Jalna

Jalna City
Air Pollution Control
Action Plan

ACTION PLAN FOR CONTROL OF AIR POLLUTION IN NON-ATTAINMENT CITIES OF MAHARASHTRA

JALNA

MAHARASHTRA POLLUTION CONTROL BOARD

KALPATARU POINT, 3rd Floor,

Sion-Matunga Scheme Rd. No.8,

Opp. Sion Circle, Sion (East),

Mumbai-400 022.

AIR QUALITY STATUS OF JALNA:

Jalna - Bachat Bhavan

Table: Data for Monthly average reading recorded at Jalna - Bachat Bhavan

Station Name	year	Month	Average of SO_2	Average of NOx	Average of RSPM
			50	*40*	*60*
Jalna- Bachat Bhavan	2017	Apr	11	49	119
		May	8	38	121
		Jun	9	37	117
		Jul	7	33	104
		Aug	8	32	95
		Sep	7	32	89
		Oct	8	33	90
		Nov	11	47	112
		Dec	11	43	116
	2018	Jan	10	43	124
		Feb	11	48	116

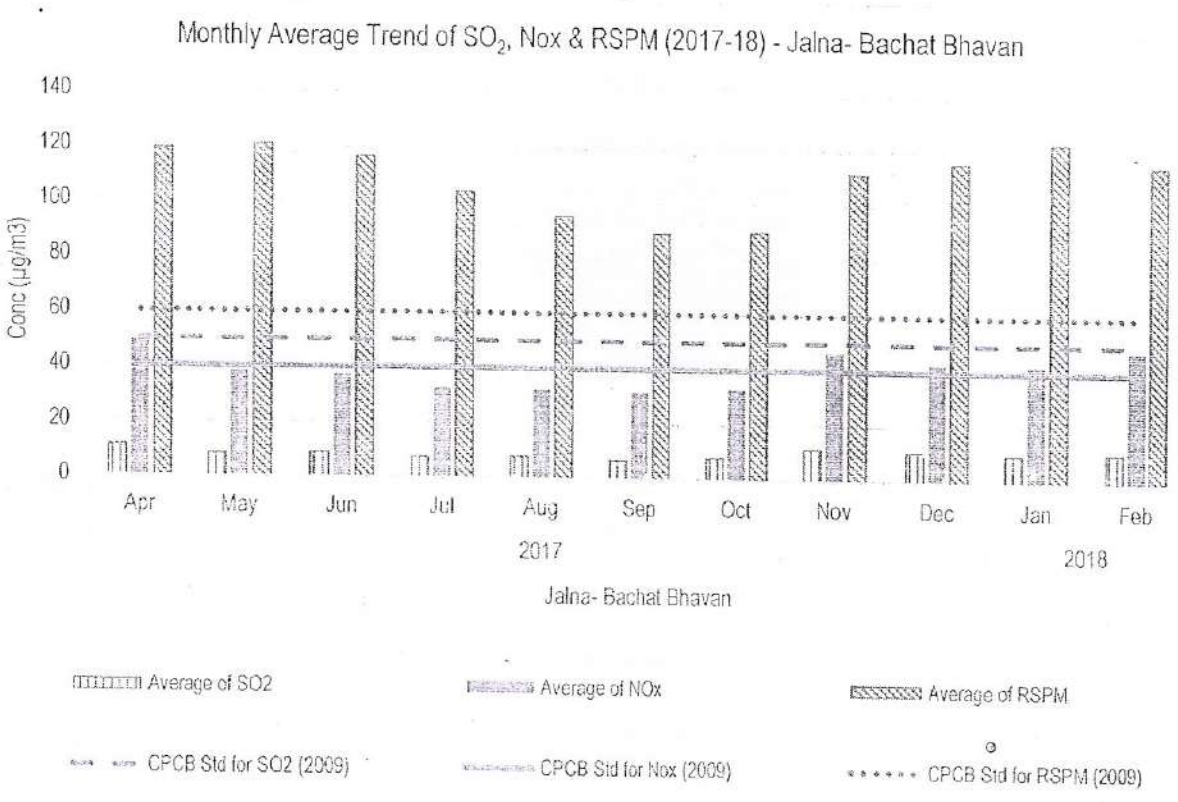


Figure: Monthly average reading recorded at Jalna-Bachat Bhavan

Table: Data for Annual average trend of SO_2, NOx, and RSPM at Jalna-Bachat Bhavan

Station Name	year	Average of SO2	Average of NOX	Average of RSPM
		50	*40*	*60*
Jalna- Bachat Bhavan	06-07	13	22	53
	07-08	17	28	87
	08-09	17	32	66
	09-10	5	28	84
	10-11	5	26	73
	11-12	6	25	89
	12-13	10	30	97
	13-14	10	30	100
	14-15	9	29	94
	15-16	11	29	111
	16-17	10	33	128
	17-18	9	40	110

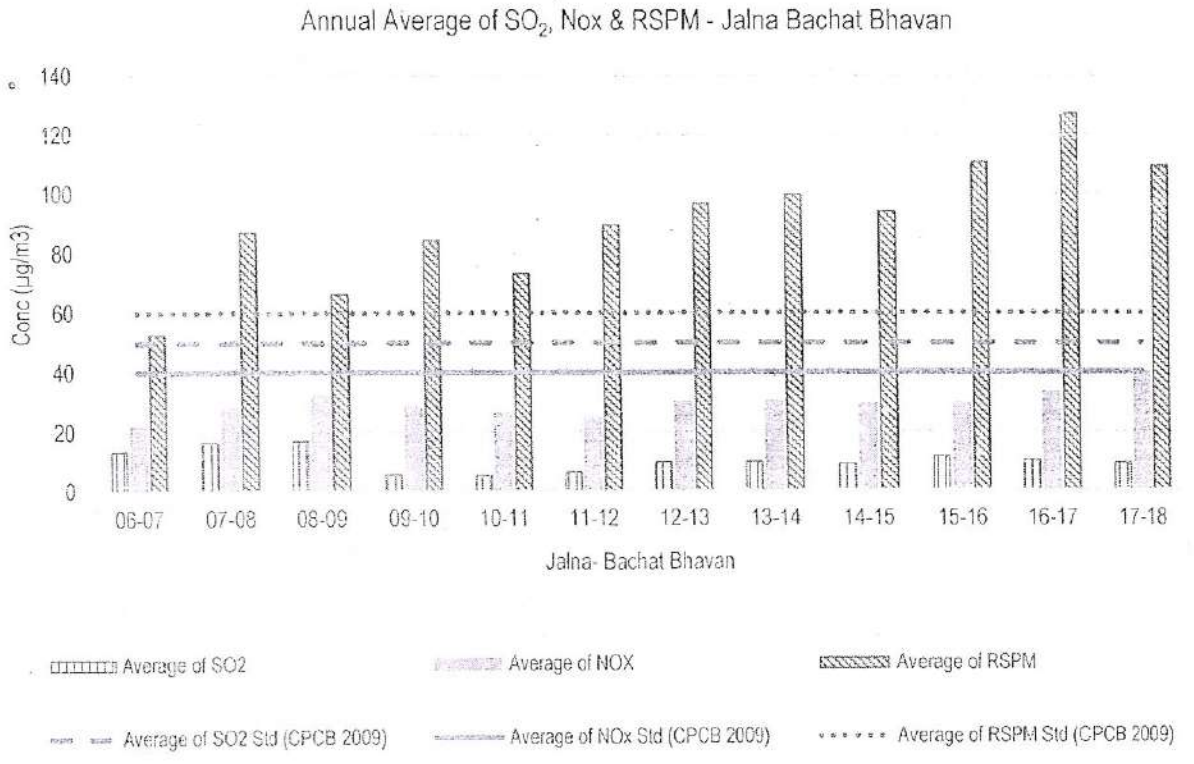


Figure: Annual average trend of SO_2, NOx, and RSPM at Jalna-Bachat Bhavan

Jalna - Krishnadhan Seeds Ltd.

Table: Data for Monthly average reading recorded at Jalna-Krishnadhan Seeds Ltd.

Station Name	year	Month	Average of SO_2	Average of NOx	Average of RSPM
			50	*40*	*60*
Jalna- Krishnadhan seeds Ltd	2017	Apr	11	42	80
		May	10	37	78
		Jun	9	39	87
		Jul	7	32	85
		Aug	9	36	79
		Sep	7	32	71
		Oct	8	32	82
		Nov	11	43	97
		Dec	11	38	98
	2018	Jan	10	45	96
		Feb	10	49	97
		Mar	12	48	98

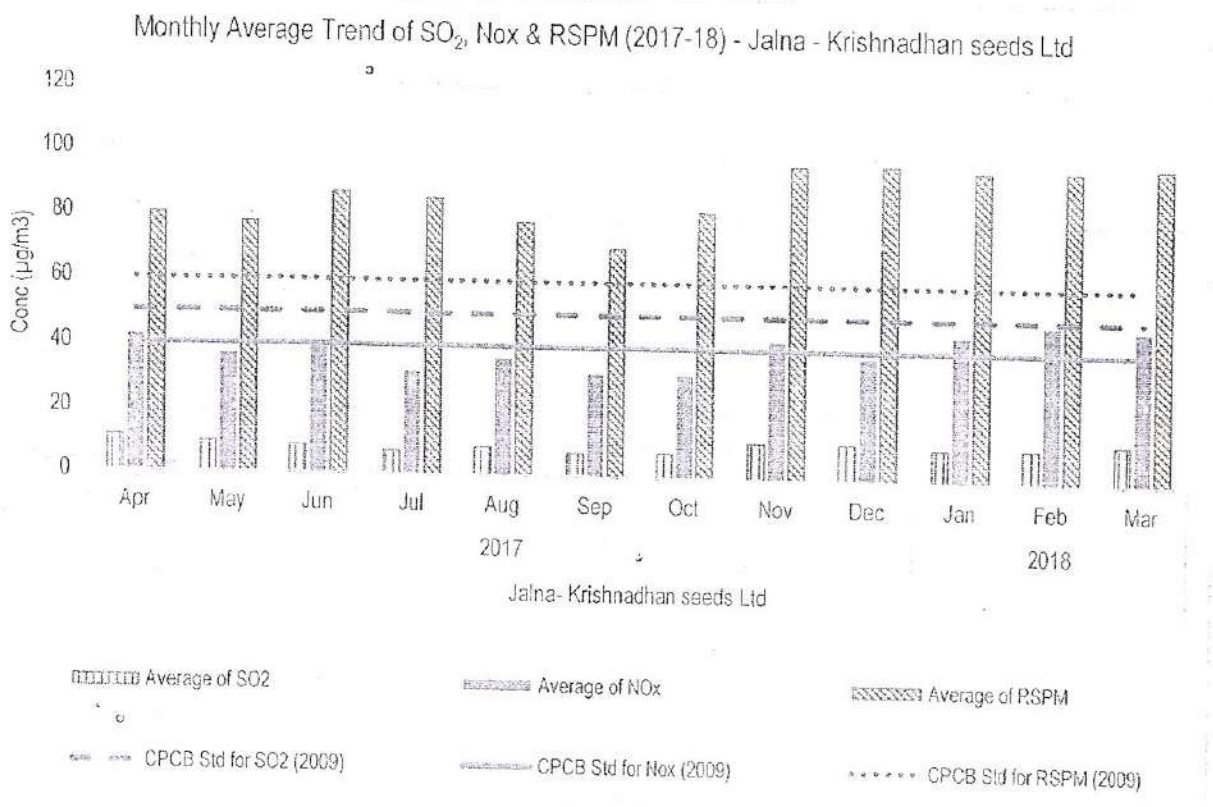
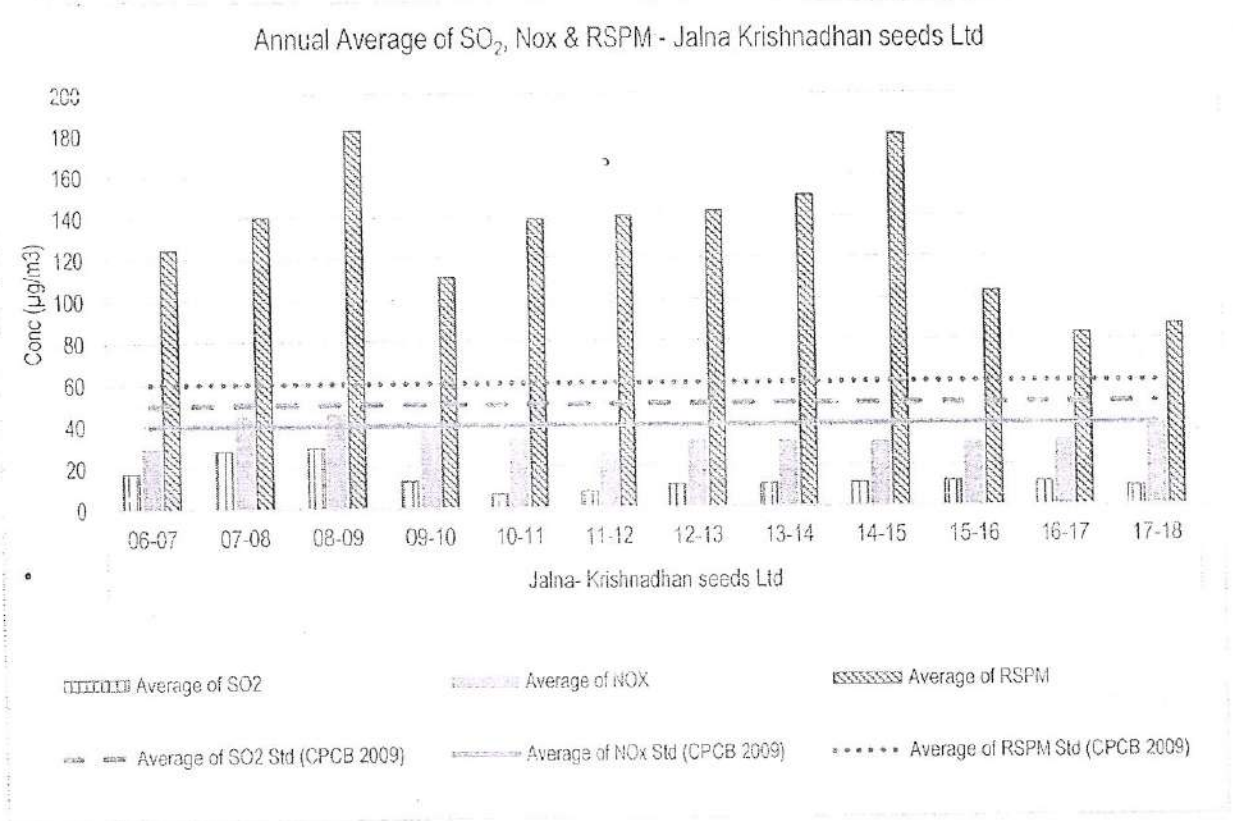


Figure: Monthly average reading recorded at Jalna-Krishnadhan Seeds Ltd.

