Water Quality Management Practices

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Week-01

Lecture-04

Environmental Legislation & Regulatory Standards

Hello everyone, welcome to this NPTEL online certification course on Water Quality Management Practices. My name is Gourav, Professor Gourav Bhowmick. I am from the Department of Agriculture and Food Engineering of the Indian Institute of Technology Kharagpur. So, as I was discussing like continuing to the to my previous discussion in my previous lecture module, if you remember that the introductory sessions like whenever we will be discussing on the pollutants, whenever we were discussing about the type of emerging contaminants in our last lecture also, we were always focusing on the safe limit, we were always focusing on what is the regulatory standard. Whenever we will be discussing about the safe limit and regulatory standard, who do you think is having that ultimate say ultimate you know the capacity of the I mean like the bodies who can actually regulate, who can actually say that which is the safe limit for my country, which is the safe limit for this country or which is the safe limit for this state, which is the safe limit for the other state. It always governed by some regulatory body right, which is coming those are the policymakers.

In a bigger scale in a worldwide manner, we have different bodies governed by the United Nations majorly like WHO World Health Organization. They have their own limit that they have set for different issues, different contaminations, different kind of human health hazards, different case of ecosystem health hazards and all. Likewise say like you take a example of USA, USA has its own agency right, USA is a environmental production agencies and all. If you consider about India, we have central pollution control board, we have national green tribunal NGT.

So, the what the recently there is this Namame Ganga mission also coming up, where

people are trying to where the policymakers I mean like the where we are trying to rejuvenate the Ganges river right. So, the pollution that it occurred that is occurring there, I mean trying to rejuvenate somehow. So, and based on that there is a committee being set up, there is a proper regulatory body that set up under the Namame Ganga mission. So, they also made certain limitations, certain standards, certain regulatory limit or bar at which only that that has to be maintained by all the citizens, all the industrials or industrial people like you know industries, municipality whatever is lying on that stretch, on that particular district, on that particular state or on that particular country. So, that has to be maintained.

So, whenever we talk about any standard, whenever we talk about any pollutant, we talk about in number right that this much is the number of or the presence of pollutant that is there in the waste water, that is there in the water and this is the number or this is the set limit that has to be reached by us in order to call it a safe limit or the it is coming under the regulatory bodies concerned or it will not come under the regulatory bodies concerned. So, what will happen? You may be ah fined, you may be put behind the bar even the prison, if you are not following those order or the limit set by the this regulatory bodies. So, we will majorly discussing about this only in this lecture that ah different environmental legislation and the regulatory standard that it presents in the ah ah in this kind of waste water or the water treatment scenarios and all ok. So, majorly the water related environmental legislations will be discussing in detail. The quality standards for sewage treatment plant effluent ah discharge, the stringent sewage discharge limit or the standards set by ah the central pollution control board ah national green tribunal for Indian mega and metro cities, the global consistency enforcement and the monitoring mechanism.

If we start with the say like water related environmental legislation for controlling the treated sewage discharge, unit European Union, EU, ah United States of America and India some of this some of this ah numbers sometimes they may match. What are these numbers? This BOD, TSS, COD, ANP, you you already have some idea right that these are some of the ways some of the units that we need to take into consideration whenever we say this water is polluted, this water is not. These are the some qualitative or the and quantitative parameters by which actually we can say that this water is not drinkable, this water is not good for agriculture uses, this water is not good for ah household purposes or this water is not good for industrial purposes. So, some water if parameter wise it is somehow ranking as a good water good quality water for industrial uses that does not give you any indication that it is good for your drinking purpose. For them the set standards are completely different ok.

So, in general if you see the when we discuss we have some quality standard and we have some ah discharge ah regulations that has to be balanced. If you are not balancing these

things what will happen we will unnecessarily creating the problem to the environment creating problem to the surface water that we are discharging the water on. Majorly the BOD biochemical oxygen demand if you remember we discussed and we will be discussing in details in coming module that to not only to define it, but also to model it and we to know that how the BOD is somehow related to the COD, TOC and all these things. This BOD limit it is actually give you a kind of a indication of the presence of biologically degrade like some organic matter which can be degraded biologically from the system ah which is coming which has to be well within the 25 milligram per liter or 25 ppm per per million you know this is the same the the the I mean like ah unit wise these are synonymous. Then the TSS total suspended solid to discuss about the suspended solid you need to first understand the solid right.

