Air Pollution Control
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Lecture 50
National Policies for Managing the Ambient Air Quality

Hello friends. You may recall we were discussing about emission and air quality standards. Today we will discuss about national policies and programs for managing ambient air quality. Because besides technological interventions which sometimes come through open market or market economy or free market economy because of voluntary decisions of the people, there are also interventions of national level bodies like Central Pollution Control Board or Ministry of Environment and Forests and climate change.

They regularly update their policies and programs for targeting a specific issue or aspect of environmental pollution. So, to improve or to manage the ambient air quality they have been there have been several national policies and programs time to time which have been proposed by the government and implemented by different agencies. So, today we will discuss about them.

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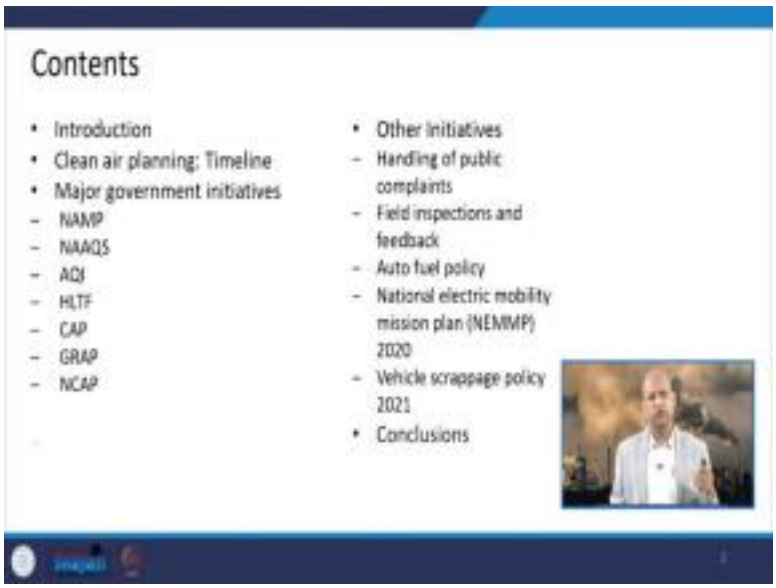

And this lecture will cover like introduction about these policies and programs, then the Clean Air Planning the timeline, which policies have come at which year. So, those timeline we will discuss, then we will discuss about major government initiatives in terms of like national ambient air national air monitoring plan or national ambient air quality standards or air quality index, those kinds of things.

And then other initiatives also we will discuss for example, handling of public complaints,

there are new systems and then field inspections and feedback related system, auto fuel policy that was implemented entire throughout the country and later on we will conclude.

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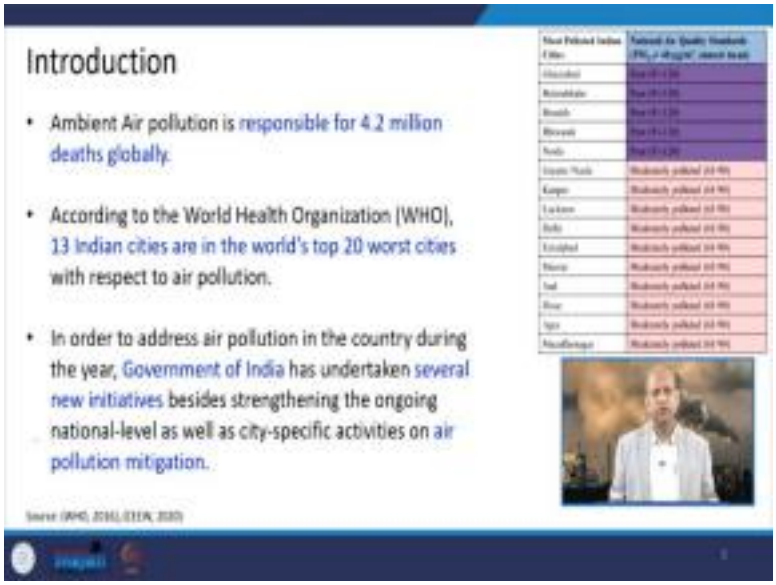

So, when we go for the introduction as, this ambient air pollution we have several times discussed about its impact and there are thousands and millions of deaths which are attributed to the exposure to the air pollution basically with estimated figures.

According to this, World Health Organization estimated figures or based on their reports, like 13 to 14 Indian cities have been ranked into top 20 worst polluted cities in entire world basically. So, in order to address air pollution in the country during the year, over the years Government of India has undertaken several kind of policies and programs. So, we will discuss about them.

