697	1,735
2021	49,559	1,172	614	1,786
2022	76,028	2,062	852	2,914
2023	87,604	1,449	972	2,421
2024	97,466	1,591	1,033	2,624

Sumber: Jabatan Siasatan dan Penguatkuasaan Trafik, Polis Diraja Malaysia
Source: Investigation and Enforcement of the Traffic Department, Royal Malaysian Police

Nota: ¹Kecederaan merujuk kepada kecederaan ringan dan parah
Notes: Injury refer to minor and serious injuries

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

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

Tahun Year	2020	2021	2022	2023	2024
Bilangan Number	5,066	4,627	3,761	4,320	4,507

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, Johor, 2020-2024

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

Tahun Year	Kematian Death	Kecederaan Injury	Kerugian (RM juta) Loss (Millions)
2020	16	45	77.3
2021	12	49	71.4
2022	14	62	73.3
2023	16	71	134.7
2024	12	61	187.9

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

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

Table 4.6: Statistics on value of flood losses, Johor, 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
Johor	1,017,727	121,906	21,280	15,937	2,072	29,775	3,434

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
Malaysia	10,260	1,163	120,629	185,222	380,742	303,380	755,413	933,354
Johor	10,260	-	25,239	2,433	71,845	29,748	274,962	58,968

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, Johor, 2024

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

Pantai yang mengalami hakisan mengikut kategori								Panjang (km)	
Coastal erode by category								Length	
Negeri State	Jumlah (km) Total	Kategori 1		Kategori 2		Kategori 3		Jumlah hakisan (km) Total erosion	%
		Category 1		Category		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
Johor	813.6	-	-	30	38.1	42	26.6	64.7	8.0

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, Johor, 2021-2025

Table 5.1: Mid-year population estimates, Johor, 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	4,020.0	4,028.3	4,107.2	4,184.4	4,205.9	1.9	0.5

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, Johor, 2021-2025

Table 5.2: Population density, Johor, 2021-2025

Tahun Year	2021	2022	2023	2024 ^p	2025 ^p	Bilangan orang bagi setiap km ² Number of persons per km ²	
Kepadatan penduduk Population density	210	210	214	218	219		

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, Johor, 2021-2024

Table 5.3: Population with treated piped water by state, Johor, 2021-2024

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	99.8	99.9	100.0	99.8	99.9	100.0	99.8	99.9	100.0	99.8	99.9

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

Table 5.4 : Water tariff rates for domestic, Johor, 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
Johor	2024	1.05	1.48	1.61

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

Table 5.5: Water tariff rates for industry, Johor, 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
Johor	2024	3.38	3.43	3.52

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, Johor, 2022

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

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

Nota: Berdasarkan Laporan Survei Kemudahan Asas 2022

Note: Based on Basic Amenities Survey Report 2022

Jadual 5.7: Bilangan ketibaan dan pelepasan kapal laut yang terlibat dalam perdagangan antarabangsa, Johor, 2019-2023

Table 5.7: Number of arrivals and departures of ocean-going vessel engaged in foreign trade at selected ports, Johor, 2019-2023

Pelabuhan Port	Ketibaan Arrivals					Berlepas Departures				
	2019	2020	2021	2022	2023 ^e	2019	2020	2021	2022	2023 ^e
Tanjung Pelepas	-	-	9,254	8,715	4,687	-	-	9,372	8,778	4,750

Sumber: Jabatan Laut Malaysia

Source: Malaysia Marine Department

Jadual 5.8: Kargo yang dikendalikan mengikut pelabuhan, Johor, 2020-2024

Table 5.8: Cargo throughput by port, Johor, 2020-2024

Tan metrik (berat muatan) '000
Metric tonnes (freightweight)

Pelabuhan Port		2020	2021	2022	2023	2024
Johor	Jumlah Total	30,036	30,331	30,769	29,050	29,870
	Import Imports	16,578	16,594	17,275	17,132	17,782
	Eksport Exports	13,457	13,737	13,494	11,918	12,088
Tanjung Pelepas	Jumlah Total	8,697	8,080	7,809	7,458	6,048
	Import Imports	2,446	3,141	2,280	5,431	2,040
	Eksport Exports	6,251	4,939	5,529	2,027	4,008