Suppose in the water we have some solid content with the total solid content that if we can find out we call it total solid. Total solid is bifurcated into two part total dissolved one or we call it total dissolved solid and total suspended solid. This total dissolved solid and suspended solid can further be divided into another two parts based on the presence of volatile compound present there majorly the biological matter that can be easily volatilized at the presence of 500 600 degree Celsius. And because of that whatever will remain that will whatever will remain if you can subtract it with the totals ah suspended solid or total dissolved solid we can get the total volatile suspended solid or total volatile dissolved solid. So, first solid then dissolved solid and ah suspended solid then each of them can be divided into two parts one of them that total volatile solid is another very important that can be easily found out from the fraction from the from this ah experiment we call it volatile suspended solid experiment and all ok VSS experiment which normally is nothing, but we use some crucibles where we know once we know the TSS we use that same like with the we once we know the TSS that ah we weigh it down in a filter paper and put it in a white crucibles and then we put it in the muffle furnace for say like couple of hour ah say for 550 to 600 degree Celsius then we take it out and whatever will be vaporized ah volatilized and we will just final weight we will get it we will ah substrate it from the initial weight and we will get the volatilized substrate ah solid concentration from there ok anyway.

So, we will discuss about all these things in detail in the coming lecture that how we can actually find out the solid content in your wastewater system. Then there comes a COD this is a chemical oxygen demand it is a it actually indicates you the presence of biological as well as chemical ah particles or the chemical ah stuffs which are actually being responsible for the reduction in the oxygen level to what level to what is the final oxygen demand because of the presence of those chemicals to be to oxidize to some other product and also to presence of some say ah ah the organic ah say the living organisms of the say biological matter which can also needs which needs also some oxygen from the system

which and to convert into a sub some by product. So, at the end the COD it is giving us the whole picture the the presence that oxygen demand because of the chemical as well as the biological ah matter whereas, by BOD it gives us the only indication of the presence of the most of the cases carbonaceous BOD when we talk about it gives us the carbonaceous organic matter present in your system. Sometimes we can extend the BOD period and we can get the nitrogenous ah organic matter also, but it is not the the standard it is not coming under standard procedure. Standard procedure is up to 5 days ah 20 degree Celsius or in Indian context we go ahead with the 27 degree Celsius for 3 days BOD calculation.

There we can only get an idea about the organic matter present in your system. Anyway so, ah the the we will discuss about it in more detail in the coming module. So, other than that what are the other pollutants major pollutants is the nitrogen and the phosphorous. So, this nitrogen is also having different constituents. Majorly when we talk about the nitrogen ah waste we talk about in terms of if it is a waste water we talk about in terms of the TKN total geldal nitrogen.

So, what is this geldal nitrogen? Geldal nitrogen is the combination of organic nitrogen plus the ammoniacal nitrogen. What are the other type of nitrogen that can be also present in the waste water is the inorganic nitrogen. What are those? Nitrate nitrate etcetera. So, this nitrate and nitrate it comes under the inorganic nitrogen whereas, the organic nitrogen and plus the ammoniacal nitrogen this comes under the category of TKN total geldal nitrogen. So, total geldal nitrogen is ah in ppm in per or in milligram per liter is of our great concern and we normally discuss about that whenever ah any regulatory standard is given to you ok.