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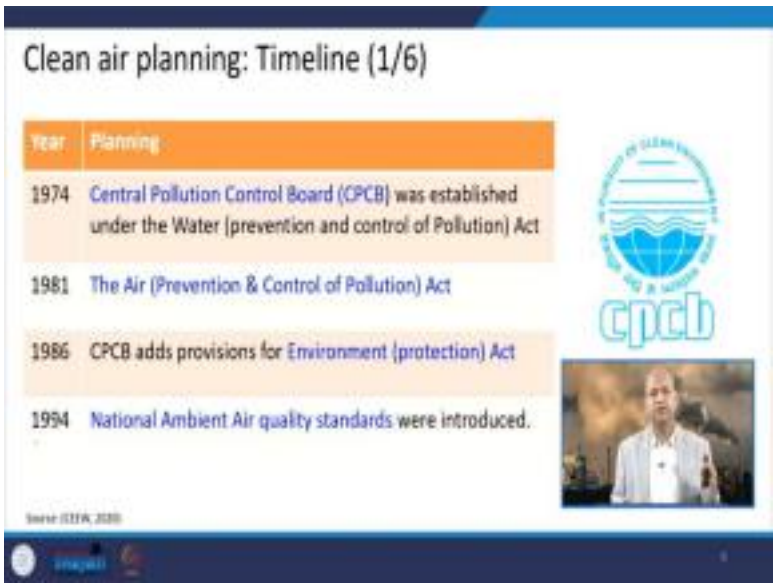

Like for example, if we start from the beginning in 1974 basically the Central Pollution Control Board that entity was established very legal entity focused entity on environment related issues. So, it was established under the water prevention and control of Pollution Act in 1981, then the air prevention and control of Pollution Act was enacted.

In 1986, Central Pollution Control Boards added additional provisions for environment protection act. And in 1994, National Ambient Air Quality Standards were introduced for criteria pollutants and so on.

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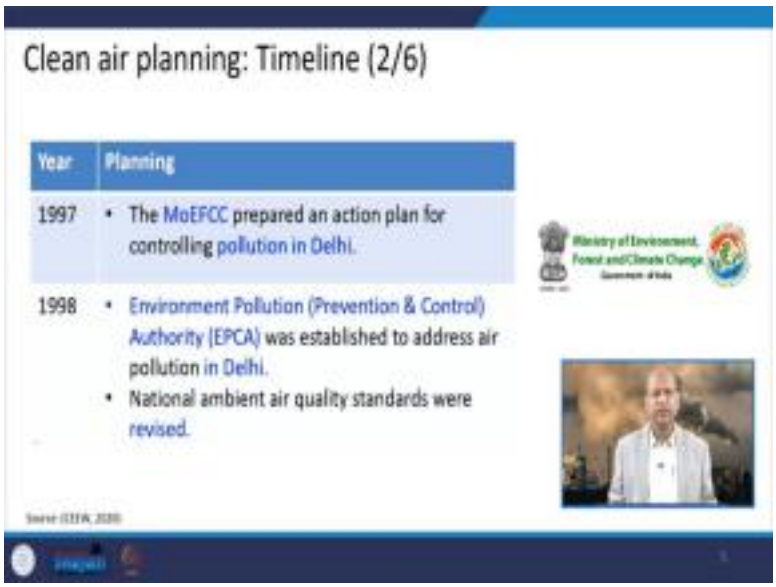

In 1997 Ministry of Environment and Forests and Climate Change prepared an action plan for controlling pollution in Delhi. Basically, earlier it was used to be known as Ministry of Environment forests. Now, it is known as Ministry of Environment and forest and climate

change.

In 1998 the environment pollution prevention and control authority EPCA was established to address air pollution in Delhi particularly because mega city Delhi has been in the news because of its peculiar situation and in winter time very high pollution loads etc. The national ambient air quality standards were revised in 1998.

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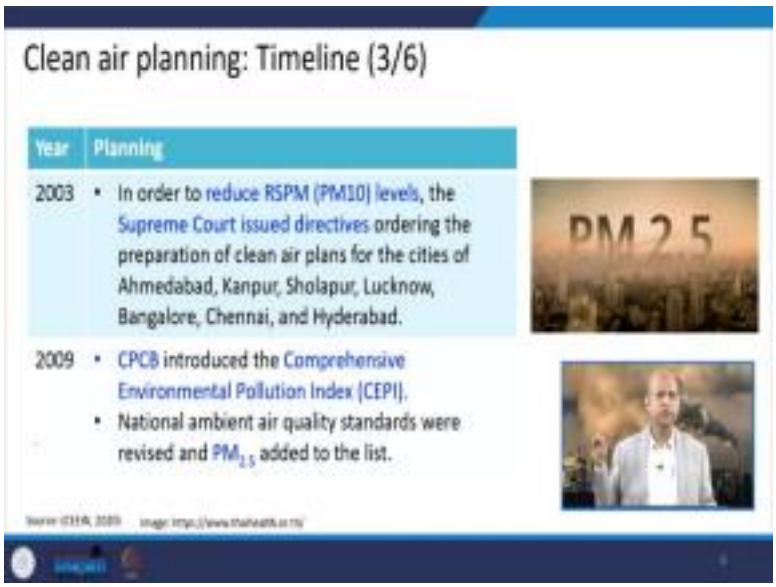

And in 2003, in order to reduce this respirable suspended particulate matter that is nothing but the PM_{10} the particulate matter of the size equal to or less than 10 micrometre. So, to reduce the level so RSPM or PM_{10} the Supreme Court issued directives ordering for preparation of clean air plans for the cities of Ahmedabad, Kanpur, Sholapur, Lucknow, Bangalore Chennai and Hyderabad because there were studies and observations that these cities are having high levels of air pollution exposure to this citizens.

