Sustainable Transportation Systems
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Lecture – 13
EIA Processes - II

Hello friends, so, in continuation to EIA processes, this is the second part. Before this, we have discussed screening, scoping, baseline related aspects of EIA process. So, this is the next part of that particular system for EIA. So, in this we will emphasize on mitigation processes of EIA, like when we do EIA, then we also come to know about certain impacts.

And if those impacts are estimated as like negative impacts, then we have to give certain mitigation measures to reduce or minimize those negative impacts. So, we will study in this particular lecture regarding mitigation processes, how they are part of EIA process.

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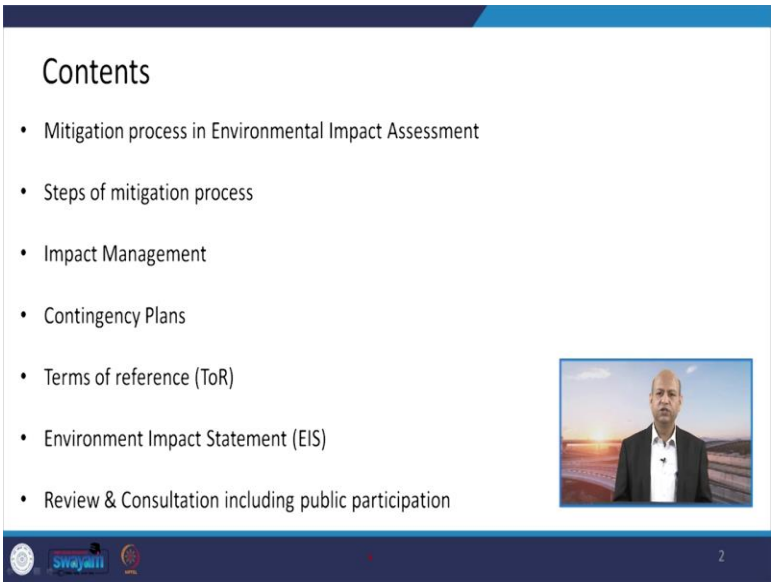

And what are different steps for implementing the mitigation process and to devise also, plus how to manage the impact. That means, again how to implement this mitigation process that is very important thing. And at the same time, we have to have certain contingency plans also, to address certain uncertainty. And then, to look into all this in an integrated way, we have to have terms of reference, which can give us, complete information that these are the steps which we need to follow.

And that is shown in terms of environmental impact statement, which covers every kind of suggestions and every kind of processes, which we have to follow for monitoring purpose also. And then review and consultation including public participation, that is also covered in this particular lecture.

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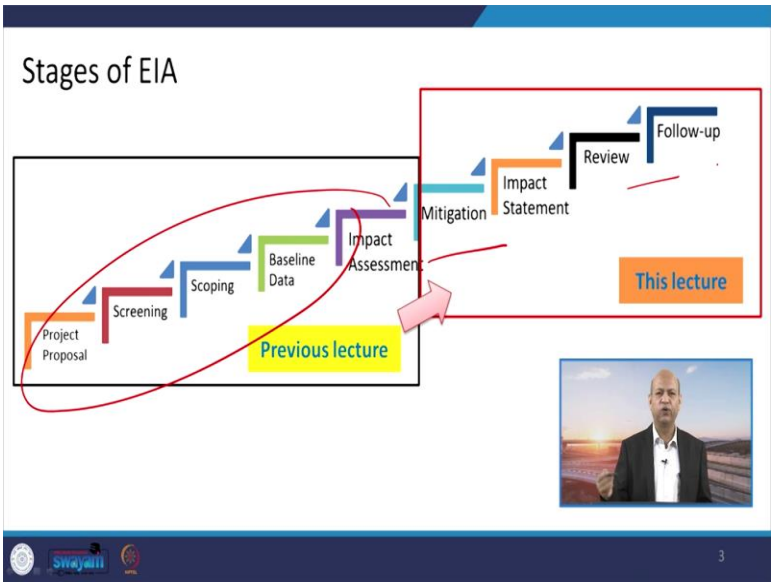

So, this, the last lecture covered this project proposal, then screening, scoping and baseline data. And accordingly impact assessment in the sense, whether it is going for complete EIA or not. And today this mitigation and impact statement, review process and the follow up this will be the part of today's lecture.

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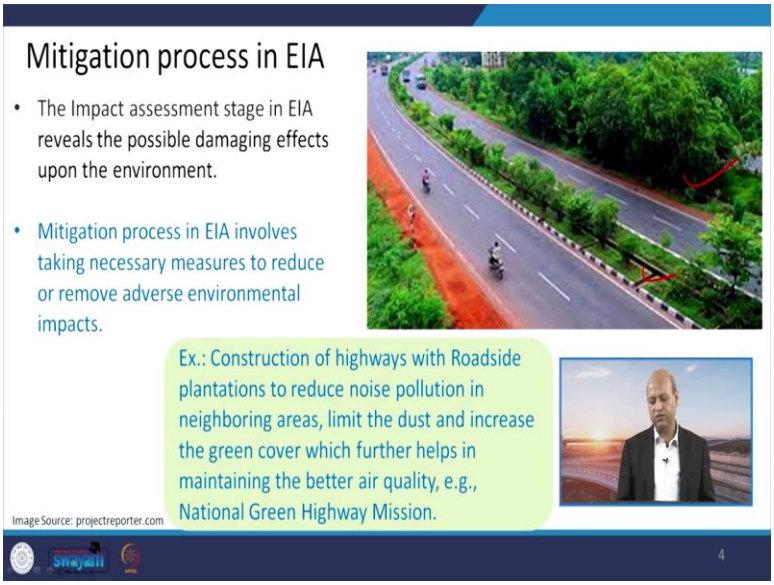

So, like mitigation processes, maybe in different ways, for example, this is the highway and if you want to reduce noise level, we want to reduce air pollution exposure. So, we can have greenery. So, this will not only add into the aesthetic value of that highway this, this will basically, make it part of the natural setting.

But at the same time, it will also reduce noise to propagate beyond this boundary lines of the highway. And also, this will reduce, the emissions that will not travel for further distances. So, the exposure to the people who are living beyond these limits of the highway, they will be less exposed, if we have these kind of mitigation measures or processes for highway, this is one example.

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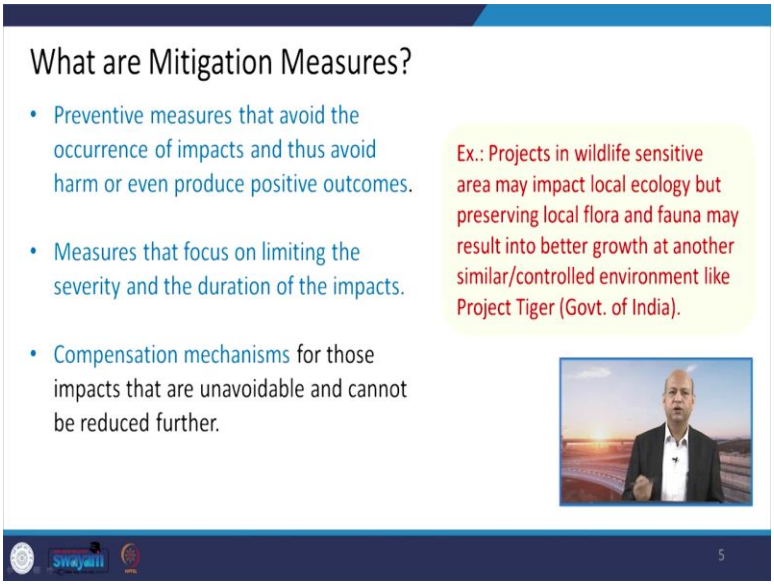

Then, for like wildlife also, if we want to protect certain endangered species or certain ecosystems, then also we have to have certain policies. For example, this before project Tiger was implemented by government of India, due to urbanization and the pressure on the forest land. Because expansion of population they required more agricultural land and other activities, their area got quite less, and the tiger population became very less.

