Sustainable Transportation Systems
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Lecture – 12
EIA Processes - I

Hello friends, so in the continuation of environmental impact assessment, overview, which we presented the last time, that what is the need of EIA, why it is done, what is the evolutionary process in this EIA whole gimmick? Well, what were the reasons why EIA was implemented for big projects, whether it is infrastructure projects of any kind, including transportation sector.

So, in that process, now, we want to see what are different processes, which are the part of EIA. When we do the EIA, what are those processes, which we have to take into account step by step or stage by stage.

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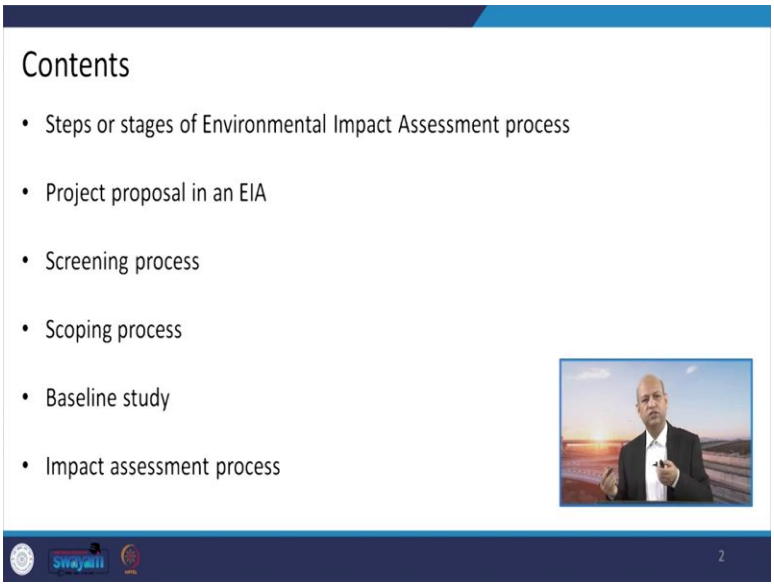

So, today we will see different steps or stages of EIA process. And then, what is the project proposal on which we need to do the EIA, what is its significance? Then screening process, how does it done for EIA, because this is the basic part of, or initial very basic and initial part of EIA. Then scoping process, because after a screening, we have to do a scoping.

And then the baseline study because, we want to collect some baseline data, on the basis of that we will can, we will see that some future scenario is deteriorating the environment or it is not

harming in any kind of pollution or other aspects. And then what is the impact assessment process, those kinds of things today we will cover.

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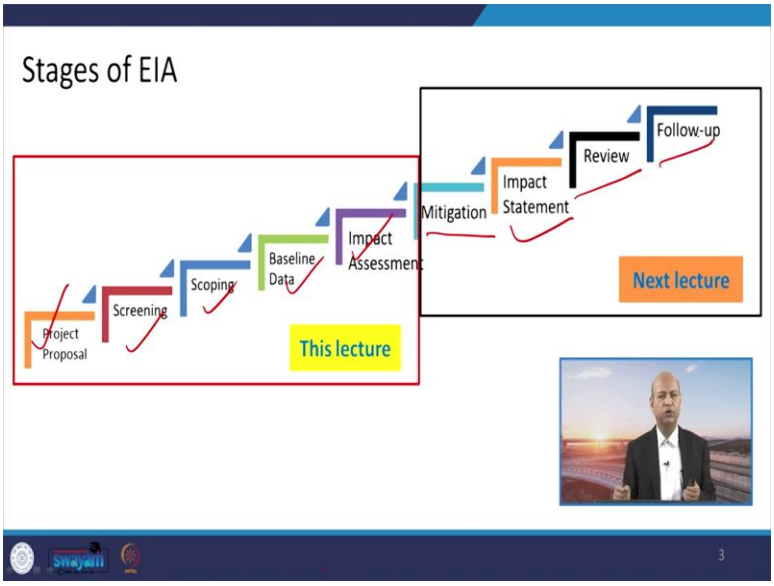

Today we will see, from project proposal to screening, scoping, baseline data, analysis collection and impact assessment. And in the next lecture, we will see the mitigation part, means if there are negative impacts, possible impacts then how to mitigate those negative impacts or influences. And then the impact statement, EIA impact assessment to, outline those mitigation measures as well as the impact plus, what is the review process.

So, that after implementing those mitigation measures, whether things are improving or not, and then the follow up. So, that negative impacts do not occur even after the project is completed and operation of the project is going on.

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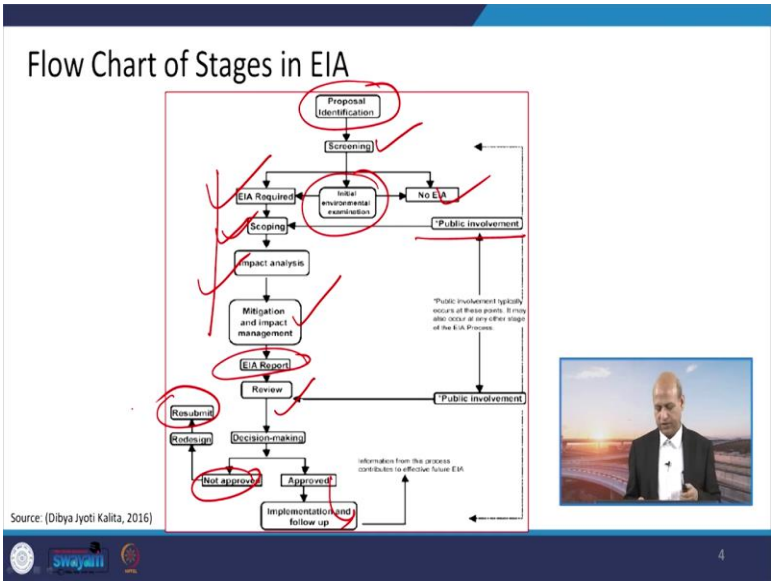

Well, this is the, basic flowchart of different stages for environmental impact assessment or EIA. So, at the beginning, this proposal identification is to be done, means we have to identify which kind of project we want to see in terms of EIA, whether it will need EIA or not? So, first of all screening is done, and through screening we want to know that whether EIA is required or not required.

So, before that this initial environmental, examination is done that is known as a screening of the project. So, there are certain parameters, based on those parameters we do the screening of the project and that gives us an insight or idea, that EIA is required not required. Not required, then fine the clearance is there, project can be executed. But, if EIA is required, then we have to see the scoping part.

So, for scoping, some public involvement is needed, public hearing and all those. Impact analysis means, we need to see if there are, certain components of the air, water, soil etc. which will be influenced by this particular project. So, what are those impacts? How to analyze them? So, we can list the impact, and then we do the mitigation and impact management related, preparation of the plan.

So, the EIA report is prepared by including all these features. And then review is done, that whether that this EIA report is fine or not. So, this public involvement can be there from this scoping to the EIA report. So, preparation of the EIA report, so that the feedback can be done,

can be addressed if there is any issue related to the community, those issues can be addressed properly in the EIA report.

And then on the basis of this review, this decision is made that this EIA has been completed and those kind of particular inferences or measures we have to implement during the project. So, that environment is not influenced in negative manner. So, the approval goes, and the implementation of the project goes on.

And then follow up is there, follow up criteria then feedback is needed. And if it is not approved, then feedback is given that these are the shortcomings of this EIA report or these are the particular aspects, which need to be improved. So, they will resubmit the EIA report after addressing those comments, which the, this EIA review committee gives to the agency.

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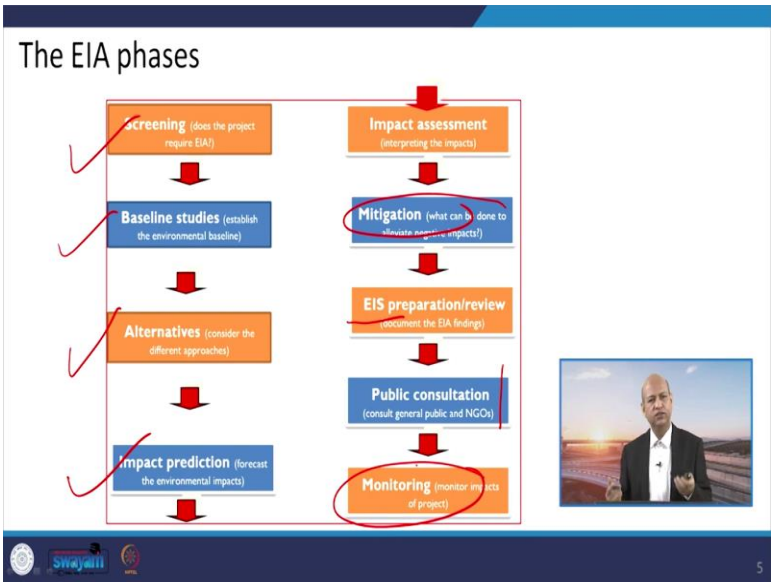

Well, so, the different phases in terms of that, so screening is there. And from screening we need to know that whether the project requires EIA or not. And then baseline studies, because without establishing the baseline studies, we do not know if there is any positive or negative influences on the parameters, like air quality baseline data, water quality, soil quality, those baseline data if we have or socio-economic related data.

And if we create different scenarios, due to implementation of the project, then we can figure out whether, some positive or negative impacts will be there. So, the baseline data collection is very,

very important. After that, we consider alternatives like different approaches to execute the project. The same objectives of the project can be met by different ways, like from A to B you want to commute, so whether railway track is okay.

And within railway track, which kind of engines you want to use like, diesel-based engine or electric locomotive, those kinds of things, we can figure out from different alternatives, or all together like some people may argue that, even railway is not required, road is sufficient for that. So, those kinds of things, all factors are included. Then impact prediction, once we know that this particular project is going to happen here.

So, the impact is predicted based on different scenarios, scenarios means the population growth and then the different activities. So, how those activities will influence this, complete that environment and surrounding and socio-economic fabric of that society. Then, what are those impact assessment? I mean, interpreting of those results, which we are creating due to different scenario generation.

Then, if negative impacts are there, then we go to mitigation plans. So, any kind of negative impact needs some sort of mitigation plan to reduce those negative impacts or to rule out those negative impacts. Then environmental impact statement is prepared and thoroughly reviewed. So, that, it is guaranteed that those negative impacts will be addressed properly. Then public consultation, means the public trust is built by these studies that, these are the impacts.

And these are the measures which will be taken to mitigate those negative impact. So, the public get to know and they trust the complete project that, okay this project will not harm their given situation. And then monitoring happens as per the plan, that if these negative impacts are there, then properly they have been mitigated or not. So, monitoring is very important, means like water quality.

