SYSTEM OF AIR QUALITY AND FORECASTING AND RESEARCH (SAFAR-INDIA)

IMPACT OF TRAFFIC REDUCTION (5th MARCH' 2020-Onwards) & JANTA CURFEW (22ND MARCH) ON AIR QUALITY

***SUMMARY**: All 4 SAFAR cities namely, Delhi, Mumbai, Pune and Ahmedabad, started to show a significant decline in NOx. Maximum decline is found in Ahmedabad followed by Mumbai and Pune. Delhi NOx declined during Janata curfew by ~20% wrt previous days. Maximum impact in Delhi is found to be in Mathura road, Noida and Delhi university. Janata Curfew impact in all 4 cities in NOx and PM10, PM2.5 is found to vary from 20% to 50% in various location in these four cities.*

DETAILED ANALYSIS

Under Normal case:

As per SAFAR-Emission Inventory, 2 sources (fossil fuel and resuspended dust) greatly affected by vehicular movements have the following share in total emissions in NOx, PM10 and PM2.5 in 4four SAFAR cities namely, Delhi, Mumbai, Pune and Ahmedabad as follows:

Pollutants	Fossil Fuel (Vehicular traffic)	Resuspended Dust (on and off road)
NOx	~60-80%	NIL
PM10	~15-20%	~40-48%
PM2.5	~30-40%	~17-21%

Under reduced Vehicle Movement /Janata Curfew:

Although changes due to day to day weather cannot be ruled out but under fair weather (uniform weather over days), any significant reduction in vehicle movements (in March '2020) as compared to average of past 2 years (2018 & 2019) during the same time is expected to change their concentration levels as follows:

(a) NOx level is expected to reduced significantly as dust do not play much role in NOx.

(b) If vehicle movements are fully stopped, PM10 and PM2.5 will reduced due to both sources viz. fossil fuel and resuspended dust emissions. More reduction is expected in PM10.

(c) If vehicular movement is reduced only partially (but not stopped fully) then fossil fuel emission will reduce but resuspended dust emissions will increase significantly due to faster movement of vehicles and acceleration lifting, and 2 counter forces will try to keep PM10 almost unchanged and PM2.5 may reduce with laser magnitude.

JANATA CURFEW RESULTS of SAFAR

DELHI:

(1) NOx which was not showing any reduction so far, started to indicate a significant declining trend on 22nd March as compared to previous 3 day (~20%).
(2) In general there is declining trend in PM10 and PM2.5 wrt previous years.
(3) Janata Curfew: PM10 reduced wrt previous 3 days but no change in PM2.5 (slight increase may be weather impact).
(4) Max Impact due to Janata Curfew in NOx: Mathura Road (46%), Delhi Univ (48%), Noida (50%).

MUMBAI:

(1) NOx which was not showing any reduction so far, started to indicate a significant declining trend now after a sudden spike on 18th (due to a mild dust lifting).
(2) Janata Curfew: 22nd March NOx declined by 30% as compared to previous days.
(3) Janata Curfew: 22nd March PM2.5 declined by 20% as compared to previous days.
(4) Maximum declining impact in NOx on locations: Andheri (25%), Borivali.