In 2009 Central Pollution Control Board introduced the comprehensive Environmental Pollution Index (CPI. So, accordingly different industrial clusters were categorized and then national ambient air quality standards were revised and $PM_{2.5}$ was added to the list of air pollutants for which the ambient air quality standards were prescribed by the government.

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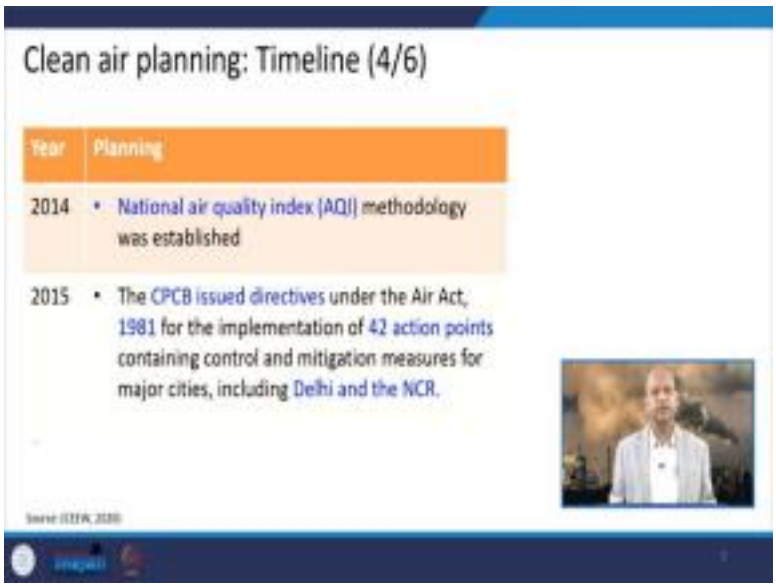

So, in 2014, the National Air Quality Index AQI methodology was established. So, that communication easy communication can be established between the public because the air quality index gives some range and color schemes those kinds of things. So, that even a layman can understand whether the air quality in and around the city is good or bad, moderate or poor or something like that.

In 2015, the Central Pollution Control Board issued directives under the Air Act 1981 for the implementation of 42 action points containing control and mitigation measures for major cities like including Delhi mega city, Delhi and the National Capital Region in and around Delhi.

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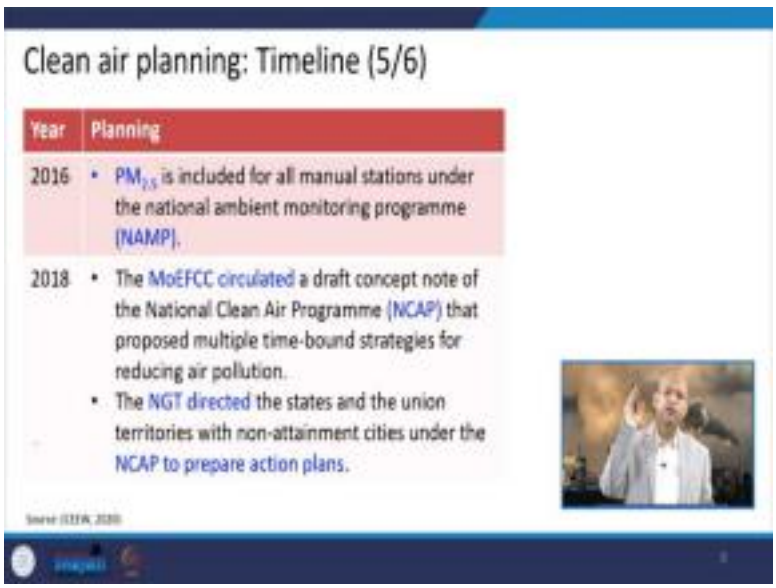

In 2016 $PM_{2.5}$ was included for all manual stations under the National Ambient Monitoring Program (NAMP) because several monitoring stations were established across India so that in particularly in cities that the air quality ambient air quality can be known for that particular

areas. In 2018 then again the Ministry of Environment and Forests and climate change circulated a draft concept note for the National Clean Air Program (NCAP).

NCAP and that proposed multiple time bound strategies for reducing the air pollution. The NGT National Green Tribunal as that directed the states and the union territories with non-attainment cities under the NCAP program to prepare action plans. Non-attainment cities means those cities which are violating the ambient air quality standards in terms of basically $PM_{2.5}$, PM_{10} those kinds of particular air pollutants.

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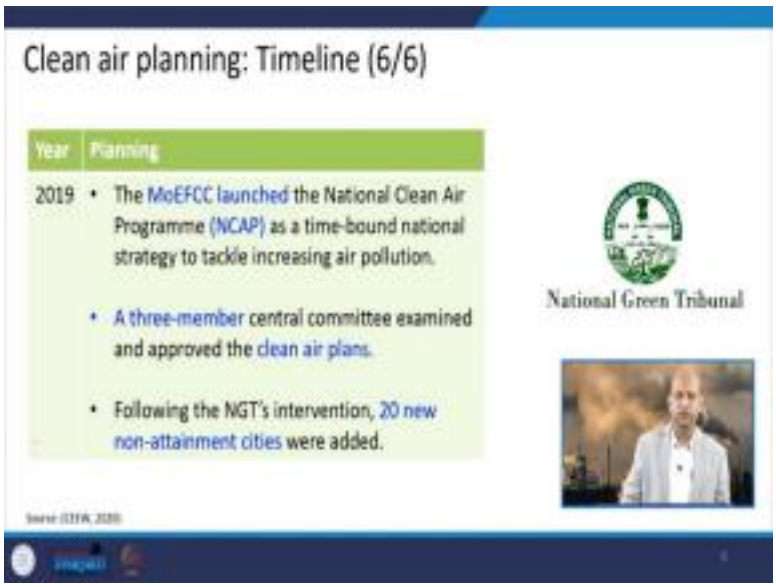