But after this project Tiger was implemented, then their population increased because of certain measures which were taken. Those sanctuaries were managed properly. No other activities were allowed to take place in vicinity of the sanctuary, so that their habitat is not disturbed. So, those kind of measures we have to take.

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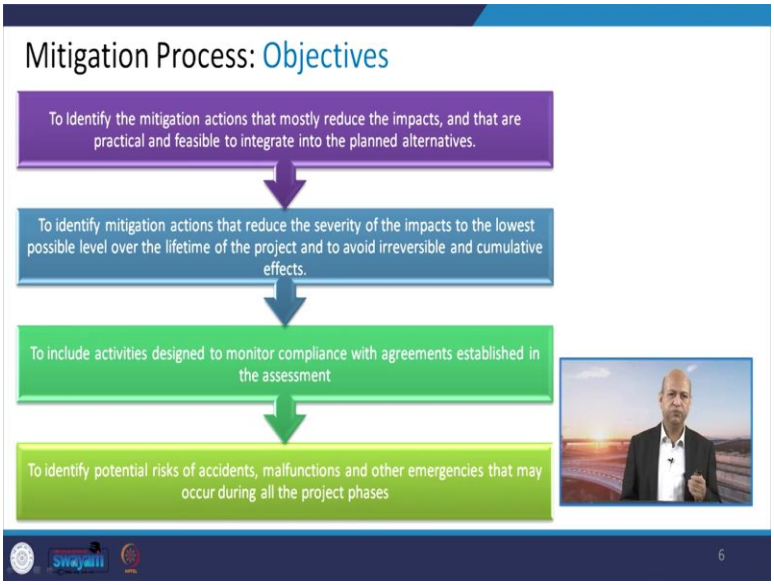

Then if you want to know the objectives, basically mitigation process is, objective is to plan something which does not harm the environment in a big way. And if some harm is there, some negative impact is there, then it should be like revival kind of thing or it should not be irreparable kind of stage. It should be resilience kind of things should be there. So, to identify those potential risks or negative impacts, and to address them in a proper manner. So, that is the objective of mitigation process.

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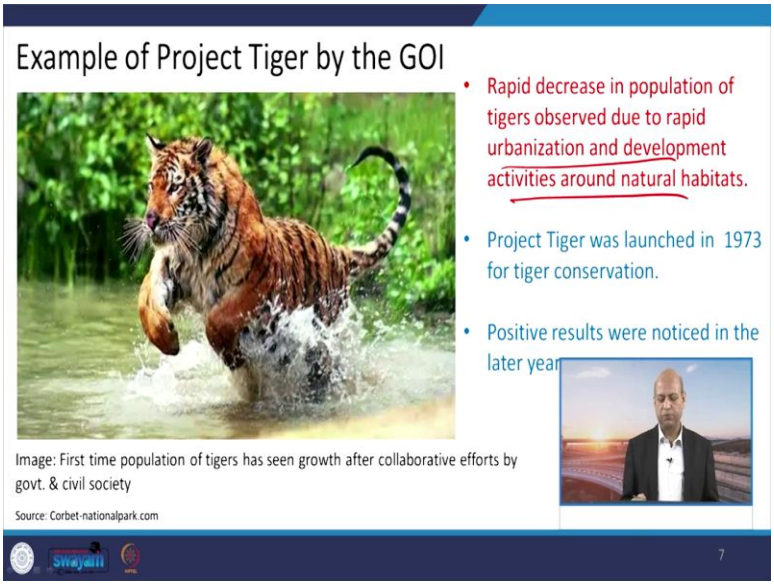

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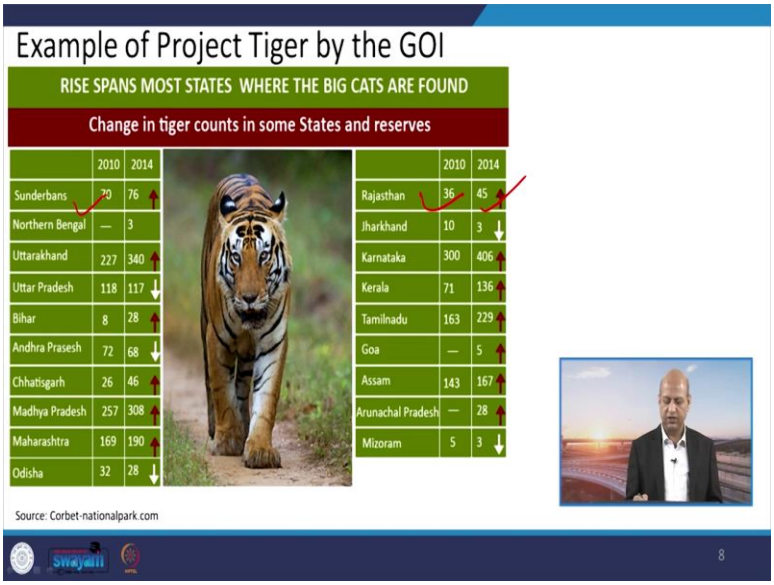

So, that which I just discussed that this was the reason, because of urbanization and developmental activities, population of Tigers reduced quite significantly. And then this project was implemented. So, you can see in between 2010 and 2014 population at different states of Tigers increased, like from 70 to 76 in Sundarbans, in Rajasthan 36 to 45. So, that way only few places there was minor decrease in the population, otherwise most of the sanctuaries around the country they noticed the increase in the population of Tigers.

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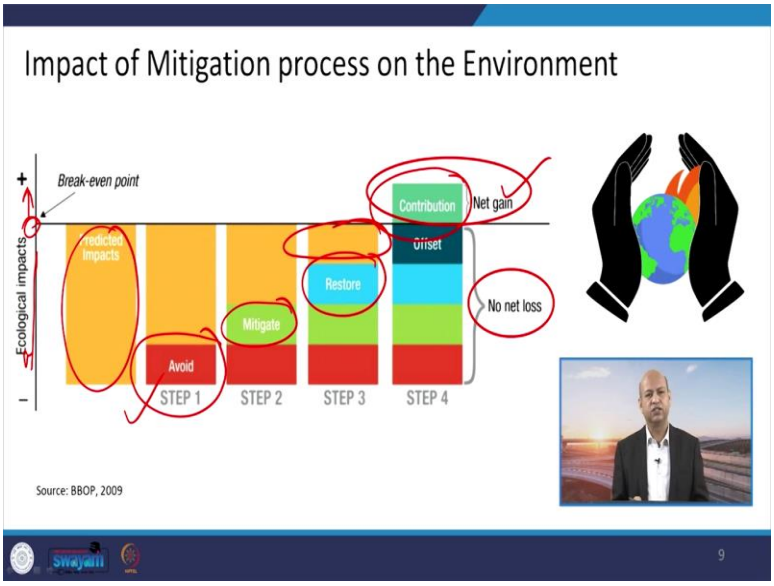

Then, the impact, how to address those impacts? Basically, when you know that certain impact is there, negative impact like this one and this is the breakeven point, where if we contribute something positive then it will go into the positive line. So, we collect data and we predict the impacts. And if we know these are the impacts, which are going to when we implement the project. So, these are the impacts which has been predicted or estimated you can say.

So, then we plan to mitigate those impacts, what we do? First of all, we go for avoidance, means can we process or can we have some alternative ways, so that certain impacts completely avoided. So, that first part is, that step one is taken. Then once avoidance is assured, then we go for mitigation, mitigate means we, we intervene, something like technological intervention, policy intervention, public participation, all those things we do.

So, that is the mitigation, and then the restoration. Means, even some harm has happened to the ecosystem or the forest land or some environmental component. Then it can be restored after project is completed, something we means in, mitigation measures, we also implement those kinds of activities, which can help in the restorage.

And then some other, those impacts, which may be offset because of certain gains. And ultimately gains, maybe that much of that quantity or extent, that net gain can be visualized. So, that way means, the net loss is not there, but net gain is achieved. So, that is the strategy which we follow through EIA. And all these processes of the EIA, which is focused on mitigation.

