Air Quality Monthly Report

November, 2022

Department of Environment
Ministry of Environment Forest and Climate Change, Bangladesh.

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Introduction:

Department of Environment (DoE), Bangladesh has established a countrywide air quality monitoring (AQM) network. The continuous monitoring of 6 (six) criteria pollutants ($PM_{2.5}$, PM_{10}, SO_2, CO, NOx and O_3) is being done by 31(thirty one) Continuous Air Monitoring Stations (CAMS) and Compact Continuous Air Monitoring Stations (C-CAMS) located in the divisional and industrial districts of the country. The network encompasses all the regions of the country - Dhaka, Narayanganj, Gazipur, Savar, Mymensing, Narsindi in the center, Chittagong in the south-east. Khulna, Cumilla and Barisal in the south, Rajshahi in the west, and Sylhet in the north-east regions, Rangpur in the north west of the country. And C-CAMS are located in Faridpur, Jashore, Satkhira, Bagerhat, Gopalganj, Tangail, Bogura, Tongi, BUET campus, Brahmanbaria, Feni, Noakhali, BSRM (Chattogram), Cox's-Bazar, Nagor Bhaban, Dhaka. The data and information generated from those stations are automatically collected in the central server and are disseminated through DoE website. Air Quality Index (AQI) for each city is calculated and published online daily for notifying the people about the status of air quality in their respective city.

Quality Assurance/Quality Control (QA/QC) methods and procedures are implemented with full documentation and are validated through an international certified calibration reference laboratory. Forms and log sheets document every activity in the air monitoring stations and document all maintenance, calibration, operation and other activities such as all visits to the stations. This monthly report provides an overview and analysis of air quality monitoring data in Bangladesh for the month wise monitoring results.

The report summarizes the data of different CAMS located in different cities of Bangladesh.

Standards of Ambient Air Quality

The Government of Bangladesh has enacted Air Pollution (Control) Rules – 2022 with ambient air quality standards. This report establishes the Air Quality Index (AQI) followed by USEPA guideline to evaluate air pollution.

Table 1: National Ambient Air Quality Standards (NAAQS) for Bangladesh

Pollutant	Limit Value	Averaging time
CO	5 mg/m^3	8 hours[a]
	20 mg/m^3	1 hour[a]
Pb	0.25 µg/m^3	Annual
	0.50 µg/m^3	24 hours
NO$_x$	40 µg/m^3	Annual
	80 µg/m^3	24 hours
PM$_{10}$	50 µg/m^3	Annual[b]
	150 µg/m^3	24 hours[c]
PM$_{2.5}$	35 µg/m^3	Annual
	65 µg/m^3	24 hours
O$_3$	180 µg/m^3	1 hour[d]
	100 µg/m^3	8 hours
SO$_2$		Annual
	80 µg/m^3	24 hours[a]

Table 2: Air quality index (AQI) in Bangladesh

Air quality index (AQI)	Category		Colour
	In English	In Bangla	
0-50	Good	ভাল	Green
51-100	Moderate	মধ্যম	Yellow Green
101-150	Caution	সাবধানতা/সতর্কীকরণ	Yellow
151-200	Unhealthy	অস্বাস্থ্যকর	Orange
201-300	Very Unhealthy	খুব অস্বাস্থ্যকর	Red
301-500	Extremely Unhealthy/Hazardous	অত্যন্ত অস্বাস্থ্যকর	Purple

Location Map of Air Monitoring Station

Figure 1: Locations Map of Continuous Air Monitoring Stations (CAMS) under Department of Environment in Bangladesh.

Air Quality Monitoring Network in Bangladesh

CAMS (DoE)	CAMS (BARC)	C-CAMS (Bogura)	C-CAMS (Nasirabad, CTG.)
CAMS (RCC, sylhet)	CAMS (Darussalam)	C-CAMS (Noakhali)	C-CAMS (Coxs bazar)
CAMS (DFO, Barishal)	CAMS (Gazipur)	C-CAMS (Rampal)	C-CAMS (Faridpur)
CAMS (DoE, M.Singh)	CAMS (Narayanganj)	C-CAMS (Satkhira)	C-CAMS (Feni)
CAMS (BTV Rangpur)	CAMS (Khulshi, CTG.)	C-CAMS (Tangail)	C-CAMS (Gopalganj)
CAMS (Savar)	CAMS (Agrabad, CTG.)	C-CAMS (Tongi)	C-CAMS (Jessore)
CAMS (Narsingdi)	CAMS (Khulna)	C-CAMS (Shampur, Dhaka)	C-CAMS (Dhaka south)
CAMS (Cumilla)	CAMS (Rajshahi)	C-CAMS (B.Baria)	