Nota: Tidak termasuk pindah kapal

Notes: Excluding trans-shipment

Sumber: Kementerian Pengangkutan

Source: Ministry of Transport

Jadual 5.9: Kadar insiden keracunan makanan dan tifoid, Johor, 2020-2024

Table 5.9: Incidence rate of food poisoning and typhoid, Johor, 2020-2024

Bagi setiap 100,000 penduduk
Per 100,000 population

Insiden Incidence	2020	2021	2022	2023	2024
Keracunan makanan Food poisoning	29.2	13.6	34.2	39.0	54.5
Tifoid ¹ Typhoid	0.1	-	0.1	0.1	0.4

Nota: ¹ Mulai tahun 2019, penyakit Tifoid termasuk Paratyphi
Notes: Starting from year 2019, Typhoid also include Paratyphi

Jadual 5.10: Bilangan kes demam denggi, demam denggi berdarah dan malaria, Johor, 2020-2024

Table 5.10: Number of dengue fever, dengue haemorrhagic fever and malaria cases, Johor, 2020-2024

Kes Cases	2020	2021	2022	2023	2024
Demam denggi Dengue fever	11,578	1,770	4,214	10,794	13,190
Demam denggi berdarah Dengue haemorrhagic fever	44	5	10	-	20
Malaria	28	15	52	54	30

Sumber: Kementerian Kesihatan Malaysia
Source: Ministry of Health Malaysia

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

Table 6.1: Environmental protection expenditure by type of expenditure, Johor, 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	326,505	228,340	448	7,720	83,744	6,252
	2019	678,474	493,438	258	6,979	160,943	16,856
	2020	808,783	636,030	3,011	7,862	159,478	2,402
	2021	862,398	660,433	4,289	9,754	184,388	3,535
	2022	876,012	658,800	1,331	5,890	197,965	12,026
Modal Capital	2018	74,292	70,035	407	2,238	1,378	235
	2019	138,470	123,100	92	1,435	2,158	11,683
	2020	179,231	168,219	2,752	1,350	6,782	128
	2021	195,199	158,045	2,710	3,359	30,916	168
	2022	209,782	169,572	136	137	39,828	110
Operasi Operation	2018	252,212	158,305	42	5,482	82,366	6,017
	2019	540,004	370,338	166	5,543	158,785	5,175
	2020	629,551	467,811	259	6,512	152,696	2,274
	2021	667,199	502,388	1,579	6,394	153,471	3,367
	2022	666,230	489,229	1,195	5,753	158,138	11,916

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) Ozone	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) Lead	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) Carbon Monoxide	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) Sulphur Dioxide	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) Nitrogen Dioxide	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) Particulate Matter	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
Above 500	<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, Johor, 2020-2022*Water quality status by stations, Johor, 2020-2022*