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National Green Highway Mission basically, you can see, in between where this partition there middle, this is a one part and other part of the highway means, one lane is for going and one for the coming. So, greenery is there, then on the both side also a lot of tree plantation is taken. And other eco-friendly corridors have been promoted by our government.

So, that way means, in agriculture field, all these integration happens very nicely. So, they not only add value to the aesthetics as I have repeated earlier also, they also help in mitigation of its harmful impact in terms of reduction of the noise level or reduction in air pollution levels. So, those kinds of things are in the direction of sustainable development. So, this mission is basically focused on this kind of development of highways with a green concept.

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Well, when we see, some green covers after road construction and using these trees etc. they really help in reducing noise. And at the same time, there are issues means, some fencing, you might have seen at certain locations, because if you come to know that at particular location, there are movement of some animals, wild animals or those. So, you have to erect some fencing here. So, that they do not come to the highway otherwise accidents may happen.

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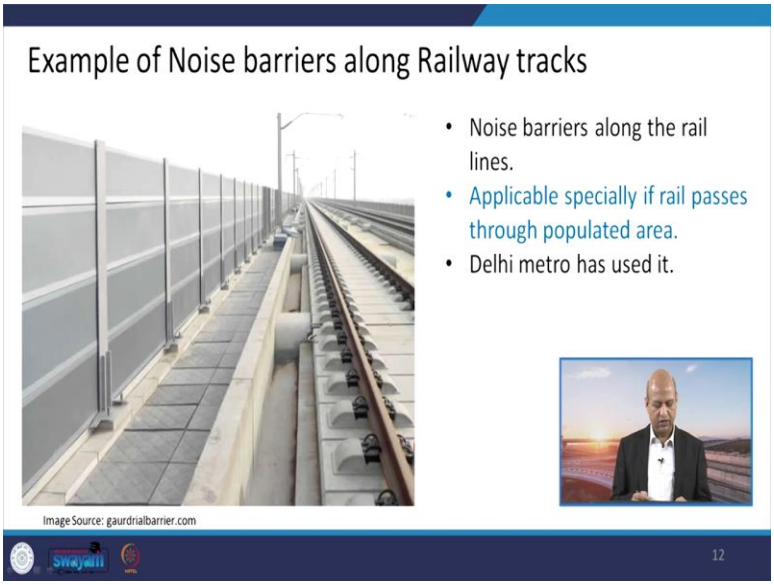

Plus, some noise barriers at the railway tracks, these are also part of mitigation. And if you have visited Delhi sometime, you can see noise barriers, across the tracks of the metro, when it passes

through the residential areas, particularly, there are noise barriers implemented so that noise does not go to the residential areas and people do not get disturbed.

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Then wildlife passages, these kinds of things also part of the mitigation. Because they have to cross, their path is disturbed because of highway. So, these kinds of wildlife passages, earlier also we discussed that what kind of passages can be there, some underpass maybe there, some upper. So, whatever is comfortable according to the size of the animals or that habitation, one can design these kind of facilities.

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For reptiles and snakes etc. these kind of innovative, bridges have been constructed in Uttarakhand. So, again, these are the environment sensitive zones. And means, we have to take care of those wildlife and biodiversity not only the, bigger animals like Elephants or Tiger or other, we should also be sensitive towards small animals and reptiles etc. So, for them also we need to have these kinds of facilities, bamboo or rope bridge for reptile animals, these have been constructed at various places in the Uttarakhand state.

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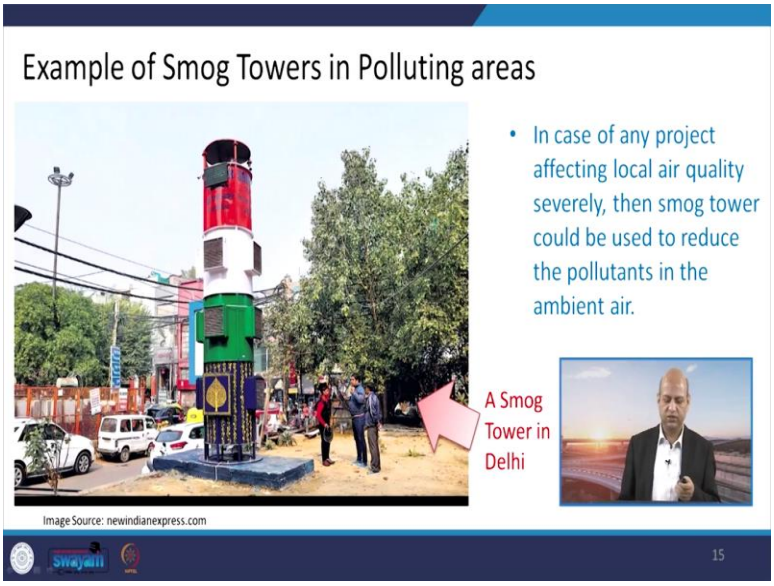

Then smog tower you might have seen in Delhi for example, if at certain locations lot of particulate pollution is there, a lot of air pollutant loading is there you can say, then to reduce the concentration, ambient air concentration of particulate matter, these kinds of smoke towers have been constructed. They suck the air and then on different multiple filters are there. So, the particulate matters are trapped into those filters and then the filter air goes out. So, that way air is purified, you can say.

But there are, certain feedback from people that these kind of smog towers have not been so, successful. The reason is, the whole environment is completely open. And whatever air it is sucking and purifying, other air from polluted area is coming to that place. So, that way there are different schools of thoughts or experiences, which give both positive or negative feedback about. But I mean to say, there are certain ways to address problems and these are the part of mitigation processes in EIA.

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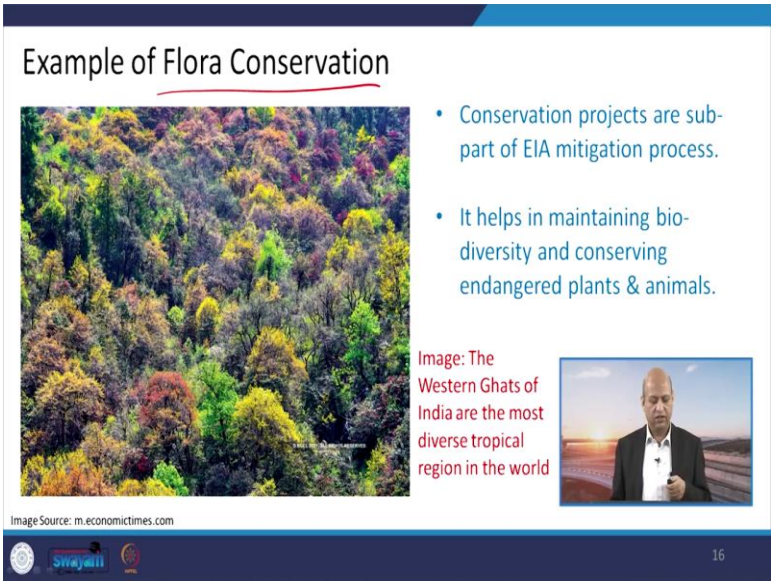

Simply if you see the flora conservation, so Western Ghats of India is very rich in biodiversity and this tropical forest regions. So, to help them maintain special provisions are made and no disturbance should be allowed. So, these are very sensitive eco zones, and we do not allow those kinds of activities which can harm, which can be harmful to these forest areas.