Station Information

Table 3: Overview of the locations and capacity of the CAMS

City	ID	Location	Latitude/ Longitude	Monitoring Capacity	Year of Est.	Type	Inlet & Met tower Height(m)
Dhaka	CAMS-1	Dept of Environment	23°.77'73.94"N 90°.37'26.03"E		2012	UB/Res	4.8 & 8
	CAMS-2	Farmgate	23°.75'94.10"N 90°.38'86.79"E		2008	Rd/Com	8.8 & 11
	CAMS-3	Darussalam	23°.78'07.75"N 90°.35'54.10"E		2012	UB/Com	8.8 & 11
Gazipur	CAMS-4	Gazipur	23°.99'41.28"N 90°.42'23.15"E		2012	SUB	8.8 & 11
Narayanganj	CAMS-5	Narayanganj	23°.62'60.79"N 90°.50'72.00"E		2012	UB industry	8.8 & 11
Chattogram	CAMS-6	TV Station, Khulshi	22°.36'04.87"N 91°.80'04.54"E	PM_{10}, $PM_{2.5}$, SO_2, CO, O_3 & NOx with Meteorological Parameters	2006	UB1	4.8 & 7
	CAMS-7	Agrabad	22°.32'30.20"N 91°.80'23.36"E		2012	UB/Res	8.8 & 11
Khulna	CAMS-8	Boyra	22°.83'57.75"N 89°.52'90.56"E		2008	UB	6.8 & 10
Rajshahi	CAMS-9	Sapura	24°.38'33.20"N 88°.60'80.07"E		2008	Rd/Res	6.8 & 10
Sylhet	CAMS-10	Red Crecent Campus	24°.88'83.34"N 91°.86'73.47"E		2012	Rd/UB/Res	13.8 & 15
Barishal	CAMS-11	DFO Office Campus	22°.71'02.87"N 90°.36'25.98"E		2012	UB/Res	6.8 & 10
Mymensingh	CAMS-12	DoE Office, Divisional Headquarter	24°.76'24.58"N 90°.40'21.02"E		2019	UB	8.8 & 11
Rangpur	CAMS-13	BTV Rangpur Station	25°.74'73.71"N 89°.22'89.31"E		2019	UB	8.8 & 11
Savar	CAMS-14	Atomic Energy Research Institute	23°.95'37.04"N 90°.27'97.94"E		2019	SUB	10.8 & 14
Narsingdi	CAMS-15	Sadar Upazila Complex	23°.93'24.56"N 90°.71'65.98"E		2019	SUB	8.8 & 11
Cumilla	CAMS-16	Court Area	23°.47'29.88"N 91°.18'06.71"E		2019	UB	8.8 & 11

UB: Urban; Rd: Road; Res: residential; Com: Commercial; SUB: Suburban; Rural: Rural

