**Sustainable Transportation Systems**
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**Lecture – 11**
**Introduction to Environment Impact Assessment (EIA)**

Hello friends, you may recall we have seen several kind of impacts of the transportation system like on the environment, human health, flora, fauna, noise impacts, all those kind of adverse impacts on the surrounding where we are living. And to learn them in a measurable or quantifying manner, we need to assess the impact. Otherwise, how can we address those impacts?

So, that is why this environmental impact assessment has to be there in process as well as in procedure. And we have to learn about the techniques or tools of the environmental impact assessment. So, this is introductory lecture today on environmental impact assessment or EIA, how did it evolve?

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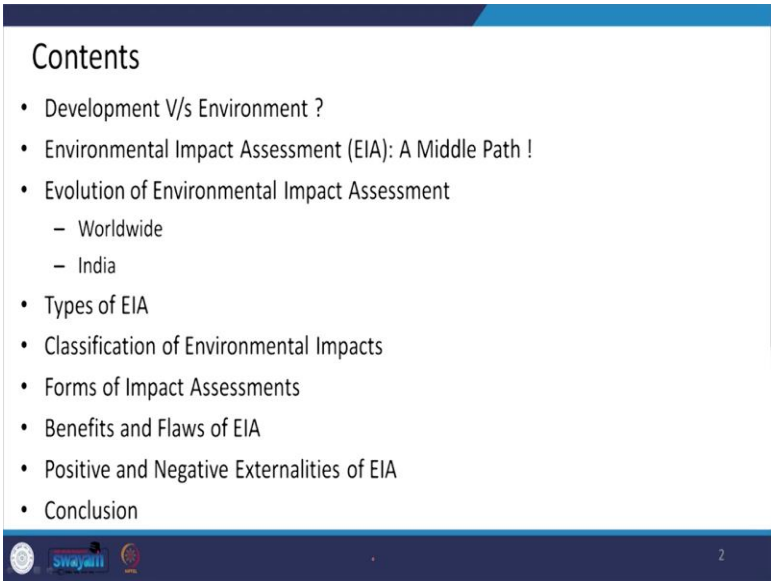


These are the contents like when development is there, then there is sometimes conflict between the environment and the development activities. So, how do we look at those activities? And whether they influence in positive or negative manner to the environment plus, whether we can strike the middle path. That means, can we make a balance, so that we have the development, but we do not have detrimental effects on the environment.

Also, we will see like, over the years, how did it transform from simple decision-making tool to overall impact assessment, multi-dimensional impact assessment worldwide as well as in the context of India. We will also see what are different kinds or types of the EIA. And classifications of impacts on the environment, then, what are different forms of the impact assessments. And if there are certain benefits or limitations or flaws to, of the EIA and then some positive and negative externalities associated with EIA, and we will conclude after that.

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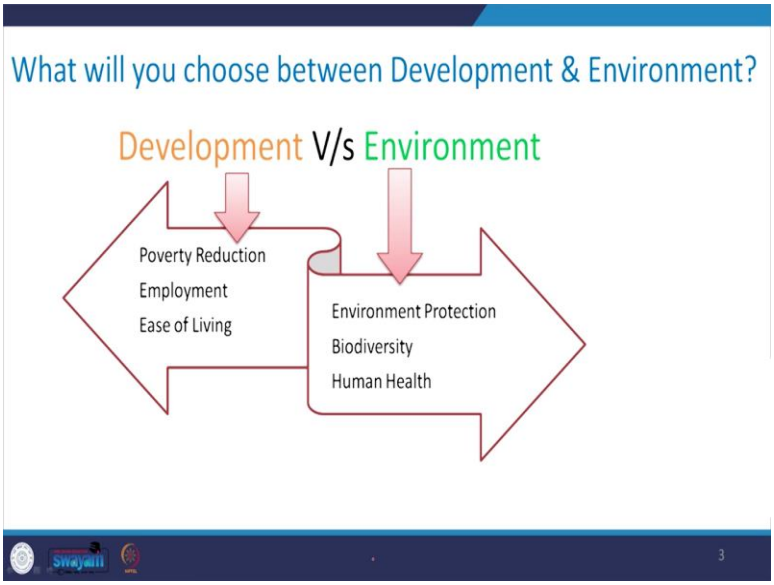


So, look at this means development versus employment. This debate has been there since long, because the current model of the development and development means, like people should not have those conditions where they cannot enjoy their life in a proper manner, poverty should not be there, because poverty has so many ill effects. Because the poor people cannot access the medical facilities or educational facilities or the overall, employability of the complete socio-economic sector and then ease of the living is also part of the development.

So, basically, when we talk about development, we want to address these issues, so that the society becomes more inclusive, becomes more wealthy and healthy and educated, law abiding all those things are the part of development. And infrastructure is basic bone of the development. But when we do these development related activities, like making some infrastructure, for example, constructing a road or railway track or airports or having, factories and industries to meet materialistic demands of the society, then we are dealing with some source of energy.

And the predominant source of the energy at present is the fossil fuel, like coal, diesel and gasoline etc. in transport sector you have already seen. So, the environmental impact is there, because of emissions, because of those activities. So, we have to have the protection of the environment when we are talking about the dimension of the environment, viz-a-viz development, and then there are biodiversity issues. Because, when we are having urbanization, and we are needing more and more land for agriculture or for industries and other activities.

So, the biodiversity in the ecosystem is being disturbed and, naturally as well as because of anthropogenic activities or manmade activities, biodiversity has been threatened in a great way. There are data and there are evidences of that. And also, the human health, because the impact of emissions, impact of the effluents, industrial effluents, they directly or indirectly affect our health. So, all those issues are related to the environment.

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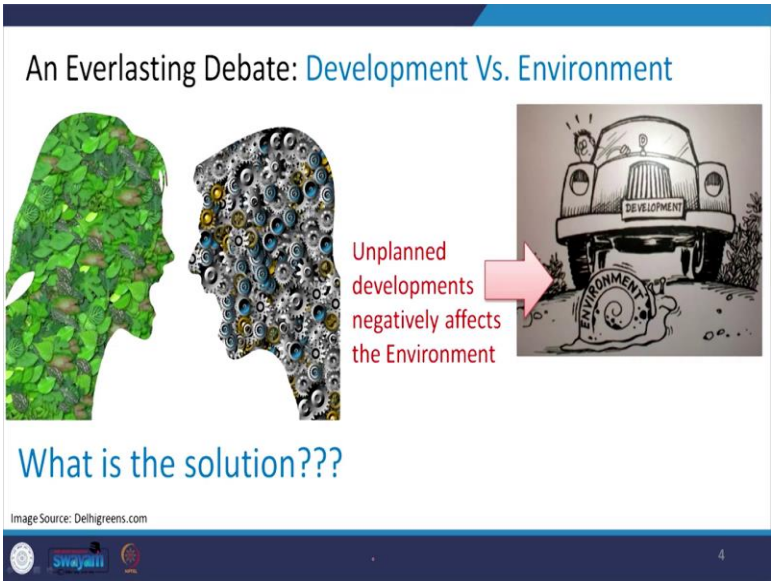


So, as I said, this is an everlasting debate, what do we want development or the environment? And can we do something that we can also have the development without harming the environment in a big way? So, what is the solution? That, that is the thing which we will learn in this EIA related lectures from today onwards. Well, you see one example so that you can visualize the impact on the environment, how these development related activities give to our surrounding.