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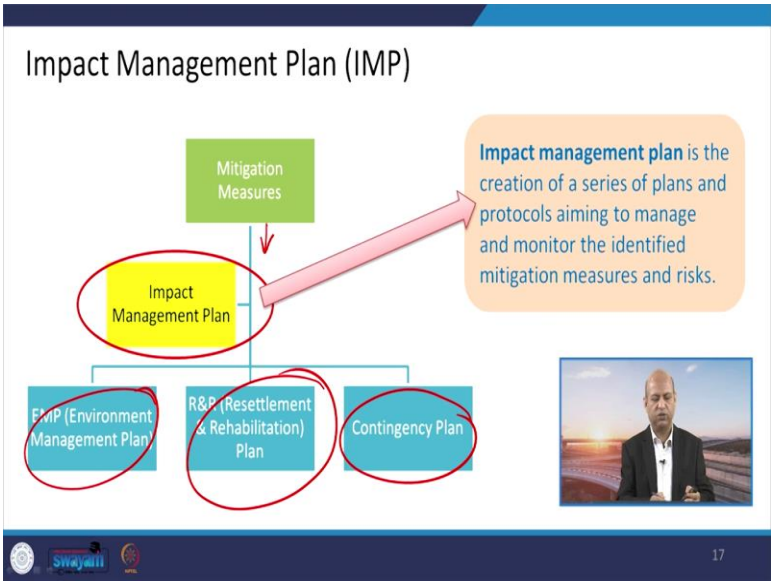

Well, then, there is part of this impact management plan or IMP. So, this is again, mitigation measures, when we talk about some, this impact plan is also there. So, the series of plans and protocols they are listed, and to achieve whether this environmental management plan you can call or contingency plan you can call, resettlement or rehabilitation plan you can call.

So, when we are talking about mitigation measures, we are also talking about impact management plan. And impact management plan all together have several other plans, as here like environmental management plan, resettlement rehabilitation plan or contingency plans. So, those kind of plans are the part of this big picture of impact management plan.

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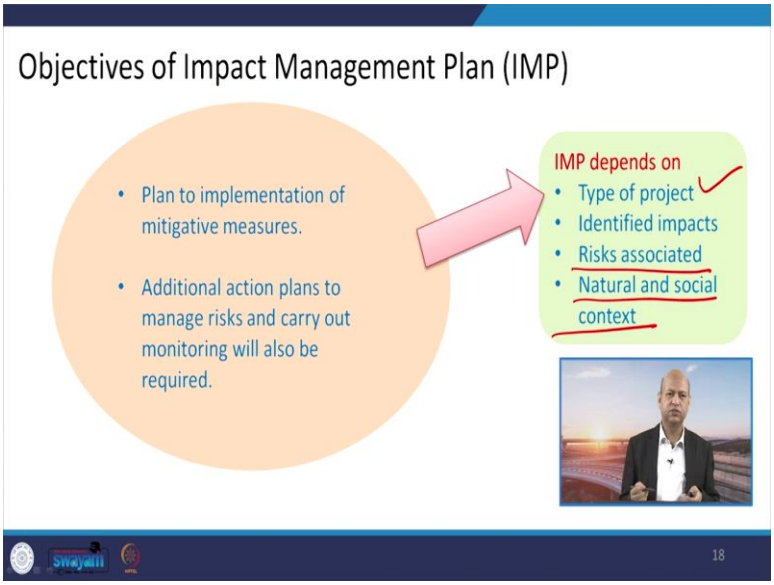

Well, what are the objectives of IMP, or impact management plan? So, you can see like, it depends upon type of the project or what kind of impacts have been identified initially, through screening, scoping and those kinds of exercises or modeling activities. Even if you have a baseline data, for example, some industrial plant is coming there or thermal power plant is coming at a particular location.

And you have air quality data of the baseline data there, x value is there. And this is very, quite nearer to the ambient air quality standard. So, after, this plant is proposed, you have to have exhaust emissions. So, you put those values into the model, you run the model and see the dispersion properties.

And ultimately you want to know what will be the concentration after this plant will be running fully with proper those air pollution control machinery as well as, and sometimes it happens that if it is not working, then some worst-case scenario kind of thing also exercise also, when done by the modelers.

And then those impacts are identified and accordingly other measures are implemented, if after this project, if we are calculating that the pollution level may be higher than the prescribed limits. So, those kind of modeling strategies, they give us idea about some risk associated with a particular activity and then natural and social context. All those things have to be addressed by IMP.

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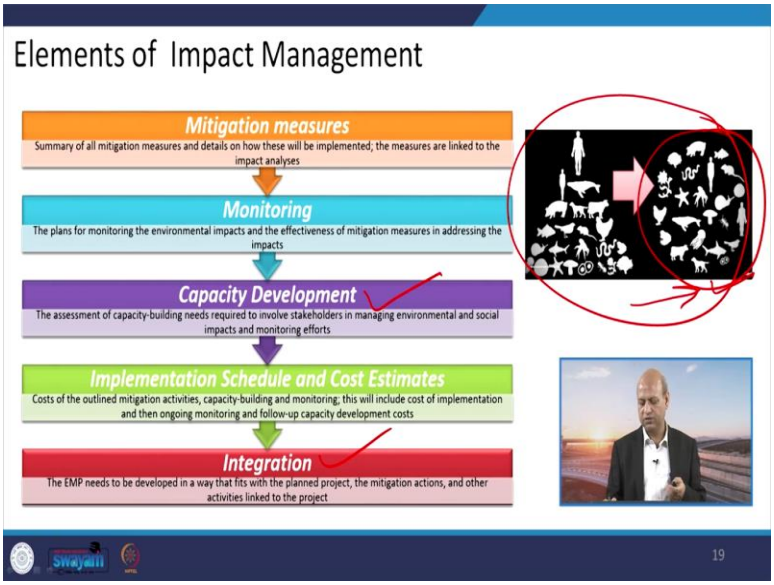

And so, you can see these mitigation measures also have a part of monitoring because, unless you have a proper monitoring, you cannot get the real feedback whether our mitigation measures are working or not working. So, the monitoring is also, should be there. Then capacity development because, at a project when the project is finished and monitoring is to be done, but if you do not have manpower of that kind of capability or capacity, which will do the monitoring then also problems. So, capacity building also is the part of that process.

And then implementation of the schedule and cost estimates and integration, all those things have to be there. And this picture, as it is said that one picture is better than the thousand words. So, you can see this philosophy of the development where we assume that the human being is at the top of all the species, and we are empowered to rule all species that kind of philosophy has damaged the world because we do not care for them. Because of that philosophy.

But if we go for the philosophy that we are part of the complete ecosystem, all other animals also have the right to live. So, these kind of philosophies help us to live with the environment in a harmony. So, this ecosystem related philosophies are, people now appreciating that we should be appreciating these value system which has come from different spiritual thoughts and you can call religions also.

But we are part of the big ecosystem and other, components of the ecosystem, whether they are trees, plants or animals, all those living entities have equal right to be there, but of course,

sometimes priorities have to be set and it is not possible that we can live without harming this environment in any way. But I mean to say that if we be, if we are sensitive, if we are careful, then we can minimize the harm.

And those kind of situations, which are seen in certain locations that high level of pollution is there, rivers have been converted into kind of drains, those kinds of situations cannot be seen, if we, value the eco system in a very religious way or very in a holy way. Then it is very helpful.

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When we talk about the resettlement and rehabilitation, then again, we have to see that minimum number of people should be disturbed. And the process should be transparent in the sense, the people should not get ill feeling. They should feel that it is their responsibility to protect a particular let us say, sanctuary. And if they are living there from centuries, then some sort of, balance has to be set. Because they have to be apprised by the ill effects of the human activities which goes to the wildlife.

So, they have to bring out and they have to give some good amenities otherwise, they will feel at the loss. There are examples that when people are de-routed from, uprooted from their locations, which they have been there from centuries, they do not feel good, when they go to the new place. There are several changes, challenges. But, if you try to have kind of participation or public participation to manage the forest land or natural ecosystem, etc. then these things may happen in a better way.

When they feel that they are also responsible for the protection of the environment and forests, then they behave with more responsibly. Otherwise, when there is a detachment or, disconnect between the environmental properties or environmental resources in their life, then there is the conflict. So, we have to make them part of this big story.