Table 4: Overview of the locations and capacity of the C-CAMS

City	ID	Location	Lat/Lon	Year of Est.	Type	Monitoring Capacity	Inlet & Met tower Height(m)
Faridpur	C-CAMS-17	Sadar, Faridpur (Municipal Office)	23°.60'64.11"N 89°.83'88.19"E		SUB		9 & 11
Jashore	C-CAMS-18	Sadar, Jashore (circuit house)	23°.16'22.16"N 89°.20'63.70"E		SUB		12 & 14
Satkhira	C-CAMS-19	Shyamnagar, Satkhira	22°.31'59.96"N 89°.04'31.70"E		Rural		5.2 & 7.2
Bagerhat	C-CAMS-20	Rampal, Bagerhat (Maytree Super Thermal Power Project)	22°.59'60.86"N 89°.55'37.20"E		Rural/Industrial		5.7 & 7.7
Gopalganj	C-CAMS-21	Sadar, Gopalganj	23°.00'88.53"N 89°.82'91.60"E		SUB		22 & 24
Tangail	C-CAMS-22	Sadar, Tangail (DoE office)	24°.24'97.96"N 89°.92'93.57"E		SUB		15 & 17
Bogura	C-CAMS-23	Sadar, Bogura (DoE Office)	24°.86'17.79"N 89°.36'11.46"E		SUB		9 & 11
Tongi	C-CAMS-24	BSCIC, Tongi, Gazipur	23°.89'41.74"N 90°.41'12.10"E	2020	Com/Industrial	PM_{10}, $PM_{2.5}$, SO_2, CO, O_3 & NOx with Meteorological Parameters	18 & 20
BUET	C-CAMS-25	Department of Chemical Engineering, BUET, Dhaka	23°.72'75.91"N 90°.39'27.97"E		UB		10 & 12
Brahmanbaria	C-CAMS-26	Sadar, B.Baria (municipal Office)	23°.97'43.71"N 91°.10'97.69"E		SUB		18 & 20
Feni	C-CAMS-27	Sadar, Feni (DoE Office)	23°.00'62.97"N 91°.38'13.05"E		SUB		18 & 20
Noakhali	C-CAMS-28	Maijdi Bazar, Noakhali (DoE Office)	22°.88'11.48"N 91°.09'69.66"E		SUB		15 & 17
Chattogram BSRM	C-CAMS-29	BSRM, Nasirabad, Chattogram	22°.37'28.38"N 91°.81'80.54"E		UB/Industrial		12 & 14
Cox's-Bazar	C-CAMS-30	Saymon Road, Sadar, Cox's-Bazar (DoE Office)	21°.44'22.08"N 91°.97'10.83"E		SUB		9 & 11
Nagor Bhaban, Dhaka	C-CAMS-31	Nagar Bhaban, DSCC, Dhaka	23°.72'40.75"N 90°.40'91.42"E		UB/Com		13 & 15

UB: Urban; Rd: Road; Res: residential; Com: Commercial; SUB: Suburban; Rural: Rural