Negeri State	Lembangan Basin	Sungai River	Nombor stesen Station number	Nilai IKA / WQI value			Kategori IKA/ WQI category (2022)
				2020	2021	2022	
Johor	Sg. Air Baloi	Sg. Air Baloi	3JABL001	60	56	55	T/P
		Sg. Air Baloi	3JABL002	59	52	56	T/P
		Sg. Air Baloi	3JABL003	60	57	61	T/P
	Sg. Amran	Sg. Amran	3JBPT018	75	81	80	ST/SP
		Sg. Bantang	3JBPT020	96	97	97	B/C
		Sg. Batu Pahat	3JBPT001	66	64	61	ST/SP
		Sg. Bekok	3JBPT005	79	84	81	B/C
		Sg. Bekok	3JBPT008	57	67	58	T/P
		Sg. Bekok	3JBPT016	85	91	85	B/C
		Sg. Bekok	3JBPT017	87	91	90	B/C
		Sg. Bekok	3JBPT019	92	94	93	B/C
		Sg. Bekok	3JBPT023	57	63	60	ST/SP
		Sg. Berlian	3JBPT007	78	77	79	ST/SP
		Sg. Chaah	3JBPT010	88	93	90	B/C
		Sg. Kahang	3JBPT022	90	92	82	B/C
	Sg. Batu Pahat	Sg. Lenik	3JBPT011	82	91	90	B/C
		Sg. Merek	3JBPT009	88	89	88	B/C
		Sg. Merpo	3JBPT006	91	90	91	B/C
		Sg. Panchor	3JBPT025	59	63	59	T/P
		Sg. Semberong	3JBPT003	57	64	63	ST/SP
		Sg. Semberong	3JBPT004	64	77	72	ST/SP
		Sg. Semberong Dam	3JBPT021	89	91	89	B/C
		Sg. Simpang Kanan	3JBPT002	58	62	59	T/P
		Sg. Simpang Kanan	3JBPT013	59	60	59	T/P
		Sg. Simpang Kiri	3JBPT012	81	82	80	B/C
	Sg. Benut	Sg. Simpang Kiri	3JBPT014	65	71	76	ST/SP
		Sg. Simpang Kiri	3JBPT015	60	64	66	ST/SP
		Sg. Temehel	3JBPT024	57	54	59	T/P
		Sg. Benut	3JBNT001	86	92	92	B/C
		Sg. Benut	3JBNT002	79	86	86	B/C
		Sg. Benut	3JBNT005	64	66	68	ST/SP
		Sg. Benut	3JBNT006	69	62	62	ST/SP
		Sg. Machap Dam	3JBNT008	92	94	93	B/C
		Sg. Parit Hj. Yassin	3JBNT004	85	81	81	B/C
		Sg. Pinggan	3JBNT007	60	59	63	ST/SP
		Sg. Ulu Benut	3JBNT003	89	90	86	B/C

Status kualiti air sungai mengikut stesen, Johor, 2020-2022 (samb.)*Water quality status by stations, Johor, 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	
Johor	Sg. Danga	Sg. Danga	3JDGA001	58	62	66	ST/SP
		Sg. Danga	3JDGA002	55	59	62	T/P
		Sg. Anak Sg. Semberong	3JEND007	84	85	84	B/C
		Sg. Dengar	3JEND010	84	91	90	B/C
		Sg. Empangan Labong	3JEND027	89	91	91	B/C
		Sg. Endau	3JEND019	85	88	89	B/C
		Sg. Endau	3JEND022	87	90	91	B/C
		Sg. Endau	3JEND023	93	96	92	B/C
		Sg. Jasin	3JEND024	94	97	96	B/C
		Sg. Jebong	3JEND005	74	82	75	ST/SP
		Sg. Kahang	3JEND020	90	89	89	B/C
	Sg. Endau	Sg. Kahang	3JEND026	90	94	92	B/C
		Sg. Kahang	3JEND028	90	88	88	B/C
		Sg. Lenga	3JEND008	68	69	74	ST/SP
		Sg. Lenggor	3JEND009	82	89	89	B/C
		Sg. Lenggor	3JEND029	81	88	90	B/C
		Sg. Mamai	3JEND015	87	88	89	B/C
		Sg. Melatai	3JEND017	70	71	73	ST/SP
		Sg. Mengkibol	3JEND001	88	89	92	B/C
		Sg. Mengkibol	3JEND002	77	84	82	B/C
		Sg. Mengkibol	3JEND003	69	75	77	ST/SP
		Sg. Paloh	3JEND016	82	85	85	B/C
		Sg. Pamol	3JEND011	72	76	73	ST/SP
		Sg. Selai	3JEND025	92	94	94	B/C
		Sg. Semberong	3JEND004	89	90	87	B/C
	Sg. Endau	Sg. Semberong	3JEND006	84	84	80	ST/SP
		Sg. Semberong	3JEND012	76	80	77	ST/SP
		Sg. Semberong	3JEND018	85	88	88	B/C
		Sg. Semberong	3JEND021	84	88	89	B/C
		Sg. Singol	3JEND013	79	83	87	B/C
		Sg. Tamok	3JEND014	91	90	91	B/C
	Sg. Jemaluang	Sg. Jemaluang	3JJML001	81	90	90	B/C
		Sg. Jemaluang	3JJML002	81	86	80	ST/SP