Table: Data for Annual average trend of SO_2, NOx, and RSPM at Jalna - Krishnadhan Seeds Ltd.

Station Name	year	Average of SO2	Average of NOX	Average of RSPM
		50	*40*	*60*
Jalna- Krishnadhan seeds Ltd	06-07	17	29	125
	07-08	28	44	140
	08-09	30	45	182
	09-10	13	37	111
	10-11	7	33	139
	11-12	8	26	140
	12-13	11	32	143
	13-14	11	31	150
	14-15	11	31	180
	15-16	12	30	103
	16-17	12	31	83
	17-18	9	39	87

Figure: Annual average trend of SO_2, NOx, and RSPM at Jaina-Krishnadhan Seeds Ltd.



Suggested Template for Development of Action Plan for Control of Air Pollution in Non-attainment Cities

Sl.No		Source group	Control option	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period (short/mid/long-term)	Time target for implementation	Responsible agency(ies)	Any other information
		Monitoring Mechanism							Jalna Municipal Council has an Environment Cell (details attached) each month the cell will meet and examine the implementation. Chief Officer- Head and MPCB RO/SRO- Meeting Convener of Environment Cell	
1	(i)	Vehicle emission	Launch extensive drives against polluting vehicles for ensuring strict compliance	Moderate	Feasible	Not needed	Short (Regular on monthly basis at Toll plaza & Extensive during winter months Oct-Nov and Jan-Feb)	Begin 2018	JMC Transport, Toll Plaza, Traffic Police, Industry association, Media	With involvement of Colleges & NGOs
	(ii)		Launch public awareness campaigns for air pollution control, vehicle maintanence, minimising use of personal vehicles, lane discipline etc.	Moderate	Feasible	Not needed	Short (Regular & Extensive campaigns during June-July, Oct-Nov and Jan-Feb)	Begin 2018	Traffic, Media,Junior Colleges & NGOs	Mitr mandals & Ganesh Mandals may be involved
	(vi)		Prepare action plan for widening of road and improvement of Infrastructure for decongestion of Roads.	High	Feasible	Yes, 4 crores	Mid (in progress)	2017-2019	JMC, MSRDC, PWD, Traffic	roads relaid, flyovers constructed
	(vii)		Prepare Plan for the construction of expressways/bypass to avoid congestion	Moderate	Feasible	Yes	Mumbai-Nagpur Expressway planned	2018 2021	JMC, MSRDC, NHAI, Traffic	[illegible]
	(xi)		Installation of Remote Sensor based PUC systems	Moderate	Not Feasible till next few years	Yes	Mid - Long term	2020 onwards	Traffic, RTO	8 Approved PUCs
	SCS-3		*Provide good public transport system*	High	Feasible	Yes, 4 crores	Short-Mid	2020	JMC, MSRTC	dire need for city buses
	SCS-7		*Electric / Hybrid Vehicles*	Moderate	Feasible	1 crores for E-Rickshaws operation and charging centre	Mid	2018-2019	Automobile firms	E-rickshaws allowed http://indianexpress.com/article/india/india-news-
	SCS-8		*OE-CNG for new public transport buses*	Moderate	Not Feasible till next few years	Yes for laying of pipelines	Mid	2019-2020	JMC, Oil & Gas companies	
	SCS-10		*Bio-diesel (B5/B10: 5 – 10% blend)*	High	Feasible	Blends available at outlets in city	Short	2018	JMC, MPCB, BIS, CMIA, Fuel firms	8000 L per month sold at Aurangabad Jalna road by IDHMA

Suggested Template for Development of Action Plan for Control of Air Pollution in Non-attainment Cities

Sl.No		Source group	Control option	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period (short/mid/long-term)	Time target for implementation	Responsible agency(ies)	Any other information
2	I	Resuspension	Prepare plan for creation of green buffers along the Traffic corridors	High	Feasible	Yes, 1 crores for green belt development	Short (in progress)	2018	JMC Horticulture, Forest Dept.	10,000 saplings with plastic guards planted this year
	II		Maintain Pothole Free Roads for Free Flow Traffic	High	Feasible	Yes	Regular		JMC, MSRDC	
	III		Introduce water fountains at Major Traffic intersection, wherever feasible	Moderate	Feasible	Not needed	Short (in progress)	2018	Steel Industries association	Needed at Bhokardan naka to be covered under CSR funds from companies
	IV		Greening of open areas, garden, community places, schools and housing societies	Moderate	Feasible		Regular		JMC Horticulture, NGOs	Campaigns, Students, NGOs, Citizen forums
3	(i)	Biomass/trash burning, landfill waste burning	Launch extensive drive against open burning of biomas,s crop residue, garbage, leaves etc.	High	Feasible	Not needed	Short	Regular basis start 2018	JMC, NGOs, Colleges	Awareness on MSWM by NGO -corner meetings, tool kit, workshop, local
	(ii)		Regular check and control, of burning of Municipal Solid waste	High	Feasible	Yes	In Progress	By 2020	JMC	
	(iii)		Proper collection of Horticulture waste and its disposal following composting –cum –gardening approach	High	Feasible	Yes, 1 crores for SWM	In Progress	By 2020	JMC	Municipal Solid Waste Handling plant 80MT/day since June 2017. Sanitary Landfill
	(iii)		Action against non-complying industrial units	High	Feasible	MPCB's role	Regular	Regular	MPCB	MPCB RO issues directives and notices
	SCS-4		*Promoting cleaner industries*	High	Feasible		In progress	2019	MPCB	M/s Karamaveer Ankushrao Tope Sakhar Karkhana (unit I and II) online monitoring system for
	SCS-8		*Installation/ upgradation of air pollution control systems*	High	Feasible		In progress	2019	MPCB	10 Steel manufacturing units have been issued
	SCS-10		*Regular audit of stock emissions for QA/QC*	High	Feasible		In progress	2019	MPCB	

Sl.No		Source group	Control option	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period (short/mid/long-term)	Time target for implementation	Responsible agency(ies)	Any other information
5	(i)	Construction and Demolition Activities	Enforcement of construction & demolition rules	Moderate	Feasible			Start 2018	JMC	
	(ii)		Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and suppression units	High	Feasible		Short	2018	JMC	
	SCS-1		*Better construction practices with PM reduction of 50%*	*Moderate*	Feasible		Mid	2019	JMC	
	SCS-3		*Ensure carriage of construction material in closed /covered Vessels*	*Moderate*	Feasible		Short	*2018*	JMC	
10		Other (city specific)								

Monitoring Mechanism for Implementation

The aforesaid action plan shall be implemented by Maharashtra State Pollution Control Board with coordination of concern departments/stakeholders.

Implementation status

The Chief Secretary, Govt. of Maharashtra to convene the meetings with different concerned departments and direct for compliance of directions for implementation of air quality of Amravati. The Principal Secretary, Environment and Forest, Govt. of Maharashtra to also convene the meeting for follow up of the aforesaid directions. The Maharashtra Pollution control Board continuously conducted the meetings with all stakeholders for preparation of comprehensive action plan for city and its implementation.

JALNA CLEAN AIR ACTION PLAN- 2017

JALNA MUNICIPAL COUNCIL

LIST OF ABBREVIATIONS

CIDCO City and Industrial Development Corporation of Maharashtra

CPCB Central Pollution Control Board

IHME Institute for Health Metrics and Evaluation

IIT Indian Institute of Technology

IITM Indian Institute of Tropical Meteorology

JMC Jalna Municipal Council

MIDC Maharashtra Industrial Development Corporation

MPCB Maharashtra Pollution Control Board

MSRDC Maharashtra State Road Development Corporation

MSME Ministry of Micro Small and Medium Enterprises

MSRTC Maharashtra State Road Transport Corporation

NEERI National Environmental Engineering Research Institute

WHO World Health Organization

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EXECUTIVE SUMMARY

Across the world, air pollution has emerged as one of the grave threats to public health. According to a report by The Energy Research Institute (TERI) and UC San Diego (University of California at San Diego) (2016), 80% of Indian cities are unable to meet the prescribed air quality standards and in almost 56% of these cities, the pollutant levels are nearly 1.5 times the permissible limits resulting in high mortality and morbidity. Managing India's air pollution requires a comprehensive national action plan with a focus on city level management plans. City level management requires stakeholder engagement, an informed city and trained personnel to deal with the complex issues of air quality monitoring as well as financial support.

Jalna city has been listed under the **17 non-attainment cities in Maharashtra** based on the observation of exceedance with respect to National Ambient Air Quality Standards 2009 consecutively during 2011 to 2015. Particulate Matter is a cause of concern for the city. Jalna's Clean Air Action Plan highlights action under the following points

- Jalna currently has **only 2 AQ monitoring stations** for its residents; it should have more monitoring stations within the city in commercial, industrial and sensitive areas. City has **no continuous monitoring station** which is urgently needed.
- City **lacks display boards** providing air quality information to public.
- Further the **emission inventory and source appertionment studies need to be completed** at the earliest in order to highlight the sources of pollution and their respective contribution to city's air quality.
- City also needs to urgently undertake research studies on **impact of air pollution on health**, extensive drive against polluting vehicles.
- **Public awareness campaigns** for air pollution control, vehicle maintenance and minimizing use of personal vehicles. Prevent parking of vehicles in congested areas.
- Only 0.64% area is under forest, **provision of green belt in and around** the city besides the roads is needed. Green Traffic islands could be developed at crowded intersections sponsored by industries.
- **10 Steel manufacturing units** have been issued directives for upgrade of APC including Hood, ID Fan, Duct, Scrubber and Chimney. **Industries need to comply with these directives within the desired time frame** and compliance must be checked by MPCB.

- There exists significant scope for **improvement of roads** and footpaths particularly other district roads and rural roads.
- City must focus on popularizing **E-rickshaws and other electric or solar vehicles** for transport.
- Major air polluting (steel) industries need to install **continuous stack monitoring facilities**.
- **Jalna does not have city buses making travel difficult for its residents** JMC must focus on **provision of city buses**.
- **Bio-diesel** can be used in cars, buses and commercial vehicles, industrial vehicles, tractors, power generators that use regular diesel. **Around 8000 L per month of biodiesel is being sold at an outlet on Aurangabad Jalna road**. It **should be popularized** and more biodiesel distribution and filling centres should be set up within the city.
- JMC must **expedite the setting up of a Municipal Solid Waste processing and disposal plant and also begin with waste segregation.**
- JMC must act and penalize the defaulters with regard to biomass and garbage burning.
- JMC must submit communication regarding compliance by builders for demolition and undertaking new construction activities in a closed manner.