For example, suppose some landfill site is coming at a particular place. And, some transportation activities are going for taking the solid waste to that landfill site. So, by this activity, if there are, effects on the water quality or not, so the water quality is monitored, air quality is monitored. And it is seen, and it is ensured that over the years, those quality parameters do not deteriorate with respect to the given guidelines.

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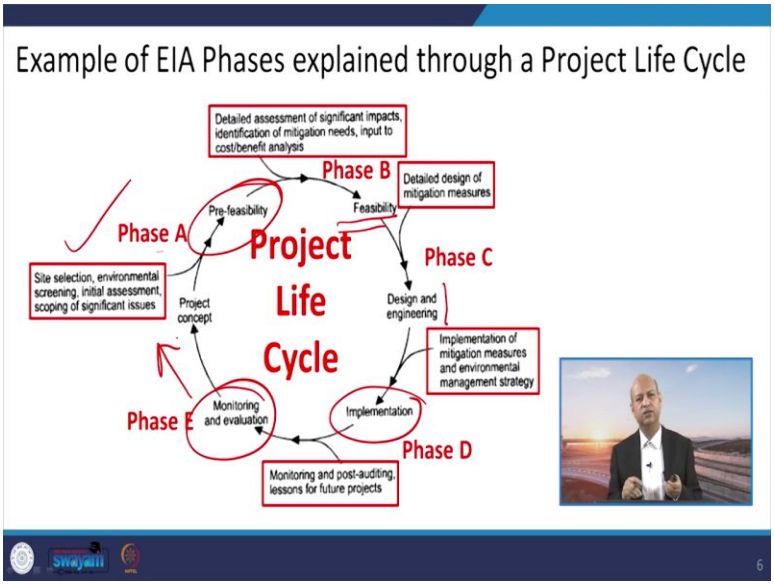

Well, this is one pictorial representation of different phases of EIA, in terms of the project lifecycle from beginning to the end. So, the Phase A, this is like site selection and then environmental screening, and initial assessment and scoping those kind of, issues to learn about this particular project. So, Phase A consider this. Then, pre-feasibility is done by this Phase A activity.

This goes to the Phase B, and Phase B basically is related to detailed assessment of significant impacts, which we have identified through pre-feasibility study of Phase A. And then cost benefit analysis, those kind of things, mitigation needs, because of those impact assessment. And then, based on the Phase B, we prepare the feasibility report. Detailed design mitigation measures are incorporated in that design process.

Then Phase C is there, design and engineering to mitigate all those negative implications and the implementation of all measures for mitigation and environmental management strategy. So, Phase C is there. So, implementation part goes after Phase C, and then the Phase D is there, which is related to monitoring which we have just discussed that post, auditing activity or post project activity, monitoring is to be done continuously.

And Phase E, phase E is related to this monitoring and evaluation of monitor data. And this gives the feedback to the complete project concept. So, in cycle all the feedback is received and it is

given to the project management committee and that agency. So, this is a kind of cycle or virtuous circle you can say.

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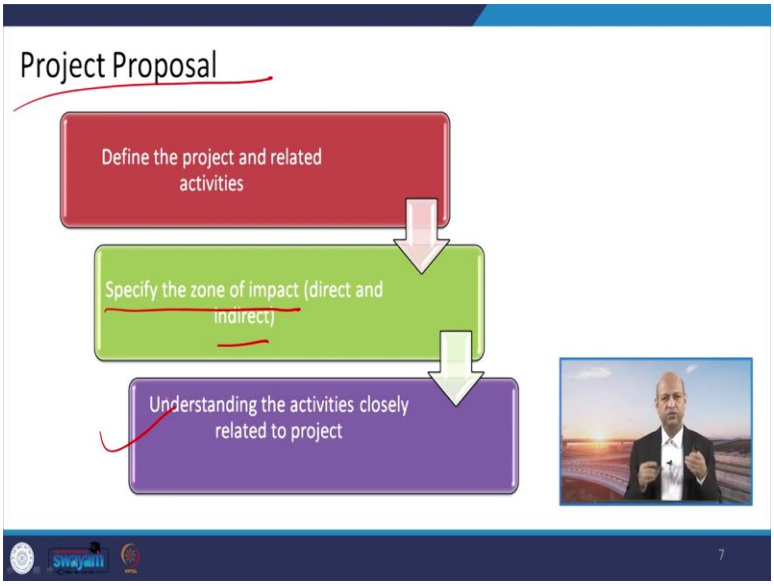

Then, the important part is very beginning, at the beginning like project proposal. So, we need to define properly the project, and its related activities. Otherwise, how will we know that environment is being affected negatively or not and up to what extent it is being affected? So, the project defining in a proper manner is essential thing. Then we specify the zones of the impact, of direct or indirect impact.

Because if some project is coming, let us say, some highway is coming. So, within this highway stretch, how much distance will be affected by noise, by emissions, all those kinds of, so, the zones are defined properly. And then we understand the activities related to the project, in totality. So, that we can recommend some measures, if required.

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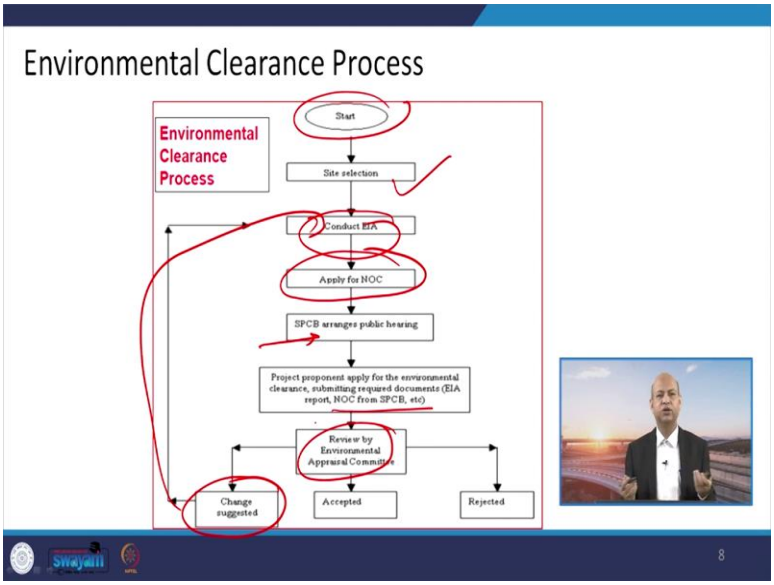

So, the environmental clearance process for a project is given in this flowchart, how it takes place. So, it starts from like site selection, one site this, this is the site where this project will come. And then, this EIA is conducted after when screening, after screening when we know that EIA is needed, so EIA is conducted. Then based on that report of EIA, that particular agency applies to, CPCB or MoEF, this NOC for executing the project.

So, the State Pollution Control Board, they go for public hearing, whether some other things are needed to be incorporated. So, project proponent, apply for environmental clearances. So, NOC from SPCB, etc. is taken, if those a public hearing goes well. And then the review of environmental appraisal committee is done through, going through this complete report after, public hearing related issues have been addressed.

And that, review committee or appraisal committee either accepts it or rejects it, or they give some suggestions to change it properly. So, if changes are suggested, then again, EIA is conducted as per the changes suggested by the committee. And then again, they apply for the NOC and the same route goes for until they either accepted or rejected by that appraisal committee.

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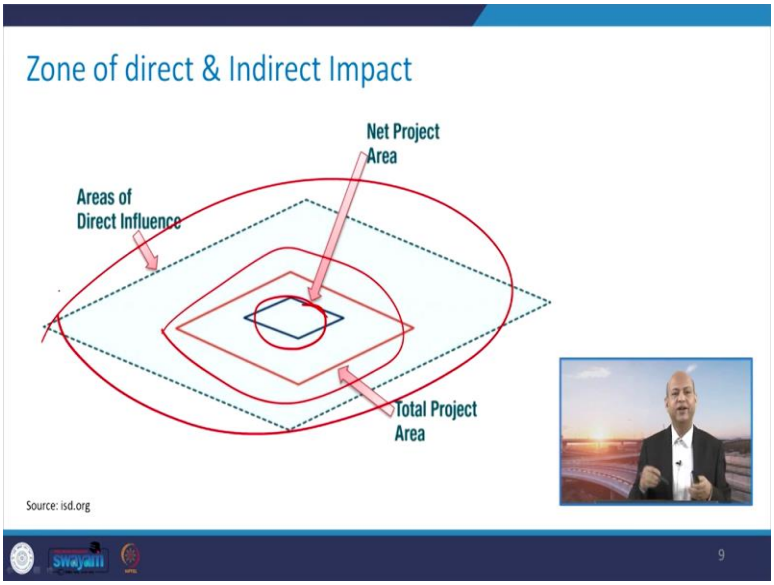

We were talking about what are the zones, which will be affected by a particular project. So, net project area may be a smaller one. But the total project area will be with some other distances, we will see like some highway's length is or width is specified, length or width. And then beyond that, some zones are there, which is included into total project area.

And after that the influences, like noise will go away for other further distances. So, this area is defined for like a direct influence, indirect influence may go beyond this also. So, that will depend upon what kind of influences may be there.

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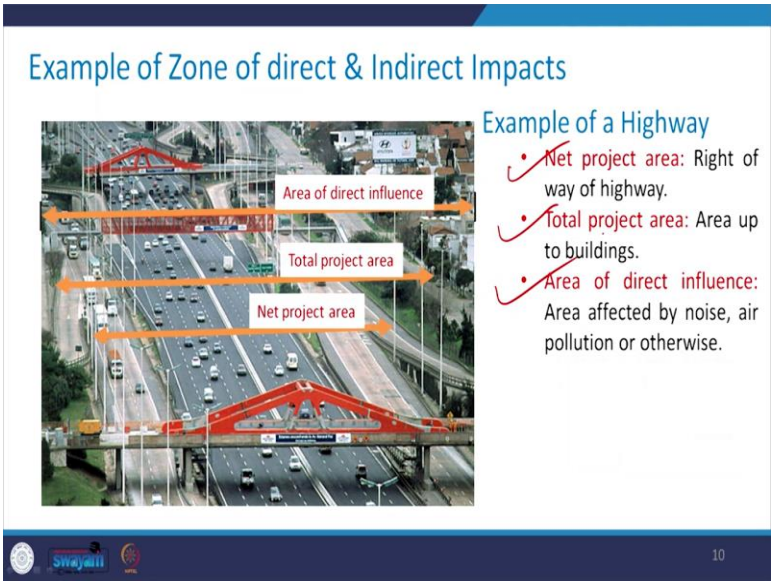

So, here you can see, this is the net project area from this particular width to this one, this is the highway width. And then the total project area will be up to the buildings, where, where buildings are there. And the area of direct influence maybe beyond those buildings, because noise and other things will go beyond that particular limit. So, the net project area, right of the way of the highway.