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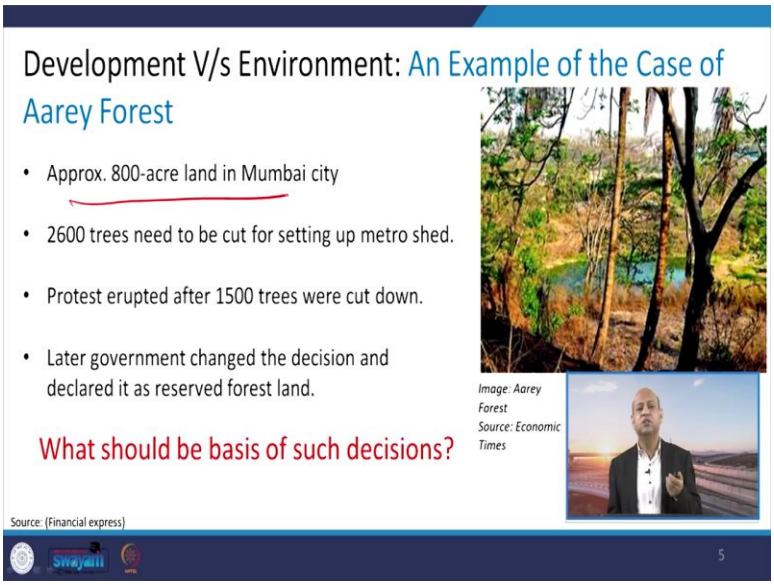


For example, in the Mumbai this Aarey forest is there, and around 800-acre land in Mumbai city is covered by this Aarey forest and 2600 trees were required to cut for setting up a metro shed. And for that activity around 1500 trees, it is said, it is reported that those workers then some environmental awareness groups or activists and the common public they got together and they started to protest about this particular ecosystem to protect it from this development activity.

And then, this decision was taken back and some other things are into now consideration. So, means, this kind of decision what is the basis of their decision, whether metro shed is not required? What about the transportation related needs? Does not public has this right that they should have better mobility? All those issues, means to but at the same time like ecosystem related services we get, because when ecosystem is healthy.

If we disturb the ecosystem, then all the services related to it, whether through vegetation or through, ponds and the birds or animals and, they as we studied in the flora fauna, the impact becomes very large and the implications becomes very severe later on, which we cannot visualize sometimes at greater length, we are sometimes very short sighted.

So, the debate is always there. The public needs mobility, public needs comfortable transportation system and public also needs these kinds of ecosystems. So, how to do? Means, what is the basis of making these kinds of conflicting decisions.

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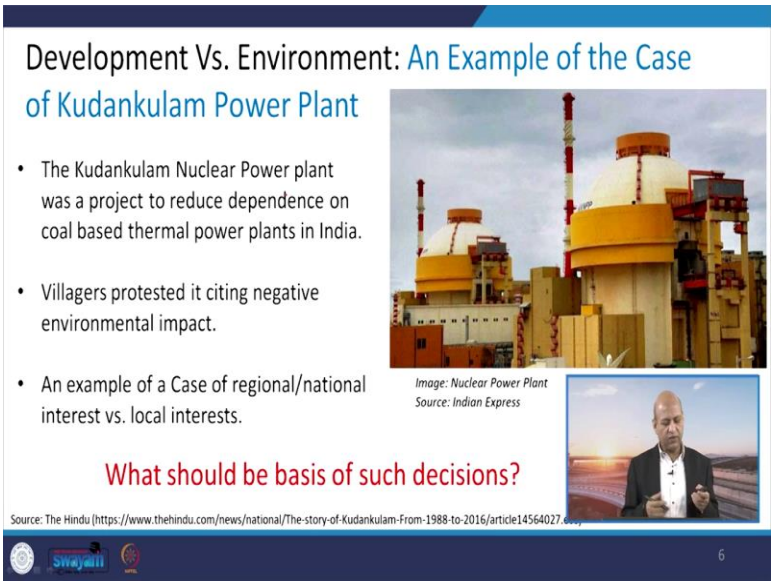


Again, one more thing you will learn about to appreciate these environmental issues and the development related requirements is this Kudankulam power plant. So, the nuclear power plant was to be established there and you might be knowing that nuclear power plants are known for, a kind of non-polluting energy source, only the hazardous material. The nuclear waste, which is in a very less quantity, that is the issue, how to handle it?

If we can handle it properly, then this does not emit like, those kinds of coal based thermal power plants, they emit lot of greenhouse gases and pollutants, which is not part of these nuclear power plants. But then there are perception, because if accidents happen, the nuclear power plants can really have very, very negative impacts, as we have seen in, in terms of Chernobyl or in Japan also, like during the tsunami when this nuclear power plant was hit, so a lot of, aquatic life and there was the threat.

Because, contamination of the radioactivity related elements were there in the surrounding area. So, those kinds of things are there. So, there is a concept like, not in my backyard kind of thing, people need energy but they do not want to have such facilities which can threaten their livelihood or threaten their life. So, the villagers protest it and citing the environmental, negative environmental impacts of the nuclear power plant.

And then, so, this is again, the conflicting issues like what are the national interests, regional interests and what are the local interests? Can we, marry those interest and can we have a balance

into them? So, what are the basis or, yardsticks to judge them, what is the right thing? So, these are the, issues which we have to see.

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So, on the basis of this, if we, talk about the philosophy of Madhyam Pratipada of Buddhist philosophy 'the middle path', means, there is a saying that we should not go to extremities of any kind, whether left or right. And as, whenever we need to make a decision, we also need some sort of yardstick or some sort of, philosophical basis.

For example, you might have read that, once Mahatma Gandhi said that whenever you are in a conflict, you should think that my decision will, how it will impact or influence the person who is, completely in a weaker position, means, whether in poverty or not educated and do not have access to any good things. So, think about that most poor person, whom you have come across in the life and see whether your decision can really change his or her life in a positive way. So, these kinds of, philosophical viewpoints are needed for making decisions.