Source up	Control option	Expected reduction and impacts	Implementation period (short/mid/long-term)	Time target for implementation	Responsible agency(ies)	Any other information
n	Launch extensive drives against polluting vehicles for ensuring strict compliance	Moderate	Short (Regular on monthly basis at Toll plaza & Extensive during **winter months Oct-Nov and Jan-Feb**)	Begin 2018	JMC Transport, Toll Plaza, Traffic Police, Industry association, Media	With involvement of Colleges & NGOs
	Launch public awareness campaigns for air pollution control, vehicle maintanence, minimising use of personal vehicles, lane discipline etc.	Moderate	Short (Regular & **Extensive campaigns during June-July, Oct-Nov and Jan-Feb)**	Begin 2018	Traffic, Media,Junior Colleges & NGOs	**Mitr mandals & Ganesh Mandals** may be involved
	Prepare action plan for widening of road and improvement of Infrastructure for decongestion of Roads.	High	Mid (in progress)	2017-2019	JMC, MSRDC, PWD, Traffic	roads relaid, flyovers constructed
	Prepare Plan for the construction of expressways/bypass to avoid congestion	Moderate	**Mumbai-Nagpur Expressway planned**	2018-2021	JMC, MSRDC, NHAI, Traffic	
	Installation of Remote Sensor based PUC systems	Moderate	Mid - Long term	2020 onwards	Traffic, RTO	8 Approved PUCs
	Provide good public transport system	High	Short-Mid	2020	JMC, MSRTC	dire need for city buses
	Electric / Hybrid Vehicles	Moderate	Mid	2018-2019	Automobile firms	E-rickshaws allowed http://indianexpress.com/article/india/india-news-india/maharashtra-to-follow-centres-order-allow-e-rickshaws-to-ply-without-permits-3012401/
	OE-CNG for new public transport buses	Moderate	Mid	2019-2020	JMC, Oil & Gas companies	
	Bio-diesel (BS/B10: 5 – 10% blend)	High	Short	2018	JMC, MPCB, BIS, CMIA, Fuel firms	8000 L per month sold at Aurangabad Jalna road by IDHMA
spension	Prepare plan for creation of green buffers along the Traffic corridors	High	Short (in progress)	2018	JMC Horticulture, Forest Dept.	10,000 saplings with plastic guards planted this year
	Maintain Pothole Free Roads for Free Flow Traffic	High	Regular		JMC, MSRDC	
	Introduce water fountains at Major Traffic intersection, wherever feasible	Moderate	Short (in progress)	2018	Steel Industries association	Needed at Bhokardan naka to be covered under CSR funds from companies
	Greening of open areas, garden, community places, schools and housing societies	Moderate	Regular		JMC Horticulture, NGOs	Campaigns, Students, NGOs, Citizen forums
ash g, l waste	Launch extensive drive against open burning of biomas,s	High	Short	Regular basis start 2018	JMC, NGOs, Colleges	Awareness on MSWM by NGO -corner meetings, tool kit, workshop, local channel

ing	crop residue, garbage, leaves etc.					
	Regular check and control, of burning of Municipal Solid waste	High	In Progress	By 2020	JMC	
	Proper collection of Horticulture waste and its disposal following composting –cum – gardening approach	High	In Progress	By 2020	JMC	**Municipal Solid Waste Handling plant 80MT/day** since June 2017. Sanitary Landfill in progress
	Action against non-complying industrial units	High	Regular	Regular	MPCB	MPCB RO issues directives and notices
	Promoting cleaner industries	High	In progress	2019	MPCB	M/s Karamaveer Ankushrao Tope Sakhar Karkhana (unit I and II) **online monitoring system for air**
	Installation/ upgradation of air pollution control systems	High	In progress	2019	MPCB	10 **Steel manufacturing units** have been issued directives for upgrade of APC including Hood, ID Fan, Duct, Scrubber & Chimney
	Regular audit of stack emissions for QA/QC	High	In progress	2019	MPCB	
ıtruction olition ities	Enforcement of construction & demolition rules	Moderate		Start 2018	JMC	
	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and suppression units	High	Short	2018	JMC	
	Better construction practices with PM reduction of 50%	*Moderate*	Mid	2019	JMC	
	Ensure carriage of construction material in closed /covered Vessels	*Moderate*	Short	*2018*	JMC	

INTRODUCTION

With almost 3.7 million global deaths in 2012 attributed to outdoor air pollution (WHO, 2014), it has emerged as one of the gravest threats to public health. 98% of cities in low- and middle-income countries do not meet World Health Organization (WHO) air quality guidelines (WHO, 2016).

Data from the country's major regulator the Central Pollution Control Board (CPCB), showed that 77% of Indian urban clusters clearly exceeded the National Ambient Air Quality Standard (NAAQS) for respirable suspended particulate matter (RSPM or PM10) in 2010 (CPCB, 2012). Another key estimate from WHO pointed that out of 20 world's worst particulate air polluted cities around 13 were in India including the capital Delhi, which has been the worst ranked city in terms of air pollution (WHO, 2014). It is quite alarming to note that the satellite measures of fine particulates created for the entire India reveal that our population living both in urban and rural areas is exposed to hazardously high levels of particulates. Almost 670 million people comprising 54.5% of the population reside in regions that do not meet the Indian NAAQS for fine particulate matter (GreenStone et al, 2015; Dey, 2012). Numerous studies have revealed a consistent correlation for particulate matter concentration with health than any other air pollutant. Studies show a statistically significant correlation between mortality and ambient particulate matter concentration (Lee et al, 2006).

The exposure to hazardous particulate matter pollution (PM2.5 and PM10) is alarmingly high in most Indian cities, with levels exceeding the National Ambient Air Quality Standards for most parts of the year. Several Indian cities such as Delhi, Gwalior, Raipur, Patna, Varanasi, Agra, and Kanpur exceed the PM2.5 levels by several times than the air quality guidelines recommended by the WHO. Health implications of air pollution are the driving forces that necessitate the management of air quality in urban spaces. Control measures and standards are primarily developed with the concerns regarding health of the citizens by creating sustainable and livable urban spaces. The World Bank Report (2016) highlighted that diseases associated with outdoor and household air pollution may have costed India as much as 8.5 per cent of its GDP in 2013. As per WHO, direct health risks associated with exposure to the pollutants vary with pollutant type, concentration and time of exposure. Healthy people commonly experience breathing difficulties or respiratory irritation if exposed to the pollutants. However, adverse

effects may result in individuals suffering from heart or respiratory ailments. Immediate health problems are caused with high levels of pollutants in the atmosphere even for relatively shorter duration which could include: respiratory illness such as asthma or bronchitis, aggravated cardiovascular ailments like heart attack or congestive heart failure, increase in probability of cancer.

Permanent health effects that may be caused with long-term exposure to polluted air including: accelerated aging of the lungs, loss of lung capacity and decreased lung function, development of diseases such as asthma, bronchitis, emphysema, and possibly cancer shortened life span. Health impacts associated with exposure to gaseous pollutants and toxic pollutants include significant damage to the lungs, heart and the nervous system. Exposure to ozone gas leads to irritation in lungs, decline in lung functioning and increased disability-adjusted life year (DALYs). Fine particulate matter (particulate matter less than 2.5 microns in diameter) is of significant concern to human health, since it can penetrate deep into the lungs.

Other pollutants such as Volatile Organic Compounds (benzene, butadiene, and aldehydes) or asbestos, and metals (such as mercury, lead, manganese, chromium) are potentially toxic if upon recurrent exposure. A number of them are reported to be known as human carcinogens (e.g. benzene, butadiene, formaldehyde, asbestos), some are known to cause significant respiratory irritation (benzene, butadiene, formaldehyde, asbestos) and a few impact the nervous system and the brain (e.g. the metals mercury, manganese) (HEI, 2007).

Air pollution has huge economic consequences for agriculture, ecosystem, and buildings it also has adverse impacts on the local weather. As per the study conducted by IITM, gases like NOx, CO & VOCs cause an increase in surface ozone and long-term exposure to high concentration of surface ozone damages vegetation with substantial reduction in crop yields and crop quality. The worst affected crop in India in terms of yield losses is wheat followed by rice (Gufran Beig, 2014).

AIR QUALITY TRENDS

The analysis of annual average ambient concentration of PM2.5 and PM10 across the country reveals that the annual concentration for PM2.5 ranged from 44.61 - 239.59 µg/m3 with an average concentration 188.35 µg/m3 for the past 20 years (1995-2015). It has consistently been over the prescribed limit of 40µg/m3 (annual average) for PM2.5 levels in ambient air. Similarly, the PM 10 concentrations over the country have also been ranging above the NAAQS limit of 60 µg/m3 (annual average) consistently since the data has been gathered.

Analysis of the publicly available monitoring data for the top 10 cities on the WHO list of highly polluted cities reveals that since the past 10 years there has not been a single day when the PM 10 concentration levels in these cities complied with the NAAQ standard. It is evident that (Fig.1) from 2011 to 2015 almost all the cities had PM10 concentrations above the NAAQ standards.

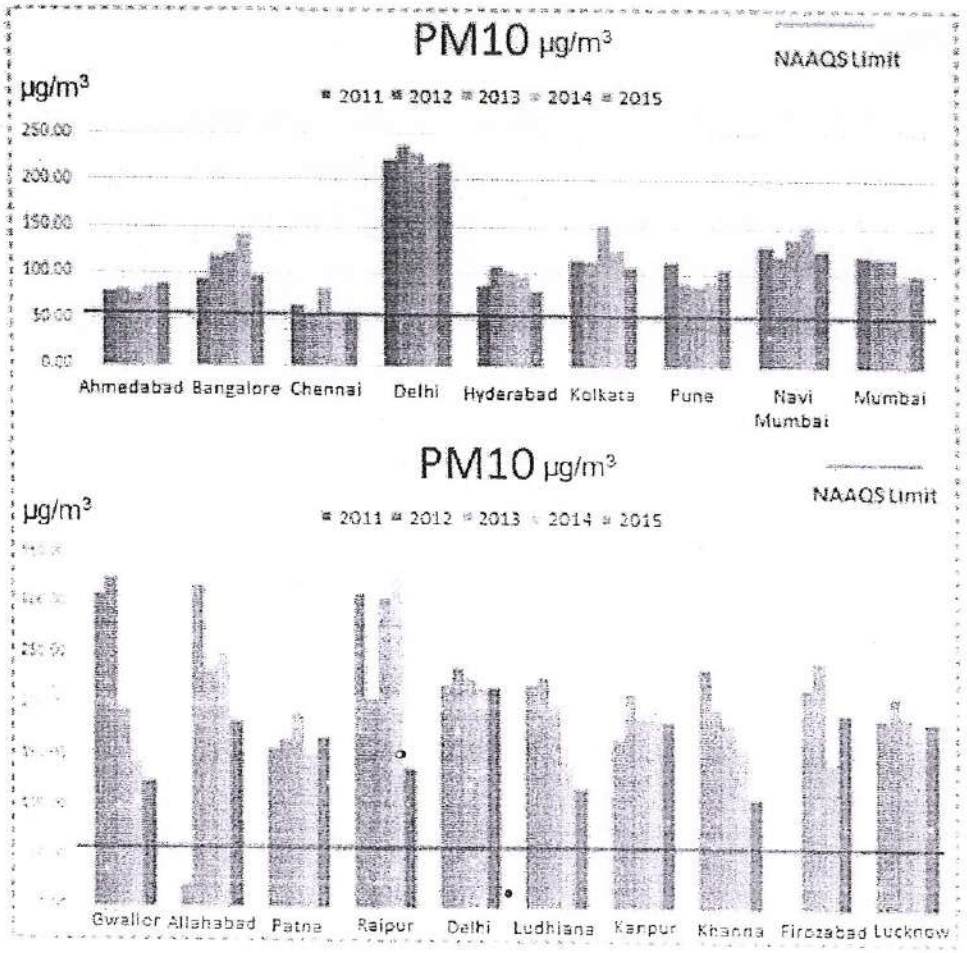

Fig. 1. Trends in PM 10 concentrations ($\mu g/m^3$) in Indian cities 2011-2015

Source: WRI India, 2017

AIR QUALITY IN MAHARASHTRA

Poor air quality in a major concern in Maharashtra cities. Ambient air quality is monitored under NAMP (National Ambient Air Quality Monitoring Programme) as per the monitoring protocol prescribed by the CPCB at selected locations. CPCB has identified **17 non-attainment cities in Maharashtra** based on the observation of exceedance with respect to National Ambient Air Quality Standards 2009 consecutively during 2011 to 2015 namely Akola, Amravati, **Aurangabad**, Badlapur, Chandrapur, Jalgaon, Jalna, Kolhapur, Latur, Mumbai, Nagpur, Nasik, Navi Mumbai, Pune, Sangli, Solapur and Ulhasnagar.

Air pollution has been viewed seriously by Supreme Court and the National Green Tribunal which have issued specific directions from time to time for improving the ambient air quality where the level of pollutants exceeded the stipulated standards. Various studies conducted in past have identified as the major air pollution sources in urban areas as suspension of road dust, vehicular emissions, biomass burning, crop residues, municipal solid wastage, construction and demolition activity emission from industrial units, DG sets, fuel uses for domestic and commercial activities.

MANAGING AIR QUALITY -INITIATIVES UNDERTAKEN

National Ambient Air Monitoring Program (NAMP) with 631 stations in 262 cities across India to determine the status and trends of ambient air quality and ensure effective regulatory compliance. The NAMP stations are equipped to continuously monitor the concentration of four pollutants (Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Particulate Matter size equal to or less than 10 micron (PM_{10}) and 2.5 micron ($PM_{2.5}$) in the ambient air on a 24-hour basis (envfor.nic.in/division/air-pollution). Additionally, the autonomous institutions (e.g. Indian Institute of tropical Meteorology (IITM), Pune) have also established monitoring stations in major cities to estimate the air quality. Mega cities like Delhi and Mumbai are equipped with a strong monitoring network with 28 monitoring stations each. Also, a major low cost monitoring network is also being assessed and established as potential to measure few criteria pollutants in the country (India Spend 2015).

