ALAM SEKITAR

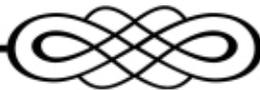## ENVIRONMENT

ALAM SEKITAR

Nota Keterangan

1. Data berhubung Indeks Pencemaran Udara (IPU) dan status kualiti air sungai diperoleh daripada Jabatan Alam Sekitar (JAS), dari 1998 hingga 2015.

2. **Indeks Pencemaran Udara (IPU)**
   IPU menunjukkan status kualiti udara di stesen terpilih iaitu di Cheras, Kuala Lumpur; Larkin, Johor Bahru; Bandaraya Melaka; Seberang Jaya; Kuching; Kota Kinabalu dan Miri. Bahan pencemar udara yang diambilkira dalam pengiraan IPU Malaysia adalah Ozon (O_3), Karbon Monoksida (CO), Nitrogen Dioksida (NO_2), Sulfur Dioksida (SO_2) dan Habuk Halus bersaiz kurang dari 10 mikron (PM_{10}).

   Ukuran indeks bagi menunjukkan status kualiti udara dikategorikan seperti berikut:

Nilai IPU	Status
0 − 50	Baik
51 − 100	Sederhana
101 − 200	Tidak Sihat
201 − 300	Sangat Tidak Sihat
Melebihi 300	Berbahaya

ENVIRONMENT

Explanatory Notes

1. Data pertaining to Air Pollutant Index (API) and river water quality status are obtained from the Department of Environment (DOE), from 1998 to 2014.

2. **Air Pollutant Index (API)**
   API shows the air quality status in the selected stations namely in Cheras, Kuala Lumpur; Larkin, Johor Bahru; Bandaraya Melaka; Seberang Jaya; Kuching; Kota Kinabalu and Miri. The air pollutants included in Malaysian's API calculation are Ozone (O_3), Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2) and Particulate Matter of less than 10 microns in size (PM_{10}).

   Index value to indicate the status of the air quality are categorized as follows:

Value of API	Status
0 − 50	Good
51− 100	Moderate
10 − 200	Unhealthy
20 − 300	Very Unhealthy
Above 300	Hazardous

3. **Kualiti Air Sungai**

Program Pemantauan Kualiti Air Sungai dijalankan oleh JAS untuk mengenalpasti status kualiti air sungai, mengesan perubahan kualiti air disebabkan oleh aktiviti pembangunan dan juga mengenal pasti punca pencemaran.

Sampel air telah diambil daripada stesen-stesen pemantauan dan dianalisa bagi mengukur Indeks Kualiti Air (IKA). Enam parameter yang dianalisa ialah Keperluan Oksigen Biokimia (BOD_5), Ammoniacal Nitrogen (NH_3-N), Pepejal Terampai (SS), Keperluan Oksigen Kimia (COD), nilai pH dan Oksigen Terlarut (DO).

Hasil daripada penganalisaan tersebut, kualiti air sungai boleh diklasifikasikan kepada tiga kategori iaitu Bersih (B), Sederhana Tercemar (ST) dan Tercemar (T).

3. *River Water Quality*

River Water Quality Monitoring Programme conducted by DOE to establish the status of river water quality, to detect changes in water quality as a result of development activities and also to identify the sources of pollution.

Water samples collected from monitoring stations and analysed to derive the Water Quality Index (WQI). The six parameters which analysed are Biochemical Oxygen Demand (BOD_5), Ammoniacal Nitrogen (NH_3-N), Suspended Solids (SS), Chemical Oxygen Demand (COD), pH value and Dissolved Oxygen (DO).

As a result, river water quality could be classified into three categories namely Clean (C), Slightly Polluted (SP) and Polluted (P).