In 2019 then ministry launched the National Clean Air program, NCAP as a time bound national strategy to tackle increasing air pollution this was the big issue basically, separate funds were allocated for this particular Pan India activity, a three member Central Committee examined and approved the Clean Air plan.

So, it was very serious and focused activity. Then the following the NGT's intervention 20 new non-attainment cities were added. So, the entire number of cities were increased, so that they could have the city action plans for improving air quality.

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So, if you look at you can if you do overview of different major government initiatives, then like NAMP; National Air Quality monitoring program or NAAQS; National Ambient Air Quality Standards or National Air Quality Index, AQI High Level Task Force HLTF then CAP that is Comprehensive Action Plan GRAP; Graded Response Action Plan, NCAP; National Clean Air Program, all these kinds of initiatives have been made by the government for improving the air quality in and around ambient cities, towns etc.

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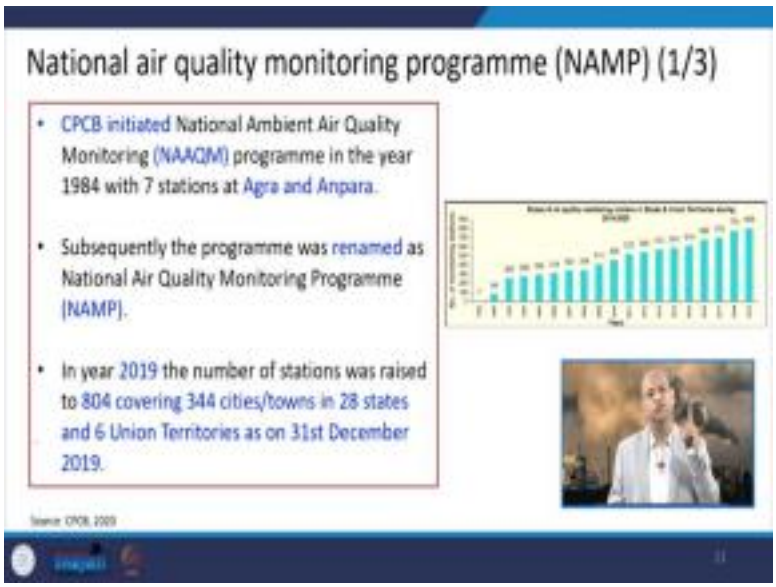

So, if we talk about this national air quality monitoring program that is NAMP then we have to know that CPCB initiated this NAAQM basically in 1984 that is National Ambient Air Quality Monitoring Program, NAAQM in the year 1984. And in 7 stations in Agra and this Anpara. Then subsequently the program was renamed as national air quality monitoring program or NAMP.

And in year 2019, the number of restrictions was raised to 804, covering 344 cities or towns in 28 states and 6 union territories on 31st December 2019. So, serious efforts serious activities have been or serious attempts have been made by the government to improve the air quality through monitoring of the air quality through observing them analysing them and reporting and then doing some intervention in terms of technology and policy.

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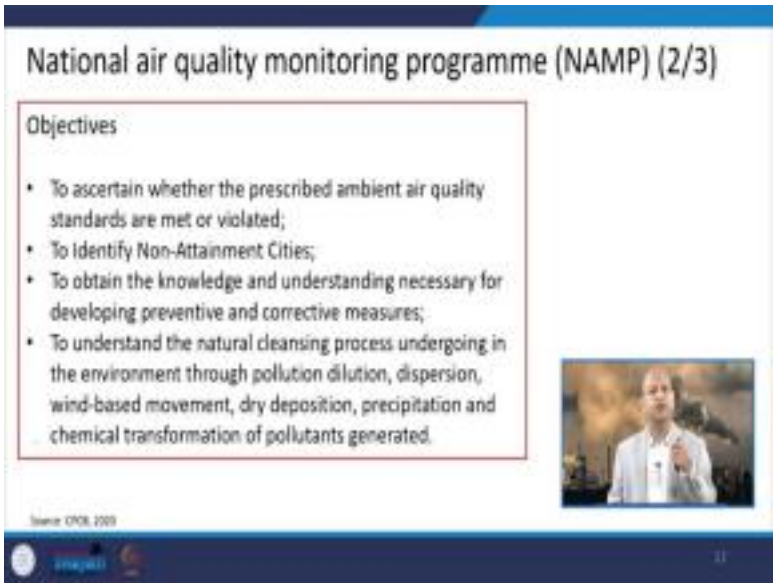

So, if you talk about this NAMP program, the objectives were very clear like to ascertain whether the prescribed ambient air quality standards are met or violated in a particular region because when we are monitoring only then we will know what is the air quality there, how much concentration of a particular pollutant is there in the ambient air so that we can compare it with the standards air quality standards.