Subsequently, in 2015 the Government launched the National Air Quality Index (NAQI) that aimed at providing effective protection to citizens against health risks from the air pollution. AQI categorizes associated health impacts on a scale of 0-500 and communicates air pollution levels to citizens. There are eight sub-indices that monitor level of a specific pollutant: PM10, PM2.5, Nitrogen Dioxide (NO2), Sulphur Dioxide, Ozone, Carbon Monoxide (CO), Ammonia (NH3) and Lead (Pb). Based on the concentration of each pollutant, a sub-index is calculated for each and worst sub-index determines overall AQI value for that particular day. Currently, the AQI display is in 24 cities and is also accessible through app download on social media.

In the absence of any concrete and robust action plan the number of cities classified as non-attainment under the NAAQS has continuously been on a rise in the country. There are approximately 94 cities in India which are under the non-attainment list of NAAQS from the past five years. As per the Section 18 (1) of the Air Act the CBCP has directed the SPCB's of the respective states to prepare the action plan and implement it to comply with the NAAQS. Yet, no such action plans are formulated and put into force. However, only recently the Delhi Pollution Control Committee (DPCC) and CPCB developed the Graded Responsive Action Plan (GRAP) which is applicable only during exigency period for the city and actions described in GRAP can come into force as and when directed by the authority. In Aug, 2017 MPCB proposed Clean Air Mission- Maharashtra 2022 for undertaking Air Quality Monitoring, Emission Source Apportionment and Air Quality Improvement Plans for 17 cities in the State of Maharashtra and Surat City, Gujarat. It is however, disappointing to note that out of 17 cities in the state only 6 cities have submitted the action plans till date.

Recently, the Maharashtra Pollution Control Board (MPCB) developed first of its kind five-star rating system in India to measure pollution for industries in collaboration with MIT's Jameel Poverty Action Lab (J-PAL). The objective is to collect data (particulate matter) from approximately 20,000 stacks and make the data publicly available and increase transparency. The industries will be rated between one and five stars depending upon their performance on the pollution front and aid in pollution abetment strategies and plans for non-performing units. Furthermore, the city of Ahmedabad in support with local Government developed first Indian monitoring and early warning system for air pollution in May 2017 with a purpose to minimize health impacts and deaths from air pollution. As a part of what is called the Air Information and Response (AIR) plan, daily AQI will be accessible to citizens through 11 LED screens across the city. Under this plan, medical professionals will be trained to respond during air pollution episodes and the warning system will notify people of excessive pollution days.

High pollution levels combined with dense population in urban areas results into high mortality and health costs. Conditions in developing Asian cities such as low average incomes, poor health facilities along with inadequate awareness about the sources and treatment of health problems, further contributes to the loss of many lives every year. The Global Burden of Disease recognized that in 2013 approximately 660,000 deaths in India were on account of outdoor air

pollution (IHME, 2015). Addressing India's air pollution and ensuring the right to clean air for all requires a comprehensive national action plan with targets and timelines, along with strict measures and monitoring plans for reducing air pollution emissions from major polluting sectors such as power generation, industry, transport and agriculture. However, our cities constantly face the problem of insufficient information on air quality management as data on air pollution is not easily available. This has resulted in poor public awareness and insufficient measures to reduce air pollution (Apte et al, 2011; Kaushik and Borah, 2016).

In order to manage air quality better, there is a need to have a comprehensive understanding of the status and gaps in the air quality management of a city. Unfortunately, air quality information is often limited, fragmented between different organizations and not easily understood by the public. In addition, India's fast growing economy is confronted with many development challenges, like energy security, economy and traffic congestion, which are further compounded by climate change. As the global climate change agreements and national policies and targets trickle down to the cities, there will be a tremendous capacity gap to deal with climate change while continuing to address air pollution and other development issues.

DEVELOPMENT OF A CLEAN AIR ACTION PLAN

A Clean Air Action Plan is a collection of regulations, policies and programs that intend to improve air quality and public health by identifying cost-effective measures to reduce emissions from various sectors. The action plan approaches vary depending on the context of cities and countries, as well as their needs and capacities to develop and implement the measures. In general, the main process of developing a clean air action plan can be summarized into four simple steps with stakeholder participation and communication being part of the whole process (Fig. 2). This clean air action plan process involves following key aspects.

Assessment: This includes review and analysis of the status and trends of air quality, impacts on public health and the environment, information on key pollutants and sources of emissions, indicators of growth and their projections in future years, baseline emissions inventory for targeted pollutants, and projected levels of emissions

Action Plan Development: This step encompasses identification of different types of control measures on pollutant emission reduction, cost-effectiveness of the control measures, and co-benefits. This is a way to address the existing situation as well as future scenarios, with due consideration of projected population growth, demand and management of services, sector specific plans from municipal corporation and urban and industrial development agencies, and expected technological advancements.

Implementation: This is a key step that requires a clear institutional framework and responsibilities, stakeholder coordination and communication, political support, allocation of financial resources and technical capabilities.

Review: This refers to the tracking and reporting of the implementation of measures and overall changes in emissions. It is important to identify monitoring mechanisms to enable review of the

effectiveness of available control measures, and to determine if changes are needed to achieve greater reductions, address excessive costs or amend measures, as appropriate (Clean Air Asia, 2016).

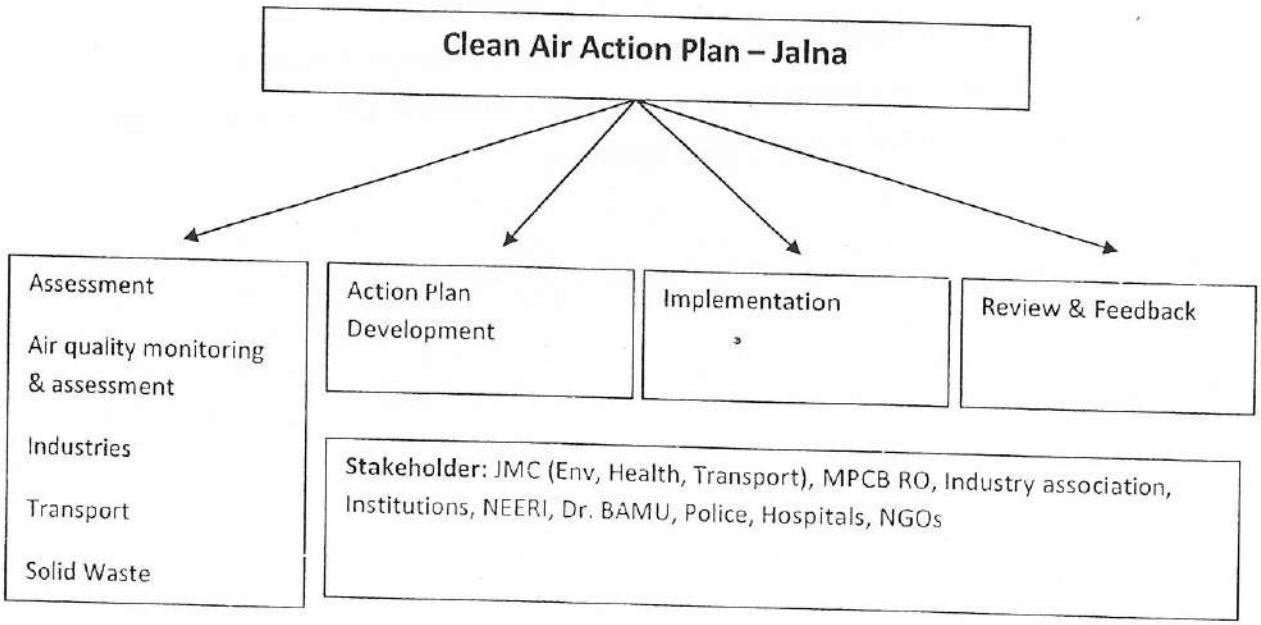

Fig. 2. Developing a Clean Air Action Plan for Jalna City

A number of districts in the state experience poor air quality levels. A National Environmental Engineering Institute (NEERI) study found that during the period from 2008 to 2011, ambient air quality at 28 sites (out of the 73 monitored stations by MPCB across 17 districts), fell in the 'very unhealthy or worse' category. Five such 'very unhealthy or worse' sites were found in Mumbai, six in Thane, four in Pune, one each in Nagpur and Aurangabad five in Chandrapur and two in Raigad, Jalna and Latur districts each (http://indianexpress.com/article/india/maharashtra/at-28-places-in-maharashtra-air-quality-a-cause-for-worry/).

In order to improve air quality management in Maharashtra cities and by extension, reduce the air pollution impacts detrimental to health, economy and society a Consultative Stakeholder Workshop "Clean Air Roadmap for Maharashtra" was organized on Friday, 25th November 2016 in Aurangabad city. It was jointly organized by Dr. Babasaheb Ambedkar

Marathwada University (Dr. BAMU) and Maharashtra Pollution Control Board along with Clean Air Asia (discussed in Annexure). On 22nd August, 2017 **Maharashtra Pollution Control Board (MPCB) in association with Department of Environment, Govt. of Maharashtra, CPCB, IIT Bombay and NEERI organized a one day National Conference**. The aim was to involve all the concerned stakeholders for discussing the issues related to Ambient Air Quality of non-attainment cities and timeline of action plans to be submitted by concerned stakeholders for effective implementation (discussed in Annexure).

ABOUT JALNA

Jalna district is a part of Marathwada Region in Maharashtra. It received the status of the district on May 1, 1982 by carving out Jalna, from the districts Aurangabad and Parbhani. The district covers an area of 7,612 km^2, which is 2.4 per cent of the total state area. Jalna is situated at the central part of Maharashtra and in northern part of Marathwada region. The district forms the eastern part of Marathwada Region of Maharashtra and is bordered by Aurangabad district in the west, Jalgaon district in the north, Buldhana and Parbhani districts in the east and Beed district in the south (Fig 1). It is bound by north latitude 19° 15′ and 20° 32′ and East longitude 75° 36′ and 76°45′ (Table 1). Currently the district has eight blocks, Bhokardan, Jafferabad, Ambad, Jalna, Partur, Mantha, Ghansawangi and Badnapur. It has four towns and 971 villages according to the Census of 2011. As regards governance, it has four Municipal councils and 781 Gram Panchayats. The total area of Jalna municipal council is 81.64 km^2 (Bodkhe, 2014). Jalna is situated at the confluence of the Kundalika and the Sina rivers and was known as "Hirawali" till 1300 AD. The last ruler in the area was "Jalarai" and the present name is after him (Waghmare, 2013).

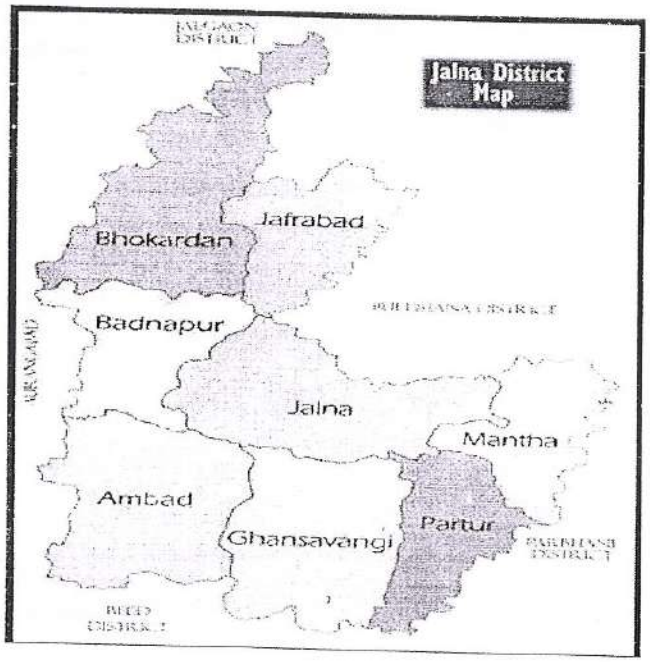

Figure 3 Jalna District Map

Source: http://jalna.nic.in/picture/jlnmap.jpg

CLIMATE

The district has dry and tropical climate with very hot summer and mild winter with humid SW monsoon season of moderate rainfall. The climate can be categorized into three main seasons viz;

a) Hot dry summer season from March to June.

b) Hot to warm humid monsoon season from June to September.

b) Cool dry winter season from October to February

The average temperature of the district ranges from 20°C during winter to 41°C during summer. Temperature during rainy season ranges from 21 to 30° C. In winter season there is appreciable fall in temperature and range from 10 to 25°C. During night temperature ranges between 20 to 25°C with cool breeze. (Waghmare, 2013).

The rainfall record shows that the district has two distinct regions with regard to the rainfall pattern. The first comprises Bhokardan, Jafrabad and Jalna talukas with rainfall of about 700 mm favorable for Khariff cropping. The second region comprises Ambad and Partur talukas with rainfall of about 800 mm, more favorable for rabi cropping. Rainfall is not uniform in all parts of the district as assured rainfall areas are Jalna and Ambad talukas and the area of moderate rainfall of 625 to 700 mm is Bhokardan and Jafrabad talukas. The average annual rainfall in the area is 725.80mm. About 83% of the rainfall occurs during June to September and July is the rainiest month.