So, in that way, this middle path propagated by Buddhist philosophy is a good thing to make the balance when we think about the environment, and the development. So, the enlightenment by avoiding the extremes of self-gratification on one hand, and self-mortification, on the other. You might have heard the story how did he, come to this conclusion, because earlier, he gave much trouble and pain to the body to get the enlightenment, but he did not get.

And ultimately, he realized that it is not required to give the punishment or pain to our bodies or worldly life. And we can make a balance to have a good life or purposeful life, healthy life. So, the concept of middle path may perhaps give us an answer that, the development goals and environmental goals, can we really make a some sort of balance? Means, we do not stretch development in up to such extent that it harms the environment in irreparable way.

And we do not give environment that must sanctity that we do not have any kind of activities which are needed for our, healthy living, our medical facilities or industrial products and etc. So, there are many schools of thoughts to achieve that, some people say that we should have, nature centric development, means this particular development strategy or the trajectory which we are following at present is, does not have that holistic viewpoint. We discard the natural ecosystem's needs.

And as if we are meant to empower the nature, which is not the right thing. Because that is the conflict between some philosophies as eastern philosophies, they always give importance to the living in balance with the nature. So, those kinds of philosophies are emerging nowadays, again, that we should do such kind of development activities, which do not harm the environment up to such extent that, we get a lot of, very ill implications later on.

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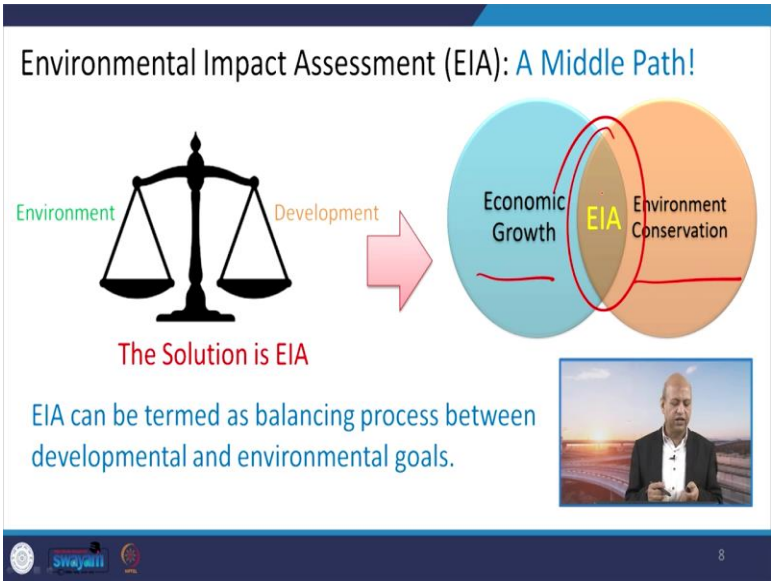


So, this is the solution that economic growth and environment conservation should go in parallel and this kind of, that common area, which we can identify that how to do the development without giving negative impacts on the environment. Well, sometimes we also talk about a decision-making tool.

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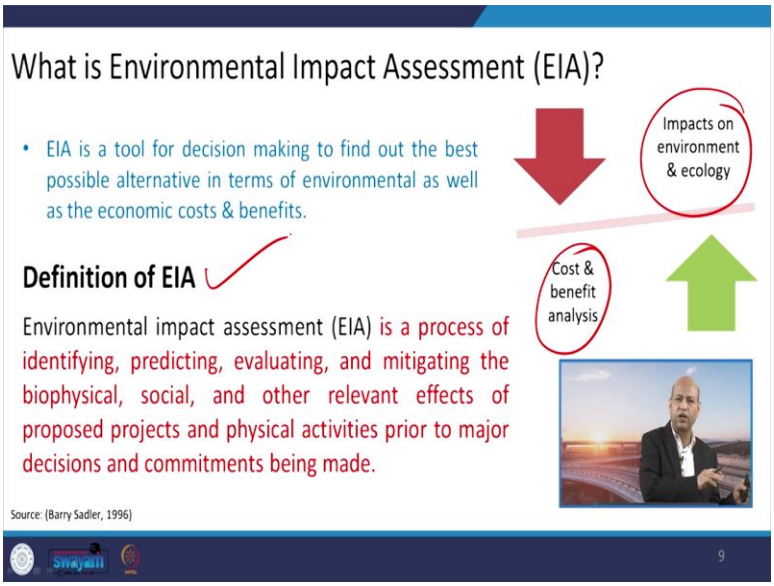


So, cost benefit analysis we do, and then impacts on the environment and ecology we look at and, we make the balance, means, the benefits, we get in terms of socio-economic benefits and the environmental impacts, can we do something to lessen those environmental impact as earlier,

you may recall that I described that Kuznets curve, which argues that whenever such developments occur, then the pollution is the by-product of that.

And it at a later stage, when we have a lot of money, we can invest them to clean the environment, that is inverted U curve. But some people argue that it is not necessary to follow the same curve, we can initially plan the development trajectory in such a way, that we do not come to that point where environment degradation happens. So, the definition of EIA, the classical definition of EIA is like it is a process for identifying or, thinking and predicting.

And then evaluating, analyzing, and mitigating the biophysical means all bio chemical or physical aspects and social aspects and then relevant effects, proposed, related to the proposed projects and physical activities prior to major decisions making and commitments we make to achieve that project. That means, whenever we are planning a project, we should think about all those related dimensions whether they are physical, bio chemical, biophysical, and then socio economic or cultural, ecological, all those dimensions we should look at.

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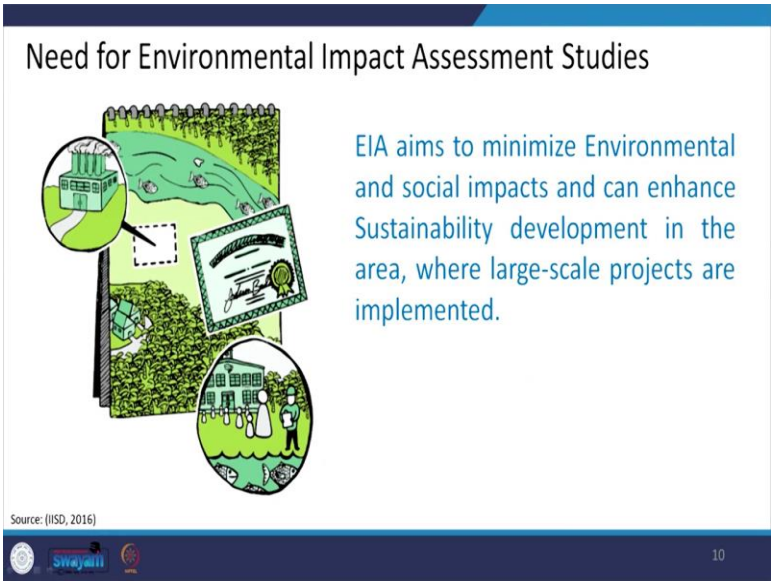


Well, you see this one pictorial representation that in nutshell, what we aim? Through EIA we aim to minimize the environmental and social impacts. And it can enhance the sustainability, for the development of that particular area or large-scale projects. So, minimizing the negative impacts on the environment or socio-economic impacts, whether maximizing the benefits.