And the total project area, area up to the buildings. And area of the direct influence beyond the buildings like air pollution or noise etc. are there beyond the buildings. So, this screening is the very beginning part of the total EIA steps or stages. And screening helps us to decide whether EIA is required or not. And there are certain parameters or criteria according to which we do the screening.

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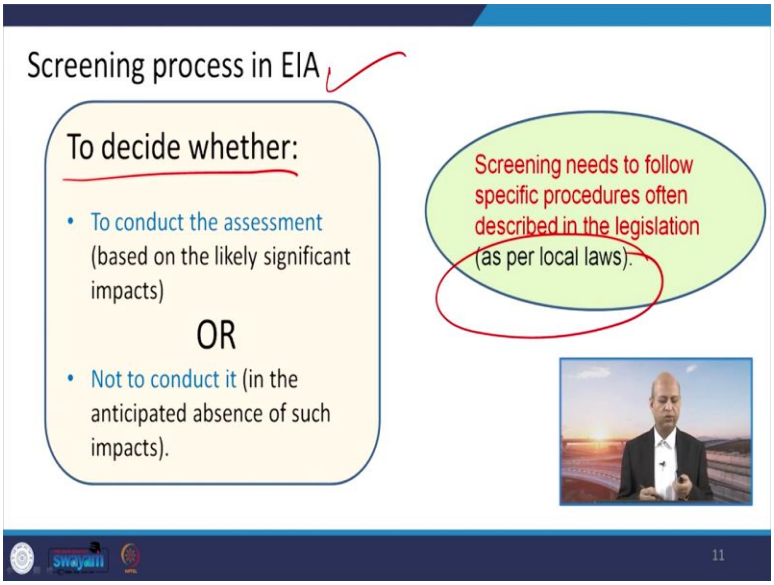

So, whether to conduct EIA or not, to conduct EIA that screening will give and that screening is done as per local laws means, some parameters are related with the local laws that will give us an idea, whether detailed EIA is needed or not needed.

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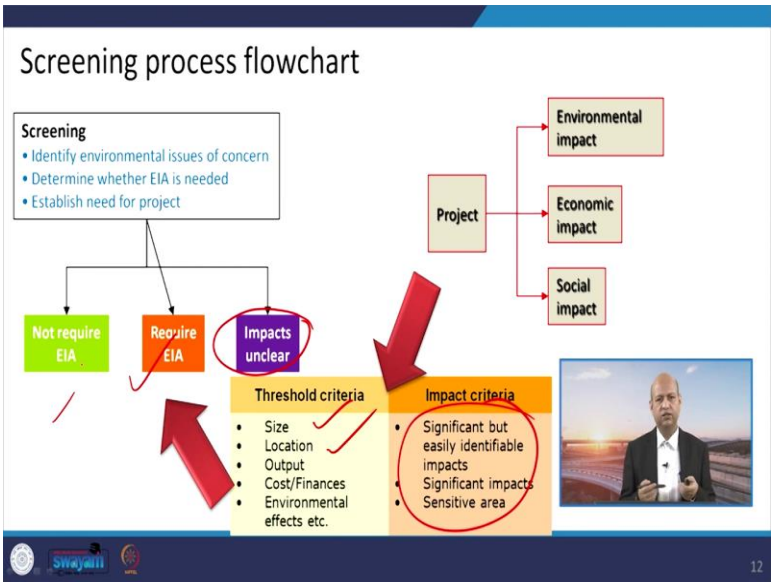

So, this is the flowchart of the, this screening process. Like, if project is there, then we see some threshold criteria like size, location output, cost, all these are the basis for screening. And then it will let us know whether EIA is required or not required. And if impacts are not clear, then

again, we need to have some additional information. So, we ask those propagators or agencies which are dealing with that project, that give us additional information.

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Now, why do we need, screening? Because there are a variety of projects, there are certain project like oil extraction, mining, bullet train, they have larger impact. So, based on those criteria, we can say that, it will require EIA. But it is not so, simple because there are other parameters also, which will require more additional information.

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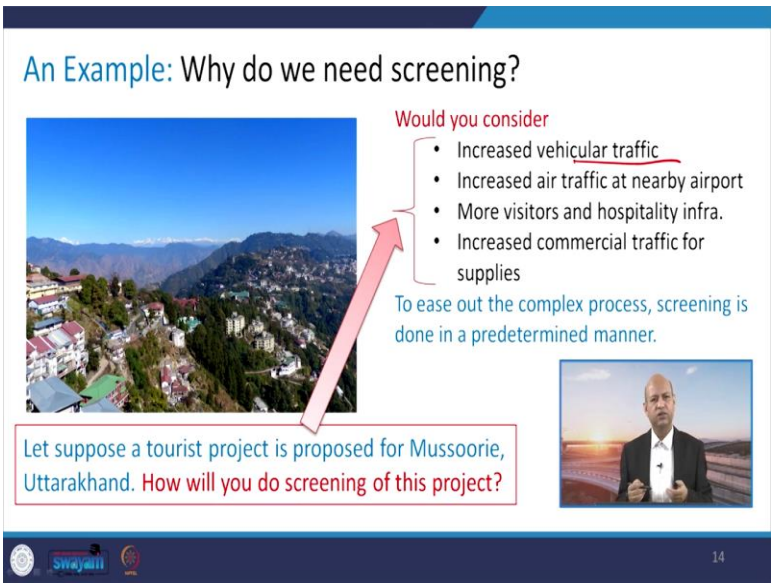

For example, for instance other example is of tourist place like in Missouri, we want to develop a some tourist project. So, that will increase vehicular traffic flow and commercial activities and then hospitality related infrastructure would be required. So, whole gimmick of this particular project will add into the baseline related parameters. So, that way, screening is needed, whether, what are those activities and whether EIA is required or not required. So, these, these are some issues.

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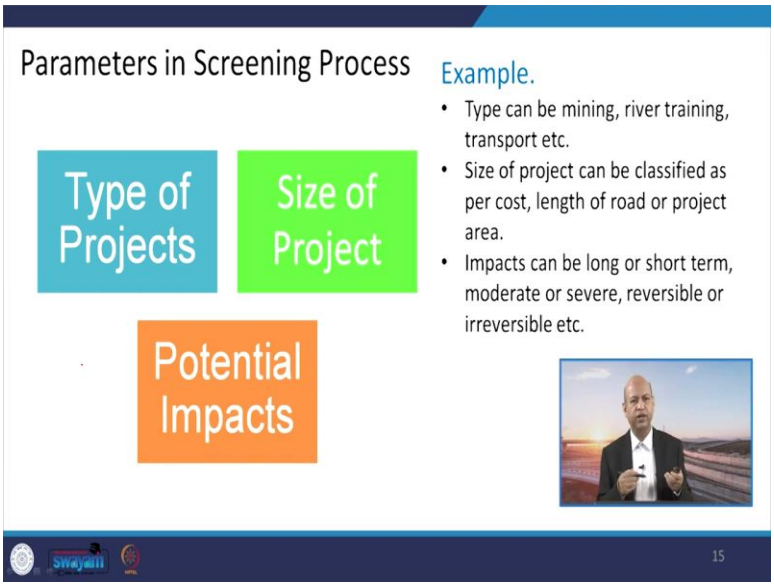

And some parameters of the screening process are based on like type of the project, size of the project or potential impact. So, there are certain guidelines, some types of the project, we can look into the list, that this is falling in that particular category of the project. So, it will require EIA or it will not require EIA.

Similarly, as per the size of the project, some projects are, can get away that it is not required or as per bigger size, there is a necessity of the EIA. And similarly, some potential impacts according to the activities of a project. So, all these three way of parameters, which helps in screening.

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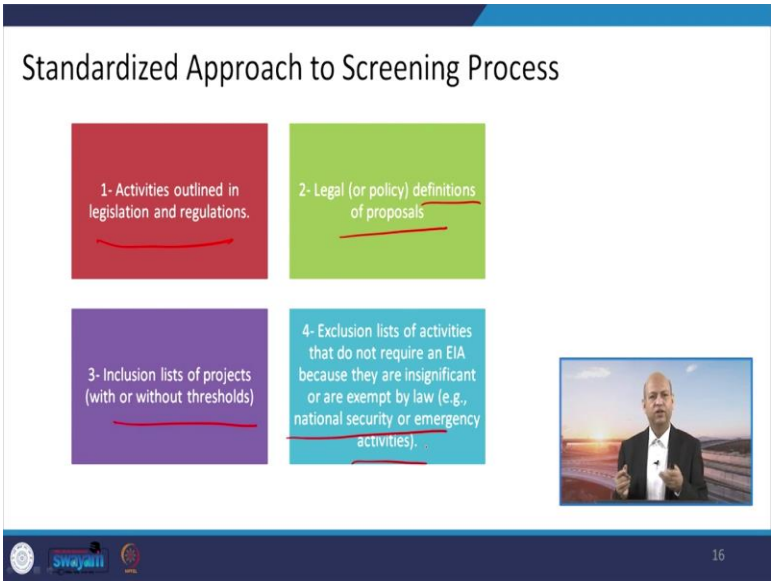

Like activities outlined in legislation. So, there, there may be some particular legislation, which gives a list that these are the projects which will essentially require some EIA or these will not require. So, there may be some basis based on some laws or regulations. Similarly, some policy definitions of the proposals.

So, again legal implications may be there to waive off EIA requirement or to consider for EIA. And other like some threshold limits, because baseline data are there and because of activities, if those threshold limits are violated, then EIA would be required. Similarly, some exclusion are there, like some national security related or emergency related activities are there. So, they are not, considered for EIA.

Because they are some special projects and we have to set some priorities and national security or safety, those issues. So, even if some harm is there at a local level of a particular, environmental component, it is addressed in other way, but the security and safety is the most important thing. So, for those, EIA may not be required.