Status kualiti air sungai mengikut stesen, Johor, 2020-2022 (samb.)*Water quality status by stations, Johor, 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	
Johor	Sg. Johor	Sg. Anak Sg. Sayong	3JJHR023	86	92	92	B/C
		Sg. Anak Sg. Sayong	3JJHR032	75	84	72	ST/SP
		Sg. Belitong	3JJHR038	83	89	86	B/C
		Sg. Berangan	3JJHR013	71	82	81	B/C
		Sg. Bukit Besar	3JJHR007	61	60	56	T/P
		Sg. Bukit Besar	3JJHR009	90	95	95	B/C
		Sg. Chemangar	3JJHR019	70	73	77	ST/SP
		Sg. Johor	3JJHR011	83	89	91	B/C
		Sg. Johor	3JJHR014	85	89	91	B/C
		Sg. Johor	3JJHR015	86	91	92	B/C
		Sg. Johor	3JJHR040	84	87	88	B/C
		Sg. Johor	3JJHR041	82	89	88	B/C
		Sg. Johor	3JJHR042	85	90	88	B/C
		Sg. Layang	3JJHR001	93	93	93	B/C
		Sg. Layau Kiri	3JJHR017	87	92	89	B/C
		Sg. Lebam	3JJHR020	79	87	88	B/C
		Sg. Linggiu	3JJHR030	84	93	92	B/C
		Sg. Panti	3JJHR037	79	87	86	B/C
		Sg. Papan	3JJHR034	81	86	87	B/C
		Sg. Pelepah	3JJHR039	95	97	97	B/C
		Sg. Pelepah	3JJHR043	86	87	87	B/C
		Sg. Pelepah	3JJHR044	87	88	90	B/C
		Sg. Pelepah	3JJHR045	90	92	93	B/C
		Sg. Penggeli	3JJHR028	89	87	90	B/C
		Sg. Penggeli	3JJHR031	89	88	89	B/C
		Sg. Remis	3JJHR026	86	89	89	B/C
		Sg. Santi	3JJHR022	89	87	90	B/C
		Sg. Sayong	3JJHR024	82	85	82	B/C
		Sg. Sayong	3JJHR025	78	84	88	B/C
		Sg. Sayong	3JJHR027	82	84	88	B/C
		Sg. Sayong	3JJHR033	83	88	89	B/C
		Sg. Sebol	3JJHR029	73	80	79	ST/SP
		Sg. Seluyut	3JJHR035	83	87	83	B/C
		Sg. Semangar	3JJHR008	81	92	90	B/C
		Sg. Semenchu	3JJHR018	66	85	86	B/C
		Sg. Sening	3JJHR021	89	93	96	B/C

Status kualiti air sungai mengikut stesen, Johor, 2020-2022 (samb.)*Water quality status by stations, Johor, 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	
Johor	Sg. Johor	Sg. Serai	3JJHR002	67	60	62	ST/SP
		Sg. Telor	3JJHR012	88	89	93	B/C
		Sg. Temoh	3JJHR016	74	84	88	B/C
		Sg. Tiram	3JJHR003	71	79	77	ST/SP
		Sg. Tiram	3JJHR004	86	91	89	B/C
		Sg. Tiram	3JJHR005	69	68	77	ST/SP
		Sg. Tiram	3JJHR006	88	93	92	B/C
	Sg. Kaw. Pasir Gudang	Sg. Buluh	3JPGD002	41	43	40	T/P
		Sg. Lato	3JPGD004	62	68	71	ST/SP
		Sg. Masai	3JPGD005	63	60	63	ST/SP
		Sg. Perembi	3JPGD001	57	47	59	T/P
		Sg. Tukang Batu	3JPGD003	42	35	34	T/P
	Sg. Kempas	Sg. Kempas	3JKPS001	29	33	39	T/P
		Sg. Kempas	3JKPS002	37	42	43	T/P
	Sg. Kim-Kim	Sg. Kim-Kim	3JKIM001	51	66	57	T/P
		Sg. Kim-Kim	3JKIM002	85	90	89	B/C
	Sg. Mersing	Sg. Empangan Congok	3JMSG004	85	88	86	B/C
		Sg. Mersing	3JMSG001	87	95	93	B/C
		Sg. Mersing	3JMSG002	84	88	81	B/C
		Sg. Mersing	3JMSG003	83	92	87	B/C
	Sg. Muar	Sg. Air Panas	3JMUA035	94	97	96	B/C
		Sg. Belemang	3JMUA051	94	95	94	B/C
		Sg. Gemas	3JMUA036	80	85	86	B/C
		Sg. Jementah	3JMUA040	93	96	95	B/C
		Sg. Juasseh	3JMUA014	94	96	92	B/C
		Sg. Juasseh	3JMUA037	93	95	95	B/C
		Sg. Juasseh	3JMUA045	94	95	94	B/C
		Sg. Labis	3JMUA011	89	88	87	B/C
		Sg. Labis	3JMUA012	89	89	88	B/C
		Sg. Labis	3JMUA015	87	87	82	B/C
		Sg. Meda	3JMUA034	82	85	80	ST/SP
		Sg. Merbudu	3JMUA030	63	77	72	ST/SP
		Sg. Merlimau	3JMUA020	70	66	73	ST/SP
		Sg. Muar	3JMUA017	82	86	81	B/C
		Sg. Muar	3JMUA019	85	87	76	ST/SP
		Sg. Muar	3JMUA022	85	89	82	B/C