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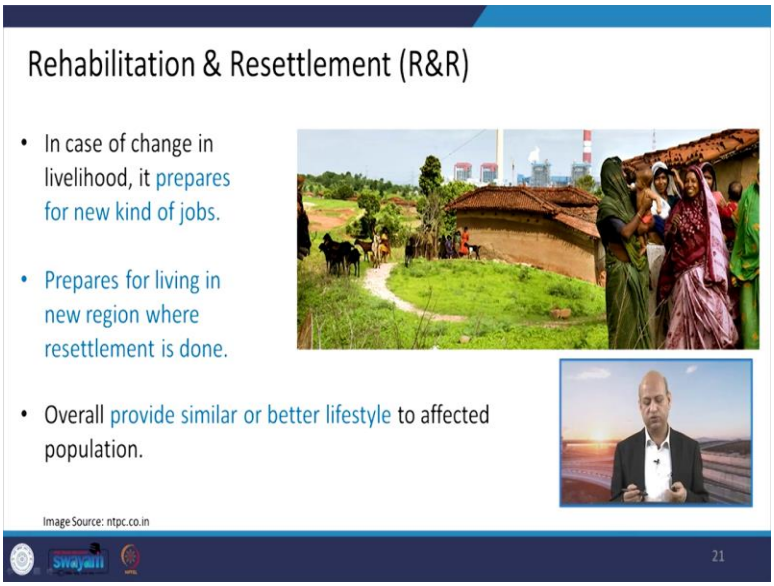

If we are moving people from one place to another or we are bringing some industrial settlements and some lands are acquired, so they have to give proper accommodation, proper benefits maybe jobs are offered. So, that way means, the population, the people should feel happy. Otherwise, agitation occurs, and projects get delayed, there are so many issues you might have seen, when we talk about developmental issues.

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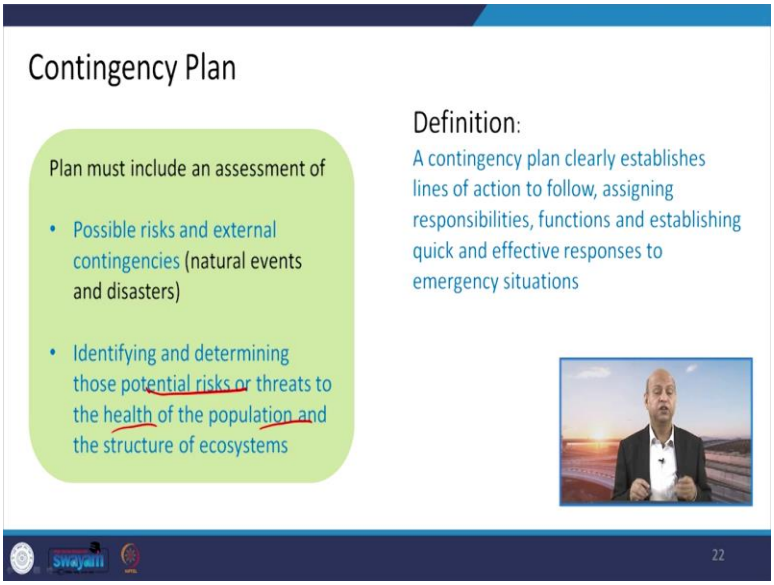

Well, then there must be some contingency plans. Because contingency plans address those things which are uncertain and which, which is difficult to predict in a reliable way. So, those kinds of potential risks should be identified or threats or risks to the health or population, and or structure to the ecosystem. And for them, some contingency plans should be in place, if something happens, even if their probability is very less.

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So, the examples like a flood occurs, what will happen, if some, as you, you might have read that in tsunami in Japan, that nuclear power plant was damaged. So, that was kind of rare, they did

not imagine that three things will happen earthquake, tsunami, and the damage to the nuclear power plant.

So, these are the rarest of the rare things sometimes happen. So, for those incidents or accidents, some contingency plans have to be there, or some fire occurs then what will happen? So, those kind of worst-case scenarios, we have to imagine and we have to make certain plans for those kind of worst-case scenarios.

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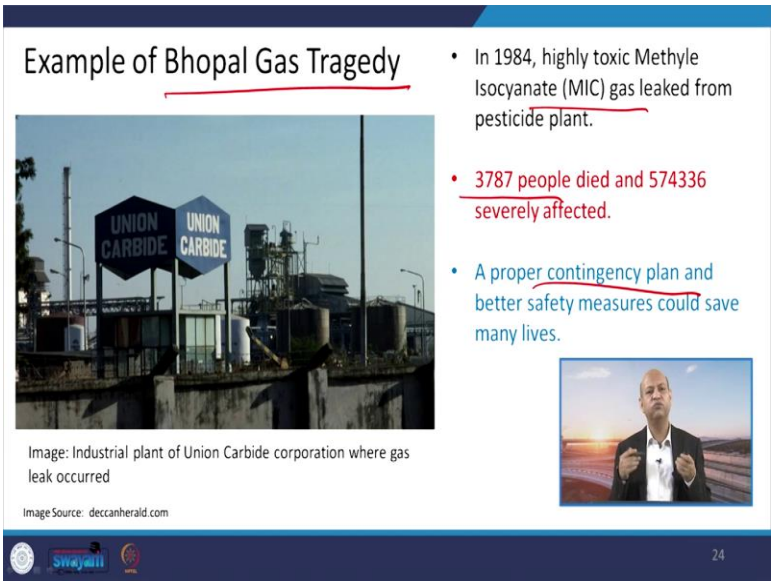

As you might be knowing about this Bhopal gas tragedy. So, thousands of people died because of this leakage of this gas, MIC methyl isocyanate gas. This is very poisonous and it is heavier than air. So, it hugs the ground when it disperses. So, it does not disperse properly as other gases disperse. So, if there were contingency plans made properly, maybe this, this kind of incident would have not resulted in such a calamity. So, these contingency plans are very important in that sense. If something happens of beyond imagination, then what we have to do, that should be in place.

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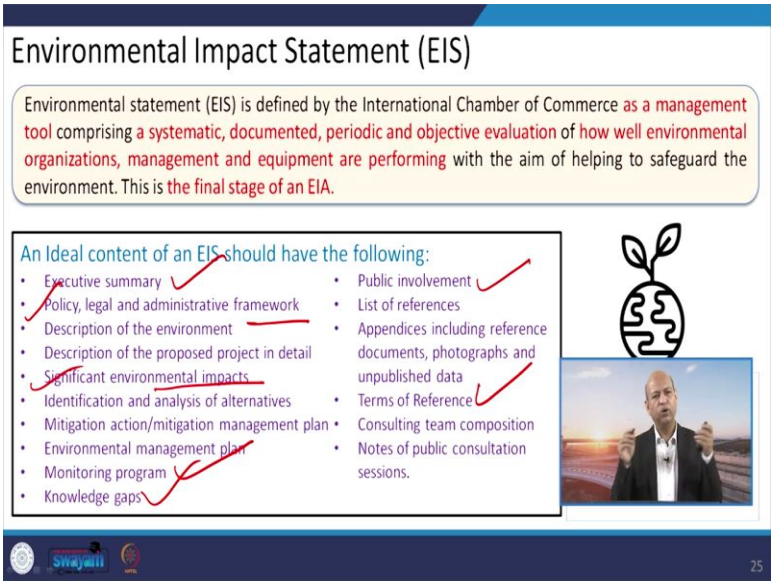

Well, this environmental impact statement which is known also ES or EIS. So, that is a document kind of thing, which have everything like, policy, legal and administrative framework beyond the summary of complete EIA. And then the significant environmental impacts be part of this statement.

So, you can see the whole list goes for like monitoring program, if there is a gap in the knowledge, that should also be part of this. Then public involvement, list of references for different environmental components and then consulting teams, terms of reference TOR, all these are part of the environmental impact statement.