Then with the help of this program basically it can also help to identify non-attainment cities that is, the cities are not attaining the ambient air quality standard that is violating they are violating the ambient air quality standards. Then to obtain the knowledge and understanding necessary for developing preventive and corrective measures for improving the air quality because this monitoring data only can help us in that direction.

To understand the natural cleansing processes undergoing in the environment through pollution dilution or dispersion or wind based movement dry deposition wet deposition that is precipitation and chemical transformation of pollutants generated because whether you do the exposure study or source apportionment study or any other kind of environmental impact or risk assessment related to studies, basically the monitor data are the key.

Without monitor data, we cannot really know where this pollution is coming from, even if you

are doing some modelling, they have to be validated by monitored data. So, the air quality monitoring program is the key or fundamental thing for implementing any kind of policy or program to improve the air quality.

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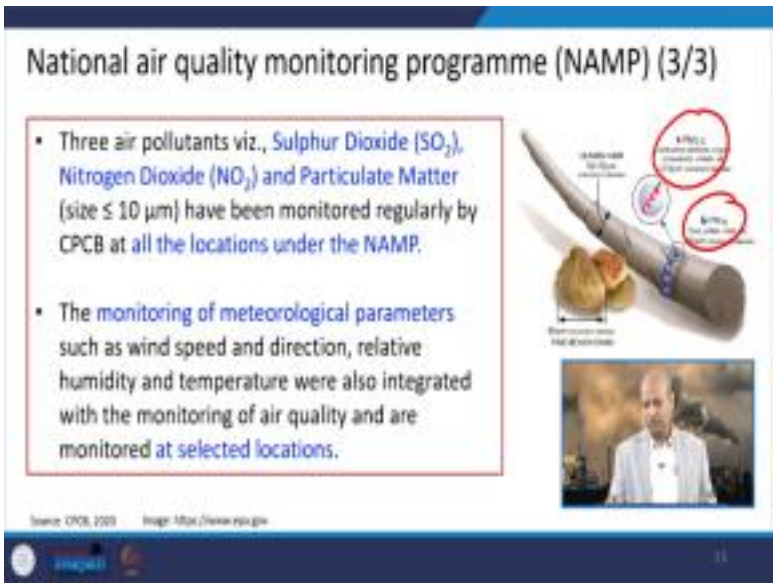

Well, in this particular program, three air pollutants like sulfur dioxide, nitrogen dioxide and particulate matter particularly size less than or equal to 10 micrometres, that is PM_{10} or it is also called RSPM - Respirable Suspended Particulate matter because it can go into our this system respiratory system. So, these have been monitored regularly by CPCB or Central Pollution Control Board at all locations under this particular program.

And here $PM_{2.5,}$ PM_{10} and this has been the perspective or with this human hair. So, this PM_{10} sizes this one if you compare with the thickness of the human hair and $PM_{2.5}$ is further very less so it is very difficult to see them with naked eyes because of our limited bandwidth of our visibility or so.

So, the monitoring of metrological parameters such as wind speed or direction, then relative humidity temperature, were also integrated the in this NAMP program basically because only then we will be able to know whether some contribution is coming from a wind direction or not, how long it is taking the pollution load towards in downwind direction. So, all these monitor these metrological data were also monitored along with the pollutant data.

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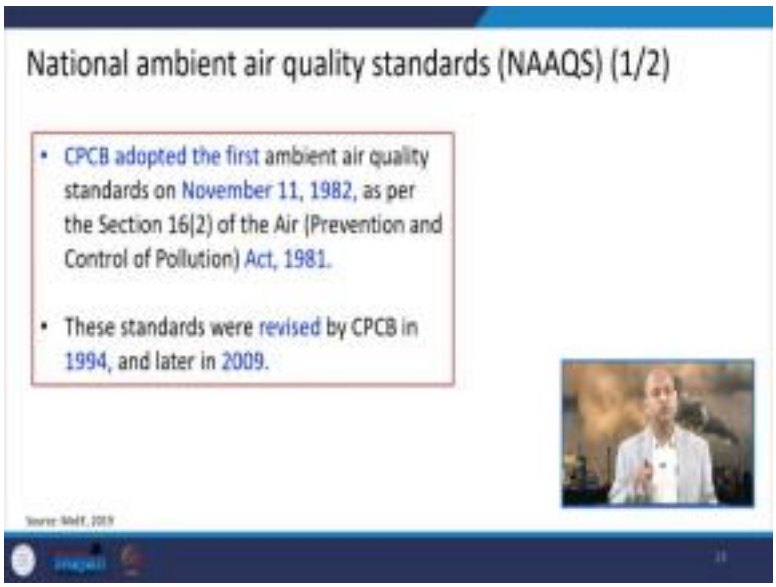
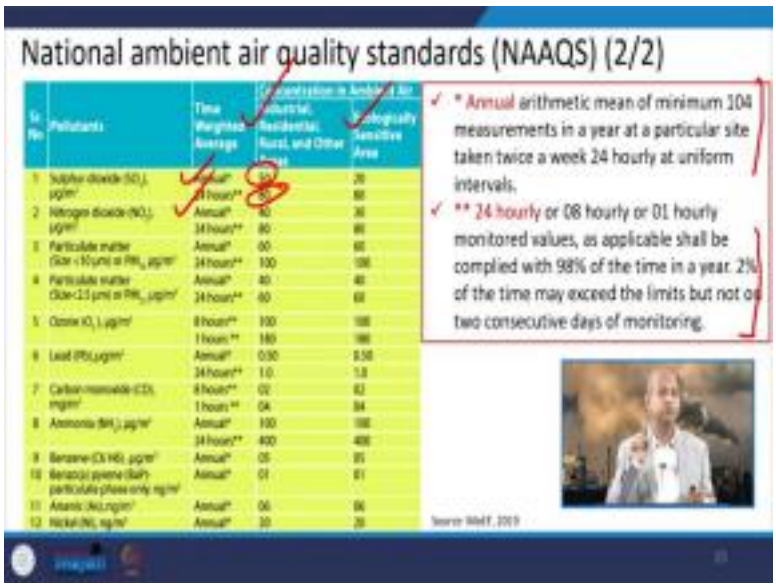