However, it is important to note that the district often experiences drought with rainfall recorded as low as 400 to 450 mm. In 2012-2013 the rainfall was 310 mm which was very low and so it was a drought year for the district. During last twelve years, except for the years 1998-1999, 2006-2007, and 2010-2011, the rainfall was less than normal, i.e. less than 645.8 mm (Bodkhe, 2014).

The air is generally high over the district except during the southwest monsoon when the relative humidity is high. The summer months are the driest when the relative humidity is generally between 20 and 25 percent in the afternoon.

Winds are generally light to moderate with increase in speed towards end of the summer season and in monsoon season. The winds blow predominantly from directions between west and north

during the hot season. They are mostly from directions between southwest and northwest during the southwest monsoon season (Waghmare, 2013).

TOPOGRAPHY

The district has moderately to gently sloping undulated topography. Its northern part is occupied by Ajanta and Satmala hill ranges. The northwestern part of the district is comprised of the eastern slopes of the Ajanta Plateau. The satmala hill ranges (943m) throws an offshoot in south-eastern direction through Jafrabad taluka which forms the western edge of the Buldhana plateau. Eastern offshoot of the Ajanta or Satmala hill ranges comprising flat topped hills divide between Purna and Girija rivers and between Girja and Dudhna rivers. The south eastern offshoot of Ellora hills comprising a series of dissected flat topped hills reach up to Ambad town. Apart from these, hilly regions occur in northern and western parts of Jafrabad, Bhokardan and Ambad taluka. Most of the southern and central parts of the district comprise undulating plains. Generally, ground slope in the district is towards east and southeast.

The river Godavari flows along the southern boundary from west to east. The rivers Dudhana, Galati and Purna are its principal tributaries. The major part of the district falls in the Purna sub-basin. The river Purna flows from the central part of the district. The rivers Khelna and Girja are other important tributaries of river Purna which flow through the district. The southern part of the district falls in Godavari sub-basin (Waghmare, 2013).

Table 1: Jalna Highlights

1.	Area	81.64 km^2
2.	Geographical position	19.1 to 20.3 North, 75.4 to 76.4 East
3.	Weather	dry and tropical climate with very hot summer and mild winter with humid SW monsoon season of moderate rainfall
4.	Average Rainfall	688.3 mm
5.	Population	285,577

DEMOGRAPHIC CHARACTERISTICS

Population of the district was 16, 07,391 in 2001 which has grown by 21.84 per cent during the decade 2001 to 2011 and has reached 19,59,046 in 2011 and is projected to be 30, 05,000 by 2032. As per the 2011 census, 80.73 per cent population lives in rural and only 19.27 per cent in urban area. Table 2 sketches complete picture of the population in Jalna district.

Table 2: Population Statistics of Jalna District

	Population			Age Group 0-6		
	Total	Male	Female	Total	Male	Female
Rural	15,81,617 (80.73 %)	8,17,279	7,64,338	2,34,903 (81.75 %)	1,26,180	1,08,723
Urban	3,77,429 (19.27 %)	1,94,194	1,83,235	52,435 (18.25 %)	27,462	24,973
Total	19,59,046	10,11,473	9,47,573	2,87,338	1,53,642	1,33,696

Source: Census of India, 2011

The density of population in the district has increased by more than 25 percent. It was 209 persons per square kilometers in 2001 and increased to 255 in 2011. As per 2011 census, Jalna Municipal Council had a population of 285,577.

(http://www.censusindia.gov.in/2011census/dchb/2718_PART_B_DCHB_JALNA.pdf).

LAND USE PATTERN

Land is very significant and basic natural resource. Land use involves the modification of natural environment into built environment such as field, pastures and settlements. Land-use studies are important as they are aimed at explaining the occurrence of different uses in different areas. Thus, the study of land utilization is of immense value in tracing out the use of land in the past and its future trends. Only through the study of the past land utilization, one can predict its future use and evolve land-use planning of a particular region (Musande, 2014).

Land use may be grouped into five categories i.e.1) Area under forest. 2) Area not available for cultivation. 3) Potential agricultural land or other uncultivable land. 4) Fallow land 5) Net sown area.

Area under Forest

This category includes all lands classed as forest under any legal enactment dealing with forests or administered as forests, whether state owned or private, and whether wooded or maintained as potential forest land. During 2005-2010 low proportion of area under forest was in Jalna district i.e. less than 1.0 percent, due to frequency of droughts and cutting of trees for different purposes.

Area Not Available for Cultivation

This category includes (i) the land put to non agricultural use, (ii) Barren and uncultivable land; area under non agricultural uses. These areas show a close association with other uncultivated land and Net sown area. It means if there is a change at all, more net sown area will be converted to this category and this may happen particularly due to increasing urbanization and construction of canals.

Other Uncultivable Land

The other uncultivable land consists of three types of nine-fold classification i.e. (i) cultivable waste, (ii) permanent pasture and (iii) land under miscellaneous tree crops and groves.

Other Fallow Land

This category includes all land, which is under current fallow and other fallow land.

During 2005-2010 low proportion of other fallow land was in Jalna i.e. less than 10 percent due to development of surface irrigation facility.

Net Sown Area

This category and fallow lands together constitute the extent of cropped lands in any region. The net sown area is the actual area under crops counting areas sown more than once in the same year.

During 2005-2010, Jalna district had more than 72 percent land under net area sown out of total area due to major irrigation project (Musande, 2014).

Table 3: General land-use in Jalna 1981-86 & 2005-2010 (Area in hectares)

Region	Year / V.C.%	Area under forest	Area not available for cultivation	Other Uncultivable Land	Fallow Land	Net sown area	Total Geographical Area
Jalna	1981-86	5150	38700	45375	62450	620925	772600
	%	0.67	5.01	5.87	8.08	80.37	100
	2005-10	4900	27960	51800	115560	572380	772600
	%	0.64	3.62	6.7	14.96	74.08	100
	V.C.%	-0.03	-1.39	0.83	6.88	-6.29	0

Source: Musande, 2014

Clearly from table 3 the area under forest has declined and also the net sown area has declined significantly (Musande, 2014).

Further the land utilization pattern indicates that only 0.64% area is under forest which is quite low. 74% per cent of the geographical area is under cultivation and 15 % is fallow. Since 74% area is under agricultural use the economy of the district is based on agriculture and agro-industries.

INDUSTRY

Jalna city is also known as steel city because many steel TMT bar making companies belong to this district. Steel from Jalna is quite popular in Maharashtra and other districts because of its quality and tuffness that are very important in every form of construction ranging from building to making house. Owing to this Jalna's steel technology is famous all over the world. The industrial development at Jalna is widely based on Engineering, Plastic and Agriculture. Pulses mills, oil mills, refineries, steel re-rolling, plastic, tiles and cement pipe, fertilizers, insecticides, pesticides and the co-operative sugar factories have played an important part in the industrial development of Jalna (http://jalna.nic.in/html/indus.html).

There are also cotton ginning and pressing factories and an agricultural market produce committee handling large quantities of all kinds of agricultural produce, including cotton. In order to promote industrial development within the region, the state government has initiated a master plan to encourage the establishment of small and large- scale industrial units. Under this plan Maharashtra Industrial Development Corporation (MIDC) has set up an industrial area in Jalna consisting of large-scale, medium scale and small scale industries. Jalna industrial area has a large number of steel rolling mills, a unit manufacturing ball bearings, agro based units like dal mills and most significant being large number of hybrid seed manufacturing units; Mahyco, Mahindra, Bejo-Shital being the few popular ones of them. The MIDC has recently announced to setup bio technology park (BT Park) at Jalna with the help of private sector units. This park will give a tremendous boost to the BT sector in this backward area of Marathwada. NRB bearing Ltd is the leading manufacturer of ball bearings used in automobiles and other heavy industrial purposes.

There are 8 Sugar factories within the Jalna district:

- Jalna Sahkari Sugar Factory, Ramnagar, Jalna.
- Samarth Sahkari Sugar Factory, Samarthnagar, Ambad
- Bageshwari Sahkari Sugar Factory, Partur.
- Rameshwari Sahkari Sugar Factory, Bhokardan
- Sagar Sugar Factory

- Samruddhi Sugar Factory, Devi Dahegaon, Tq. Ghansavangi
- M/s Karamaveer Ankushrao Tope Sahakari Sakhar Karkhana (unit I and II)

http://jalna.nic.in/html/indus.html

At present 8 industrial areas are under MIDC JALNA as given below in Table 4. However, only 4 lie within the Jalna municipal limits.

Table 4: Industrial areas in Jalna district

Sl. No.	Name of Ind. Area	Land acquired (in Hect.)	Land developed (in Hect.)	Prevailing Rate Per sqm (in Rs.)	No. of plots	No. of allotted plots	No. of vacant plots	No. of Units in production
1.	Old Jalna	50.58	50.58	260/-	89	89	-	62
2.	Addl. Janla Ph. I	158.10	158.10	260/-	333	331	02	259
3.	Addl. Jalna Phase II	123.46	123.46	260/-	146	133	13	80
4.	Addl. Jalna Phase III	260.76	-	-	-	-	-	-
5.	Partur C.G	63.15	36.21	70/-	38	17	21	02
6.	Ambad	35.38	24.38	35/-	94	60	34	07
7.	Bhakardan	10.69	10.69	30/-	60	57	03	22
8.	Jafrabad	14.04	14.04	25/-	36	35	01	05
	Total	716.16	417.46		796	722	74	437

Source: http://dcmsme.gov.in/dips/ips-jalna%20profile.pdf

There are 35 approved mega projects in the district out of which 24 are in MIDC and 11 are located outside the MIDC with proposed investment of INR 3689 crores and employment potential of 12774. At present there are 11Working Mega Projects out of 35 approved Mega Projects in Jalna district as presented below in Table 5.

Table 5: Mega Projects in Jalna

SNo.	Industrial Unit	Product	Value (INR Crore)	Employment
1.	Laxmi Cotton Spin, Samgaon Dist. Jalna	Cotton Yarn	57.62	275
2.	Abhay Cottex Pvt. Ltd. Gundewadi	Cotton seed extraction	43.44	271
3.	Bhagyalaxmi Rerolling mill, Daregaon	Rerolling mill	103.33	401
4.	Om Sai Ram Steel & Alloys, MIDC	Rerolling mill, TMT Bar	19.46	303
5.	Jalna Siddhivinayak Alloys, MIDC	Rerolling mill, TMT Bar	44.21	330
6.	Kalika Steel Alloys Pvt. Ltd, ,MIDC	MS Beam	35.25	310
7.	Mahesh Products Ltd. Khadgaon	MS Bar	14	273
8.	S.R.J Pitti Steel, MIDC	TMT Bar	39.96	413
9.	Mauli Steel Pvt. Ltd., MIDC	TMT Bar	10.47	150
10.	Meta Roll & Commodities, Daregaon	Sponge Iron	112	389
11.	Rukmini Imple Pvt. Ltd. Devulgaon	Cashew Packing	24	280
			503.84	3395

Source: http://jalna.nic.in/html/indus.html

In addition to these mega projects there are numerous other enterprises cotton ginning and pressing (90), oil mill (43), dall mill (17), seed processing (8) and steel rerolling mills (53)

Table 6: Categories of Industries in Jalna

Description	Red	Orange	Green	Total
Large	36	01	0	37
Medium	02	06	0	08
Small	80	223	797	1100
Total	**118**	**230**	**797**	**1145**

Source:MPCB SRO Jalna, 2017

According to MPCB in Jalna there exist MIDC phase-1 and phase-2 which has 10 large steel industries and 13 re-rolling mills which are in operation. In the steel industry particulate matter (PMs) such as soot and dust that may contain iron oxides are released in huge quantities (Table 6, Fig.2). For mitigation Air Pollution Control Equipments including hood, ducting, ID Fan, Water, Scrubber and Chimney have been set up and are in operation. Further MPCB has given instructions to the industries for controlling air pollution. In light of MPCB's directives M/s Karamaveer Ankushrao Tope Sakhar Karkhana (unit I and II) have established online monitoring system for air. 10 Steel manufacturing units have been issued directives for upgrade of APC including Hood, ID Fan, Duct, Scrubber and Chimney (MPCB SRO Jalna, 2017).