What are the importance of this legislations? The protecting the water bodies and the aquatic ecosystems definitely, ensuring the public health and safety because that waste water where you are discharging your waste whether it be whether it will be having a municipality whether it will be having say like your industry that waste can actually cause a drastic harm to the system ok. It also ensure the ecosystems ah preservation that it will not damage the ecosystem because if you are somehow pouring excess amount of polluted water in a certain ecosystem aquatic ecosystem ah per say what it will happen? It will change the whole scenario it will change the whole ah the the flora and fauna that can easily thrive in that systems. It will change its ah complete ratio it will it may change the ah type of organisms also that is present in your systems type of organisms that can sustain in your system. So, in general the preservation of in order to preserve the ecosystems we have to have a very strong legislation. Sustainable resource management if we have a proper legislation it will be easier for us to reduce the ah additional resources that it may require for treating those excess ah amount of waste in the ah downstream line rather than in the upstream only during the x a during the ah when you when the effluent is coming in contact

with the surface water body even if you can treat it before that that is much better.

Then to throw it in the surface water body when it mixed mixed with a huge water system it you cannot when you want to do it at the later stage it will cost you more than if you can do it in the in situ water treatment you understand. So, resource management is something very important and that is in order to have a sustainable resource management this kind of legislations are necessary. Economic awareness to let people understood ah the vanity of the situation that they should understand that the throwing ah say like you know ah I will be you know criticized maybe for that what I am saying right now even the most of the labs the chemical lab that is there in the most of the institutions that also has to be very much aware of what they are doing. Why? Suppose this awareness is required in those chemical labs in what they what they are doing we are doing a lot of researches and all after then we will simply final water or whatever it is we will just simply throw it into the drainage system simply throwing into the our basin not all the institutions are doing it, but there are some institutions which does not have the awareness of the the vanity of the situation that what kind of huge ah like you know issue that they are creating. Most of the R and D institutions whether it be institute whether it be in industry in the institutions or government body this R and D institutions has to be very much aware of the waste water that they are creating out of their system out of their building out of their ah premises that has to be treated in situ because otherwise in one way you are trying to help the society at the same time you are creating more nuisance.

So, this is the awareness level that has to be developed in public that ah what exactly is the sustainable way of treating stuff sustainable way of dealing the pollutant all the same things has to be well discussed well ah aware by I mean like people should be aware of all this things and the legal accountability. If you see the industries they they can go ahead with once they have a lot of money they they can think it is ok we can create a nuisance in the system it is not of our problem I mean like if there is someone will ask you for you know say something and they will like you know ok I will give you money that is it more than enough no you have to have a legally accountable for that it is not only money it is also about that the harm that you are causing to the system. It is not only the big units sometimes I mean the small units small ah this MSM is the medium and small ah and small industries and all they also do this entrepreneurs they are also doing this kind of nuisance to the systems because they consider it is in a very small amount. Just imagine this small amounts one after another thousands of people if they are doing it ah cumulatively they are creating a huge nuisance to the surface water body where this wastewater is actually at the end it will reach. So, what ah this regulatory body can do they will have their they have they will ah right they will have their legislations which is which will definitely ah provide them all the power to actually act on those people and actually give them a enough fine or let them liable for any kind of disruptions any kind of issues that may happen because of

the ah the willing full like you know discharge or you know their purpose full discharge of ah on the pollutant polluted water into the surface water bodies for here other for ah in the surface in a in a normal uses.

The quality standards for sewage treatment plant effluent discharge ah it actually varies as I was discussing at the beginning from country to country the state to state even from district to district. A comparative analysis on the guidelines ah for identifying the best available technologies in wastewater management systems are properly ah shown by the UP EPA the Environmental Protection Regencies 2010 and also ah Ghanurag at all 2022's paper you can follow those ah site I mean like the resources those are very useful and there it is very clearly mentioned that how this different BATs I mean the best available technologies are available for I mean like can made available for ah what type of pollutant and what type of ah treatment systems that we are targeting and what is the legislation ah requirement what is the I mean like the regulatory requirement for ah your ah in your locality. So, in general if you see the EPS the United States Environmental Protection Regencies 2010 they have this BOD limit of ah around 30 milligram per liter and TSS ah limit of around 30 milligram per liter as well. It should be less than that this final discharge ah from your ah municipal system municipality wastewater sewage treatment ah plant. However it ah varies to place to place in Indian environmental protection amendment rules 2017 it says that in the metro cities and state capitals the BOD should be as less as only 20 and TSS can be 50 milligram per liter.