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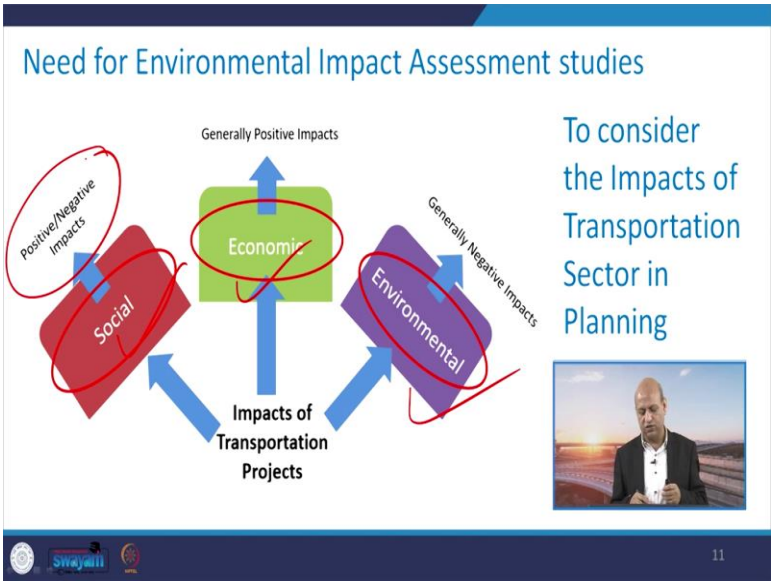


I mean to say, that even development can be such that the environmental conservation happens as well as environmental or ecological all aspects, get enhanced over the years rather than damaging it. Like for example, let me give you one instance like in Rajasthan, people used to face a lot of drought related problems. But, when this development of Rajasthan canal or Indira Gandhi canal happened, then it gave opportunity for the farmers to have good agricultural produce and to enhance their livelihood in quality as well as in terms of monetary gains.

But there are certain negative impacts also, like at some places, these lands were damaged by lot of water logging etc. So, all those things, issues are there, but overall, those particular areas where people used to face problems related to water that was solved in a great way. So, those kinds of things we can have, but we have to be very thoughtful about the total impact. Well, the need for EIA studies is to see all those dimensions.

We earlier also discussed if you recall, like social, economic or environmental. So, all these impacts particularly from the point of view of the transportation projects, we have to look. And we have to make like positive or negative impacts in social economic dimensions, because wherever some road will go, some benefits will be there. Because, people will have an opportunity to go to the cities to take their produce to sell there.

So, those are positive benefits, but there are also negative impacts, because sometimes accidents may happen because of that traffic and all other issues. So, those negative impacts may also be

there. So, we have to minimize the negative impacts, we have to maximize the positive impacts. Economic impacts means, generally positive because of developmental projects, some job opportunities occur many things, good things occur.

Socially means, sometimes migration occurs. So, conflict is there between different social groups, that is also one negative aspect. But again, the balance is to be needed. Environmental impacts generally negative, only in very few instances positive environmental impacts occur, but generally it is negative. Because, whatever ecosystem which has been there for, centuries, that will be disturbed by developmental activities.

So, in that context, that impact will be negative. So, we have to minimize that negative impact. Now, the purpose, what is the purpose basically? So, the EIA can help us to, it can facilitate in decision making. Also, it can, aid in in terms of like formulation of development actions. Because, EIA will give you a new knowledge about that particular area.

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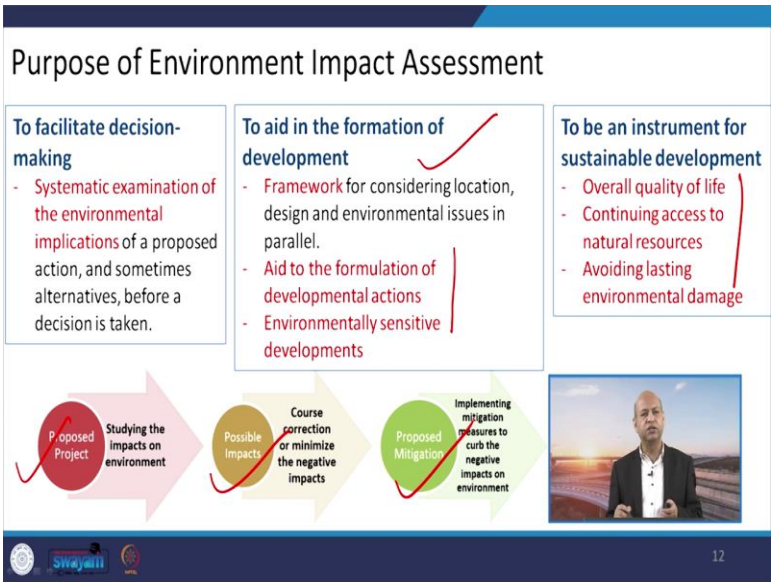


What do we need to do, so that environment get protected in a certain way? So, the new knowledge will be there because of those studies. So, it will help in developing this framework in the designing of the project in some mitigation measures. So, ultimately, what we want to do that overall quality of life and in sustainable manner, means, development occurs in a sustainable manner. So, from the proposed project, possible impacts and proposed mitigation, all these things come into picture when we do the EIA.