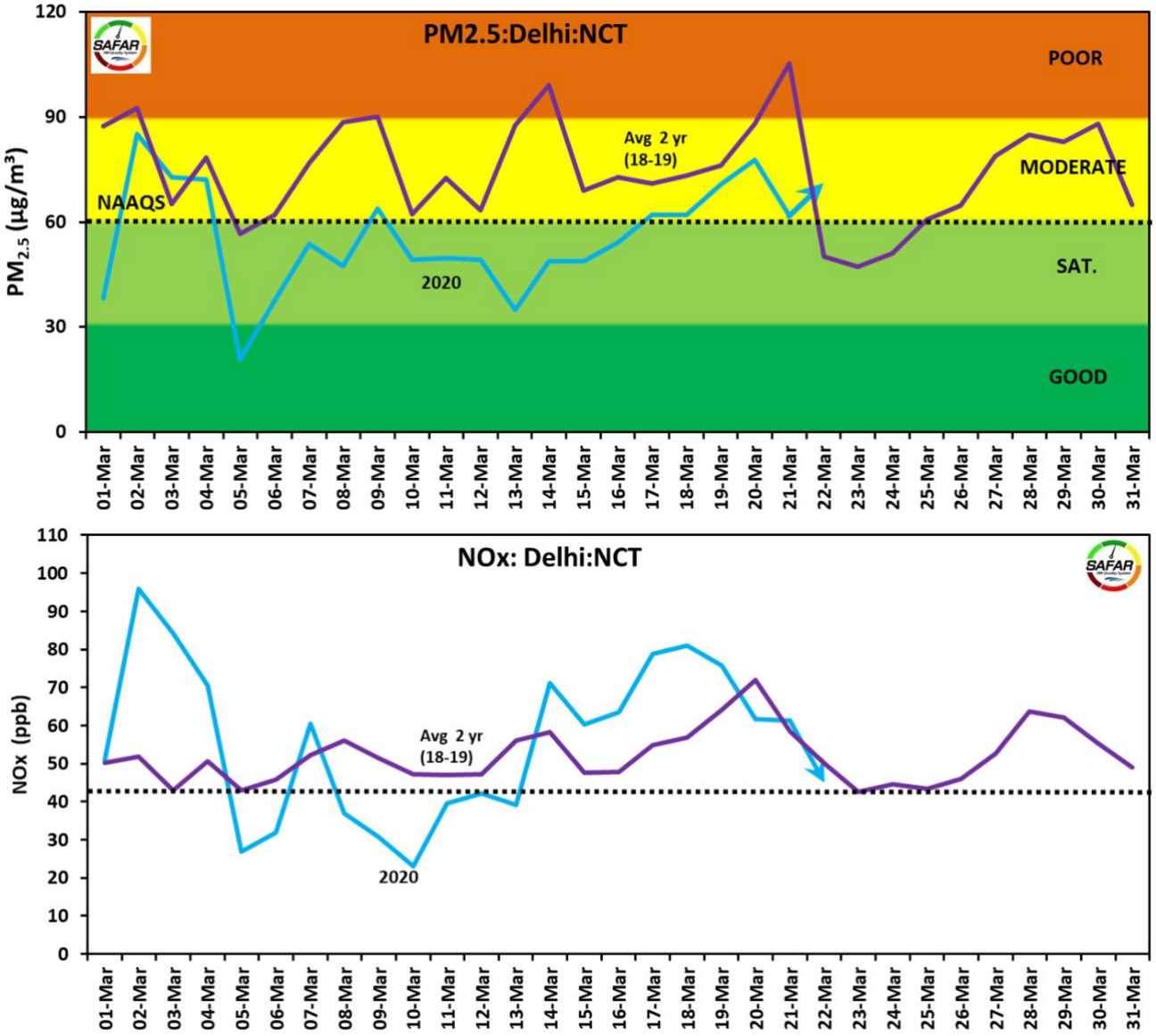
PUNE:

(1) NOx continue to indicate a significant declining trend and faster decline on 22nd March as compared to previous day (20%).
(2) Janata Curfew: NOX reduced wrt previous days by 15%.
(3) Janata Curfew: Maximum declining trend in NOx in Pashan (50%), Shivajinagar (20%) Lohegaon (30%).

AHMEDABAD

(1) NOx continue to indicate a significant declining trend (53%) and faster decline on 22nd March as compared to previous day.
(2) In general there is declining trend in PM10 and PM2.5 wrt previous years (10-15%) after a spike on 19th March due to sudden lifting of dust.
(3) Maximum declining trend in NOx in S.P. Stadium, Pirana and Airport.

City /Location MARCH	Avg (2018 - 19)	2020	% Reduction in 2020 wrt 18-19
PUNE-NOx	35 ppb	20 ppb	42%
PUNE-PM2.5	60 µg/m³	45 µg/m³	25
AHMEDABAD-NOx	41 ppb	19 ppb	53
AHMEDABAD-PM2.5	78 µg/m³	70 µg/m³	11
MUMBAI-NOx	45 ppb	25 ppb	45
DELHI-PM2.5	75 µg/m³	55 µg/m³	26


PM2.5:Delhi:NCT
POOR
MODERATE
SAT.
GOOD
NAAQS
Avg 2 yr
(18-19)
2020
PM2.5 (µg/m³)
120
90
60
30
0
01-Mar
02-Mar
03-Mar
04-Mar
05-Mar
06-Mar
07-Mar
08-Mar
09-Mar
10-Mar
11-Mar
12-Mar
13-Mar
14-Mar
15-Mar
16-Mar
17-Mar
18-Mar
19-Mar
20-Mar
21-Mar
22-Mar
23-Mar
24-Mar
25-Mar
26-Mar
27-Mar
28-Mar
29-Mar
30-Mar
31-Mar