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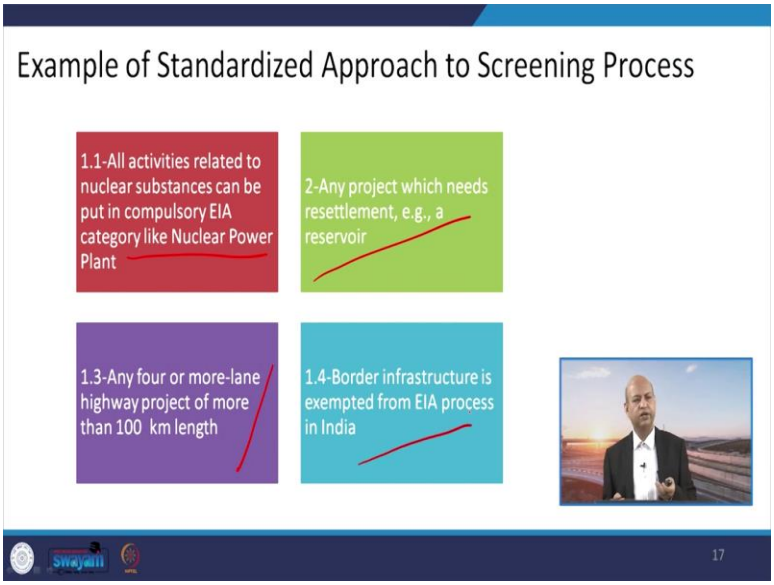

There are certain examples of these activities like for example, if nuclear activities are there, like nuclear power plants, etc. So, there will be compulsory EIA, because, we have to see how much far it can affect, if some accident happens or how will the waste generated will be handled properly. So, that would be part of the EIA. And then, there are like some projects which are requiring resettlement of the population.

For example, reservoir etcetera. So, they also need according to their size and projects activity, it requires EIA. Similarly, like four lane or more highway projects, and if they are more than hundred kilometer in length, so then they also require EIA. If they are less than that, then maybe detailed EIA is not required, other rapid EIA may be there. Then border infrastructure, which is exempted from EIA process, in our country. Because as I said, it is national safety and security issue and we have to give most importance to those issues.

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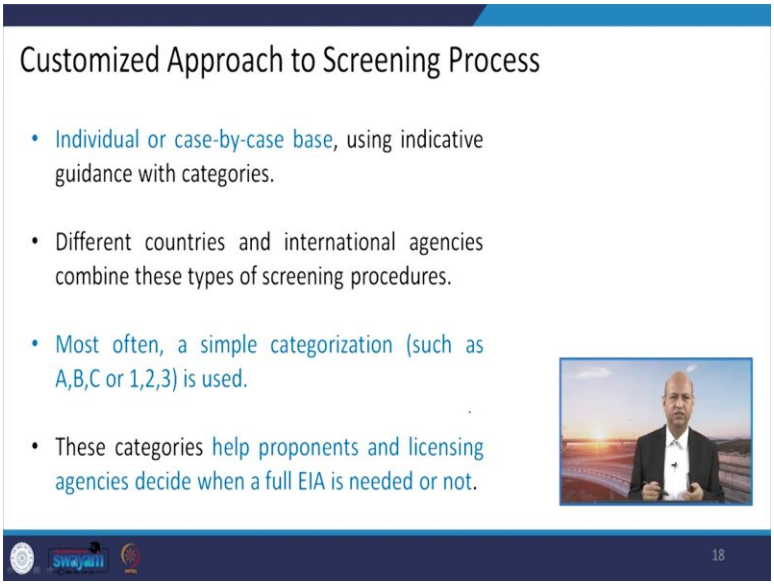

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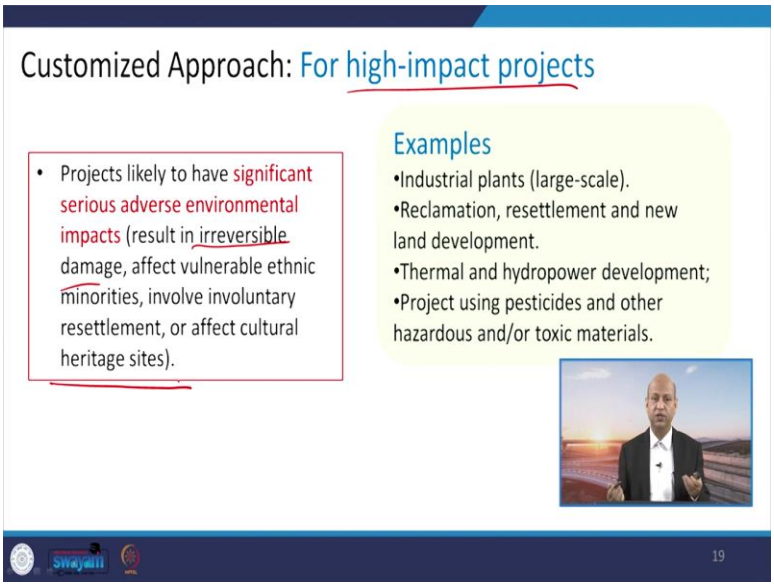

Then there may be some customized approaches for screening process like, like A, B, C, D, 1, 2, 3 we can give them categorization, for case-by-case guidance. So, that it is done step by step in a proper way. And like industrial plants are there of large scale or reclamation, resettlement, thermal hydropower projects, those high impact projects may require, certain activities to be done.

So, some irreversible damages maybe there, or some vulnerable ethnic minorities maybe there. So, if those are the issues then we can list and we can decide whether, this project has to be there

or not or some measures are to be incorporated. Some cultural or heritage sites are if in nearby areas, so how to protect them, those are the sensitive issues which need to be addressed properly.

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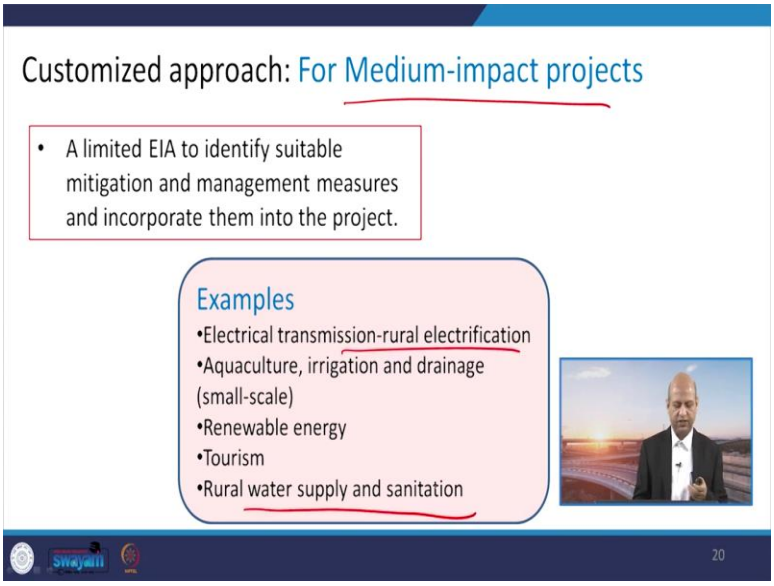

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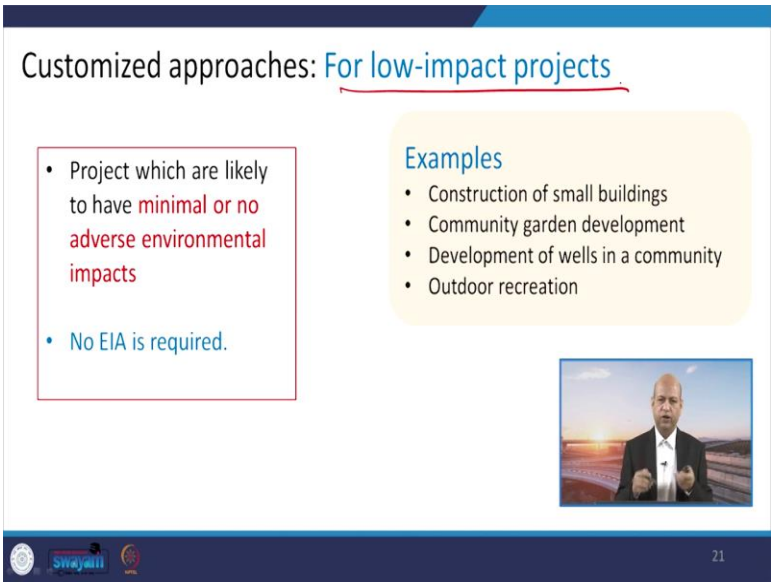

Then we if talk about medium impact projects, like transmission, rural electrification, rural water supply, sanitation, tourism, those kind of things are there. So, limited EIA can be there for those projects, maybe detailed EIA is not required. And then if there are low impact projects, for example, some small buildings construction or community garden development, so, for those activities, no EIA is required because their impact may not be so significant in reality.

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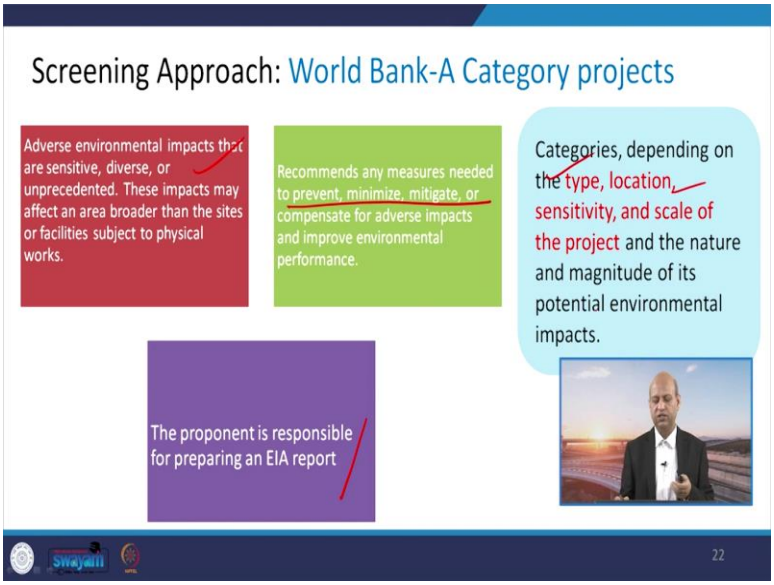

So, different agencies have given different approaches for screening. For example, World Bank has defined category wise projects, some categories are there. So, like adverse environmental impacts or sensitive or diverse or unprecedented kind of projects are there. So, those are one another list.

Then some measures or, to prevent and minimize those impacts. So, those kinds of categories are there, then proponent is responsible for preparing an EIA report. So, these have been properly defined for those categories based on, type, location, sensitivity, scale of the project. So, those are the categories based on that screening is executed.

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World Bank B category projects are there, which are less adverse. So, earlier one was, category A projects, so according to this category A means, it is sensitive and those kinds of as per type and location etcetera. Similarly, category B project is there as per World Bank definition. So, they are less adverse than those category A projects. So, these impacts are, site specific or few of them may be irreversible, but most of the impacts may not be so, severe as in category A. So, accordingly this screening is done and the EIA is executed as per the need.