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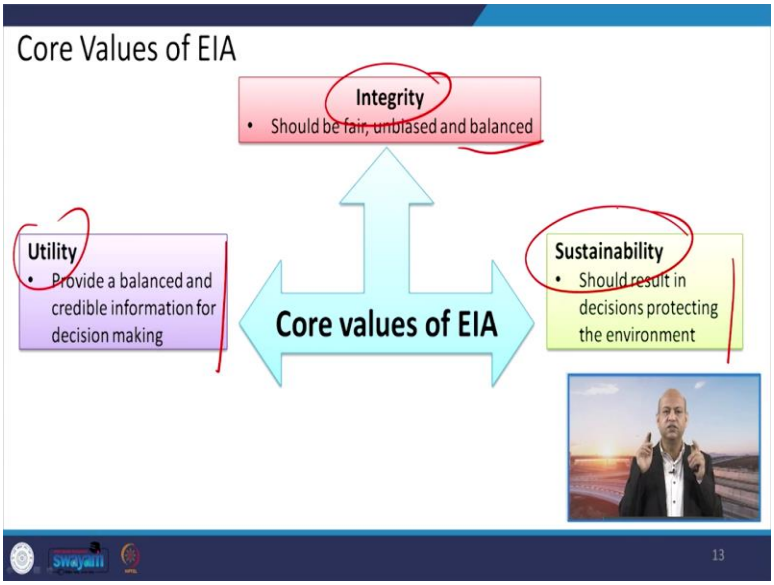


So, the EIA's purpose is threefold means, you predict the purpose then you carry out, you get the data, you offer some mitigation strategies. Then if we want to, see in an overall picture, then there are three big dimensions of the core values of EIA. Integrity is very important, if somebody is, doing EIA in a very shabby way and they are just, preparing reports without giving due diligence, then the report will not help to make good decisions.

That is why, it should be very fair, it should not, be in certain biased means, we should have a very objective way of looking at the things and it should be balanced. Utility, because, it will give a lot of information. So, in decision making, it will help a lot, so, that is the big utility. And sustainability aspect, because the findings of the EIA will help us to design that project in a sustainable manner. So, the utility integrity and sustainability these are the three core values of EIA, we should follow always.

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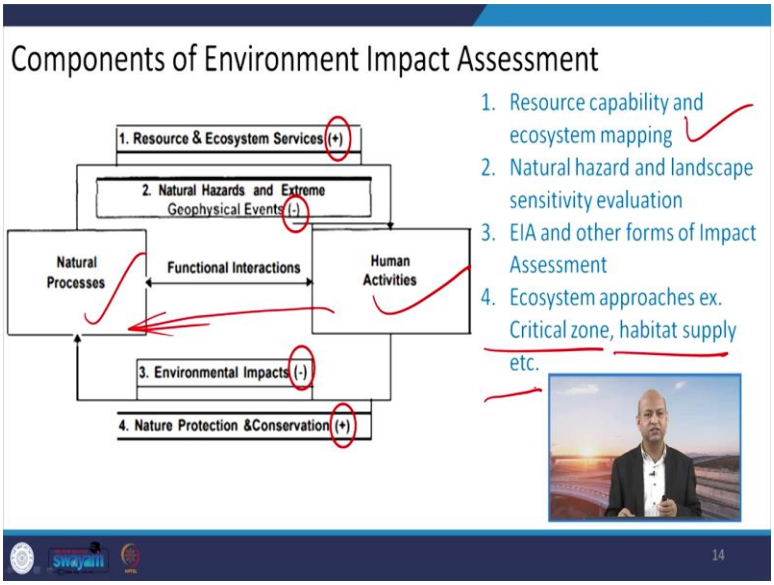


Well, the components of EIA means, natural hazards or extremes or resources ecosystems or environmental impact. So, natural process will be there, human activities will be there and both these things interact, that is why EIA is needed. And the resources capability or ecosystem mapping, they will give us an idea about, the wealth of the nature which is affected by that project and up to what extent it is being affected, all those things we have to see. So, the critical zone or habitat supply, etc. all these things will be the components of the complete EIA.

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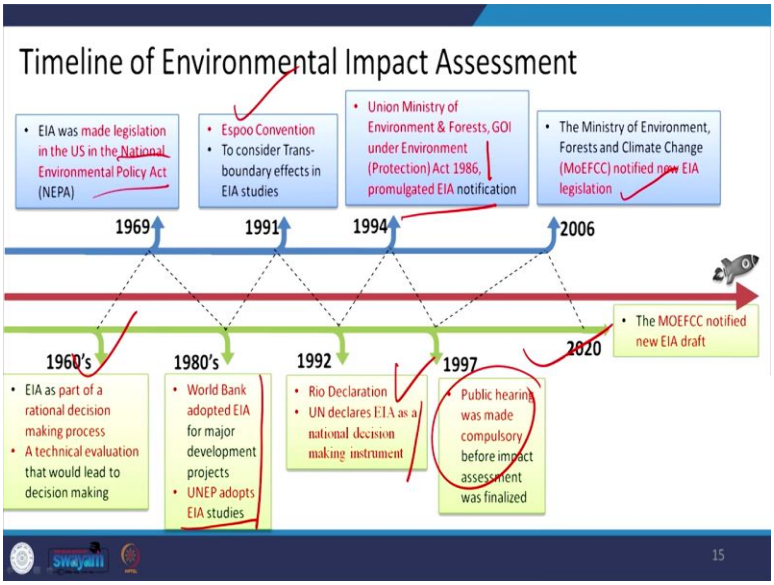

If you want to see that how this EIA got evolved over the years. So, from '60's to 2020, there are many many milestones which were achieved, like in USA this National Environmental Policy Act was enacted in '69 or '70 around. And then World Bank started to adopt EIA for development projects that was one condition they implemented. And UNEP, United Nations Environmental Program also gave importance to EIA.

Then there was, in Finland Espoo convention, which gave, importance to Trans-boundary effects of the EIA studies, so, best practices came into picture. Then Rio declaration means there was a big convention at the international level. And, India took part in that and we are very much concerned about the environment from the very beginning, our cultural part also, is there that we give much importance to nature.

And then, in '86, we had this EIA related notification. And then public hearing was made compulsory in '97. So, the evolution has occurred. And Ministry of Environment Forests and Climate Change, it notified new EIA legislation. So, when we get feedback, so we have a scope for improving different acts at different timings. So, and we are the country this India, in fact, had this Ministry of Environment and Forest much earlier than several countries.

In '80's, we had this exclusive Ministry for the Environment and Forests. And even in, in British era also, there were some legislations to protect the forest and wildlife and biodiversity. So, we are very much concerned about the environment, since long basically.