The best available technologies which is not available for BOD less than ah 20 milligram per liter it is applicable for 30 to say like 100 ah milligram per liter as of now based on the European Union's legislation ah. Other than that in India we have this national green tribunal NGT and this NGT's NGT's suggestion or their regulations BOD should be as low as only 10 milligram per liter and COD should be 50 milligram per liter and fecal coliform should be less than 500 most probable number per 100 ml. That means, the in 100 ml of wastewater there is a chances of maximum like on an average 100 number of presence of this fecal coliforms in the wastewater. So, that is the limit set by the national green tribunal ah of India. So, it actually varies with the place to place.

So, many nations have adopted similar global commitments for sewage discharge and this global global efforts are actually necessary to you know reduce any kind of ambiguity that is present because some of the ah water bodies are shared between two or more countries you know even two or more continents also there are two continents there are also examples of such water bodies. So, in that case suppose one water body suppose in say one example the Brahmaputra river which is coming from say like China and it will go through say like India and then it will reach at some point in Bangladesh. So, all these cases in three different country has its three different regulations. So, you have to have some global effort

set. So, that the water that that once it will receive to the second country or the third country it will be of same category it will be of still safeguard having safeguard measures taken by the first country or the second country.

So, that your follow up country will not face substantial issue or the resource constraint to treat that wastewater or treat that water to you know ah for to feed their ah citizen you understand right. So, this is why the global consistency and the collective commitments are required. So, how we can ah do that we can have a international agreements. We can have a technology transfer between the industries in between the countries. So, some countries suppose in the first country from which actually the in the water is coming they suppose ah suppose they do not have those technologies or the resources available with them to treat the water to it the effluent or that sewage coming out of the city or the industries to a level that it will be make usable for the second country.

So, what second country can do they can actually ah share some of their technology which are readily available with them to the first country. So, that the water which is coming from them to the second country will not be of a affecting through them it is like you know for their mutual benefit. Collective initiatives they should have they should both take some initiative. So, that they can ah come up with some stringent regulatory standard that has to be followed by all the industries and the municipal municipalities present in the neighboring I mean like the shore area of that river which is shared by both the countries. Bilateral and multilateral aid, environmental organization has to be also involved in it.

So, to help them with the understanding the facts in more details. Data and research sharing which I was ah discussing along with the technology transfer data and research sharing is also important. So, that you will let them know that how the overall commitment is required how global consistency has to be maintained or this multilateral consistency has to be maintained. So, that ah some people will somehow may forget or somehow may you know miss ah I mean like somehow bypassed ah the data and somehow they they create a huge amount of nuisance to the follow up system and follow up unit and in the downstream region ah can be affected because of that. Ah harmonized standard has to be set by all these countries both the countries or more than 1, 2 countries if they are involved in this bilateral or try multilateral strategies.

And so, all these things are one of the major ah you know initiatives that is nowadays become ah really like we should be univocal on these things that we all should actually come up with this collective endeavors which involves different nations organizations and communities worldwide ah to actually come up with this global effort to protect the water quality present in the systems and all and then it is recently all water assessment program by United Nations in 2006 actually are trying to come up with this global ah initiatives of

such. What are the challenges ah challenges that ah is there in implementing and complying with this sewage discharge regulations? Ah I as I was discussing in the last day also remember we that ah it is not only that ah you being a policy maker you just give a very strong ah you know standard you set a very strong and stringent standard and you are compelling your ah all the companies or the industry to follow that. Suppose all of a sudden you set a standard just to give you an example say like BOD should not be less than ah there should not be any BOD I mean like say like 5 I mean let us say 5 million per liter or 0. You come up with these ideas that is best possible combination best possible option, but that does not make sense that your industry has the capacity they industry suppose they are earning in ah very minute amount if I say a very tiny fraction of their actual revenue and in order to clean the water they will actually become loss ah making industry. So, you cannot just simply implement this kind of ah strict very stringent actions or the regulations unless until you know that what is the standard of this company whether they will be able to ah pick it up or not and if not then you give some subsidy you give some at use provide as a government or as a policy makers you provide those ah help and ah the the solutions to the company.