Status kualiti air sungai mengikut stesen, Johor, 2020-2022 (samb.)*Water quality status by stations, Johor, 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	
Johor	Sg. Muar	Sg. Muar	3JMUA026	84	89	85	B/C
		Sg. Muar	3JMUA027	85	84	83	B/C
		Sg. Muar	3JMUA028	83	81	83	B/C
		Sg. Muar	3JMUA029	75	84	85	B/C
		Sg. Muar	3JMUA031	77	83	84	B/C
		Sg. Muar	3JMUA033	73	77	80	ST/SP
		Sg. Muar	3JMUA039	82	85	82	B/C
		Sg. Muar	3JMUA041	80	86	84	B/C
		Sg. Muar	3JMUA042	78	86	85	B/C
		Sg. Muar	3JMUA043	79	83	85	B/C
		Sg. Muar	3JMUA046	86	89	83	B/C
		Sg. Muar	3JMUA047	81	87	84	B/C
		Sg. P. Mengkuang	3JMUA018	89	92	91	B/C
		Sg. Pagoh	3JMUA049	66	74	76	ST/SP
		Sg. Palong	3JMUA024	88	89	87	B/C
		Sg. Palong	3JMUA025	84	85	81	B/C
		Sg. Pendol	3JMUA050	90	95	93	B/C
		Sg. Sarang Buaya	3JMUA038	58	60	60	ST/SP
		Sg. Segamat	3JMUA016	89	90	86	B/C
		Sg. Segamat	3JMUA044	91	94	89	B/C
		Sg. Segamat	3JMUA048	92	95	91	B/C
	Sg. Senarut	3JMUA021	75	77	79	ST/SP	
	Sg. Serom	3JMUA032	63	63	63	ST/SP	
	Sg. Simpang Loi	3JMUA023	77	84	73	ST/SP	
	Sg. Tenang	3JMUA013	79	76	81	B/C	
	Sg. Paloi	Sg. Paloi	3JPAL001	89	90	90	B/C
	Sg. Pontian Besar	Sg. Air Hitam	3JPBS001	71	74	73	ST/SP
		Sg. Ayer Merah	3JPBS005	43	54	54	T/P
		Sg. Pontian Besar	3JPBS002	65	65	63	ST/SP
		Sg. Pontian Besar	3JPBS003	80	85	78	ST/SP
		Sg. Pontian Besar	3JPBS004	86	84	85	B/C
		Sg. Pontian Besar	3JPBS006	64	63	60	ST/SP
		Sg. Pontian Besar	3JPBS007	73	73	74	ST/SP
	Sg. Pontian Kecil	Sg. Pontian Kecil	3JPKC001	86	84	85	B/C
		Sg. Pontian Kecil	3JPKC002	76	75	70	ST/SP