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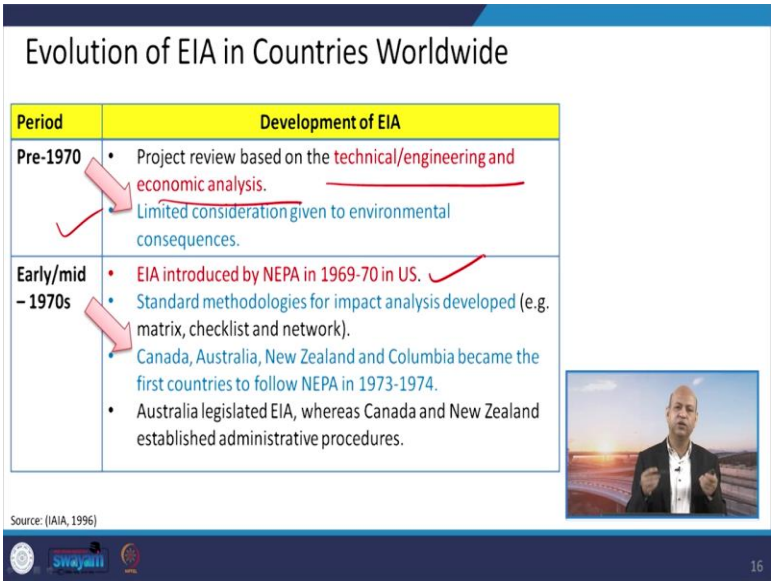


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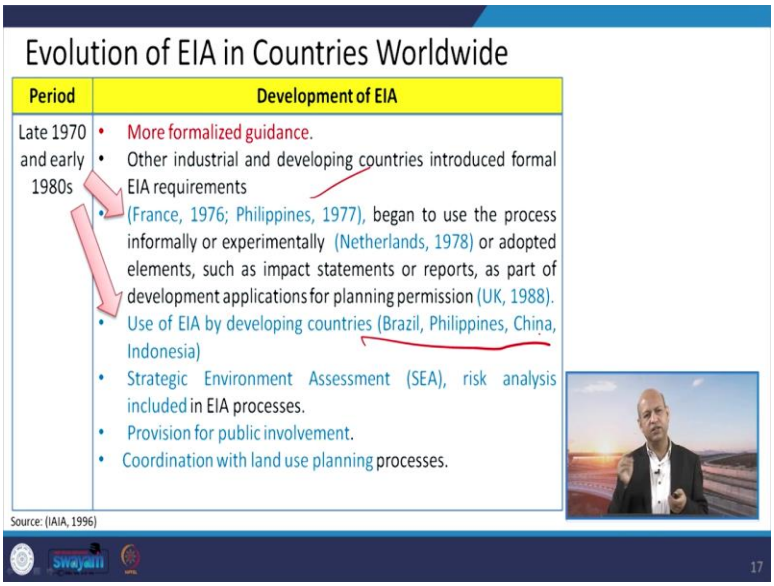


When we talk about, in different countries, so see this table gives the timeline in '70's. There were some technical and engineering economic analysis, which were the part of the environmental consequences analysis. And then in '69 or '70, this USA and Nepal, implemented EIA or introduced, and later on other countries followed the shoot, like Canada, Australia, New Zealand, in different way, basically. Then France, Philippines, and all those countries, had Brazil, China, Indonesia, all, this EIA, they implemented in their own way.

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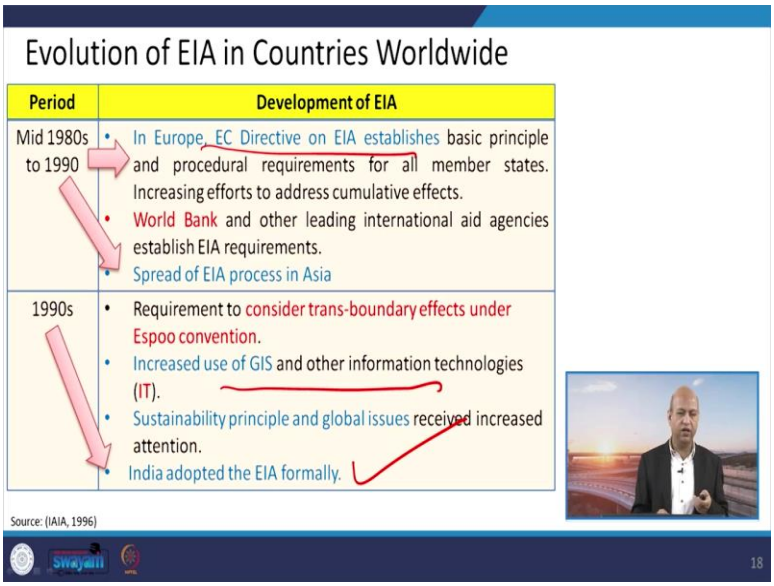


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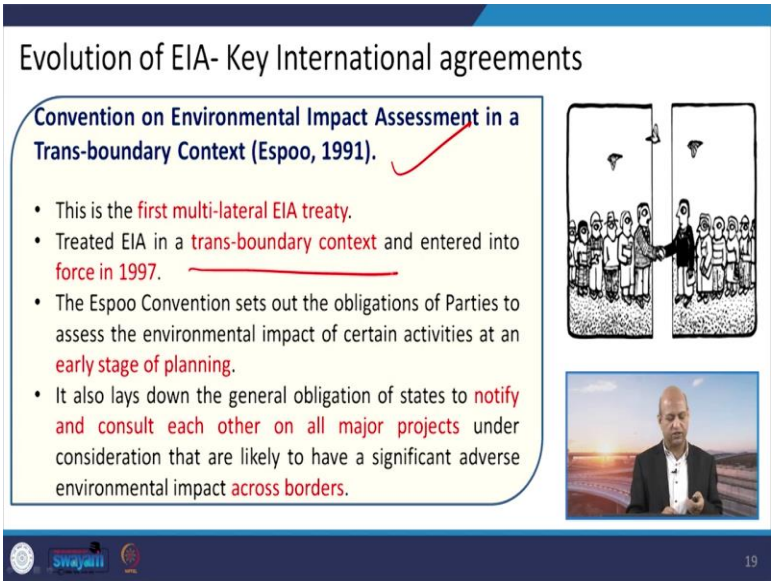


So, there were different directives, like EC also had directives on EIA. And then, we had, GIS implementation because it helps as a tool for having EIA in a nice manner, in a quick manner. So, we formally adopted in '90's. Although in '86, we had this act. And then, as I said, on that timeline, this Espoo gave, this convention gave in 1991, much importance to this. And in '97 this trans-boundary context was implemented.