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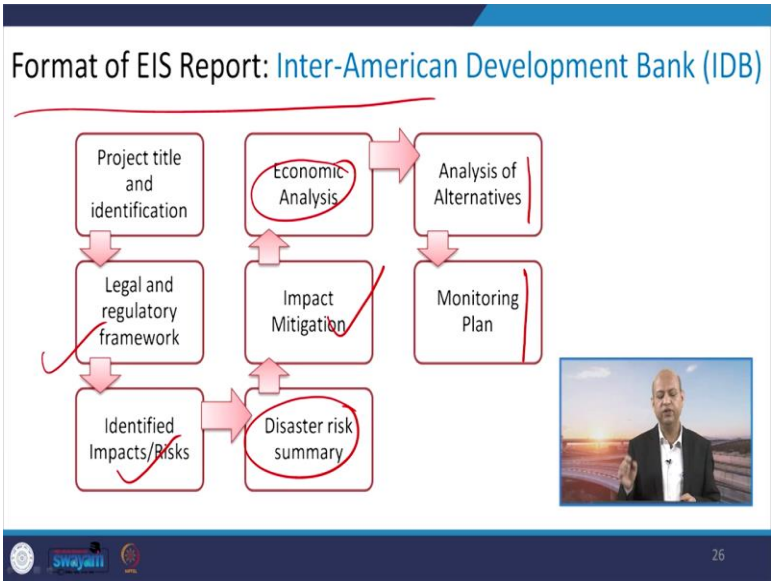

Well, EIS has been promoted and prescribed by different international agencies in their own way. For example, this IDB, Inter-American Development Bank, it has given certain steps like project title and identification must be the part. Then legal and regulatory framework, identified impacts and risks, we have seen all these things, but how to put them in a sequencing manner that is the thing.

Disaster risk summary, impact mitigation, how to achieve. Then economic analysis, like cost benefit analysis, analysis of alternatives means, which alternatives will be the best. So, we have to see different scenario generations and alternatives we have to consider. Then the monitoring plans all those are part of this format, which has been recommended by Inter-American Development Bank.

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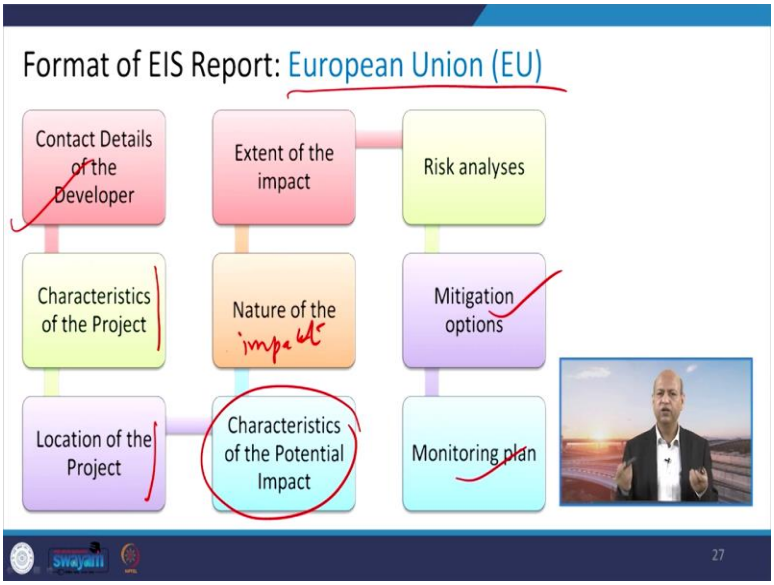

Similarly, European Union has recommended some format of this EIS report and that format is like contact details of the developer must be first of all. Then what are the characteristics of the project, that should be included and location of the project. Then characteristics of the potential impacts again, the impact thing is there.

Then, nature of these impacts and the extent of these impacts. And so, nature of the impact, risk analysis, mitigation options, monitoring plan. So, each organization is recommending in different way, all those things are included with other nomenclatures.

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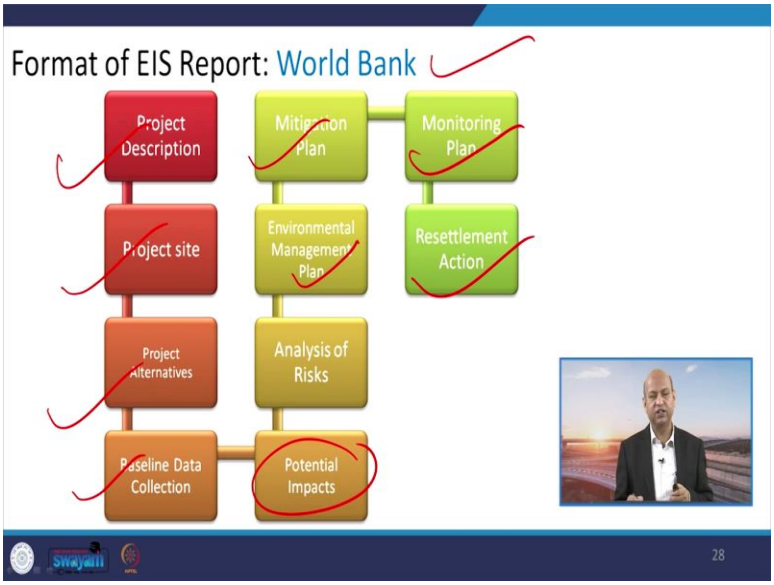

World Bank has recommended like project description, first of all, then project site, related detail must be there and then project alternatives. So, that we can choose the best one, best possible. So, project alternatives must be considered, then baseline data collection, and then the potential impacts again, the same thing. Analysis of different kinds of risks, whether health risk, or environmental risk, all those things, climate risk.

And then environmental management plan to address those kind of risks, negative externalities we have to address. So, that is the part of environmental management plan. The mitigation plan means, how to address means interventions to reduce the impacts and the monitoring plan and the resettlement action if there are issues of similar way.

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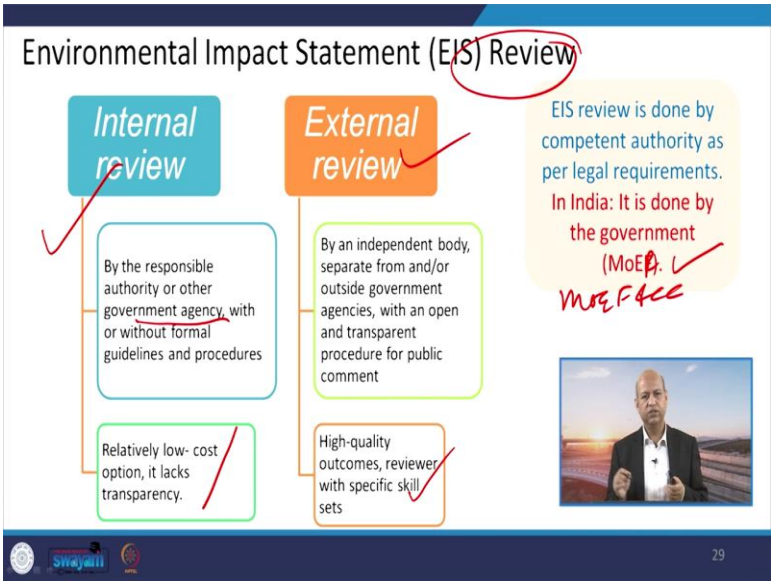

Similarly, the review process is very important. And that is done internal and external. So, internal reviews are by some responsible authorities of the government agencies and these are the, low-cost kind of setup. But external agencies may also be there, which are reputed one and they are known for their integrity and transparency, so external agencies may also be hired for those kinds of activities. In our case in India, Ministry of Environment and Forest and climate change MOEF&CC, this is the responsible for this review process.

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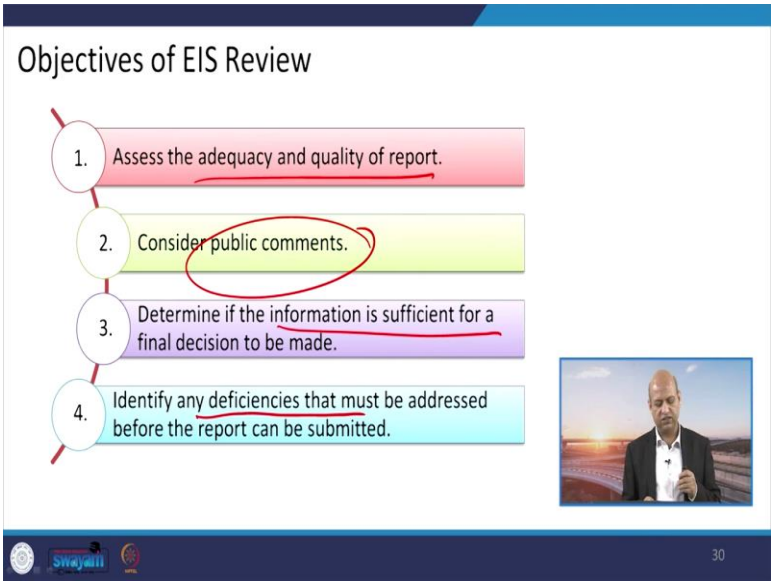

The objectives are the same, we have to assess the adequacy and quality of the report means, it should not be like copy and paste. We should really do extensive study and based on the data collection and real analysis; the report must be prepared. Then the public comments should be considered properly. And how they are addressed, means the feedback is very important. Because the public participation without public participation, the success of a project is always questionable.