Status kualiti air sungai mengikut stesen, Johor, 2020-2022 (samb.)*Water quality status by stations, Johor, 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	
Johor	Sg. Pulai	Sg. Pulai	3JPLI001	82	83	86	B/C
		Sg. Pulai	3JPLI002	72	77	82	B/C
		Sg. Pulai Dam	3JPLI004	95	95	96	B/C
		Sg. Ulu Choh	3JPLI003	72	72	74	ST/SP
	Sg. Rambah	Sg. Rambah	3JRBH001	75	69	78	ST/SP
		Sg. Rambah	3JRBH002	65	63	70	ST/SP
	Sg. Sanglang	Sg. Sanglang	3JSLG001	59	57	51	T/P
	Sg. Sedili Besar	Sg. Ambat	3JSBE005	86	84	76	ST/SP
		Sg. Dohol	3JSBE001	89	90	86	B/C
		Sg. Mupur	3JSBE009	67	73	73	ST/SP
		Sg. Pasir Panjang	3JSBE010	88	87	76	ST/SP
		Sg. Sedili Besar	3JSBE002	86	86	86	B/C
		Sg. Sedili Besar	3JSBE004	91	93	91	B/C
		Sg. Sedili Besar	3JSBE006	82	87	85	B/C
		Sg. Sedili Besar	3JSBE007	74	72	70	ST/SP
		Sg. Sedili Besar	3JSBE008	87	89	85	B/C
		Sg. Sedili Besar	3JSBE011	90	88	87	B/C
		Sg. Temubor Kanan	3JSBE003	93	95	93	B/C
	Sg. Sedili Kecil	Sg. Anak Sedili Kecil	3JSKE005	25	24	74	ST/SP
		Sg. Anak Sedili Kecil	3JSKE006	79	85	75	ST/SP
		Sg. Bahan	3JSKE002	78	73	64	ST/SP
		Sg. Bahan	3JSKE004	74	78	76	ST/SP
		Sg. Sedili Kecil	3JSKE001	89	88	83	B/C
		Sg. Sedili Kecil	3JSKE003	80	76	78	ST/SP
	Sg. Segget	Sg. Segget	3JSGT001	81	71	64	ST/SP
		Sg. Segget	3JSGT002	77	68	72	ST/SP
		Sg. Segget	3JSGT003	59	67	65	ST/SP
		Sg. Segget	3JSGT004	63	78	76	ST/SP
		Sg. Segget	3JSGT005	54	65	72	ST/SP
	Sg. Skudai	Sg. Melana	3JSKU008	91	95	94	B/C
		Sg. Melana	3JSKU009	61	59	66	ST/SP
		Sg. Skudai	3JSKU001	55	63	65	ST/SP
		Sg. Skudai	3JSKU002	66	71	65	ST/SP
		Sg. Skudai	3JSKU003	61	74	74	ST/SP
		Sg. Skudai	3JSKU004	89	90	93	B/C

Status kualiti air sungai mengikut stesen, Johor, 2020-2022 (samb.)*Water quality status by stations, Johor, 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	
Johor	Sg. Skudai	Sg. Skudai	3JSKU005	72	79	81	B/C
		Sg. Skudai	3JSKU006	66	76	77	ST/SP
		Sg. Skudai	3JSKU007	43	54	63	ST/SP
		Sg. Skudai	3JSKU010	55	62	61	ST/SP
		Sg. Skudai	3JSKU011	92	92	95	B/C
	Sg. Bala	Sg. Bala	3JTRU008	55	47	55	T/P
		Sg. Pandan	3JTRU007	46	43	58	T/P
		Sg. Plentong	3JTRU004	56	66	67	ST/SP
		Sg. Sebulung	3JTRU009	53	58	62	ST/SP
		Sg. Sengkuang	3JTRU011	52	53	50	T/P
	Sg. Tebrau	Sg. Tampoi	3JTRU010	52	60	58	T/P
		Sg. Tebrau	3JTRU001	44	65	57	T/P
		Sg. Tebrau	3JTRU002	55	72	54	T/P
		Sg. Tebrau	3JTRU003	65	72	68	ST/SP
		Sg. Tebrau	3JTRU005	57	65	62	ST/SP
		Sg. Tebrau	3JTRU006	64	69	71	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, Johor, 2020-2022*Marine water quality status for coastal, Johor, 2020-2022*