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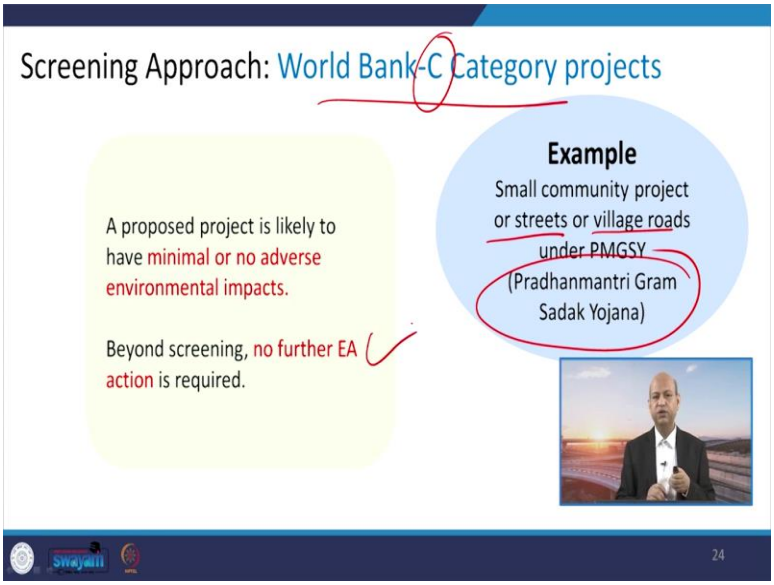

Similarly, there may be some, category C projects, which have very minimum or insignificant impact. So, like for example, in our case Pradhanmantri Gram Sadak Yojana. So, it is a small activity, though network is quite huge the so many villages are being connected, but the influence or significance is not so much in relation to the environmental component or some village roads, streets etc.

So, for those activities, no EIA is required. So, these are the C category kind of projects as per the World Bank definition. So, if you want to apply loan for let us say for strengthening Pradhanmantri Gram Sadak Yojana, so for that EIA report will not be required to get the loan from the World Bank. So, these are the category wise different projects and EIA requirement or not so, helping in screening.

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Similarly, European Union has given some criteria, this is based on like size, location, activities and their impacts. So, like power stations, they are decided as per their power, like megawatt how much megawatt is there. So, beyond certain limits it is required or less than that, EIA is not required. Similarly, landfills total volume and total capacity in tons. So, that will be the criteria to require or not require this EIA.

Length of the roads, certain kilometers as we have seen, four hundred kilometer and beyond that we need EIA. So, similarly, there are certain length definition. Pipelines of the transport of gas, again, length in kilometers. So, these are the ways the EU has given definition for a screening approach.

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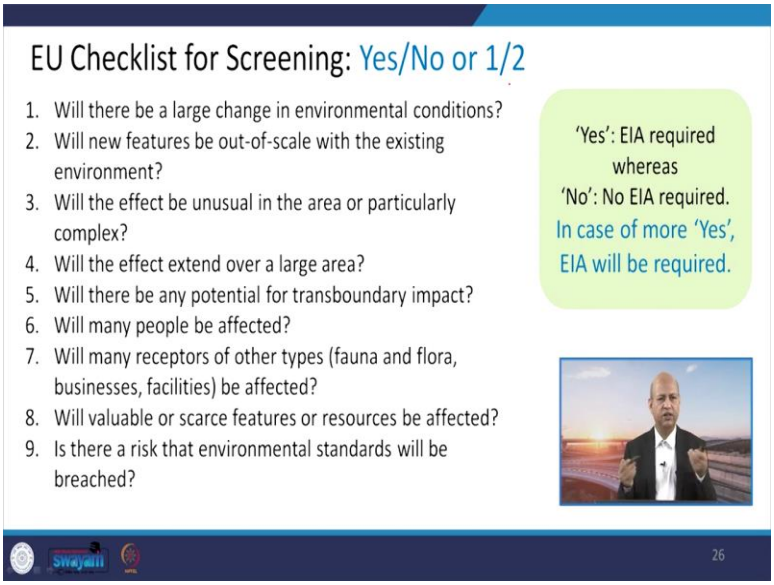

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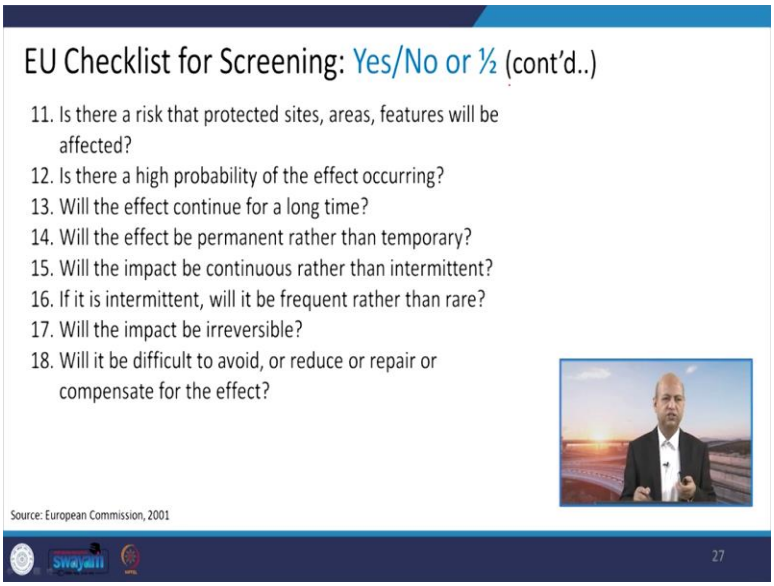

So, the EU checklist for screening, so there are certain questions and we can see whether, like will there be a large change environmental condition, yes or no? So, there are list of questions for the checklist. And you just write one or two, or yes or no. So, accordingly when we get more yes, then we need EIA, if we get less yes then we can say okay, it is insignificant we do not need EIA. So, that kind of checklist process is there for screening. So, these are the continuous, in continuation the questions which is required to be answered for knowing whether EIA is required or not required.

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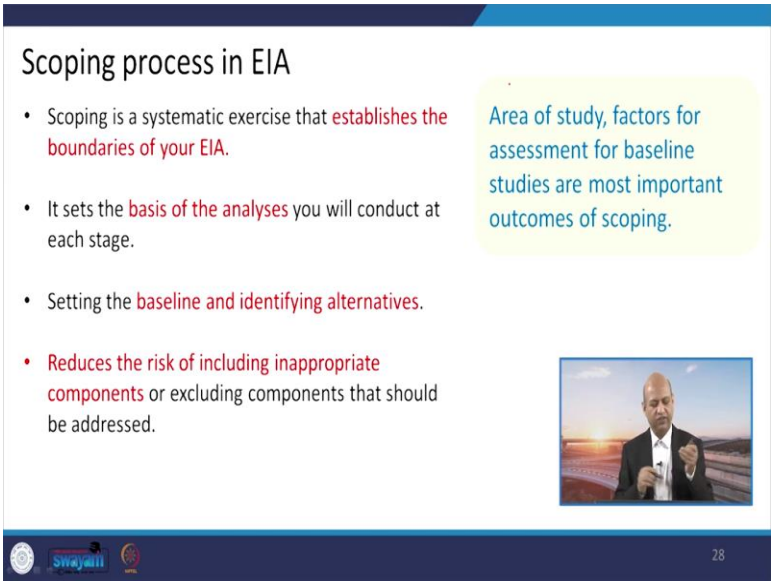

Then after screening, the scoping is there. And that is the systematic exercise to establish what will be the boundaries of the EIA. Means, that much scope is there. And then it will also give us an basis for analysis of the different stages. So, baseline criteria setting and then identifying different alternatives and reducing this inappropriate components or those not required impacts, which will be considered in this scoping.

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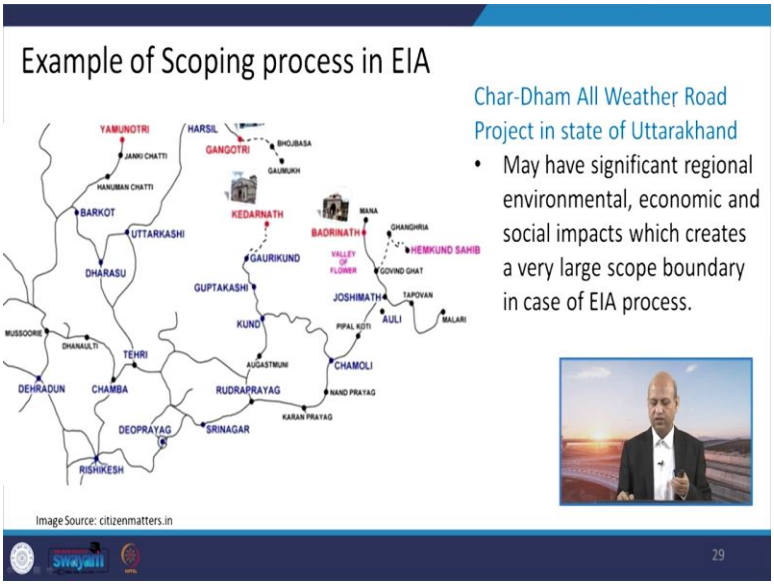

And the scoping example, like in Char-Dham All Weather Road Projects, there are many environmental or economic or social impacts, which can be there. So, the scoping is done as per their significance of the influence.

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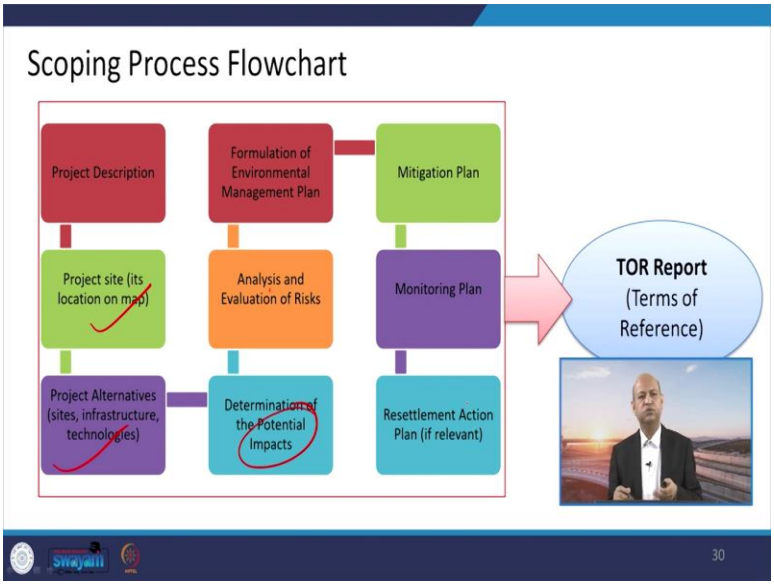

Then this is the flowchart, like project description is there, then project site, location map must be there, project alternatives. After that determination of the potential impacts, analysis of the evolution of the risks. And then mitigation plan and monitoring plan, resettlement. So, these all, information gives us to define the TOR, Terms of Reference. So, these scoping process helps us to preparation of the TOR report, Terms of the Reference report.