NOx: Delhi:NCT
Avg 2 yr
(18-19)
2020
NOx (ppb)
110
100
90
80
70
60
50
40
30
20
10
0
01-Mar
02-Mar
03-Mar
04-Mar
05-Mar
06-Mar
07-Mar
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14-Mar
15-Mar
16-Mar
17-Mar
18-Mar
19-Mar
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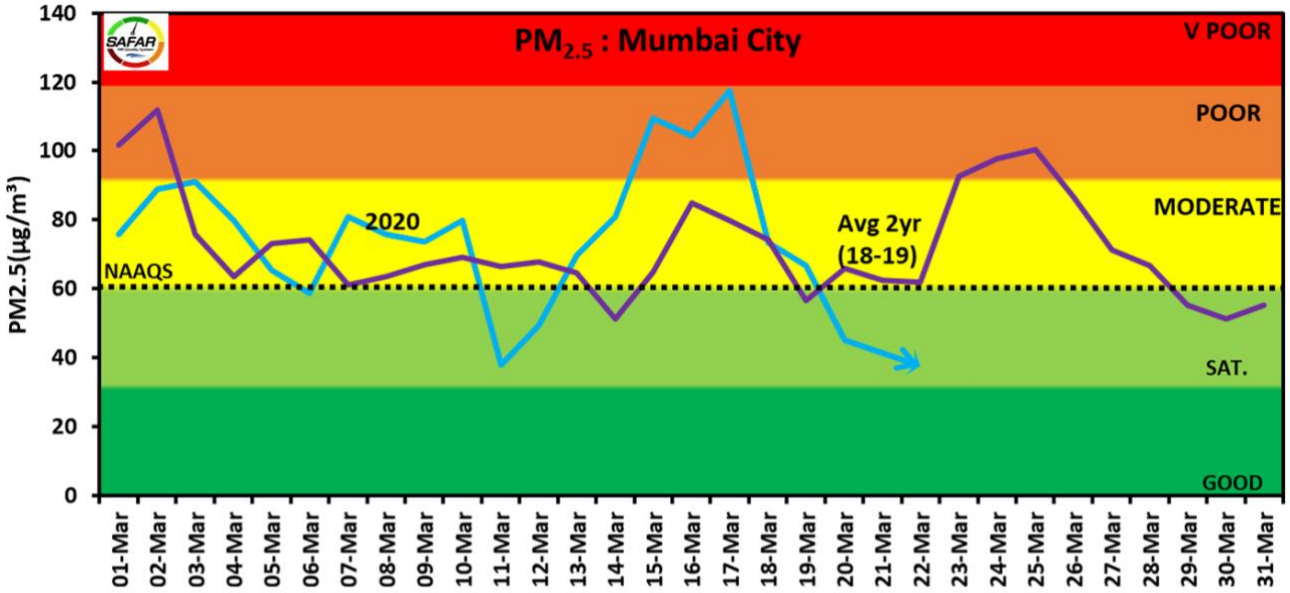
29-Mar
30-Mar
31-Mar