Summary of Components
Month of November, 2022

Table 5: Summary of components, Month of November, 2022

Parameter	Summary	BARC	Darus-salam, Dhaka	Gazipur	Narayanganj	TV-Station, Chattagram	Agrabad, Chattagram	Sylhet	Khulna	Rajshahi	Barisal	Savar	Mymensingh	Rangpur	Cumilla	Narshingdi
SO_2 -24 hr	Average	5.3	DNA	5.5	DNA	3.9	8.2	5.1	1.1	DNA	6.5	2.9	1.5	3.5	1.6	1.2
	Max	8.9	DNA	6.4	DNA	7.7	9.5	5.5	1.8	DNA	8.1	5.5	1.6	9.3	3.7	1.9
	Min	0.8	DNA	4.7	DNA	1.1	6.2	4.8	0.7	DNA	6.1	1.1	1.3	0.2	0.6	0.5
	Excedance(Days)	0.0	DNA	0.0	DNA	0.0	0.0	0.0	0.0	DNA	0.0	0.0	0.0	0.0	0.0	0.0
	Data capture(%)	80.6	DNA	90.3	DNA	71.0	96.8	83.9	96.8	DNA	48.4	77.4	51.6	64.5	80.6	87.1
NO2 -24 hr	Average	19.1	6.1	DNA	DNA	12.4	13.2	7.5	8.0	4.6	0.4	9.1	6.5	5.6	5.2	6.0
	Max	112.6	14.4	DNA	DNA	12.6	33.6	14.1	8.1	33.3	1.7	17.1	8.7	18.7	5.4	7.2
	Min	4.0	1.7	DNA	DNA	12.1	4.5	1.4	7.9	0.5	0.1	3.9	4.2	1.1	5.0	4.0
	Excedance(Days)	4.0	0.0	DNA	DNA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Data capture(%)	93.5	64.5	DNA	DNA	74.2	96.8	80.6	96.8	96.8	61.3	96.8	90.3	96.8	83.9	64.5
CO-8hr	Average	3.7	DNA	DNA	6.0	2.2	DNA	DNA	1.4	1.1	DNA	3.7	0.6	1.8	1.3	3.1
	Max	9.0	DNA	DNA	9.0	4.4	DNA	DNA	5.5	3.0	DNA	7.1	2.3	11.1	3.1	4.2
	Min	0.3	DNA	DNA	0.8	0.9	DNA	DNA	0.1	0.7	DNA	0.5	0.1	0.1	0.0	1.3
	Excedance(Hour)	313.0	DNA	DNA	51.0	8.0	DNA	DNA	17.0	0.0	DNA	238.0	0.0	7.0	0.0	16.0
	Data capture(%)	74.1	DNA	DNA	10.1	78.6	DNA	DNA	82.7	98.0	DNA	78.9	94.0	76.6	60.5	82.1
O_3-8hr	Average	6.5	DNA	4.7	DNA	5.2	DNA	DNA	17.8	12.8	DNA	23.1	16.3	19.8	17.8	8.4
	Max	21.0	DNA	11.8	DNA	10.6	DNA	DNA	42.0	18.2	DNA	52.0	38.0	99.7	48.1	37.7
	Min	0.1	DNA	3.3	DNA	3.3	DNA	DNA	3.7	7.5	DNA	5.6	3.1	1.9	1.1	0.1
	Excedance(Hour)	0.0	DNA	0.0	DNA	0.0	DNA	DNA	0.0	0.0	DNA	2.0	0.0	16.0	0.0	0.0
	Data capture(%)	79.4	DNA	91.8	DNA	80.9	DNA	DNA	61.3	95.8	DNA	99.1	93.8	77.8	83.1	83.6
$PM_{2.5}$ -24hr	Average	124.1	131.8	117.7	169.1	DNA	69.3	50.9	97.7	125.8	64.4	141.9	109.1	139.6	30.6	89.9
	Max	217.4	227.8	271.6	233.5	DNA	104.4	106.0	130.0	266.3	98.9	223.9	140.7	269.5	68.1	156.3
	Min	68.4	48.0	47.2	106.4	DNA	41.5	27.3	58.3	62.8	36.7	70.5	83.4	45.4	10.1	12.1
	Excedance(Days)	24.0	25.0	28.0	30.0	DNA	15.0	3.0	23.0	29.0	10.0	30.0	29.0	20.0	1.0	23.0
	Data capture(%)	77.4	83.9	96.8	96.8	DNA	96.8	74.2	77.4	96.8	77.4	96.8	93.5	71.0	83.9	90.3
PM_{10} -24hr	Average	179.7	175.0	197.7	278.7	72.5	153.0	109.9	91.3	193.2	132.1	190.4	221.6	239.9	84.3	173.5
	Max	324.3	244.7	279.7	363.8	133.3	246.9	200.1	157.8	301.3	189.4	290.9	300.3	606.9	177.8	255.0
	Min	107.6	85.9	84.2	184.8	31.9	95.7	60.8	13.8	125.2	77.5	103.5	129.1	83.8	34.2	111.9
	Excedance(Days)	9.0	18.0	27.0	30.0	0.0	15.0	3.0	2.0	22.0	5.0	20.0	25.0	14.0	1.0	9.0
	Data capture(%)	38.7	83.9	96.8	96.8	80.6	96.8	54.8	51.6	96.8	77.4	96.8	83.9	54.8	58.1	48.4
Solar rad. 1hr	Average	250.96	73.4	DNA	DNA	DNA	139.8	DNA	196.8	DNA	128.7	224.1	230.0	273.5	243.7	320.4
	Max	334.6	468.8	DNA	DNA	DNA	641.5	DNA	935.5	DNA	613.3	763.7	635.6	852.5	791.7	795.6
	Min	0.1	7.3	DNA	DNA	DNA	9.2	DNA	0.4	DNA	8.3	0.0	0.0	0.1	0.0	0.0
	Data capture(%)	23	80	DNA	DNA	DNA	91	DNA	84	DNA	74	59.0	45.7	35.5	52.0	42.5
Relative Humidity 1hr	Average	70.5	58.0	DNA	DNA	60.0	66.9	DNA	62.9	69.9	65.7	74.2	84.3	81.1	94.3	51.0
	Max	94.9	92.6	DNA	DNA	96.8	94.8	DNA	71.9	90.7	80.9	100.0	99.4	99.5	99.6	83.2
	Min	38.7	25.2	DNA	DNA	57.1	30.6	DNA	58.1	41.8	51.9	37.9	42.0	41.5	55.0	19.5
	Data capture(%)	50.7	80.0	DNA	DNA	87	90	DNA	94	97	74	53.8	94.2	72.3	79.6	82.8
Ambient Temp. 1hr	Average	27.5	22.3	DNA	DNA	25.1	26.2	DNA	25.3	31.6	24.3	20.4	23.4	21.3	26.7	24.0
	Max	34.2	33.2	DNA	DNA	33.6	41.9	DNA	33.1	34.5	36.8	30.8	31.4	30.5	33.3	31.7
	Min	15.0	11.2	DNA	DNA	14.9	8.2	DNA	18.2	17.5	13.9	11.4	16.6	11.6	19.7	16.0
	Data capture(%)	55.5	83	DNA	DNA	88	67	DNA	94	97	74	99.1	93.8	67.5	78.5	87.0
Rainfall 1hr	Average	6.20	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0.59	DNA	0.19	1.64	DNA	DNA
	Max	16.28	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	1.11	DNA	4.37	4.96	DNA	DNA
	Min	0.04	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0.03	DNA	0.03	0.01	DNA	DNA
	Data capture(%)	52.28	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA	73.25	DNA	91.80	9.27	DNA	DNA
CAMS= Continuous Air Monitoring Station, NAAQS=National Ambient Air Quality Standard, a=Refurbisment CAMS, PM= Particulate Matter																
DNA= Data Not Available																