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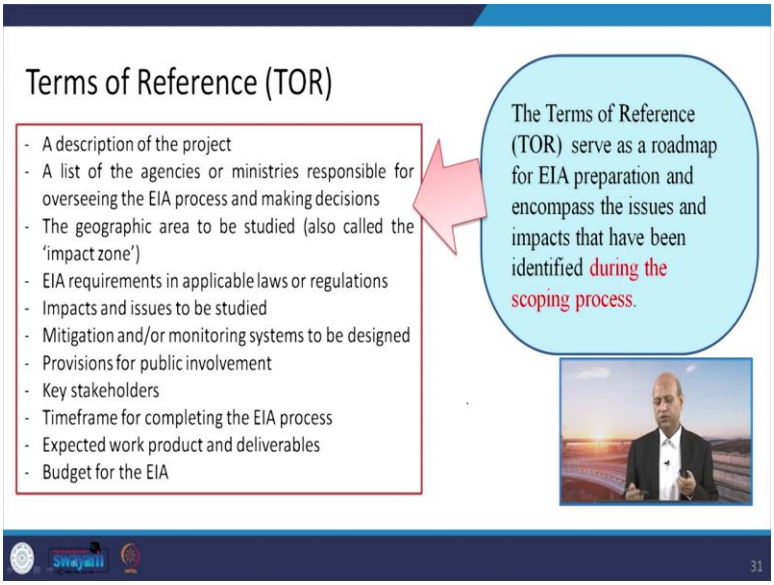

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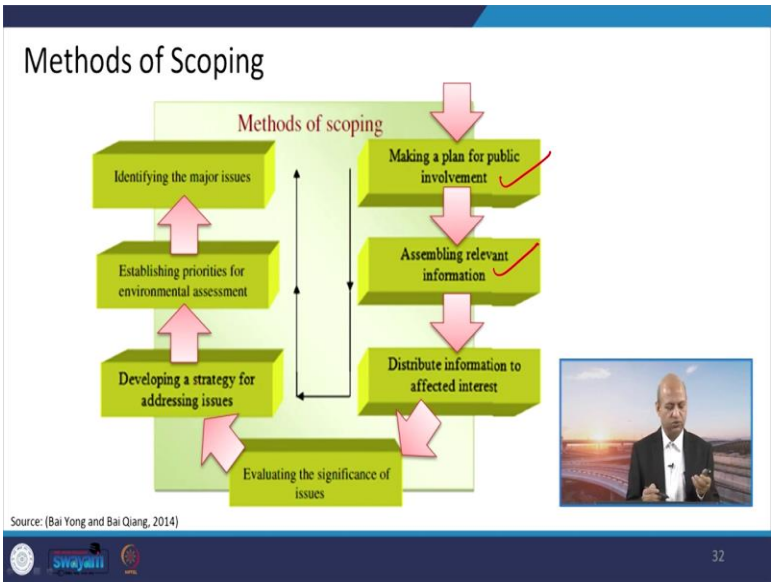

So, in this TOR report, we have in detail all the description of the project and different agencies, related agencies or laws and regulations and the key stakeholders. So, that, as per TOR, EIA is prepared and properly done. Similarly, this is again one pictorial representation of the method of scoping.

So, the making of the plan for the public involvement, then assembling the relevant information, gathering data, distribution of the information, affected parties, then evaluating the significance, developing a strategy for addressing those significant issues, establishment of priorities as per the

feedback of environmental assessment and identifying those major issues. So, these are the complete part of the scoping.

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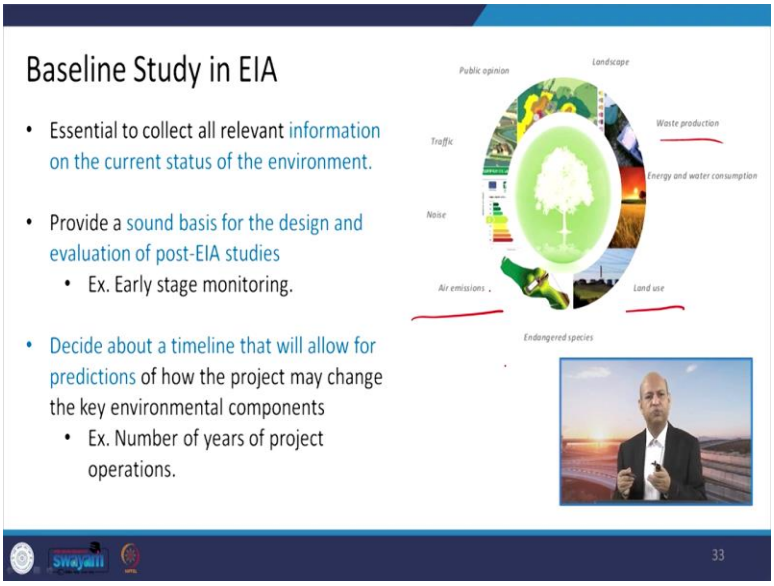

Then baseline study, baseline means, whatever is there before implementing the project, whatever, standards are there of air or water or whatever, any kind of means so, many traffic data is there, means the baseline data before executing any project, those data have to be collected, whether in terms of land escape, waste production or land use or, air emissions, all those things, we have to gather the information.

And we can say, this is the baseline data before implementing the project. So, that after implementing the project, those baseline data will be affected in positive or negative way. For example, so many people are unemployed at a particular location, after implementing that project, there may be employment generation. So, that will be the positive impact. But in terms of other environmental components, there may be some negative impacts. So, all those things have to be listed.

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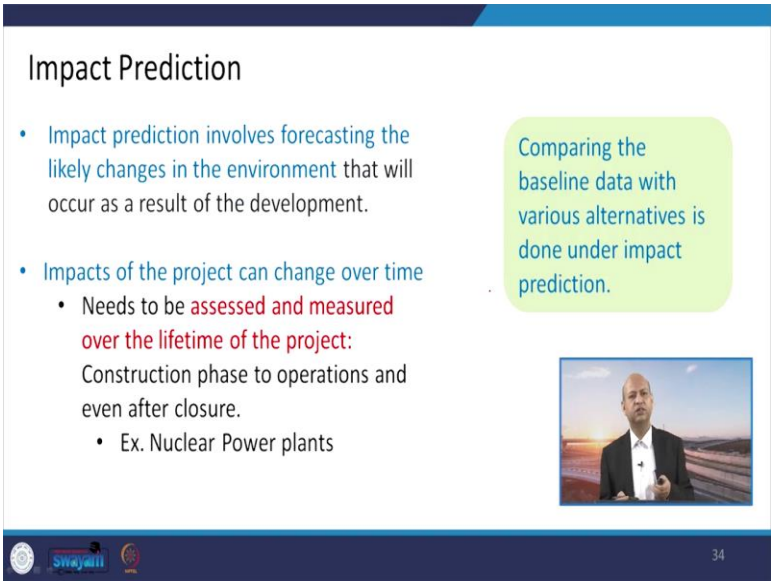

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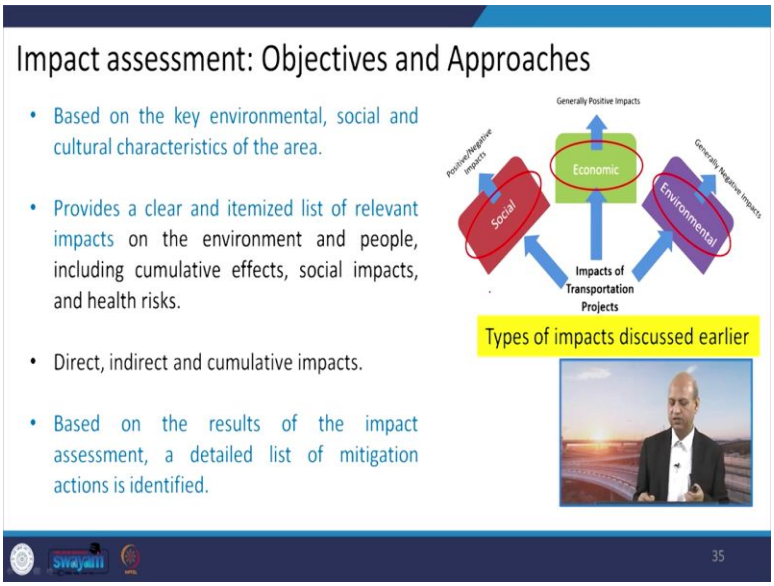

And the impact prediction is to be done based on some scenario generation, some modeling activity, and as per the data which we have already access to. Similarly, the objectives or approaches of the impact assessment, as we have seen already the social economic and environmental or direct or indirect or cumulative impacts, all those impacts should be discussed in the EIA, detailed EIA.

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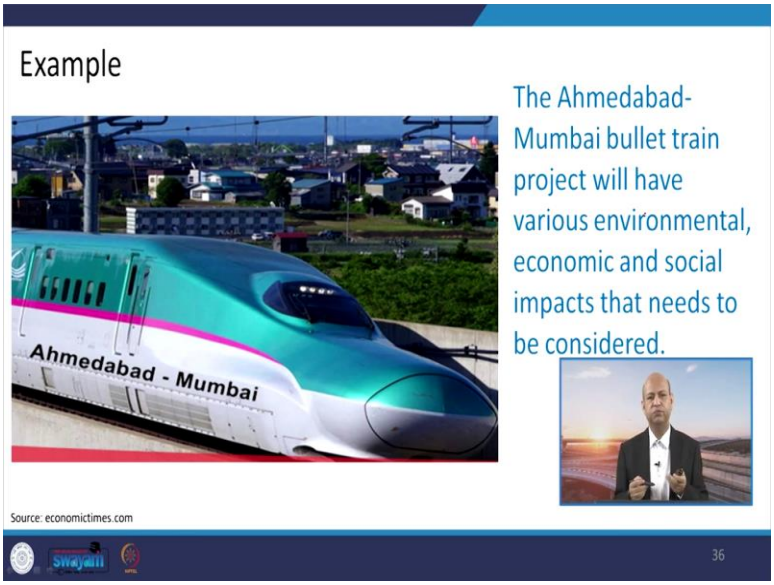

One example like, this bullet train, it will have several impacts and economic and socio-economic impacts means, it will be positive impact, people will have a one way to commute very fast to Mumbai, Ahmedabad to Mumbai. But there may be some negative impacts, when it is passing through in certain locations. So, some environmental components may be influenced. So, we have to see those particular impacts.