PM2.5 : Mumbai City
V POOR
POOR
MODERATE
SAT.
GOOD
NAAQS
2020
Avg 2yr
(18-19)
PM2.5(µg/m³)
140
120
100
80
60
40
20
0
01-Mar
02-Mar
03-Mar
04-Mar
05-Mar
06-Mar
07-Mar
08-Mar
09-Mar
10-Mar
11-Mar
12-Mar
13-Mar
14-Mar
15-Mar
16-Mar
17-Mar
18-Mar
19-Mar
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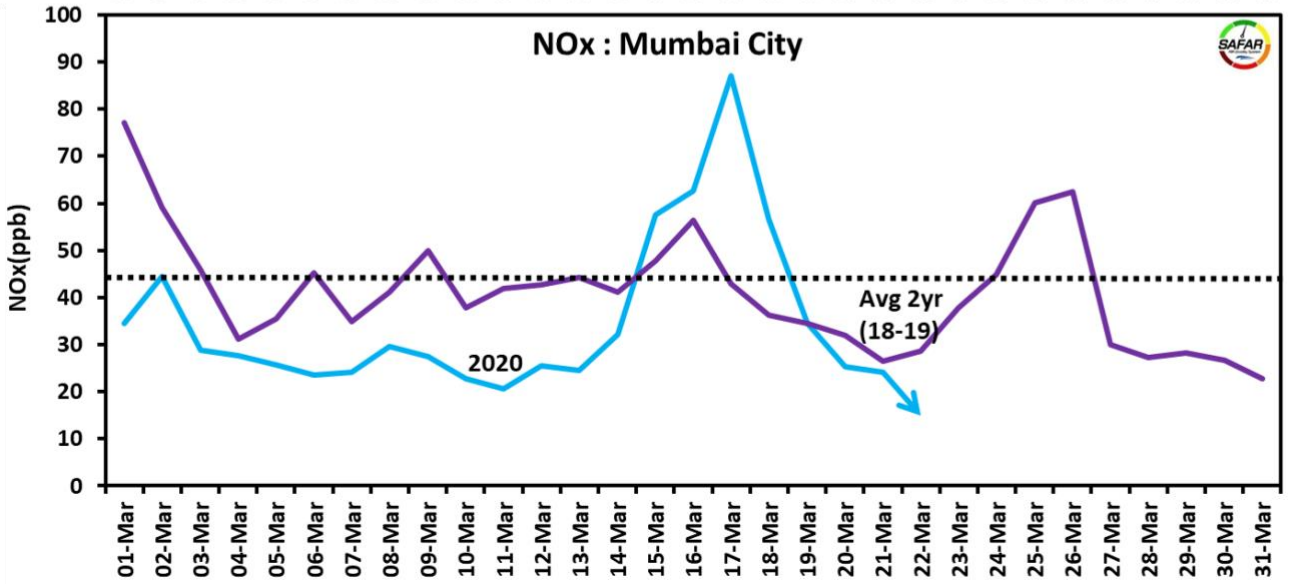
28-Mar
29-Mar
30-Mar
31-Mar