So, this financial constant you have to make sure that the your policy document has ah made it clear that if some people who is actually poor who is actually coming into the category that if they will add this water treatment technologies and all it will end up making their industry become ah not feasible not you know I mean like useful for them to earn some good money. So, what you can do in those cases you as a as a policy maker as a the government should come forward and the this regulatory body should come forward and suggest them some alternative ways of doing it. So, that the those employment will also retain the people will get their employment at the same time the environmental standards can also be set ah well set I mean like the you will not harm the environment at all. Technological barrier the the major problem is the lack of expertise in the this modern facilities that is available. So, this modern treatment plant or the design that will be discussing with you I am 100 percent sure very few of them actually knew about this technologies before had though you are having the same water even while maybe having this discussion like having watching this lecture you are drinking the water without even knowing that where this water is coming from.

You need to understand this this is very important we need to be water educated like you know why we as nowadays people call energy educated people water educated or environment educated this has to be this three has to be the pillar of any education systems that water education environment education energy education. Even before like you know passing the class 12 for the graduation you need to be having this three education for sure. So, that you will know your environment better you know your ah like in the situation that is surrounding that the places that you are where the you are at the about the environment

much better way. So, this water which is coming to your ah glass it has to pass through a several kilometers of water distribution line before that it was there in a water treatment unit before that it was there in a it was freely roaming from freely roaming in a surface water body right. So, from the surface water body you ah suck the water from it you have a water treatment line which treat that water and then it will ah supply to you in your households right and then you are very happy you just go and open the tap you have the water either you put it again one aqua guts have one small aqua gut and you are confident enough that your water is good enough for you to drink.

You need to understand the technology it is very important. So, that is the main purpose of this subject that you need to understand that what you are drinking you need to understand that what about the waste water that you are creating what is the fate of it what is happening to that waste water that waste water at the end it comes to the surface water and that same surface water you are drinking the water right. So, that is a circle. So, this circle you have to understand it better for you to ah you know influence the policy makers of your place or for you to influence your children your neighbor your like you know the the the relatives everyone to aware of the the the vanity of the situation that that you need to know that how the water and waste water been treated and why it is of our utmost important for us to understand it. So, this technological barrier is there because of our unwillingness and sometimes even we do not have to do it we because of our other involvement and all, but it is very important for us to understand this basics ok.

Maintenance and the operations the negligence leads to the non compliance we neglect some of the times the regulatory bodies come up with some ah good ah you know ah standards and the set their regulation sets and set some standards and all, but we normally try to avoid this we do not care about this is negligence is very important and because of the maintenance of your treatment units operations ah operational um the I mean like the economic involvement that it requires. So, we have to somehow make an optimized system political factors. So, ah we normally try to avoid this discussions when we have in scientific ah situation scientific ah ah you know discussions the political factors are very important where people of ah certain ah I mean like you know certain section sometimes may ah try to implement some new thingy some new technology or something, but the other sections seems like you know they are not interested in it because like definitely because if the system will be installed the the water will be purified the the energy will be ah less ah costly and it may actually people will be more you know prone to you know giving vote to a certain political parties. So, other political party may not be influenced with that and somehow try to jeopardize, somehow try to convince people I did no no no that that energy that type of system is actually works only that treatment plant will does not do anything at the end it will ah reduce the quality of water that we are having as of now. So, do not worry see I am also drinking the water from the system you can also do

it.

So, they will do it in front of everyone they will have the glass full of water they are drinking and they will consider you they will say like ok. So, this is see if I can do it you can also do it you do not remember for the next couple of days there may be he is hospitalized or may be you know he will be using some other form of water after words like he will never use that water anymore. So, just to make the ah you know discussion a little bit lighter I am discussing this thing. So, this is political factor that actually is very important for you it is your responsibility to actually deter from this influences. Community resistance land and natural resources definitely sometimes the community resistance is there because sometimes the waste water like in Singapore ah most of their water that they are drinking it is coming out of the urine that they are ah I mean like from their waste water only.