Then CPCB adopted the first ambient air quality standards on November 11, 1982 as per the section 16(2) in the year Prevention and Control Pollution Act 1981 and these standards were revised by CPCB in 1994 and then again in 2009. So, it is a continuous improvement program or evolution has to happen based on different results which comes like earlier $PM_{2.5}$ was not there later on it was added.

In fact, in the beginning only SPM was there suspended particulate matter, that is basically the particulate matter of size around 100 micrometre later on PM_{10} more jaded then $PM_{2.5}$ added because research came into existence that no this coarser particles 100 micrometre size but fine particles are more responsible for health impacts negative health impacts, so those were added. (Refer Slide Time: 13:34)



Now, if you see this comprehensive list of national ambient air quality standards NAAQS, around 12 pollutants have been listed here. So, whether it is SO_2, NO_2 lead carbon monoxide

all these are like criteria pollutants, some toxic pollutants are also there like Benzo Pyrene, BaP, carcinogenic, then you will see like annual and 24 hour standards are there, short term 24 hours long term annual standards.

So, we will see the annual standards values are less because you are getting export continuously for one year. Short term is more like 80 or so the difference. And these basically how these data are monitored or different areas like for industrial area, different standards are there for ecologically sensitive area, different standards are there.

In fact, earlier there were three zones residential, industrial and sensitive. Now, the industrial residential, rural and other areas have been combined into one and ecologically sensitive area has been in different categories. So, two categories are there. Then if we talk about annual arithmetic mean. So, basically, what is the mean?

How many these samples should be there, how many days monitoring should be there? So, it has been properly documented in statistical terms. It has a statistical significance, annual automatic mean of minimum 104, 104 measurements in a year at a particular site taken twice a week, 24 hourly at uniform interval. So, that is the minimum number of samples or measurements we should have otherwise the annual mean will not be established properly.
If we talk about 24 hourly then it is basically it can be like three 8 hourly or 1 hourly then you can have different for 24 hours, these monitored values can be there they can then you can have the average value of 24 hours basically. So, as applicable it shall be compiled and with 98 percent of the time in a year, 2 percent of the time may exceed the limits but not on two consecutive days of the monitoring.

So, these are the statistical things which should be met otherwise, our data will be erroneous. So, 2 percent time it can exceed but not consecutive days, it can be like today it can exceed then it should not exceed tomorrow, it should exceed after two days, three days something like that.

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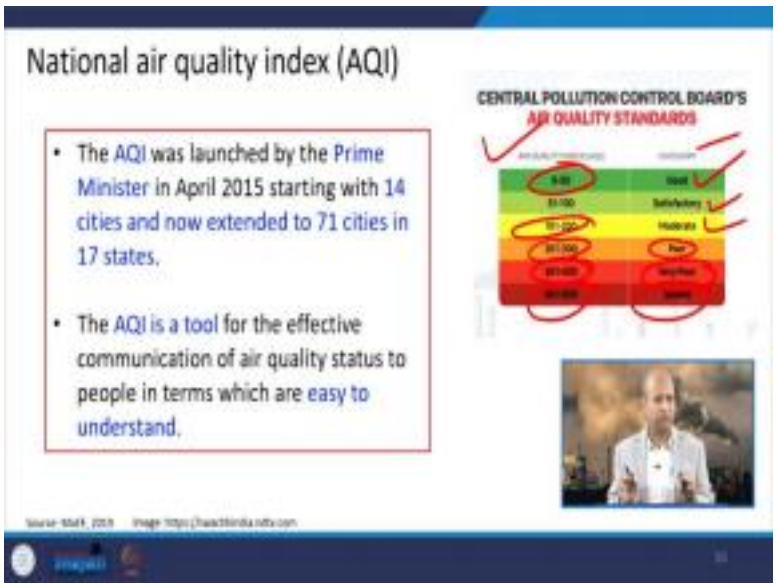

Well, when we talk about National Air Quality Index, these are the indices which are good for communication to the layman people , they do not know they are not scientist on engineer, they want to know whether it is good or bad, very simple thing, they do not want to go for concentration 80 micrometre or 80.5 or 90 scientists and engineers maybe for them.