Then we have to determine the information is sufficient or not for the final decision making. Because ultimately, why EIA is being done. EIA is being done to know whether the benefits of this project will be more than the impacts, overall, in totality. So, the decision-making process must be helped by this exercise and also, we have to identify certain deficiencies, which can be addressed properly and rather converted into in a positive way.

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Public participation, stakeholders so, NGOs or, their government local bodies like Panchayat all those people have to be invited properly and they have to be informed, timely, and date and time. And then we have, those recording is also video recording is also done.

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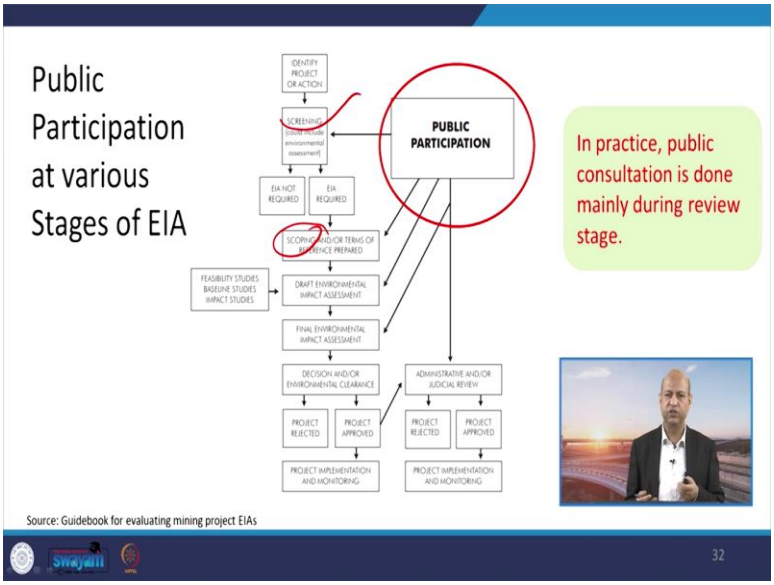

So, the public participation at various stages occur in EIA, it is not only once but you can have at several stages. Like when you are, we are doing screening then also we can get some feedback from the people, when we are doing scoping then also, we can get some feedback from the people. And these feedback, constructive feedback always helps to, do EIA exercise in a better way. Otherwise, of course, there are certain experiences of people that sometimes nuisance happens, some people have their own vested interest.

So, you have to identify means, that you have to bring trust between the EIA agency and the people. And there are different groups of the people. So, one has to talk and one has to convince that, if there are some groups which are making nuisance because of their narrow interest, then the larger group will handle them, because if the project is beneficial to all, naturally people will try to convince those other groups which, who do not want to have that project there. And they will satisfy them with different data, arguments, information, knowledge, etc.

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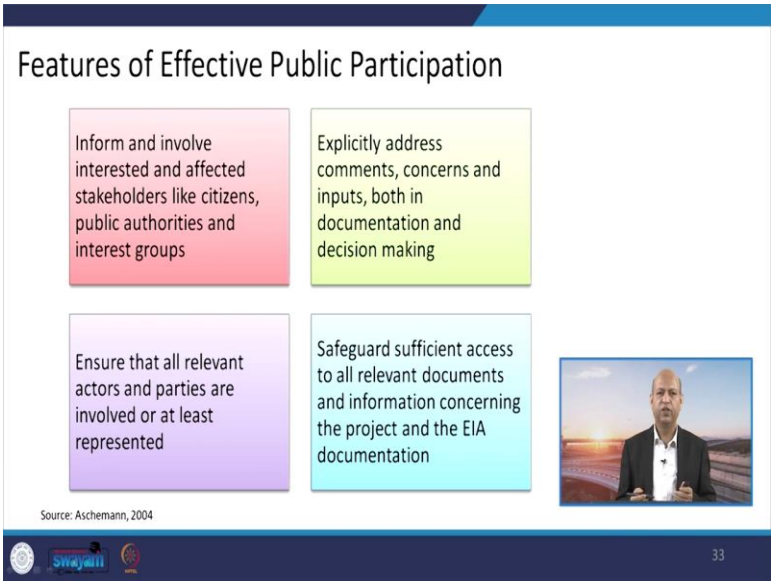

Well, different features of effective public participation are again, like the inputs must be in a proper manner, so that decision making can be easy. And also, transparency must be there and timely they should be informed. And the relevant documentation must be there, means not only the recording, but documentation, proper documentation always helps.

Because you can always show that this was the recorded data are there. And these are the things which you have already agreed to. If somebody denies, so you, that is the document to, convince them. Plus, if you have addressed their some concerns, you can also document them, and you can show that this already has been addressed properly.

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So, the steps of public participation, as I said, initial announcement through newspapers, other media, TV, radio, there are ways, some notices can be placed and leaflets can be distributed. So that the people get to know timely, there will be some public participation consultation with the project developers and the people who are going to be affected positively or negatively by their project.

Then letters and some questionnaire-based survey can also be done, this can really help. Some workshops can be organized and exhibitions can be executed or organized. Because, if you have certain experiences of similar project from other location, you can give them information through exhibitions. Then public meetings should be held, and articles in media can be published. So, that people read. So, as much as information you can dissipate, that will really help the people to come to a rational conclusion.

So, establishing community-based group, which really helped to bridge between the developer and the stakeholders. And then publishing a draft before completing the process, and which should be shown to them, so, that the trust is built that nothing is hidden, nothing is hidden, everything is transparent. And these developers really mean business to help the society as well as the country. They are not only just to make money, but they have social responsibility and they are responsible people.

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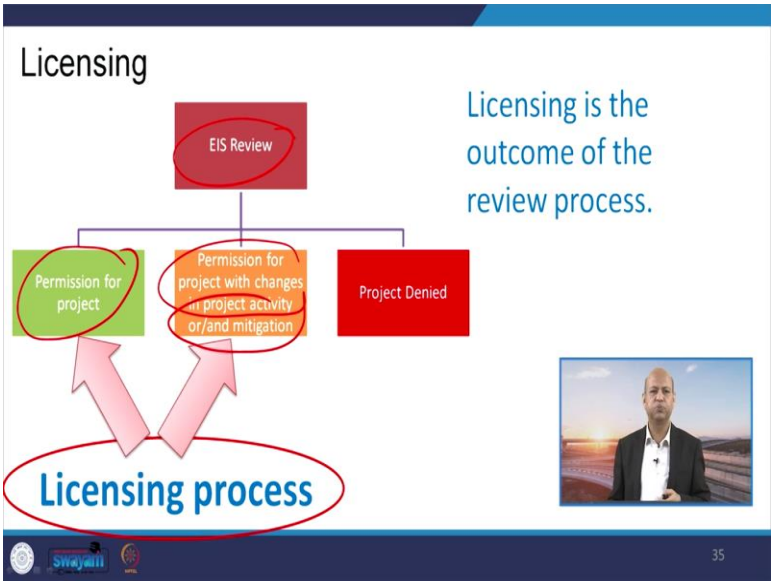

So, in this process, this EIS review when we do ultimately what it leads to, it leads to licensing. Means, either it will be rejected or denied that okay now, these are the reasons that this project cannot be executed there, or their permission will be given to project if everything goes fine. If feedbacks are there, then some permission can be given with some guidelines that you have to do this particular, inclusion of these policies or technologies.

And then you come back again that okay, in our, this assessment report or environmental impact statement, we have included, we will take this technology, so that suppose pollution does not occur up to the large extent. Well, after that follow up monitoring is also very important.