So, they have the acceptance key ok. So, from urine if you have a proper systems you can treat that water and at the end you can have that water drinkable enough. However, if you say the same to your local community and they will say like no no way I am going to do that. If people know that the waste water is being used for treating the that the the waste water is being treated and then same same water is supplied no one will drink that water. However, if you are not told about anything actually this is something that is what is being done most of the cases the same waste water is going to the surface water bodies just after a couple of meter away there will be another or couple of hundred meter away there will be another ah suction line from where the water is being collected from where this water is coming the same waste water that you are dumping ok. In in the many of cases it may happen that same waste water that you are dumping you are again sucking that water only pumping ah pumping out the water from the surface water body for to the and throwing like you know somehow treating it in your water treatment plant and then you supplied to your ah drinking water systems.

But if once people do not know they will definitely have it. It is it is same like we go to the vendor unless we do not know how they are preparing the food we are completely ok with that. So, something like that. So, this community resistance is something very important. Rapid urbanization the escalated demand of the demand it outspaces the available facilities.

So, you do not have the facilities suppose when you are in New York or you are in New Delhi or say suppose somewhere in Shanghai or Beijing. So, you do not have the capacity you do not have the land available for a water treatment plant because there are scarcity of land for even human being to settle the there because of the ah rapid urbanization and all. So, to there the land footprint is very important and the water treatment and all this

becomes a secondary issue. Industrial and agricultural discharges because those are non point sources very hard for you to actually I mean like you know identify I mean especially I would say like you know you you should have a very stringent ah policies at place in order to tackle this agricultural discharge to be precise if I say because this is the agricultural runoff are very hard to you know find out in a certain level because what you can do ah it will it may sometimes leach through the surface it is some leach through the soil and it can actually ah reach to groundwater. It can also go ahead with the surface runoff phenomena during the rainy season it can come in contact with the storm water diet ended systems and then it will come to your treatment plant as well.

So, which is also something challenging and also changing environmental conditions unusual weather circumstances weather circumstances is one of the major challenge for even treating the sewage itself you know. Enforcement mechanism regulatory authorities are there they have to use the tools and the strategies to monitor control and also if possible penalize the entities that fail to add to this regulations. What are the tools and strategies you can have the civil and criminal liability for non compliance and deliberate violation against the rules of the standards that ah is set by the regulatory body of your country. Permitting and the licensing this it is it you need you can only get to ah start your industries once you have the permit or the license that you have ah you are maintaining the discharge limit you are maintaining the ah the quality of your ah that water the that is effluent that is coming out of your systems. Inspections regular inspections has to be there ah schedule or unannounced some random inspection has to be there to make sure that those industries or those ah regular I mean like those municipalities are actually complying to the regulations set by those ah regulatory bodies.

Penalties and fines has to be imposed on a very ah strict manner without any delay when if someone consider this is a this is not of a big important and you just can throw n number of chemicals in the waste water whenever you feel like. It is very dangerous you just realize that if someone will like in a spit on your waste spit on your the water that you are drinking and you are considering it is ok it is ok it is completely ok you cannot be ok with that it is very dangerous it is it is very heinous job that this industries those municipalities that they are doing. So, you have to be vocal and you have to be going to your policy makers and have to ask them that whether they are actually treating the waste water that is coming out of your city or not before discharging into the surface water bodies. So, once you have this voice then only it is possible for ah you know ah for the regulatory bodies for the sorry policy makers to start implementing the penalties and fines in a very regular manner. So, that they will not do this kind of heinous job then this sampling and analysis is very important for giving them the certification that their industries complying with the regulatory standard.