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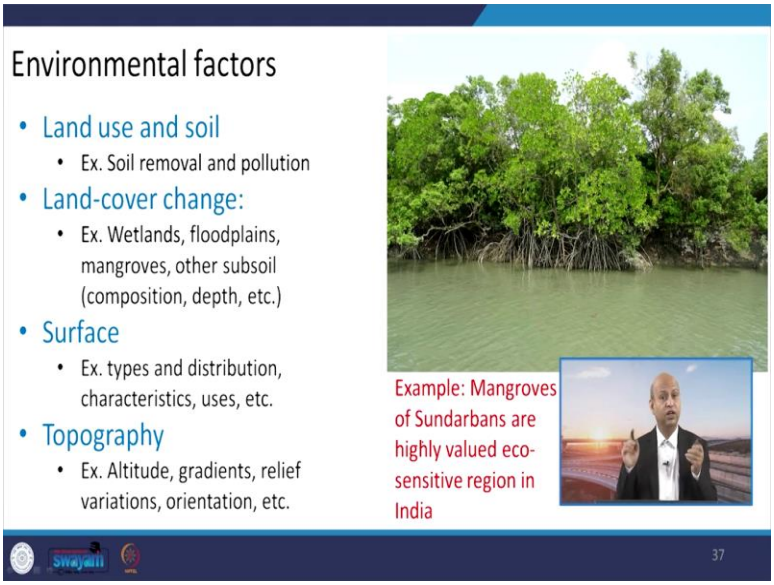

Similarly, like environmental factors may be of different nature, let us say some project is coming in those Sundarbans area. So, these mangroves of Sundarbans are very highly valued and

highly eco sensitive zone is there. So, we have to protect them. So, accordingly, those environmental factors have to be incorporated. Because, if something goes and it is disturbed, then the whole ecosystem can be disturbed. So, we cannot allow those kinds of projects, which can disturb it significantly.

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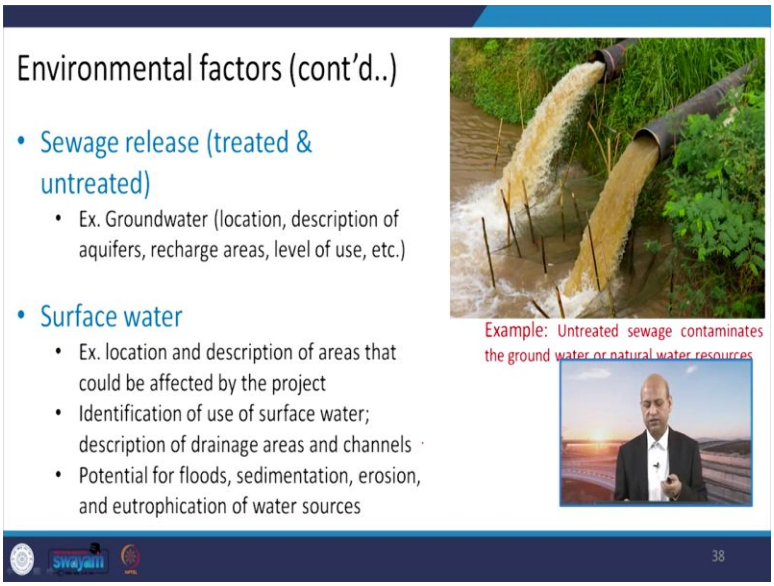

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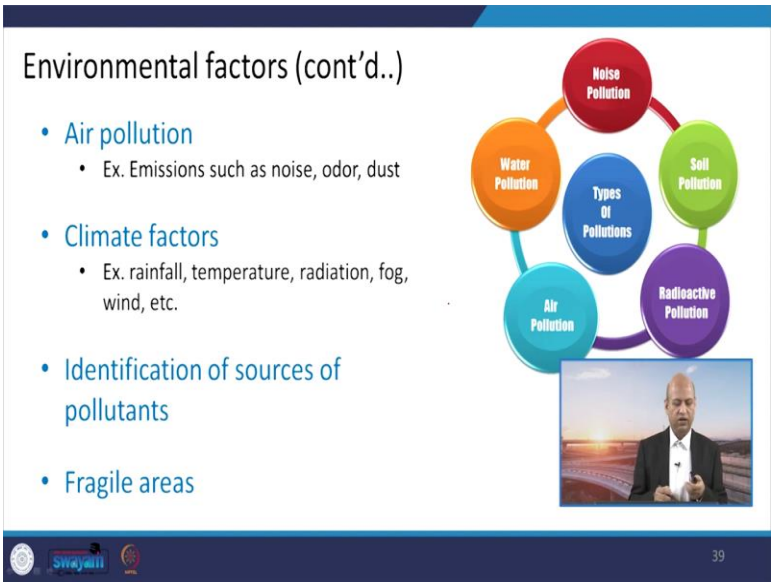

Similarly, other factors, maybe there like some sewage generation because of some township, construction activities may be there. And they may influence the groundwater or water bodies.

So, we have to see those factors also. In addition, like air pollution or rainfall temperature, all these baseline data, we have to collect and report in the EIA report.

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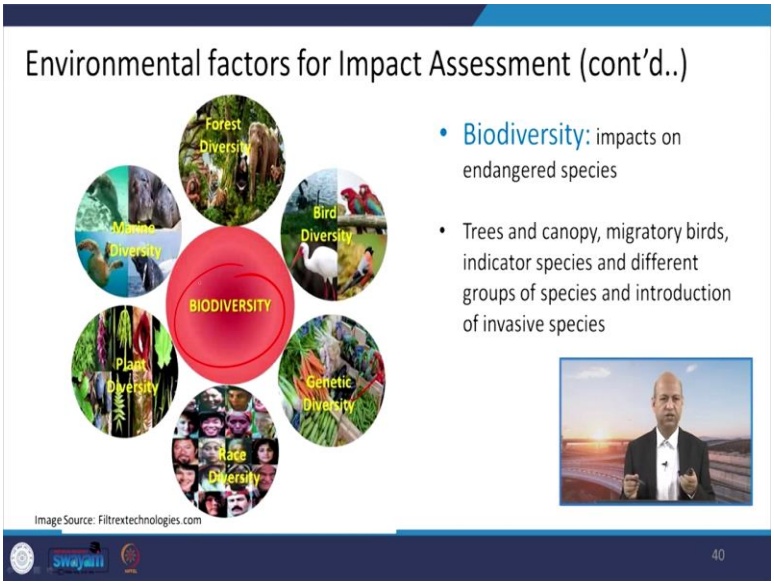

So, different environmental factors, in it is given like biodiversity, bird diversity, forest diversity or marine and plant, all those race, ethnic groups genetic diversity, all these are part of the biodiversity. So, we have to be careful that none of them gets affected very negatively, whether it is forest, flora, fauna or social groups.

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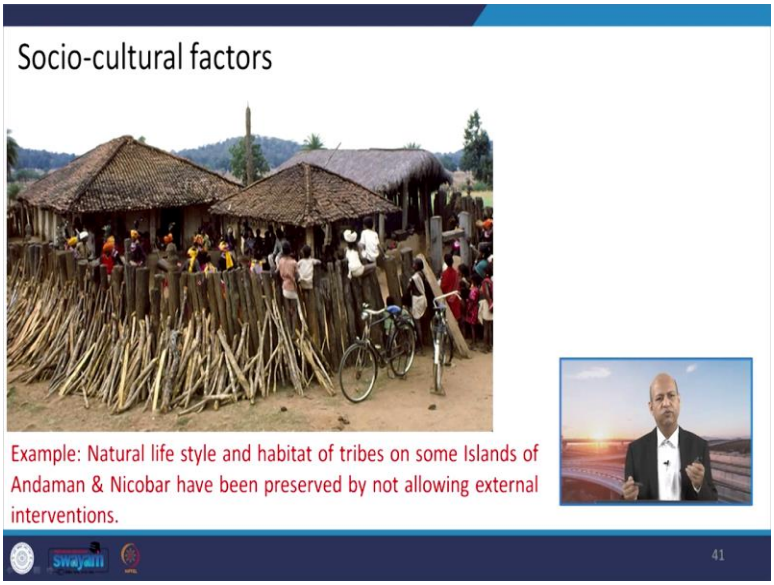

So, for example, this you can see the socio-cultural factors as these tribes of some Andaman Nicobar areas, they are, not disturbed, they are protected, they are preserved. Because of these infrastructure activities, they are local cultures or very old habitat and other specific issues may be affected negatively. So, that is why they are kept preserved, properly and no one is allowed without proper guidelines following.

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Then socio economic factors maybe there like, one example is Sardar Sarovar dam, and that, had this resettlement issues. So, there were many, agitations also. So, those kinds of socio-economic factors may also be there in the complete EIA report.

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Then there may be issues related to historic and heritage factors. This one example, like Hazrat Ganj area in Lucknow. So, that special heritage locality is there, so civil society wants to preserve it. So, no project will be allowed there which can really, damage its particular heritage value.

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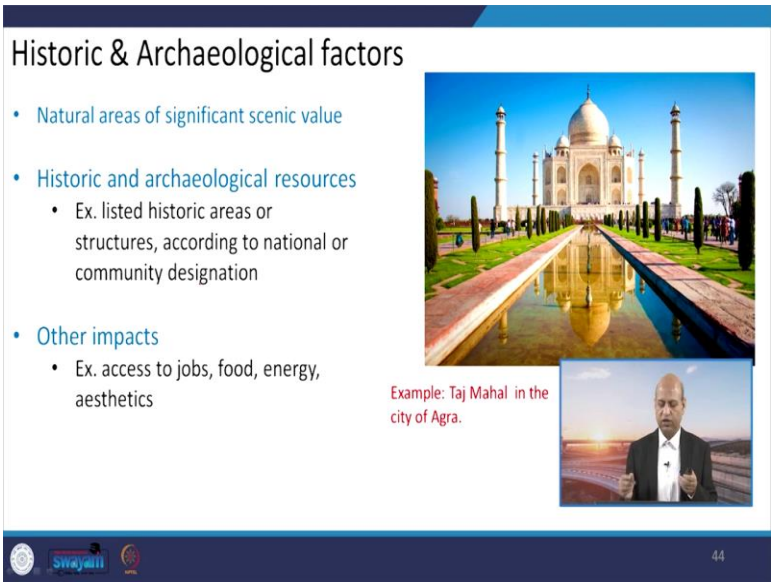

Similarly, like Taj Mahal in Agra, so that is another historic and archaeological factor as you can see. So, again, no activity will be allowed in vicinity of that particular zone, which can influence it in a negative manner.