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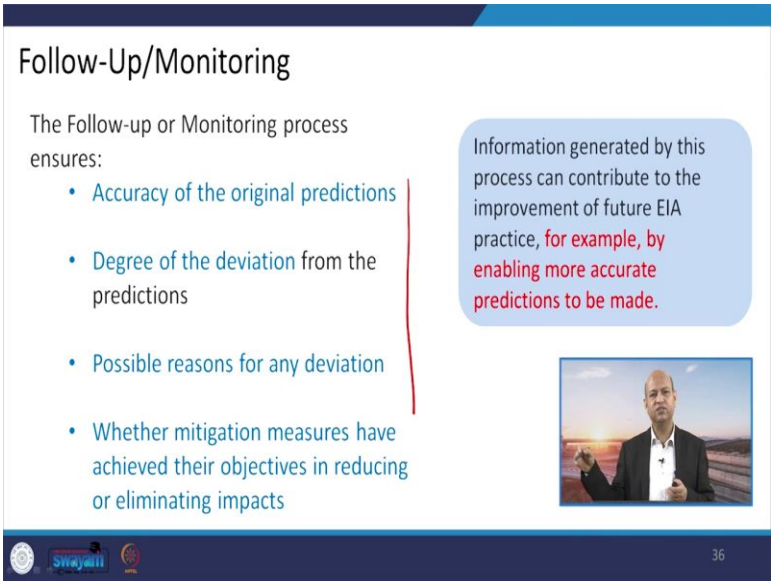

So, the accurate and reliable prediction must be there otherwise, the decision will not be proper. So, accordingly the, this process has to be established. And for example, earlier also I think, I shared with you that suppose some landfill site is there. And you want to monitor nearby wells, the water quality. So, the monitoring must be continuous as well as the people should be trained to catch some deviation in the quality of the water.

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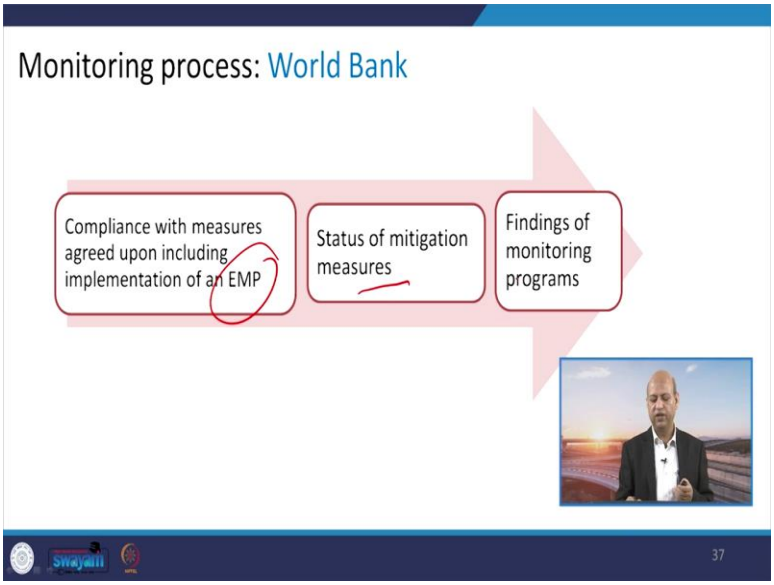

World Bank has given some monitoring process related guidelines. So, those like compliances with measures agreed upon including implementation of the environmental management plan.

And then status of mitigation measures and findings of the monitoring programs, they should be clubbed together and they should be communicated to the people.

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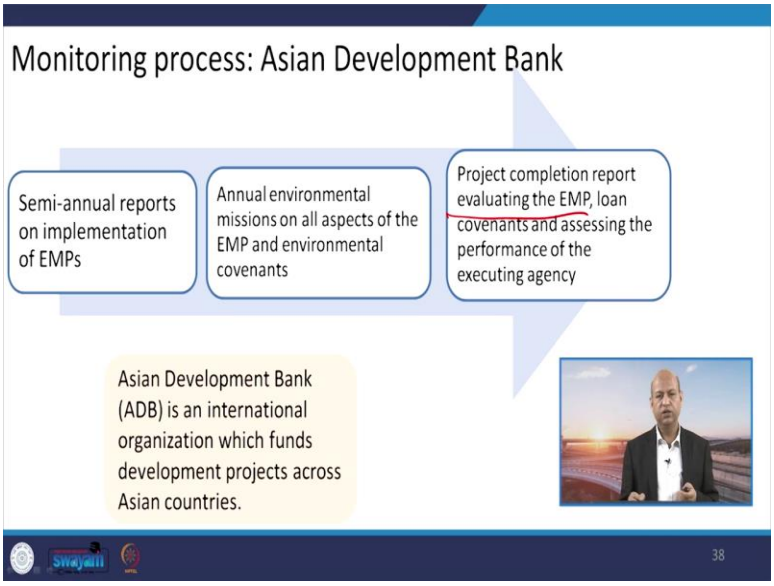

Similarly, Asian Development Bank, ADB has given certain ways. So, like annual reports must be there and implementation of EMP should be included in that annual report. And environmental missions annually should be there, then project completion report, the evaluations should be properly done. And the loan related, issues, so they should be in parallel according to them.

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Similarly, European Bank of Reconstruction and Development, EBRD they have also given the monitoring process, that how the team of the project site should be built. And then annual environmental reporting like the ADB, periodic environmental audits. All those things has to be done.

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So, if we want to give some summary that what kind of shortcomings may be there in EIA report? And what could be the reasons? For example, an EIA report describes the proposed

construction of an industrial plan, but omits the information about construction of pipeline and other facilities, which transport or handles the raw material and finished products.

So, what is the shortcoming? Their shortcoming basically, the description of the proposal does not cover the key features. So, that way, in the review process, these kinds of shortcomings are listed. And these are just one by one some examples of particular EIA related shortcomings.

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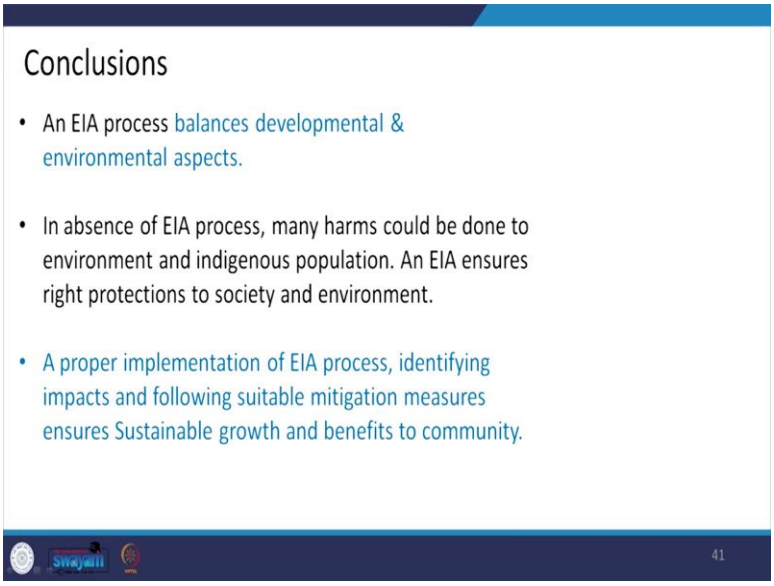

So, in conclusion, we can say that balance has to be marked or striked or achieved between development and environmental aspects or aims and objectives. And the EIA process really helps in that. And the process should be inclusive, transparent and public participation must be there. And so that the sustainable development and sustainable growth can be achieved without any, wrong feelings, ill feelings in the public.

And it should be like a win, win situation between the developers of a project and the stakeholders of every kind, whether the employer and the employee and then working class as well as the people who are passing through some roads, which will be part of a project. So, there should not be any kind of negative impact in such a way that, it is harming the quality of life of the people.

And the EIA really helps in achieving these goals. So, these are the references if you want to have more information. And thank you for your attention. So, these are the processes of the EIA we have completed today. Thank you again.

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