NOx : Mumbai City
2020
Avg 2yr
(18-19)
NOx(ppb)
100
90
80
70
60
50
40
30
20
10
0
01-Mar
02-Mar
03-Mar
04-Mar
05-Mar
06-Mar
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09-Mar
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14-Mar
15-Mar
16-Mar
17-Mar
18-Mar
19-Mar
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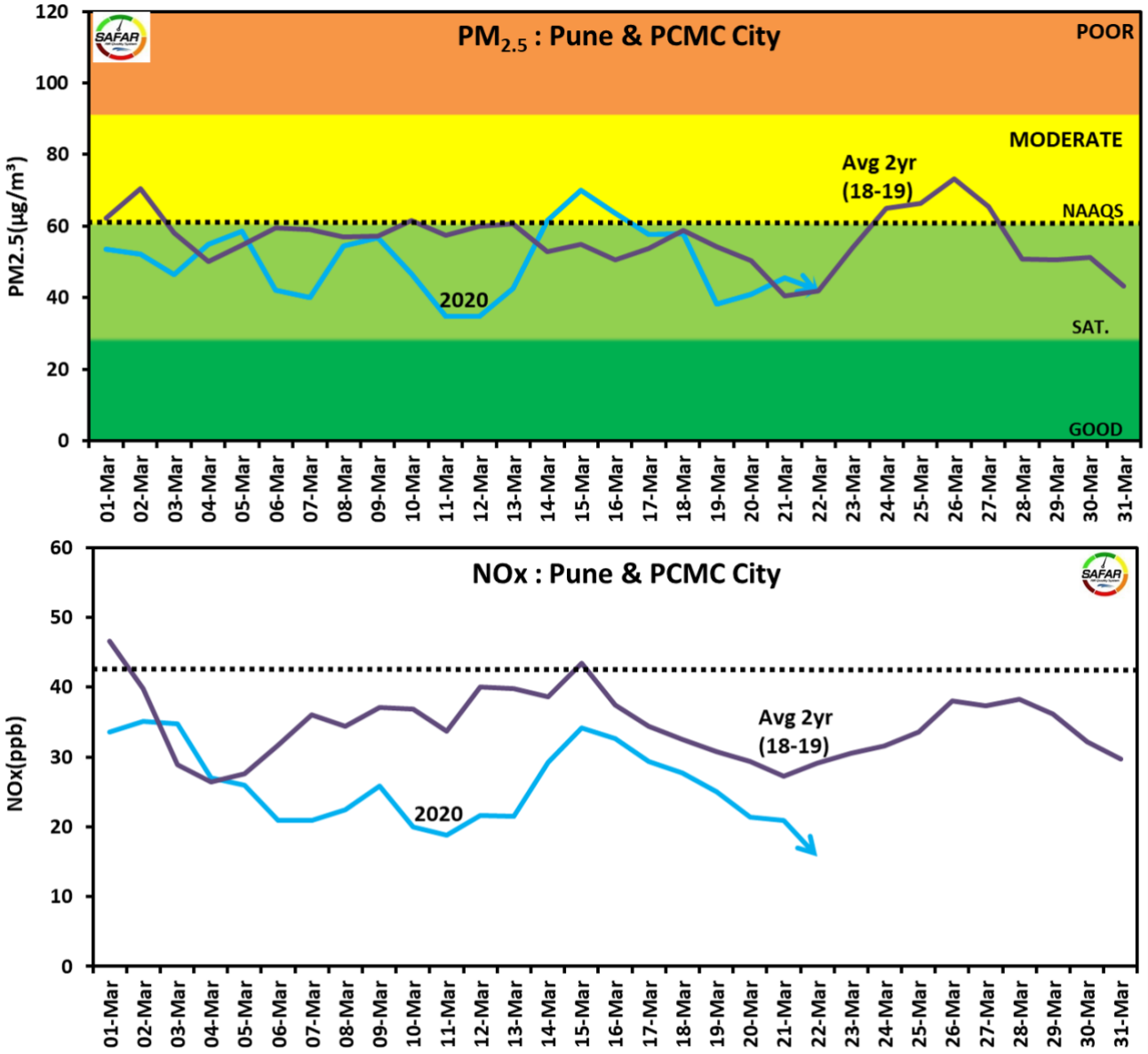
30-Mar
31-Mar