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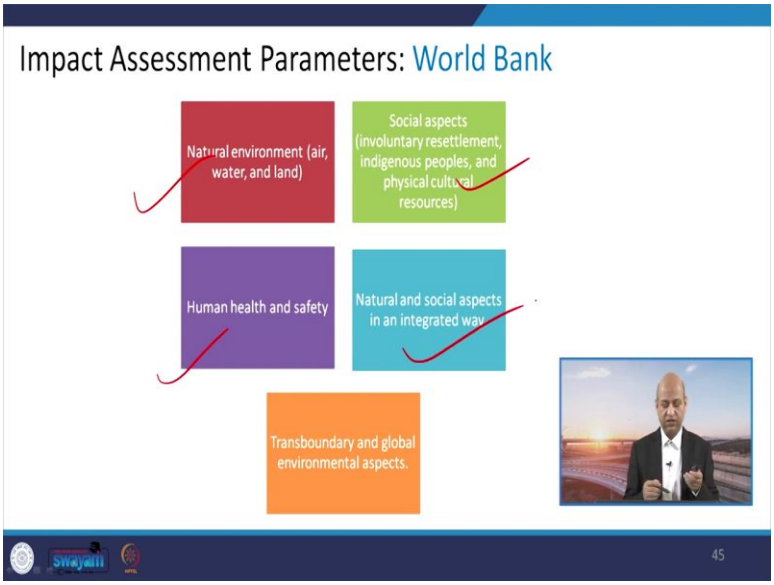

So, there are, different impact parameters from the World Bank like natural, social, human health and natural and social aspects of integrated way. And then transboundary and global environmental aspects. That means, local to regional to global, all those things we have to see in totality or in integrated manner.

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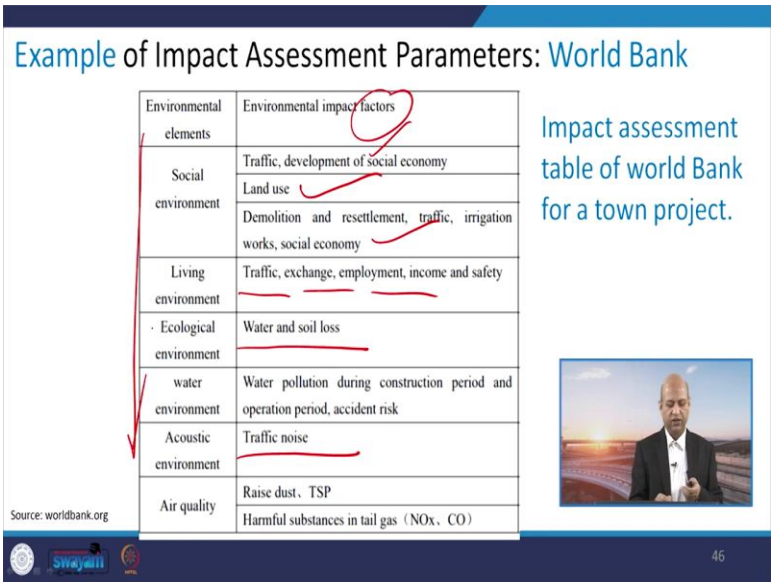

Environmental elements	Environmental impact factors
Social environment	Traffic, development of social economy
	Land use
	Demolition and resettlement, traffic, irrigation works, social economy
Living environment	Traffic, exchange, employment, income and safety
Ecological environment	Water and soil loss
water environment	Water pollution during construction period and operation period, accident risk
Acoustic environment	Traffic noise
Air quality	Raise dust、TSP
	Harmful substances in tail gas（NOx、CO）

So, these are the list like social environment that includes land use, traffic or demolition of some particular buildings. Then living environment again, traffic exchange employment, all these environmental impact factors are influencing or related. Ecological environment, water and soil

loss, those kinds of things can happen. Acoustic environment, because of traffic noise. So, we have to see those factors, which influence these elements of the environment, whether it is socio economic or air quality or water quality, all those things we have to see.

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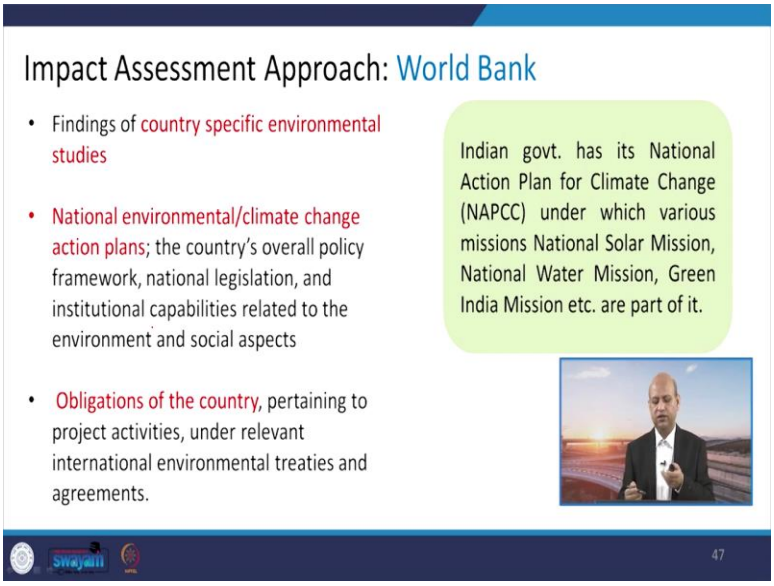

Well, when we see, these impact assessment approaches, so there may be some country specific environmental studies, which gives us some idea or insight. And then, there are some frameworks of national legislation and, those environmental and social aspects which have to be incorporated. So, these are the, part of that particular approach.

And for example, in Indian government, national action plan for climate change is there. And according to that plan, there are several missions, like National Solar Mission, National Water Mission, Green India Mission, all these acts, missions are under these particular action plan. So, as per, these international guidelines, we are meeting all those requirements.

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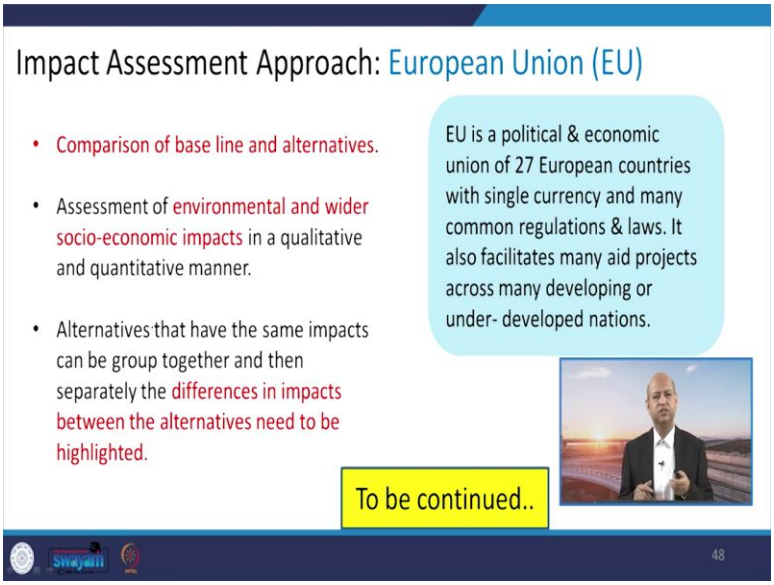

Similarly, there are some approaches from EU also, and they have given some particular baseline and alternatives criteria socio economic. So, the World Bank or EU, those bigger organization, they generally recommend such approaches which people follow as a good guidelines.

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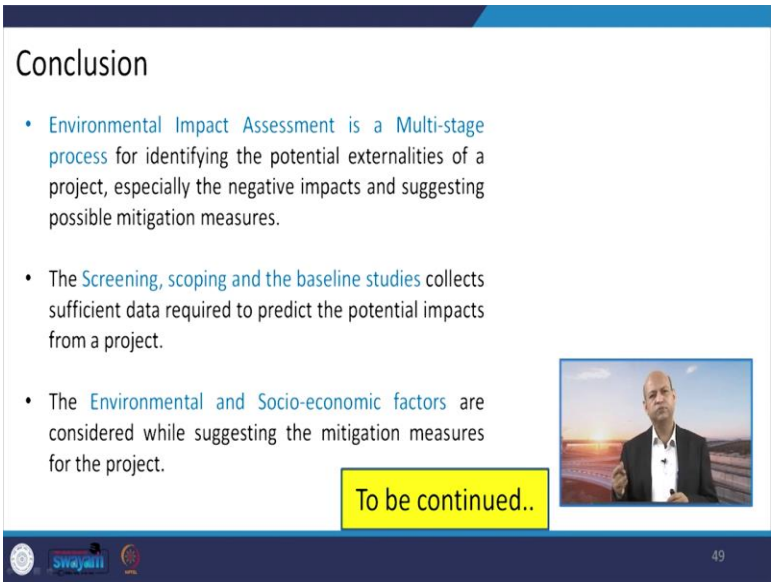

So, at last, this is the conclusion of this lecture that we have considered screening, scoping and baseline studies related information in this particular part of EIA processes. So, you have gone through all these, guidelines as per World Bank or other agencies which, propagates certain systematic way of looking at things through screening and scoping.

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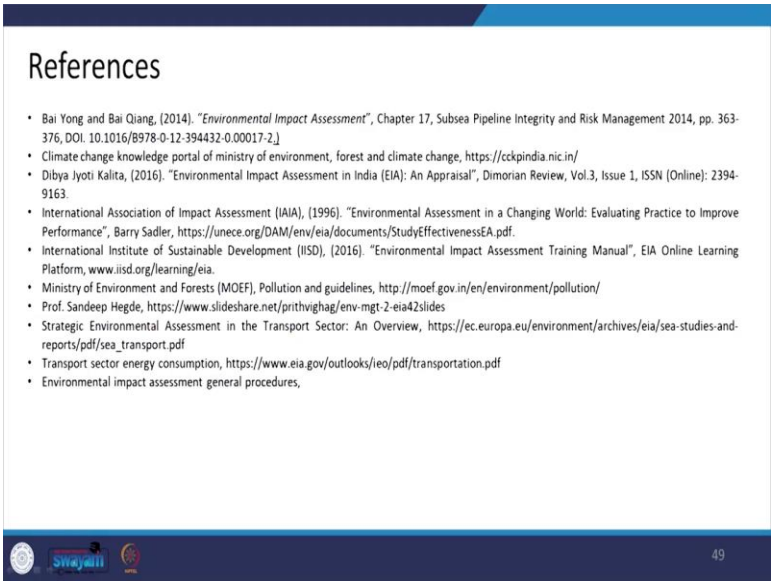

And then some socio-economic factors all those have to be integrated in this first phase. And the next phase will be taken in the next lecture. So, that is all for today and this is the reference list, and which we can access for additional information. And thank you for your kind attention. So, next part we will see in the next lecture. We will continue about EIA concerns or EIA related processes. Thank you again.