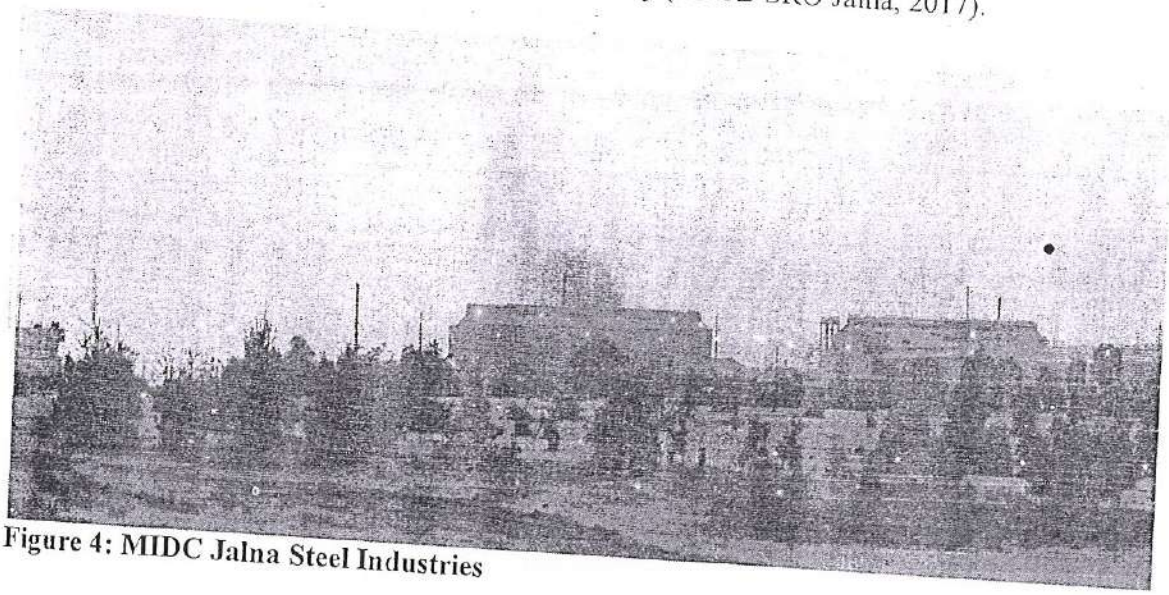

Figure 4: MIDC Jalna Steel Industries

VEHICLES

From Table 7 it is clear that the number of vehicles in Jalna has been on a rise over the years.

In 2013 the total number of vehicles was 207230 which increased to 232116 in 2014 at 12% growth and the number crossed 282958 in 2016.

Table 7: Growth of Vehicles between 2013 and 2016

	2013	2014	% Growth	2015	% Growth	2016	% Growth
Jalna	207230	232116	12.01	258961	11.57	282958	9.27

Source:http://mahatranscom.in/pdf/MVD%20Statistics%20-%202015-16.pdf

It is evident from table 8 that 2 wheelers comprise the maximum proportion (almost 80%) of the total fleet. Motor cars comprise only 3.5% of the total vehicle population. There are around 6437 auto-rickshaws in Jalna.

Table 8: Category of Vehicles

Category	Type of Vehicles	Number of Vehicles
1.	Motorcycles	200211
2.	Scooters	12172
3.	Mopeds	12279
	Total number of 2 Wheelers	**224662**
4.	Motor Cars	9916
5.	Jeeps	6188
6.	Station Wagons	128
7.	Taxi meter fitted	596
8.	Tai Tourist Cabs	140
9.	**Autorickshaw**	6437
10.	Stage Carriages	242
11.	Contract Carriages	27

12.	School Buses	212
13.	Private Service Vehicles	7
14.	Ambulances	117
15.	Articulated/Multi-axled vehicles	5
16.	Trucks & Lorries	2991
17.	Tankers	261
18.	Delivery van (4 wheelers)	3306
19.	Delivery van (3 wheelers)	6436
20.	Tractors	13642
21.	Trailers	7169
22.	Others	476
	Total	**282958**

Source:http://mahatranscom.in/pdf/MVD%20Statistics%20-%202015-16.pdf

Table 9: Category of Vehicles based on type of Fuel

SNo.	Office	Diesel	Petrol	LPG	CNG	Others	Total
1.	Jalna	41121	234232	436	0	7169	282958

Source:http://mahatranscom.in/pdf/MVD%20Statistics%20-%202015-16.pdf

From table 9 it is clear that Petrol based vehicles comprise a majority among the total vehicle population in Jalna.

E-RICKSHAW

Jalna does have MSRTC buses plying between major cities and district centres it doesnot have city buses making travel difficult for its residents. E-rickshaws have been successfully experimented in Delhi, Kolkata and Nagpur. These auto-rickshaws are available at reasonable rates and work on electrical battery. Govt of Maharashtra has recently clarified that it would follow the central government's directive of allowing e-rickshaws to ply without permits all over the state, except Mumbai. It is expected that these would provide a cheap means of transport to Jalna residents at very nominal rates in addition to reducing air pollution

(http://indianexpress.com/article/india/india-news-india/maharashtra-to-follow-centres-order-allow-e-rickshaws-to-ply-without-permits-3012401/).

Table 10:Vehicles detected for auto pollution

SNo.	Office	Vehicles checked 2013--14		Total	Vehicles checked 2015--16		Total
1.	Jalna	Transport	Non-Transport		Transport	Non-Transport	
		435	190	625	342	67	409

Where

1) Non Transport :- Two Wheelers, Motor Cars, Jeeps, Station Wagons, Tractors, Trailers & Others
2) Transport :- Taxi Cabs, Auto Rickshaws, Stage Carriage, Contract Carriage, School Bus, P.S.V., Ambulances Trucks and Lorries, Arti. Multi. Vehicles, Tankers, Delivery Van-Four & Three Wheelers

Source:http://mahatranscom.in/pdf/MVD%20Statistics%20-%202015-16.pdf

Clearly during 2013-14 as well as 2015-16 the transport vehicles (comprising of taxi cabs, auto-rickshaws, buses, trucks etc.) were mainly detected for auto pollution.

Table11: Performance of PUC Checking during 2015-16

SNo.	Office	Performance of PUC Checking		Revenue collected (Rs in Lakh)
	Jalna	MV Checked	MV Detected	
		413	305	2.79

Source:http://mahatranscom.in/pdf/MVD%20Statistics%20-%202015-16.pdf

During 2015-16 almost 305 motor vehicles (Table 11) were fined for failing pollution under control check. A sum of Rs 2.79 Lakhs was collected as fine. There are 8 approved PUC in Jalna. However, few other centres are functioning illegally and there is dire need to train the staff as

well as check corruption or other malpractices. Remote Sensor based PUC would require complete computerization and would be full proof from any fudging or faking however, it would take more time for such a system to be in place.

CLEAN FUEL

Figure 5: Biodiesel outlet on Aurangabad Jalna road

BIOFUELS

Biofuels provide a low cost, readily available alternative to conventional fossil fuels. The use of Bio-ethanol and Bio-diesel in vehicles also lowers harmful particulate matter emissions. Bio-diesel can be used in cars, buses and commercial vehicles, industrial vehicles, tractors, power generators that use regular diesel. Around 8000 L per month of biodiesel is being sold at an

outlet on Aurangabad Jalna road. It is popular among consumers on account of being Rs 5-6 per litre cheaper to diesel (https://timesofindia.indiatimes.com/city/aurangabad/bio-fuel-to-lead-the-way-in-clean-energy-in-india/articleshow/61800534.cms).

ROAD

National and State highways are well maintained however, the other district roads and rural roads need proper maintenance for avoiding road dust re-suspension. Road relaying and the construction of flyovers is in progress. In addition 3-laning of Aurangabad-Jalna-Jintur road, 4 laning of Jalna-Ambad-Vadigodri Road (SH-176), 4 laning of Aurangabad-Yedeshi section of NH-211 is also under progress.

Table 12 Roads in Jalna

SNo.	Road	Length
1.	Rail track	88 km
2.	National Highway	22 km
3.	State Highway	1054 km
4.	Main district roads	855 km
5.	Other district roads	729 km
6.	Rural road length	798 km
7.	Total Road length	3559 km

Source: http://jalna.nic.in/html/atglance.html

The **Maharashtra Samruddhi Mahamarg** (also known as **Nagpur Mumbai Super Communication Expressway**) is an infrastructure project that will build a fast-track, state-of-the-art expressway connecting Mumbai—the state capital and financial capital of the country with Nagpur—the state's winter capital. The project also proposes to develop 20+ Krushi Samruddhi Kendra (new towns) along the Mahamarg.

The expressway will be 700 kilometres (430 mi) long, directly connecting ten districts, twenty-six talukas and around 392 villages. It will have a speed limit of 150 kilometres per hour (93 mph) which will bring Nagpur and Mumbai within 8 hours reach. The expressway will pass

through ten districts, namely Nagpur, Wardha, Amravati, Washim, Buldhana, Aurangabad, **Jalna**, Ahmednagar, Nashik and Thane. It will connect Nagpur to Mumbai and have direct connectivity with the country's largest container port—JNPT. This will enhance EXIM (export-import) trade of the state. Inter-connecting highways and feeder roads would be constructed to connect all important cities and tourist places along this route (http://www.dnaindia.com/mumbai/report-maharashtra-to-begin-work-on-first-smart-highway-2324601).

WASTE MANAGEMENT

As per estimates the total MSW generation is 80 MT per day from 54 wards which include 57000 households and 3 markets.

MSW is collected from close to 100% of city area comprising by the city municipality. However, no waste segregation is undertaken. Door to door collection is undertaken by loading into ghantagadi. There is 1 storage bin in each ward which is attended on a daily basis and cleaning is done once every week. 10 sweepers per ward are deployed for road sweeping. For waste transportation 12 tractors, 6 ghantagadis, 1 dumper placer, 1 compactor for all wards. There are 5 trips per ward with a total of 1 MT waste transported per ward (JMC, 2017).

Table 13: Waste collection in Jalna

SNo.	Parameter	Status
1.	No. of wards/ houses/markets covered	54 wards, 57000 houses, 3 markets
2.	% population served	100%
3.	No. of handcarts deployed ward wise	10
4.	No. of conservancy staff deployed for primary collection ward wise	10 per ward
5.	No. of sweeper deployed for road sweeping ward wise	10
6.	How door to door collection is practiced	By loading into Ghantagadi
7.	Whether waste segregated	Proposed
8.	Whether bins being attended on daily basis provision of cleaning/washing bins	Bins attended daily and cleaned once in a week
9.	Quantity of MSW collected per day	80 MT
10.	Waste transportation no. of tractors/dumpers/tippers deployed ward wise	12 tractors/6 ghantagadi/1 dumper placer/1 compactor for all wards
11.	No. of workers deployed for waste transportation per ward	6 workers per ward
12.	No. of trips made by vehicles ward wise	5 trips/ward

13.	Total quantity of waste transported ward wise	1 MT/ward
14.	Mass awareness programmes organized	NGO meetings, handbills, tool kit, workshops, local TV channel
15.	Sweeping tools	200
16.	Refuse collection vehicle	12 tractor
17.	Containerized tricycle	50
18.	Containerized handcart	130
19.	Waste storage bins	75
20.	Dumper placed vehicles	1
21.	Litter bins	50

Source: JMC, 2017

In 2005 Jalna Municipal Council (JMC) received financial aid from the Central Pollution Control Board (CPCB) and the Maharashtra Pollution Control Board (MPCB) for a pilot solid waste management project. This project was planned on a 10-acre plot in Samangaon, and was meant to treat 80 tonnes of garbage every day. Currently, the civic body dumps garbage at Sarewadi village, which is near Kundalika river, the source of drinking water for Jalna residents. However, the progress in project implementation has been slow (https://timesofindia.indiatimes.com/city/aurangabad/Jalna-Municipal-Corporations-solid-waste-management-project-a-non-starter/articleshow/20754274.cms).

Despite much delay the setting up of a Municipal Solid Waste processing plant (i.e. composting and its operation and maintenance) of plant capacity 100 MT of fresh city garbage per day is in progress.

Setting up of a Waste Disposal facility (i.e. landfilling) for disposal of reject arising out of waste processing plant is also in progress.

AIR QUALITY STATUS

Under State Ambient Monitoring Protocol there are two Monitoring stations located at

1. IMA Hall, Bhokardan Naka Jalna (Residential/Commercial).

2. Krishidhan Seeds Pvt Ltd., Add. MIDC Phase-II (Industrial).

Jalna currently has – 2 monitoring stations for its residents; it should have more monitoring stations within the city in commercial, industrial and sensitive areas. City has no continuous monitoring station which is urgently needed for monitoring of PM 2.5, CO and Ozone within residential, commercial and industrial areas.

City also lacks display boards providing air quality information to public which may be taken up by Jalna's industry forum for sensitizing the public with regard to air quality.

Table 14: Air Quality Data from 2012-2017 (Annual Average)

Location :- Krishidhan Seed, Jalna Industrial area			
Year	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	RSPM ($\mu g/m^3$)
2012	9.8	29.4	117.8
2013	11.5	31.5	141.9
2014	11.2	30.09	187
2015	10.9	30.2	164.5
2016	10.9	31.9	86.5

Source: MPCB SRO, Jalna, 20017

From Table 14 it is clear that RSPM levels in the industrial area have been higher than the standards. However, in 2016 there has been a drastic decline in the concentrations which needs to be further brought below the standards.

Figure 6: Trend in RSPM concentrations

Source: MPCB SRO, Jalna, 20017

From Figure 6 it is evident that RSPM concentrations at Krishidhan Seed location in MIDC Jalna have been continuously high (above the standards) over the 5 year period. Further the concentrations peaked in 2014 and have been on a decline since then.

Table 15: Air Quality Data from 2012-2017 (Annual Average)

Location :-IMA Hall, Bhokardan naka, Jalna (Type- Residential)			
Year	**SO2 ($\mu g/m^3$)**	**NOx ($\mu g/m^3$)**	**RSPM ($\mu g/m^3$)**
2012	8.8	30.1	93.7
2013	9.9	30.2	105.4
2014	8.42	29.44	94.16
2015	10.8	30.4	119.5
2016	9.1	31.5	146

Source: MPCB SRO, Jalna, 20017

From Table 15 it is observed that RSPM concentrations at IMA hall which is a residential site in Jalna have been above the permissible limits over the 5 year period.