The major purpose to deter the non compliance of this institute this industries and the municipality ah municipalities and to encourage the proactive pollution control and to protect the water quality which is our utmost important. Monitoring procedures ah monitoring procedures are essential for accessing and the ensuring the compliance with the sewage discharge regulations definitely and also our procedures involve the systematic data collection analysis and the reporting to evaluate the quality of discharge effluent. It can be done ah in by different procedures first of all the periodic sampling. It is the ah it is specific to individual water parameters and you have to take the sample periodically and you have to ah make a proper chart and a proper excel sheet where you will be reporting it to your industry. Suppose you you are a environmental manager of a particular industry or you are a environmental manager or the environmental ah like a person who will be taking care of the issues related to the environment for your municipality you have to make a note of all the ah like you know say regulatory standards and that you set I mean like the that is set for your ah industry or for your city.

Then there comes a continuous monitoring real time monitoring systems nowadays the in technology has improved like anything. So, we have online monitoring systems OMS. So, online monitoring system is nothing, but you set certain probes and the electrodes in the system. So, by which you can actually get the real time data and that real time data is actually it is there are some Wi-Fi chips or sometimes there are some sim card also attached to the design only. So, and the algorithm is means submit such a way that it will be it will directly providing the real time data to your ah say whatever graphical interface that you have made in that GUI the data will be transferred and from there you can get what is the actual pH value actual DO value dissolved oxygen actual ah say like salinity of your ah salinity or say like alkalinity I mean like say oxygen reduction potential ammonia nitrate.

So, all these things you can easily get it a COD BOD you can get it in a ah online monitoring systems in a one single screen. So, that screen can be shared with the regulatory body also say like in Indian case suppose you are one industry and that industry ah whatever the regulatory ah standard is there I mean like it is maintaining or not that should be shared with the ah say like in Delhi they have their higher office it is shared. So, they got to know that that industry is actually having all of a sudden a higher peak of certain components or not all these things can be easily ah affirmed. Then there is third party verification sometimes what happen independent consultant and auditing firms are asked ah sometimes most of the cases what happened there are some like in India case there are IITs NITs there are there are some institutions ah of eminence where they are asked to they are asked to requested by the regulatory bodies to go and visit those industries for a surprise surprise visit and to go and take some sample and talk to them whether they are actually maintaining the water quality that is set for them or not. So, we suppose we go there and we take the sample and we do the analysis in our lab and we inform the say like

central body as a third party that ok.

So, whatever report ah we are giving you. So, this is actually and whatever report that you have given about that industry is actually kind of true and we are verifying it and in case it is not matching we will say like no it is not verifying there needs to be further inspection and it needs to be dealt very strictly. Then you have to do the environmental impact assessment study water quality aquatic or ecosystem health to understand all these things and also data management and the reporting is very important the documentation is very important ah I would say in this all these cases. The major purpose is to detect the deviations from the established standard taking the timely corrective actions and identifying the trend by which we can say that ah this is the trend and slowly some peak or some hike in the ah some pollutant is ah establishing or we can witness. So, please work on these things in your industry or in your municipality there is a chance some industry or some people are actually throwing those excess ah polluted water into the systems that can be very harmful for the people who is using it in a downstream region. In conclusion our discussion I hope you understand the the seriousness of the situation and ah it actually this discussion actually underscore the global significance of water related environmental legislation in controlling treated sewage discharge majorly highlighting the importance of stringent quality standards for sewage treatment to preserve water quality, protect the ecosystems and ensure the public health.

Also we discuss about the significance of water related environmental legislation for controlling the treated sewage discharge and its crucial role in safeguarding our environment public health and long term sustainability of water resources and all. The focus on stringent ah sewage ah ah discharge standards in for Indian mega and metro cities were also emphasized and ongoing efforts to enhance the environmental protection emphasizes the need of ah comprehensive sewage management systems for rapidly growing urban areas were also discussed. So, I hope you have a very good pictures, skew picture like you know scenery you can see the scenery how the treatment ah systems are actually working this and how the legislation units are ah prescribing the standard they and then this standard how they are maintained and who are this third party people and also how this ah ah regulatory bodies are actually at the end come up with this idea of you know how different kind of legislation to safeguard the environment and all ok. So, I hope ah the this discussion actually ah give you give you some ah additional knowledge in this respect and these are the references and we will see you in the next lecture. Thank you so much.