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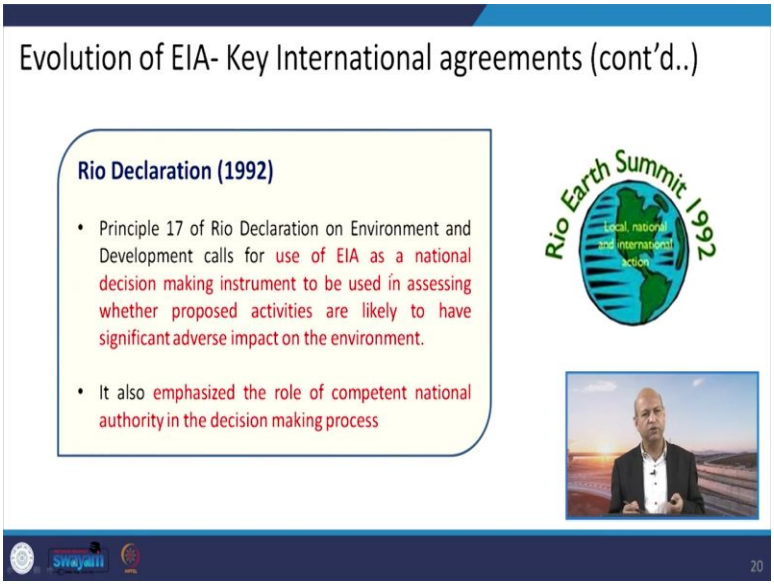


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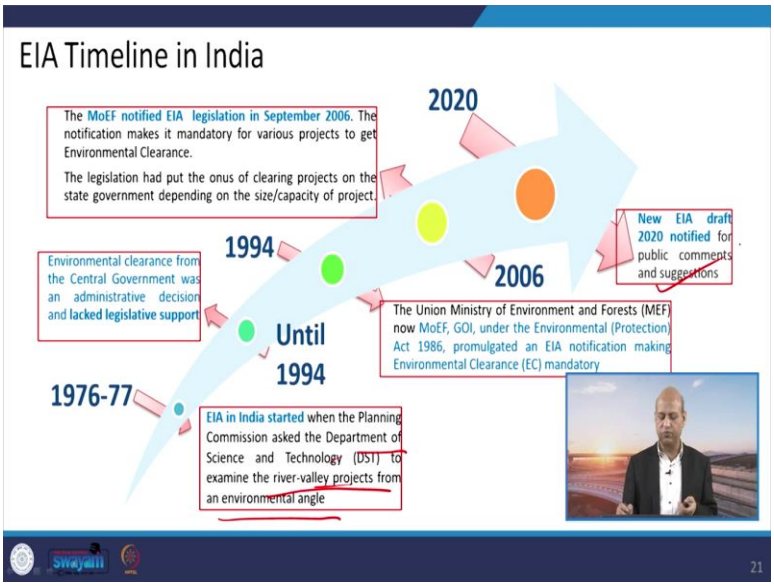


So, the international community gave importance to the EIA. And this Rio declaration, I already gave you about this timeline. EIA timeline in India you can see from '76 to '77, like we started from DST river valley projects, we wanted to see from environmental angle, how this will influence. So, the roots are there even in '70's. And later on, we enacted proper notification for EIA. And now we are again improving like for public information and public feedback, it is available.

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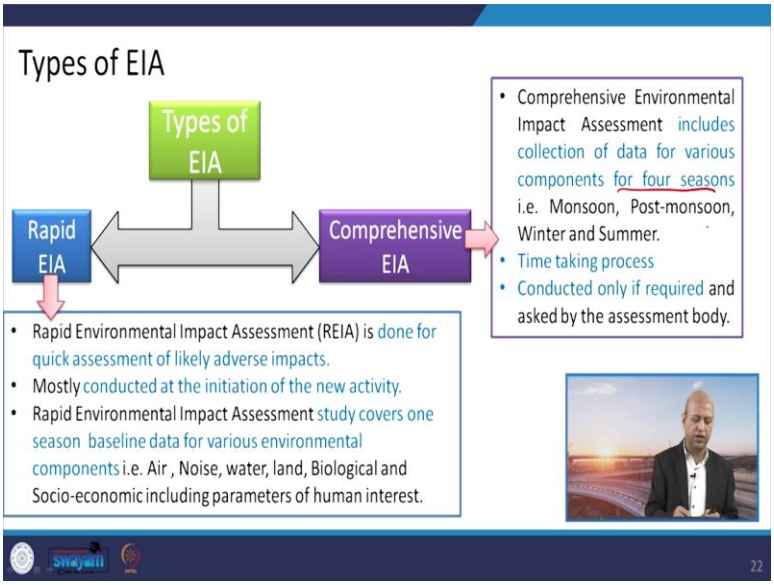


Types of EIA we talked, then major, classification is like, rapid EIA and comprehensive EIA. In comprehensive EIA basically, we go for long term data collection for whole one year, and the four seasons rather, you can monsoon, post monsoon, winter, summer. So, we collect the data and we analyze and it is a comprehensive complete analysis. But, in quick terms like rapid EIA we do only for one season. So, baseline data are collected for one season. And then some predictions are done with the help of some modeling.

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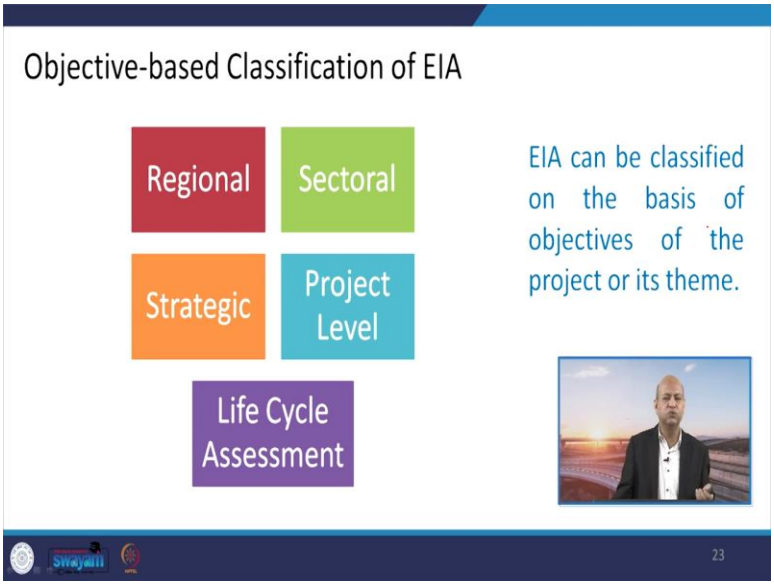

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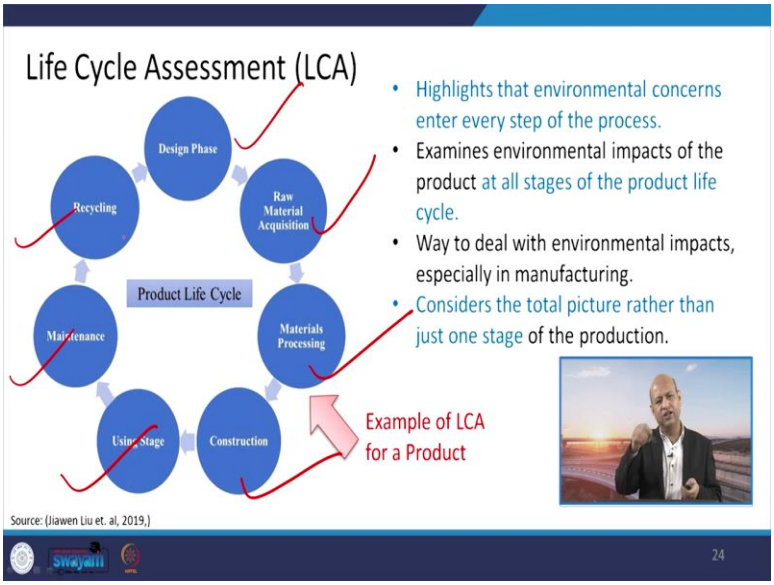


Well, objective based classification of EIA can be termed in terms of like regional or sectoral strategic, project level or lifecycle assessment. So, these are different ways to look at the EIA. And, when we talk about lifecycle assessment, then it is a complete, cradle to grave analysis. Means, whatever product we want to make or whatever project we want to make, so, from very initial planning, I mean, extracting some metal from the mining then finishing product and then discarding that product, it will also have some impact on the environment.