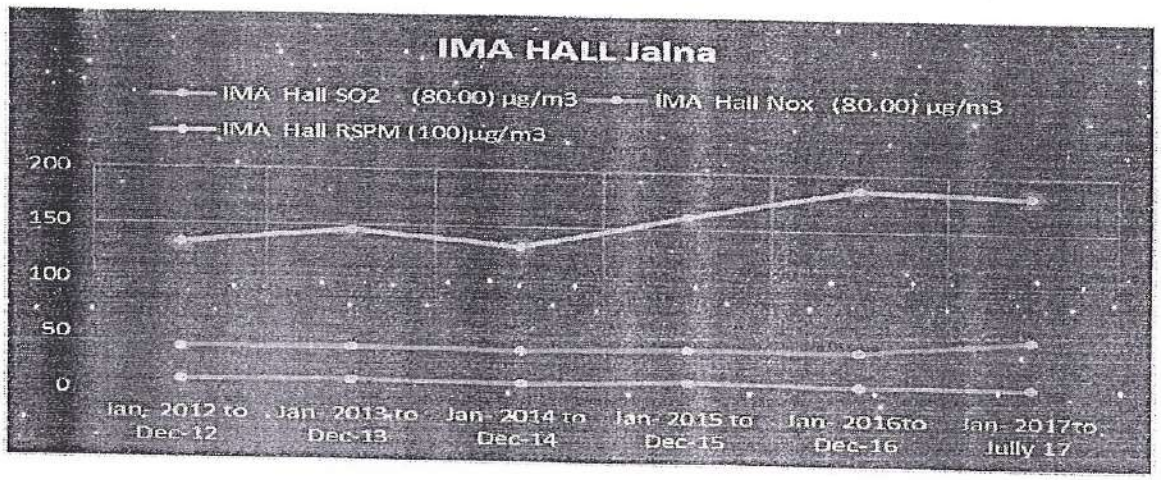

Figure 7: Trend in RSPM concentrations

Source: MPCB SRO, Jalna, 20017

From Figure 7 it is evident that RSPM concentrations at IMA hall location in Jalna have been continuously high (above the standards) over the 5 year period. Further the concentrations have revealed an increasing trend since 2015 which is worrisome as it is a residential location.

CAPACITY TO DETERMINE SOURCES OF AIR POLLUTION AND THEIR CONTRIBUTION: Emission inventory and source apportionment research for Jalna is needed for identifying the sources of air pollution and highlighting the contribution of each source. These studies would assist in prioritization of actions to mitigate air pollution.

CAPACITY TO ESTIMATE IMPACTS OF AIR POLLUTION: A comprehensive literature review revealed scarce studies on the estimation of health impacts of air pollution for Jalna. However, there exist studies at the National level on the impact of air pollution on visibility, climate change, agricultural productivity and long-range pollutant transport. The city needs to urgently undertake research studies on these themes, particularly relating to health, in order to have a better understanding of the impact of the air pollution experienced by the city residents.

RECOMMENDATIONS AND WAY FORWARD

Jalna is situated at the central part of Maharashtra and in northern part of Marathwada region. Currently the district has eight blocks, Bhokardan, Jafferabad, Ambad, Jalna, Partur, Mantha, Ghansawangi and Badnapur. As regards governance, it has four Municipal councils and 781 Gram Panchayats. The district has dry and tropical climate with very hot summer and mild winter with humid SW monsoon season of moderate rainfall. However, it is important to note that the district often experiences drought with rainfall recorded as low as 400 to 450 mm. The district has moderately to gently sloping undulated topography. The river Godavari flows along the southern boundary from west to east. The rivers Dudhana, Galati and Purna are its principal tributaries. As per the 2011 census, 80.73 per cent population lives in rural and only 19.27 per cent in urban area. The land utilization pattern indicates that only 0.64% area is under forest which is quite low. 74% per cent of the geographical area is under cultivation and 15 % is fallow. Since 74% area is under agricultural use the economy of the district is based on agriculture and agro-industries.

Jalna city is also known as steel city because many steel TMT bar making companies belong to this district. The industrial development at Jalna is widely based on Engineering, Plastic and Agriculture. Pulses mills, oil mills, refineries, steel re-rolling, plastic, tiles and cement pipe, fertilizers, insecticides, pesticides and the co-operative sugar factories have played an important part in the industrial development of Jalna. According to MPCB SRO in Jalna there exist MIDC phase-1 and phase-2 which has 10 large steel industries and 13 re-rolling mills which are in operation. In the steel industry particulate matter (PMs) such as soot and dust that may contain iron oxides are released in huge quantities. **10 Steel manufacturing units have been issued directives for upgrade of APC** including Hood, ID Fan, Duct, Scrubber and Chimney. Industries need to comply with these directives within the desired time frame and compliance must be checked by MPCB.

In 2013 the total number of vehicles was 207230 which increased to 232116 in 2014 at 12% growth and the number crossed 282958 in 2016. **2 wheelers comprise the maximum proportion (almost 80%) of the total fleet**. Motor cars comprise only 3.5% of the total vehicle population. There are around 6437 auto-rickshaws in Jalna. **Jalna does have MSRTC buses plying between major cities and district centres it does not have city buses making travel**

difficult for its residents. E-rickshaws may provide a cheap means of transport to Jalna residents at very nominal rates in addition to reducing air pollution

There are 8 approved PUC in Jalna. However, few other centres are functioning illegally and there is dire need to train the staff as well as check corruption or other malpractices. Remote Sensor based PUC would require complete computerization and would be full proof from any fudging or faking however, it would take more time for such a system to be in place.

Bio-diesel can be used in cars, buses and commercial vehicles, industrial vehicles, tractors, power generators that use regular diesel. Around 8000 L per month of biodiesel is being sold at an outlet on Aurangabad Jalna road. It is popular among consumers on account of being Rs 5-6 per litre cheaper to diesel.

National and State highways are well maintained however, the other district roads and rural roads need proper maintenance for avoiding road dust re-suspension. **Maharashtra Samruddhi Mahamarg** (also known as **Nagpur Mumbai Super Communication Expressway**) a state-of-the-art expressway connecting Mumbai with Nagpur would pass through Jalna. It is expected that it will improve connectivity and also lower emissions with the provision of high speed expressway with speed limit.

Totai MSW generation in Jalna is 80 MT per day from 54 wards which include 57000 households and 3 markets. MSW is collected from close to 100% of city area comprising by the city municipality. However, no waste segregation is undertaken. Door to door collection is undertaken by loading into ghantagadi. In 2005 JMC received financial aid from the CPCB and the MPCB for a pilot solid waste management project. This project was planned on a 10-acre plot in Samangaon, and was meant to treat 80 tonnes of garbage every day. Currently, the civic body dumps garbage at Sarewadi village. **Despite much delay the setting up of a Municipal Solid Waste processing plant** (i.e. composting and its operation and maintenance) of plant capacity 100 MT of fresh city garbage per day is in progress.

Setting up of a **Waste Disposal facility** (i.e. landfilling) for disposal of reject arising out of waste processing plant is also **in progress**.

Jalna currently has – 2 monitoring stations for its residents; it should have more monitoring stations within the city in commercial, industrial and sensitive areas. **City has no continuous monitoring station** which is urgently needed for monitoring of PM 2.5, CO and Ozone within residential, commercial and industrial areas.

City also lacks display boards providing air quality information to public which may be taken up by Jalna's industry forum for sensitizing the public with regard to air quality. 5 year Air Quality Data indicates RSPM levels in the industrial site have been higher than the standards. However, the concentrations need to be further brought below the standards. RSPM concentrations at IMA hall location in Jalna have been continuously high (above the standards) over the 5 year period. Further the **concentrations have revealed an increasing trend since 2015 which is worrisome as it is a residential location.**

Emission inventory and source apportionment research for Jalna is needed for identifying the sources of air pollution and highlighting the contribution of each source. These studies would assist in prioritization of actions to mitigate air pollution. The city needs to urgently undertake research studies on impact of air pollution on health, in order to have a better understanding of the impact of the air pollution experienced by the city residents.

Provision of green belt in and around the city besides the roads is needed. Green Traffic islands could be developed at crowded intersections sponsored by industries. There exists significant scope for improvement of roads and footpaths.

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ANNEXURE

Workshop: Clean Air Roadmap for Maharashtra

A Consultative Stakeholder Workshop was organized by Dept. of Environmental Sciences Dr BAMU and Maharashtra Pollution Control Board on 25th Nov, 2016 along with Clean Air Asia. 30 experts from academia, industry, NGOs, students and medical doctors participated in the workshop and expressed their views. Prof. Satish Patil BCUD, BAMU convened the workshop in presence of Dr. Jitendra Singh Sangewar, Regional Officer MPCB. Dr. Geetanjali Kaushik an expert presented the air quality status of Aurangabad city. Dr. Chate from IITM Pune highlighted SAFAR's role in providing air quality information to residents in Pune, Mumbai and Delhi. Mrs. P. S Rao from NEERI; Nagpur presented the various initiatives planned for Nagpur city. CMIA was represented by Mr. Anil Nalwade from Wockhardt.

Workshop on 'Clean Air Roadmap' held in city

Civic Response Team, Disha Foundation and CMIA discussed issues concerning city air quality

LOKMAT NEWS NETWORK
AURANGABAD, NOV 26

Katherine Thaday (director, CCAP, Clean Air Asia) from UK, Dr Gestanjali Kaushik and other delegates participated in the workshop on 'Clean Air Roadmap' held at Hamu, in Aurangabad on Friday.

Clean Air Asia, in association with Dr Babasaheb Ambedkar Marathwada University and Maharashtra Pollution Control Board organised a workshop on Clean Air Roadmap on Friday.

Board for College and University Development (BCUD) director Satish Patil convened the workshop along with Parthana Borah (India director, Clean Air Asia).

Katherine Thaday (director, CCAP, Clean Air Asia), Dr Gestanjali Kaushik (air quality specialist, Clean Air Asia) has applied CAST (Clean Air Scorecard Tool) developed by Clean Air Asia and the Asian Development Bank for Aurangabad city.

The report has revealed a bad score of developing for the city implying that despite poor work for air quality and health index, the city received better scores for clean air management capacity and clean air policies and action.

Civic Response Team, Disha Foundation and CMIA discussed issues concerning city air quality.

Experts from NEERI and IITM provided recent research trends and shared their findings with the audience.

Students from Government Engineering College expressed their desire to participate in the initiatives planned for clean air for Aurangabad city.

CMIA experts from industries and many experts from Hamu department of chemical and department of environmental science participated in the workshop.

Clean Air Mission – Maharashtra 2022

One day National Conference

Air Quality Monitoring, Emission Source Apportionment and Air Quality Improvement Plans for 17 cities in the State of Maharashtra and Surat City, Gujarat

Hotel Taj (Vivanta) on 22nd Aug, 2017

Poor air quality in a major concern in Maharashtra cities. Ambient air quality is monitored under NAMP (National Ambient Air Quality Monitoring Programme) as per the monitoring protocol prescribed by the CPCB at selected locations. CPCB has identified **17 non-attainment cities in Maharashtra** based on the observation of exceedance with respect to National Ambient Air Quality Standards 2009 consecutively during 2011 to 2015 namely Akola, Amravati, **Aurangabad**, Badlapur, Chandrapur, Jalgaon, Jalna, Kolhapur, Latur, Mumbai, Nagpur, Nasik, Navi Mumbai, Pune, Sangli, Solapur and Ulhasnagar.

Air pollution has been viewed seriously by Supreme Court and the National Green Tribunal which have issued specific directions from time to time for improving the ambient air quality where the level of pollutants exceeded the stipulated standards. Various studies conducted in past have identified as the major air pollution sources in urban areas as suspension of road dust, vehicular emissions, biomass burning, crop residues, municipal solid wastage, construction and demolition activity emission from industrial units, DG sets, fuel uses for domestic and commercial activities.

Improvement of air quality require multidisciplinary, sustained and integrated approach including close monitoring of implementation, for that involvement of all stakeholders is essential for preparation of appropriate action plans which will help in reducing urban air pollution. In view of the above **Maharashtra Pollution Control Board (MPCB) in association with Department of Environment, GoM, CPCB, IIT Bombay and NEERI organized a one day National Conference**. The aim was to involve all the concerned stakeholders for discussing the issues related to Ambient Air Quality of non-attainment cities and timeline of action plans (Short term and Long term) to be submitted by concerned stakeholders for effective implementation.

MPCB's Member Secretary Dr. P. Anbalagan in his address highlighted the fact that the state of Maharashtra has the maximum number of air quality monitoring stations within the country. Special Guest -**CPCB's Chairman Shri. S.P. Singh Parihar** mentioned that air quality is an important issue for humans, animals and plants as well. He complimented the presence of Mayors in the Conference and said that local body institutions are for welfare of citizens. Further he advised that it was important to not just understand present air quality and challenges but focus should be on its being continuous for the future as well. Shri. Parihar highlighted Delhi and NCR's Graded Response Action Plan that as the air quality becomes worse at different stages what steps can be undertaken by each agency.