PM2.5 : Pune & PCMC City
POOR
MODERATE
NAAQS
SAT.
GOOD
Avg 2yr
(18-19)
2020
PM2.5(µg/m³)
120
100
80
60
40
20
0
01-Mar
02-Mar
03-Mar
04-Mar
05-Mar
06-Mar
07-Mar
08-Mar
09-Mar
10-Mar
11-Mar
12-Mar
13-Mar
14-Mar
15-Mar
16-Mar
17-Mar
18-Mar
19-Mar
20-Mar
21-Mar
22-Mar
23-Mar
24-Mar
25-Mar
26-Mar
27-Mar
28-Mar
29-Mar
30-Mar
31-Mar

NOx : Pune & PCMC City
Avg 2yr
(18-19)
2020
NOx(ppb)
60
50
40
30
20
10
0
01-Mar
02-Mar
03-Mar
04-Mar
05-Mar
06-Mar
07-Mar
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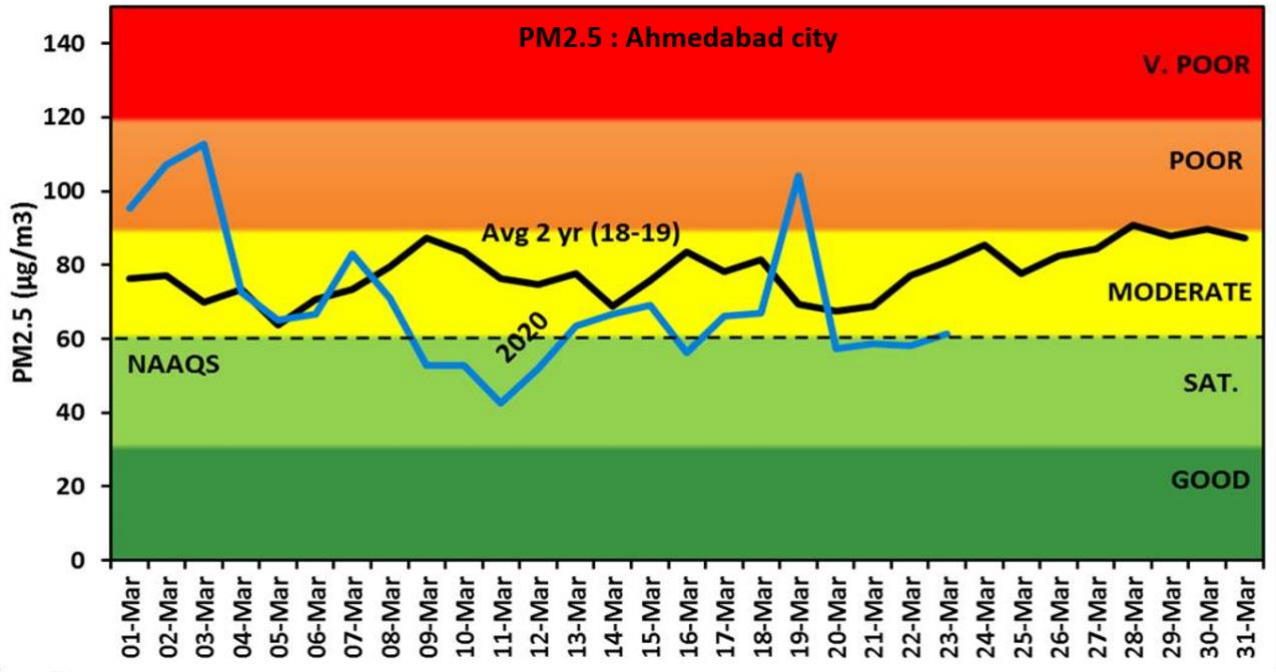
PM2.5 : Ahmedabad city
V. POOR
POOR
MODERATE
SAT.
GOOD
Avg 2 yr (18-19)
2020
NAAQS
PM2.5 (µg/m3)
140
120
100
80
60
40
20
0
01-Mar
02-Mar
03-Mar
04-Mar
05-Mar
06-Mar
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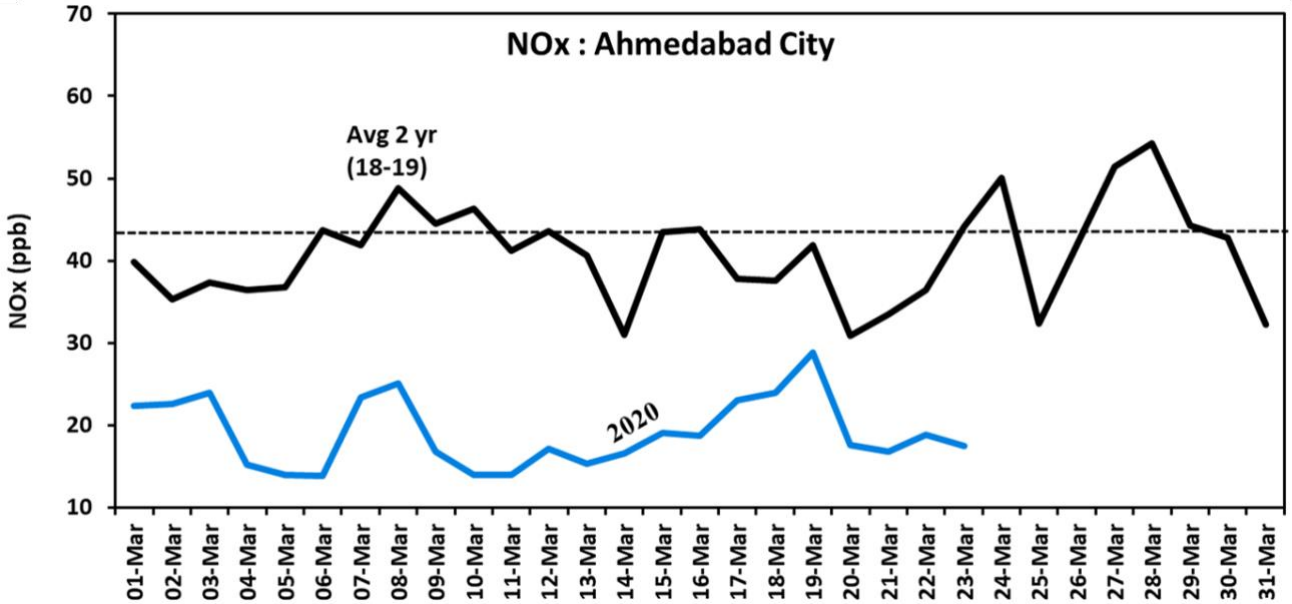
NOx : Ahmedabad City
Avg 2 yr
(18-19)
2020
NOx (ppb)
70
60
50
40
30
20
10
01-Mar
02-Mar
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