JADUAL 20.1a : BACAAN MAKSIMUM DAN MINIMUM TAHUNAN INDEKS PENCEMARAN UDARA BAGI STESEN TERPILIH, 1998 – 2019, MALAYSIA

Table 20.1a : Annual Maximum and Minimum Air Pollutant Index for Selected Stations,1998 – 2019, Malaysia

| Tahun / Year | Kualiti Udara / Air Quality — Indeks Pencemaran Udara (IPU)[1] / Air Pollution Index (API)[1] | | | | | | | | | | | | | |
| | Cheras Kuala Lumpur | | Larkin Johor Bharu | | Bandaraya Melaka | | Seberang Jaya | | Kuching | | Kota Kinabalu | | Miri | |
	Mak. / Max.	Min.	Mak. / Max.	Min.	Mak. / Max.	Min.	Mak. / Max.	Min.	Mak. / Max.	Min.	Mak. / Max.	Min.	Mak. / Max.	Min.
1998	140	10	116	7	92	4	111	16	90	3	459	1	649	6
1999	137	3	114	6	77	3	79	10	76	4	70	1	120	4
2000	141	13	119	7	122	4	127	4	84	1	70	1	79	3
2001	157	16	119	10	127	3	140	8	84	1	80	1	84	2
2002	153	11	116	4	105	5	115	4	130	1	88	8	126	5
2003	143	11	112	2	114	6	106	11	85	6	76	2	86	3
2004	97	32	126	8	147	5	121	8	97	17	62	1	77	2
2005	390	5	111	1	114	2	151	10	78	23	63	2	133	2
2006	162	5	143	5	153	5	121	6	188	5	86	2	104	1
2007	131	4	141	0	92	4	101	8	75	6	64	3	73	6
2008	135	8	101	5	80	3	99	6	72	5	55	1	76	6
2009	168	4	99	2	137	4	106	5	114	10	78	1	179	6
2010	169	26	111	15	139	22	93	28	54	16	68	10	89	17
2011	150	11	84	3	97	12	98	6	100	4	61	2	96	4
2012	155	4	137	2	83	3	105	6	93	16	61	1	97	5
2013	186	22	226	17	415	16	132	27	89	17	90	8	93	18
2014	170	3	198	10	128	5	119	14	123	11	59	3	84	2
2015	185	9	192	28	176	6	287	9	209	5	75	5	99	4
2016	151	7	109	5	87	5	87	7	71	6	73	3	149	2
2017	181	0	106	12	0	122	230	15	60	8	136	0	82	0
2018	142	14	87	20	140	21	124	28	109	9	90	9	83	7
2019	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Nota / *Notes* :

[1]**Bacaan status kualiti udara berdasarkan bacaan maksimum harian**

Air quality status readings are based on daily maximum readings

..   data belum diperoleh

JADUAL 20.1b : BILANGAN LEMBANGAN SUNGAI YANG DIAWASI MENGIKUT KATEGORI,MALAYSIA, 1998 – 2019

Table 20.1b   :   Number of River Basins Monitored by Category, Malaysia, 1998 – 2019

Tahun *Year*	Kualiti Air / *Water Quality* Kategori / *Category*			
	Jumlah Lembangan Sungai Diawasi *Total River Basins Monitored*	Tercemar *Polluted*	Sederhana Tercemar *Slightly Polluted*	Bersih *Clean*
1998	120	16	71	33
1999	120	13	72	35
2000	120	12	74	34
2001	120	13	47	60
2002	120	14	43	63
2003	120	9	52	59
2004	120	9	53	58
2005	146	15	51	80
2006	146	7	59	80
2007	143	7	45	91
2008	143	7	60	76
2009	143	9	64	70
2010	143	13	65	65
2011	140	11	53	76
2012	140	12	54	74
2013	140	10	56	74
2014	140	12	66	62
2015	140	5	64	71
2016	140	10	72	58
2017	140	14	72	54
2018	143	10	54	79
2019	..	..	..	..