It may be those values important for health risk assessment etc., but the layman or the common public want to know whether it is good or bad for me. So, for that, this air quality index is a very good thing for communicating purpose. So, the AQI was launched by the Prime Minister in April 2015 starting with 14 cities and now extended 71 cities in 17 states.

So, that way the scope has increased and Air Quality Index or category like dark green 0 to 50 range is there, then it is Good 51 to 100, lighter green Satisfactory then yellow 101 to 200 it is Moderate, it is fine, like that satisfactory. 201 to 300 it is Poor air quality. So, those sick people should avoid those situations otherwise healthy people can tolerate but 301 to 400 Very Poor. It should be avoided and 401 to 500 it is Severe or very dangerous kind of thing and we should not get exposed to such a polluted ambient air.

So, the AQI is a tool for the effective communication of air quality status to the people in terms of easy to understand. So, in color schemes, if they know, then they will avoid. So, for example, in a city center, a particular city center, you are saying and there are now tools to also predict the air quality and if you if AQI is giving signal that air will be very bad tomorrow it will be worst severe then people can avoid to visit that particular place. So, those kinds of things are there.

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Then this graded response action plan. So, in January, 12, on January 12 2017, this was notified, this is again very interesting thing because for prevention control and abatement of air pollution in Delhi and NCR which has been affected very seriously because of several reasons local air pollution as well as transportation of pollution from the wind direction. So, in winter, especially, it gets worst air quality.

So, like it comprises major such as prohibition on entry of trucks into Delhi. So, government monitors and then these agencies suggest to the government what should be done like, you might be reading in newspapers recently those construction activities were banned or schools were closed because there was very poor air quality in Delhi.
So, similarly what kind of action plan can be there depending upon the situation or quality of the air. So, the closure of high schools or brick kilns or mix plants, all those kinds of things can be taken and for particular period they can be banned, so that those emissions can be suppressed.

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Well, then there is this High-Level Task Force (HLTF). So, this was constituted in November 2017 under the chairmanship of principal secretary to the Prime Minister of India. So, this gives the seriousness about the government seriousness about the air quality. For managing the air pollution in Delhi and NCR. This particular, committee is very much serious.

So, this HLTF is closely monitoring implementation activities related to air pollution mitigation in Delhi and NCR and recently Supreme Court also took the note, honourable Supreme Court also took the note. So that way our agencies are very serious about air quality issues and they want that air quality should not be poor status and the citizens have the right for the clean air basically.

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And then this regular review meetings are held during the year with all concerned central government ministries and state governments which are concerned about in that region, NCR

National Capital Region, under the chairmanship of Honourable Minister of Environment and Forests and climate change, as well as the secretary of this environment forest and climate change ministry to ensure that various measures for prevention control and mitigation of air pollution in Delhi NCR are taken in coordinated and effective way so that all agencies are working in a very cohesive and cooperative way.

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Then this Comprehensive Action Plan CAP, the central government notified a comprehensive action plan that is CAP in 2018 for identifying timelines and implementing agencies for actions identified for prevention control and mitigation of air pollution in Delhi and NCR. So, very focused programs and policies have been there.

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Then this CAP also did like total 55 agencies have been directed under this CAP under Section 3 and 5 of Environmental Protection Act 1986 to ensure a strict implementation of this CAP program, they include like Ministry of Petroleum and National Gas, Ministry Of Road Transport And Highways, Ministry of Housing and Urban Affairs, Delhi Police, Delhi NCR Chief Secretaries, Environment Departments, Transport Departments, Urban Local Bodies, Industry Department, so that every concerned agency or departments, they work together in an integrated way and like, no stone should remain unturned for reducing the air pollution.
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Well, then, we come to this NCAP, National Clean Air program NCAP. So, Ministry of Environment and Forests and climate change launched National Clean Air program NCAP in 2019 under the Central Sector of control of pollution is scheme as a long-term time bound and national level scheme or strategy to tackle the air pollution problem across the country.

So, now, it is no more a city specific plan, the entire India has been under this particular program. So, this include 23 states and union territories 122 non-attainment cities, 92 action plans submitted as of 2019 November 25, non-attainment cities in Maharashtra, 18 so like this is the state which is having maximum number of non-attainment cities one of the maximum numbers.

Total number of action points listed in the action plan are 4711. So, very detailed very exhaustive kind of a study has been or program has been established through NCAP.
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And the goal of this NCAP is to meet the prescribed annual average ambient air quality standards at all locations in the country, NAAQS which are prescribed by CPCB under MOe FCC, the tentative national level target of reduction of 20 percent to 30 percent of $PM_{2.5}$ and PM_{10} particulate matter concentration by 2024 it has been proposed in the end cap and the comparison or baseline year is 2017 basically, so in comparison to the air quality, that levels of 2017 we have to reduce 20 to 30 percent by 2024.