Table 6: Air Quality Index (AQI) Month of November, 2022

Date	Dhaka	Chattogram	Gazipur	Narayanganj	Sylhet	Khulna	Rajshahi	Barishal	Savar	Mymensingh	Rangpur	Cumilla	Norshindi
01-11-2022	191	124	178	207	DNA	DNA	173	139	179	177	177	112	181
02-11-2022	175	107	171	219	DNA	106	181	117	174	174	176	147	183
03-11-2022	181	135	170	193	DNA	124	183	DNA	170	174	165	139	176
04-11-2022	241	163	207	260	DNA	118	197	DNA	188	189	178	160	236
05-11-2022	321	120	193	328	DNA	144	193	DNA	191	179	180	172	195
06-11-2022	341	160	162	343	DNA	148	232	DNA	198	164	176	146	208
07-11-2022	209	180	195	208	DNA	182	192	120	218	201	188	136	216
08-11-2022	209	121	181	250	DNA	151	243	154	207	186	187	155	204
09-11-2022	184	150	163	DNA	DNA	123	195	117	164	190	164	79	156
10-11-2022	154	154	119	DNA	DNA	158	196	121	161	196	167	102	161
11-11-2022	164	148	146	DNA	DNA	156	188	120	174	189	174	118	165
12-11-2022	188	147	185	DNA	DNA	160	184	118	187	168	175	124	168
13-11-2022	348	98	313	354	119	222	381	DNA	354	310	DNA	131	307
14-11-2022	334	165	263	342	124	DNA	324	DNA	304	221	DNA	156	321
15-11-2022	251	128	235	272	119	124	290	DNA	200	175	126	129	249
16-11-2022	195	126	215	222	90	163	244	136	190	231	DNA	97	198
17-11-2022	202	118	208	278	94	174	258	152	210	197	DNA	105	208
18-11-2022	267	94	195	305	DNA	201	321	187	278	187	DNA	119	223
19-11-2022	211	138	205	308	DNA	180	305	139	192	214	DNA	117	198
20-11-2022	254	160	227	302	DNA	165	234	135	226	198	222	128	205
21-11-2022	198	170	196	DNA	DNA	156	198	121	197	183	DNA	135	169
22-11-2022	318	163	DNA	DNA	156	185	197	156	317	198	DNA	157	178
23-11-2022	310	181	DNA	353	162	222	205	175	309	207	249	173	191
24-11-2022	310	181	DNA	353	162	222	205	175	309	207	249	173	191
25-11-2022	208	124	DNA	347	156	186	166	173	248	207	249	185	195
26-11-2022	292	147	179	330	DNA	177	220	148	242	255	292	DNA	DNA
27-11-2022	177	166	DNA	308	DNA	187	169	142	191	224	294	161	DNA
28-11-2022	189	182	199	324	DNA	184	195	156	192	222	221	141	176
29-11-2022	259	164	198	332	108	183	167	158	226	216	190	154	168
30-11-2022	282	164	310	330	137	163	145	157	274	238	171	170	184