JADUAL 20.2 : PELEPASAN BAHAN PENCEMAR KE UDARA MENGIKUT JENIS DAN PUNCA, 1998 – 2019, MALAYSIA

Table 20.2   : Emission of Pollutants to the Atmosphere by Type and Sources, 1998 – 2019, Malaysia

('000) Tan Metrik / *Tonnes*

Tahun / *Year*	Punca Tetap / *Stationary Sources*		Kenderaan Bermotor / *Mobile Vehicles*	Lain- lain[1] / *Others*[1]	Jumlah / *Total*
	Industri / *Industrial*	**Stesen Janakuasa** / *Power Plant*			
1998	706.5	..	2,402.8	146.5	3,255.8
1999	461.4	..	2,563.1	114.2	3,138.7
2000	566.7	..	2,642.6	29.2	3,238.5
2001	308.0	..	2,561.7	8.6	2,878.3
2002	702.1	..	2,939.9	14.6	3,656.6
2003	125.1	127.4	1,649.1	163.2	2,064.8
2004	372.4	359.0	1,478.6	38.7	2,248.7
2005	157.3	148.8	1,538.0	23.1	1,867.2
2006	158.7	150.7	1,631.4	44.9	1,985.7
2007	132.9	178.2	2,172.8	49.4	2,533.4
2008	148.7	221.4	1,630.8	54.4	2,055.3
2009	166.3	595.9	1,762.8	60.3	2,585.3
2010	113.9	619.2	1,829.7	60.4	2,623.2
2011	116.4	633.5	1,905.6	90.6	2,746.1
2012	86.4	693.2	2,024.6	151.5	2,955.7
2013	86.0	701.8	2,025.6	142.4	2,955.8
2014	101.9	742.9	2,092.0	88.1	3,024.9
2015	85.3	746.8	2,149.5	88.5	3,070.2
2016	101.9	774.5	2,192.3	80.4	3,149.1
2017	101.9	742.9	2,092.0	88.2	3,024.9
2018	96.6	821.6	2,359.0	107.5	3,384.8
2019	..	..	..	..	..

Nota / *Notes* :

[1] **Data tahun 1998-2002 merujuk kepada Pembakaran Sisa Industri. Mulai 2003, termasuk hotel, pusat komersial, institusi dan pasar malam.**

 1998-2002 data refer to Burning of Industrial Waste. Commencing 2003, include hotels, commercial centres, institutions and night markets.

.. **Data tidak diperoleh memandangkan tiada perincian bagi punca tetap**

 Data is not available as there is no detail for stationary sources

JADUAL 20.3 : STATUS KUALITI AIR SUNGAI BERDASARKAN PENCEMAR UTAMA, 1998 – 2019, MALAYSIA

Table 20.3 : Status of River Water Quality based on Main Pollutants, 1998 – 2019, Malaysia,

Tahun	Jumlah Lembangan Sungai Yang Diawasi	Keperluan Oksigen Biokimia (BOD$_5$) Biochemical Oxygen Demand			Ammoniakal Nitrogen (NH$_3$-N) Ammoniacal Nitrogen			Pepejal Terampai (SS) Suspended Solids		
Year	Total River Basins Monitored	T	ST	B	T	ST	B	T	ST	B
		P	SP	C	P	SP	C	P	SP	C
1998	120	25	36	59	52	53	15	41	28	51
1999	120	31	75	14	33	70	17	45	22	53
2000	120	18	63	39	22	48	50	53	25	42
2001	120	21	41	58	24	43	53	38	25	57
2002	120	22	29	69	29	40	51	28	14	78
2003	120	15	29	76	29	37	54	28	17	75
2004	120	18	37	65	30	47	43	31	11	78
2005	146	28	41	77	43	54	49	34	22	90
2006	146	22	28	96	41	56	49	42	20	84
2007	143	12	37	94	36	56	48	42	39	62
2008	143	18	46	79	33	38	72	53	33	57
2009	143	42	73	28	40	47	56	57	32	54
2010	143	52	79	12	42	66	35	48	27	68
2011	140	57	80	3	35	64	41	35	26	79
2012	140	59	69	12	38	67	35	16	28	96
2013	140	94	46	-	41	58	41	11	24	105
2014	140	125	15	-	40	59	41	19	22	99
2015	140	121	19	-	43	65	32	20	13	107
2016	140	129	11	_	38	83	19	30	23	87
2017	140	90	50	_	43	86	11	30	45	65
2018	143	52	37	_	50	88	5	41	31	71
2019	..	..	..	..	..	..	..	..	..	..

Nota : T – Tercemar ST – Sederhana Tercemar B – Bersih

Note : P – Polluted SP – Slightly Polluted C – Clean

.. data belum diperoleh