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And in a midterm five year annual action plan this will be reviewed and then further it can be progressed or extended the program may be further extended, up to 20 to 25 years in the long term after a midterm review of the outcome. So that you look at the seriousness so that we can ensure that air quality is not deteriorated by any means.

Overall objective of the NCAP anticipate comprehensive management plan for prevention, control and abatement or mitigation of air pollution. Besides augmenting the air quality monitoring network across the country. So, monitoring, modelling, implementing, capacity building, so many things are there in this particular program.

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And the collaborative multi scale and cross sectoral coordination between the relevant central ministries, state governments and local bodies have been planned and may manage streaming and integration integrating these existing policies and programs including the National Action Plan on Climate Change (NAAPC) and other initiatives of the GOI has been integrated.

So, this framework the Smart Cities frame work has also been used launched for NCAP in 43 Smart Cities. So, all these kinds of programs have been integrated and all these 122 non-attainment cities have been under this particular program.

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There have been many other initiatives basically, besides those policies programs which we have discussed. For example, handling of public complaints. So, there have been new app in NCR like Sameer app and emails through which or social media networks, people can register their complaints, if there is issue related to air pollution or so then every complaint loss is immediately forwarded to the concerned agency. So, that kind of integration has been achieved or known.

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Then this inspections and the feedback. So, 52 CPCB teams have been constituted to monitor and to give kind of feedback as well as to do something for stopping if there is like burning of refuge or waste thing, those kinds of things, then, there are like scoring methods which have been developed for assessing the effectiveness of action which has been taken and reported to the incident, so that we can know which kind of strategy has done very well.

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Then auto fuel policy which was in 2003, it was published and it was aimed at addressing issues of vehicular emissions and vehicle technologies by applying fuel quality standards and the objective of this particular expert committee was to draw a roadmap so that this auto fuel quality up to 2025 can be properly maintained.

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So, now, like from Bharat Stage-IV or Euro-III we have leaped from directly to Bharat Stage-VI or Euro-VI directly, we did not go for BS-V. So, that way like BS-IV standards or norms for diesel vehicle petrol vehicle and BS-VI norms are very stringent. So, that way fuel quality has been improved and with effect from first April of 2020, the BS-VI norms have been implemented for new vehicles and the fuel quality has been ensured from different refineries.

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Then if we talk about like national electric mobility mission plan which has been launched in 2013 and it aims to achieve national fuel security by promoting hybrid and electric vehicles in the country because otherwise, we are dependent on import of the fuel, then we need to achieve total electric vehicles sales of six to seven millions units by 2020, this was the figure earlier when this program was launched.

And by 2030 basically this India's transition to electric vehicles has to be completed. So, that is a very ambitious plan and along with it like electricity generation from solar, wind, etc. have been also in parallel loans.

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So, that way for air quality and for climate change, India is very serious and they are going to extra efforts. Then the commercial vehicles, there are other policies like vehicle, this scrappage

policy 2021. So, recently a few months back, it was implemented that the commercial vehicles of more than 15 years or passenger vehicles of more than 20 years will not be allowed on the road.

So, they have to be mandatory scrapped, so that their fuel efficiency when it goes down because of certain years, then the new vehicles come with the stringent those norms and vehicular emissions are very less. Then on October 1, 2021 rules for fitness scrapping centres were released and thereby like up to 2024 Fitness Test rules will be rolled out by for other categories. (Refer Slide Time: 29:10)

Well, when other initiatives we talk then there are like introduction and enhancement of the metro rail, bus based public transportation systems in selected cities like Delhi, Kolkata, etc. then there is in parallel like Ujjawala scheme which has been launched which was launched in 2016 in Ballia Uttar Pradesh.

And now, it is entire country where poor people are given cooking, LPG related, stoves and these cylinders, so that they get rid of those like cow dung or wood kind of uses for cooking, otherwise, they are very highly emitting highly emitting sources. So, these are the cleaner fuels, so that way again, very serious efforts have been made in entire India.

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So, other initiatives also include like introduction of energy efficient these labelling programs for energy intensive home appliances like air conditioners, you might have seen three star four star five star those kinds of things, refrigerators also India's national hydrogen mission 2021 to cut down the carbon emissions and increase the use of renewable sources of energy. So, those kinds of initiatives have been made.

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So, in conclusion, we can say that several policies and programs are have been undertaken by the government of India to reduce the air pollution in a serious way and the National AQI, that is the Air Quality Index, this takes the weighted values of industrial air pollution related parameters, for example, pollutant concentrations into a single number or set of numbers.

To that and, then represented into color scheme, so that easily it can be communicated to the

general public. National Clean Air program NCAP proposed stringent norms and mitigation measures for abatement of air pollution across the India like 122 non-attainment cities and so, more cities are included and serious efforts are being made. State Pollution Control Boards, they should develop measures for implementation that are both state wise and the city specific and clean air plans should reflect the this distinction.

So, that has been integrated into these kinds of initiatives and policies and programs. So, this is all for today. I hope you get I know this visualization of serious efforts in terms of policies and programs which have been implemented by the government of India in collaboration with the State governments and urban local bodies and all other agencies. So, thank you for your kind attention.

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These are the list of references which you can go through in your leisure time, so this is all for today. Thank you for your attention. See you in the next lecture. Thanks again.