Negeri State	Kawasan Area	Nilai IKAM MWQI Value			Kategori Category (2021)
		2019	2020	2021	
Johor	Tanjung Bin	90	90	91	Terbaik/ Excellent
	Pelabuhan Tanjung Pelepas	92	91	82	Baik/Good
	Hadapan Jabatan Laut	87	82	81	Baik/Good
	Pantai Stulang Laut	48	56	55	Sederhana/ Moderate
	Jeti Teluk Jawa	62	70	59	Sederhana/ Moderate
	Pelabuhan Pasir Gudang	57	59	66	Sederhana/ Moderate
	Hadapan HSAJB	49	58	51	Sederhana/ Moderate
	Pantai Lido	44	54	50	Sederhana/ Moderate
	Pantai Teluk Mahkota	90	93	95	Terbaik/ Excellent
	Pantai Tanjung Leman	83	97	94	Terbaik/ Excellent
	Pantai Sri Pantai	87	91	95	Terbaik/ Excellent
	Tanjung Merak	89	85	89	Baik/Good
	Tanjung Pengelih	90	92	88	Baik/Good
	Pantai Tanjong Stapa	91	72	77	Sederhana/ Moderate
	Pantai Teluk Gorek	83	93	93	Terbaik/ Excellent
	Pantai Air Papan	95	92	93	Terbaik/ Excellent
	Jeti Kukup	59	62	83	Baik/Good
	Pasir Gogok	92	89	89	Baik/Good
	Tanjong Buai	75	91	87	Baik/Good
	Pantai Desaru	95	94	95	Terbaik/ Excellent
	Tanjung Sepang	92	90	93	Terbaik/ Excellent
	Tanjung Penyusup	83	93	93	Terbaik/ Excellent
	Pantai Sungai Lurus	74	88	85	Baik/Good
	Punggur	69	90	79	Sederhana/ Moderate
	Pantai Penyabung	82	95	96	Terbaik/ Excellent
	Tanjung Resang	90	92	94	Terbaik/ Excellent
	Tanjung Balau	93	94	94	Terbaik/ Excellent
	Batu Layar	90	92	95	Terbaik/ Excellent
	Tanjung Sengat	72	85	92	Terbaik/ Excellent

Sumber: Jabatan Alam Sekitar
Source: Department of Environment

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

Negeri State	Kawasan Area	Nilai IKAM MWQI Value			Kategori Category (2021)
		2019	2020	2021	
Johor	Kuala Sungai Segget	41	51	46	Tercemar/ <i>Poor</i>
	Kuala Sungai Laloh	42	55	54	Sederhana/ <i>Moderate</i>
	Kuala Sungai Johor	88	92	92	Terbaik/ <i>Excellent</i>
	Kuala Sungai Batu Pahat	67	58	57	Sederhana/ <i>Moderate</i>
	Kuala Sungai Muar	57	57	55	Sederhana/ <i>Moderate</i>
	Kuala Sungai Mersing	62	59	59	Sederhana/ <i>Moderate</i>

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

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

Negeri State	Kawasan Area	Nilai IKAM MWQI Value			Kategori Category (2021)
		2019	2020	2021	
Johor	Setindan	94	97	97	Terbaik/ Excellent
	Babi Tengah	94	93	97	Terbaik/ Excellent
	Dayang	94	95	93	Terbaik/ Excellent
	Nanga Besar	78	78	94	Terbaik/ Excellent
	Sibu Tengah	86	96	96	Terbaik/ Excellent
	Pemanggil	95	94	95	Terbaik/ Excellent
	Kukup	62	70	89	Baik/Good
	Pisang	94	86	90	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 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 (IUCN)</i> .	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.	<i>Bamboo plantation</i>	<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.	<i>Enrichment planting</i>	<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.	<i>Rattan plantation</i>	<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.	<i>Planting of medicinal plants</i>	<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.	<i>Landfill</i>	<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.	<i>Sanitary landfill</i>	<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.	<i>Nursery</i>	<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 lebih 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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ISSN 2805-4806



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20 Oktober



2016 - 2030