Mrs. Shobha Vanshete mayor of Solapur city said pollution from dust is an issue in her city, she requested to provide both funding and guidance for the control of pollution. **Mrs. Hasina mayor of Kolhapur** said that despite taking several workshops under Swacch Bharat Mission the pollution in the city did not reduce. Kolhapur being a beautiful city of gods, she came to appraise the issues facing the city to CM and hoped to get guidance from the Conference.

Mrs. Nanda mayor of Nagpur city highlighted the initiatives undertaken by the city for improving its air quality. Ist pilot in country taxis running on batteries (inaugurated by Shri Nitin Gadkari). E—rickshaws in cities also running on batteries. She stressed that unless we took action kids will have severe problems. 2040 Niti Ayog has target of having battery operated vehicles. Awareness is important but actual field work is needed. Schools need to be aware cited the example of CLEAN INDIA under which kids are counseled not to throw waste outside in a similar manner they should be counseled against air pollution.

In his address **Shri Satish Gavai Add. Chief Secretary (Environment) GoM** said that when Swedish Minister came to meet the CM he asked him what steps he had undertaken under the Paris Agreement. He expressed that more people in India are dying due to air pollution as compared to those on roads in European cities. Due to global warming a glacier comprising area of 25000 km^2 equivalent to areas of almost 5 cities has declined. To support the Municipal Corporations to apply for funding for pollution related projects a Handbook for funding opportunities was to be soon released. Sweden has committed to phase out fossil fuel driven vehicles by 2020. He stressed that air quality monitoring and preventive measures are our

accountability towards the society. Mr. Gavai concluded with we are a young nation we should take example from developed nations and this sense of responsibility should transcend on public domain.

Chief Guest of Function was Shri Pravin Pote-Patil (Minister of State for Environment, Maharashtra). All chowks have air purifiers (worth Rs 80,000- 90,000) solar based reduce air pollution on traffic junctions. Personal accountability and responsibility each municipal corporation, each member, I and only then we will be able to change Maharashtra. Each month a status report of Municipal Corporations would be released to inform about their air quality.

Prof. Virendra Sethi from IIT Bombay proposed the vote of thanks. He concluded that air pollution has no boundaries and we all have a commitment towards the future of India ensuring its health and prosperity.

Urban air quality: Action Planning Presentation on behalf of Dr. Prashant Gargava (CPCB) was given it was highlighted that a comparison of risk factors between 1990 and 2015 revealed that ambient air pollution was consistently ranked at 4. According to him PM and NOx are a cause of concern at present however, O_3 and Benzene would be concerns in the future. He pointed out that in India it has been our perception and not science which has guided our actions. Further complexity in developing Air Quality Management plans is on account of lack of public awareness, coordination among agencies, financial constraints and limited periodic monitoring. He shared the example of DTC bus operations strengthening which did not yield desired results and commented that review must be undertaken to make it effective.

Dr. V.M. Motghare MPCB Jt Director Air mentioned that out of CPCB's 94 cities within the Non-Attainment list 17 cities are in the state. He commented that the latest AQI revealed 60% observations were in good shape, 35% were moderate while rest 2-5% fell in the category of poor air quality.

He informed about various initiatives – WAYU (wind augmentation purifying unit) across various locations in Mumbai. Dr. Motghare revealed about the Star Rating Program for 27 corporations and how their outlook would change from next month. For instance with regard to air quality Nagpur city may receive 5 star rating. MPCB launched STATE ENVIRONMENT CARE CENTRE in April 2016 a portal for online access of monitoring data from the industries.

It has also been proposed to set up Ambient air quality monitoring stations for remote locations over DC's office such as in Gadhchiroli. Dr. Motghare also highlighted that as per CPCB's directive section 18(b) to MPCB issues directions to all Municipal Commissioners on 11th Aug, 2016. **17 non-attainment cities had to submit the clean air action plan. Despite three reminders however, only 5 cities (Nagpur, Chandrapur, Amravati, Navi Mumbai and Ulhasnagar) have submitted. Unfortunately Aurangabad city is also included in the cities which have not submitted the action plan. Surat City presented its Air Quality Improvement Plan- Member Secretary, GPCB Gujrat**

It is the second largest city in Gujarat known for its diamonds, textiles and also Petrochemicals. However, the area within the limits of Surat city is expected to double in the next 5 years. Surat is a non-attainment city with regard to PM 10.

The highlights of the plan were the actions undertaken by the city in terms of controlling vehicle emissions, awareness programs, fuel quality, status of battery operated vehicles, status of flyovers and bridges, use of ethanol. Further the status of operation of BRTS or Metro, biomass burning, control of industrial emissions and waste management were presented.

Source Apportionment study and its Action Plan for Maharashtra cities was presented by Prof. Virendra Sethi from IIT Bombay. He mentioned that in Chandrapur region satellite data has revealed that the NOx and SOx concentrations have declined while the PM levels have increased. For smaller cities local management would be the key. Management of Garbage, Landfill or Dumpsites, Roads, Traffic management and expansion of Green belt would be significant for these cities to tackle air pollution.

An interesting piece of research was presented by **Shivani and Isha Khot from Mumbai**. These 2 girls have designed a new signal instead of 3 lights it has 4 lights additional purple light on top which helps in reducing emissions, expenditure on oil and also help in earning carbon credits for the country.

Air Pollution and Health: Challenges, it was presented by Dr. Arun Sharma IHBAS and University College of Medical Sciences, Delhi.

He said that air pollution is not important because of the economic losses due to it but on account of its impact on our health. 15 years of cigarette smoking (3-4 per day) can cause irreversible damage to our body. In similar manner air pollution related diseases do not develop immediately but over a period of time and also the damage is irreversible. Evidence reveals that in Greater Raipur area (Durg-Bhilai-Raipur) slums had high levels of PM2.5 and carcinogens in the air. Diseases such as COPD, Asthma, Cancer, Pneumonia and premature mortality have also been associated to air pollution. Lungs have the greatest surface area in human body, therefore the intake of air is 10 times more than that from food.

Mr. P.R.K Murthy- Transport Sector Planning, Director Projects, Metro, MMRDA

Mr. Murthy presented statistics that there are 15 deaths per day so do we need to reduce travel? Mtero could be an alternative. Over 70,000 persons per hour can be conveyed by metro. In terms of capacity 1 metro coach is equivalent to 78 private cars and 24 bus lanes.

Dr. Ritesh Vijay, NEERI highlighted that 27 cities including Aurangabad city have been mapped for noise pollution.

Mr. Ulhas Parlikar, Deputy Head Geocyle India brought the vision of circular economy for discussion. In Linear economy the flow is Resources- Manufacture- Consumption- Waste so the Take, Make and Dispose approach leads to pollution. However, in circular economy vision the flow is circular from make, consume, recover and recycle which makes it minimum waste and pollution.

The panel comprising of Dr. Rakesh Kumar NEERI, Dr. Anbalagan MPCB and Dr. Naidu presented the way forward with regard to the pollution under control initiatives undertaken by the State of Maharashtra in terms of boilers, smokeless chulhas for slum areas and adoption of PNG.

It was concluded that to tackle urban air pollution in an integrated manner the involvement of all stakeholders is essential for preparation of appropriate action plans. In this background Aurangabad city must focus of the preparation and submission of its clean air action plan by Oct-Nov, 2017.

Interaction Meeting with MPCB Sub Regional Office at MIDC, Jalna

25th Oct, 2017

Regional Workshop on Non-Attainment Maharashtra Cities 29th Nov, 2017 @ MPCB Headquarter Mumbai

The regional Workshop on Action Plan for 17 Non-attainment Maharashtra was presided over by CPCB Add Director and Air incharge Dr. Prashant Gargava. NEERI Director Dr. Rakesh Kumar, MPCB Joint Director Air Dr. Motghare and Prof. Virendra Sethi from IIT Mumbai discussed the action plans with city representatives. 6 cities namely Nagpur, Chandrapur, Amravati, Navi Mumbai and Ulhasnagar have already submitted their plans. In this workshop the action plan for Aurangabad was discussed in detail along with Mumbai and Nagpur. It was advised to revise the plan and submit in the new format presented during the workshop. On 30th Nov the draft plan in revised format was accepted by Dr. Gargava from CPCB. City was represented by expert Dr. Geetanjali Kaushik who has prepared the plan. Dr. Gargava commented that Aurangabad is working like a champion and might become a model city not

only for Maharashtra but also for the whole India in the near future. Dr. Sangewar RO Aurangabad, Mr Kadam SRO Aurangabad and Dr. Vijay Patil from Aurangabad Municipal Corporation were in attendance to support the city's initiatives.

Aurangabad revises air quality improvement plan

From left, CPCB scientist Satish Batra, CPCB additional director Prashant Gargava, air quality expert Gufranjali Kaushik, and MPCB scientist SC Kollur

[illegible]

Suggested Template for Deve!opment of Action Plan for Control of Air Pollution in Non-attainment Cities

Control option	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period (short/mid/long-term)	Time target for implementation	Responsible agency(ies)	Any other information
Launch extensive drives against polluting vehicles for ensuring strict compliance	Moderate	Feasible	Not needed	Short (Regular on monthly basis at Toll plaza & Extensive during winter montns Oct-Nov and Jan-Feb)	Begin 2018	JMC Transport, Toll Plaza, Traffic Police, Industry association, Media	With involvement of Colleges & NGOs
Launch public awareness campaigns for air pollution control, vehicle maintanence, minimising use of personal vehicles, lane discipline etc.	Moderate	Feasible	Not needed	Short (Regular & Extensive campaigns during June-July, Oct-Nov and Jan-Feb)	Begin 2018	Traffic, Media,Junior Colleges & NGOs	Mitr mandals & Ganesh Mandals may be involved
Prepare action plan for widening of road and improvement of infrastructure for decongestion of Roads.	High	Feasible	Yes	Mid (in progress)	2017-2019	JMC, MSRDC, PWD, Traffic	roads relaid, flyovers constructed
Prepare Plan for the construction of expressways/bypass to avoid congestion	Moderate	Feasible	Yes	Mumbai-Nagpur Expressway planned	2018-2021	JMC, MSRDC, NHAI, Traffic	
Installation of Remote Sensor based PUC systems	Moderate	Not Feasible till next few years	Yes	Mid - Long term	2020 onwards	Traffic, RTO	8 Approved PUCs
Provide good public transport system	High	Feasible	Yes	Short-Mid	2020	JMC, MSRTC	dire need for city buses
Electric / Hybrid Vehicles	Moderate	Feasible	Not needed, borne by consumers	Mid	2018-2019	Automobile firms	Cricksnaws allowed: http://indianexpress.com/article/india/india-
OE-CNG for new public transport buses	Moderate	Not Feasible till next few years	Yes for laying of pipelines	Mid	2019-2020	JMC, Oil & Gas companies	
Bio-diesel (B5/B10: 5 – 10% blend)	High	Feasible	Blends available at outlets in city	Short	2018	JMC, MPCB, BIS, CMIA, Fuel firms	8000 L per month sold at Aurangabad Jalna road by IDHMA
Prepare plan for creation of green buffers along the Traffic corridors	High	Feasible	Yes	Short (in progress)	2018	JMC Horticulture, Forest Dept.	10,000 saplings with plastic guards planted this year
Maintain Pothole Free Roads for Free Flow Traffic	High	Feasible	Yes	Regular		JMC, MSRDC	
Introduce water fountains at Major Traffic intersection, wherever feasible	Moderate	Feasible	Not needed	Short (in progress)	2018	Steel Industries association	Needed at Bhokardan naka to be covered under CSR funds from companies

Suggested Template for Development of Action Plan for Control of Air Pollution in Non-attainment Cities

Control option	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period (short/mid/long-term)	Time target for implementation	Responsible agency(ies)	Any other information
Greening of open areas, garden, community places, schools and housing societies	Moderate	Feasible		Regular		JMC Horticulture, NGOs	Campaigns, Students, NGOs, Citizen forums
Launch extensive drive against open burning of biomas,s crop residue, garbage, leaves etc.	High	Feasible	Not needed	Short	Regular basis start 2018	JMC, NGOs, Colleges	Awareness on MSWM by NGO -corner meetings, tool kit, workshop, local
Regular check and control, of burning of Municipal Solid waste	High	Feasible	Yes	In Progress	By 2020	JMC	
Proper collection of Horticulture waste and its disposal following composting –cum –gardening approach	High	Feasible	Yes	In Progress	By 2020	JMC	Municipal Solid Waste Handling plant 80MT/day since June 2017, Sanitary Landfill
Action against non-complying industrial units	High	Feasible	MPCB's role	Regular	Regular	MPCB	MPCB RO issues directives and notices
Promoting cleaner industries	High	Feasible		In progress	2019	MPCB	M/s Karamaveer Ankushrao Tope Sakhar Karkhana (unit:
Installation/ upgradation of air pollution control systems	High	Feasible		In progress	2019	MPCB	10 Steel manufacturing units have been issued
Regular audit of stack emissions for QA/QC	High	Feasible		In progress	2019	MPCB	
Enforcement of construction & demolition rules	Moderate	Feasible			Start 2018	JMC	
Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and suppression units	High	Feasible		Short	2018	JMC	
Better construction practices with PM reduction of 50%	*Moderate*	Feasible		Mid	2019	JMC	
Ensure carriage of construction material in closed /covered Vessels	*Moderate*	Feasible		Short	***2018***	JMC	