Because, suppose this pen is there and for manufacturing this pen some raw material is needed. So, for raw material extraction, some mining activity is needed. So, what are the impacts of those mining activities? And for, then manufacturing it and when it is, done with, when it is not usable, and we want to throw it away then again it will have some environmental impacts.

So, all those environmental impacts, when we look into means, design phase, raw meterial acquisition or extraction, metal processing, then construction using a stage means operational maintenance, recycling, and ultimately discardation or disposal. So, what will happen? All these stages, that is known as lifecycle assessment. So, that gives the total picture of impact of any product or project.

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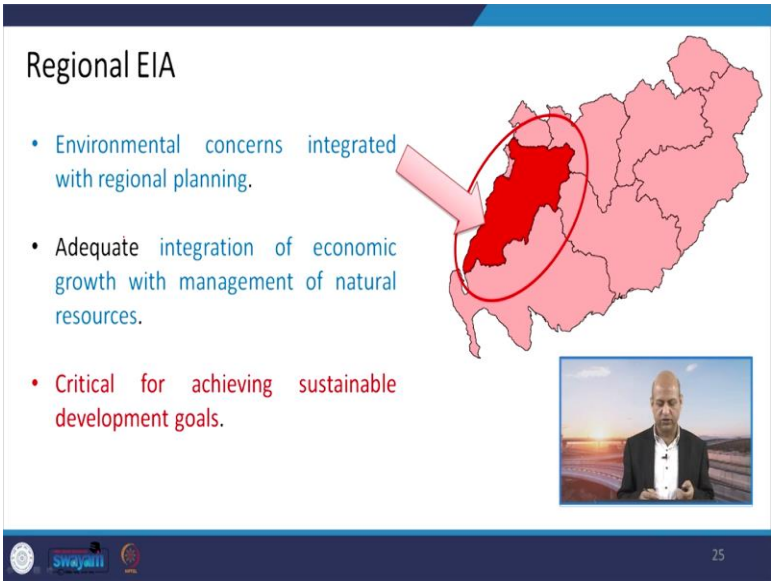


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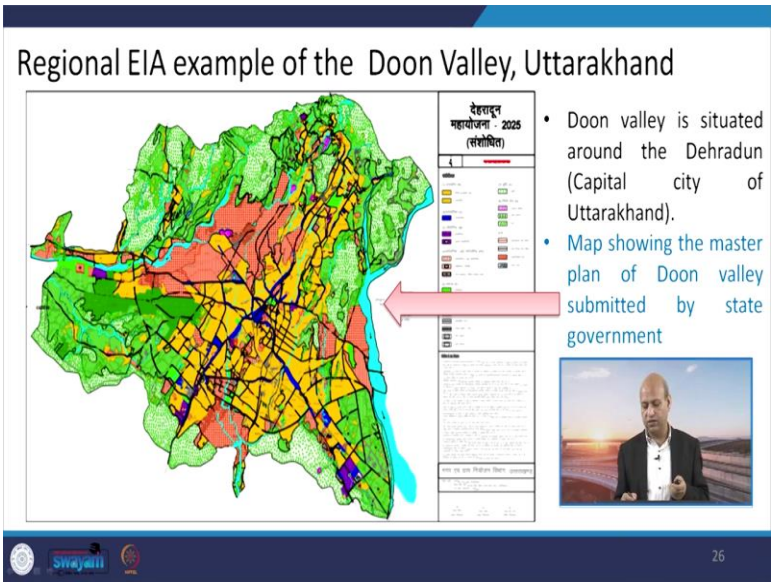


Regional EIA means a particular, region and that region dimensions may vary from several kilometers to hundreds of kilometers, what kind of picture we want to look at. So, that way local regional, intercontinental, continental or international or global those kinds of things can be defined. One example is like, regional EIA example of Doon Valley in Uttarakhand, where our institute IIT Roorkee is there. So, this kind of master plan was made.

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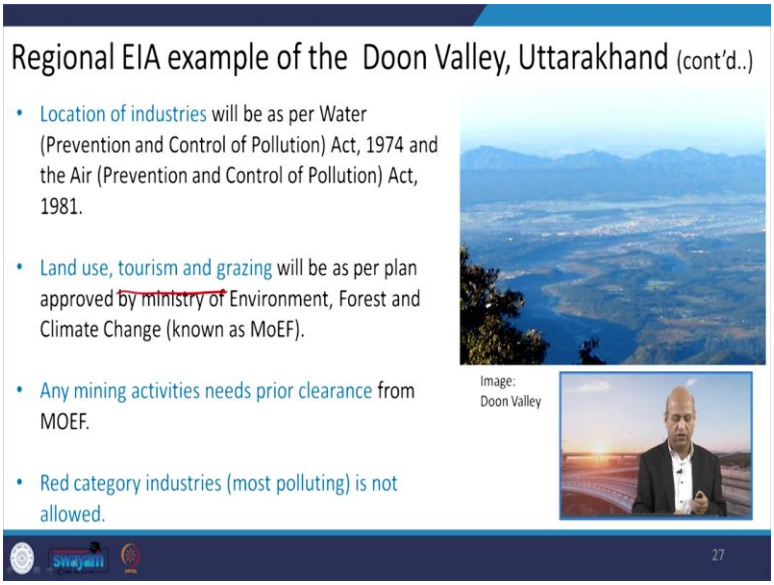


And different kinds of decision-making process were properly defined, that where industries will come, what kind of industries may come here, like polluting industries were not allowed on the packaging kind of industries could be allowed, or tourism kind of things defined properly. Location of industries were also marked, no mining activities are allowed unless, prior permission from the central ministry not the state one. So, all these things were categorized properly, so that this valley can be protected, for its biodiversity, for its environmental values.

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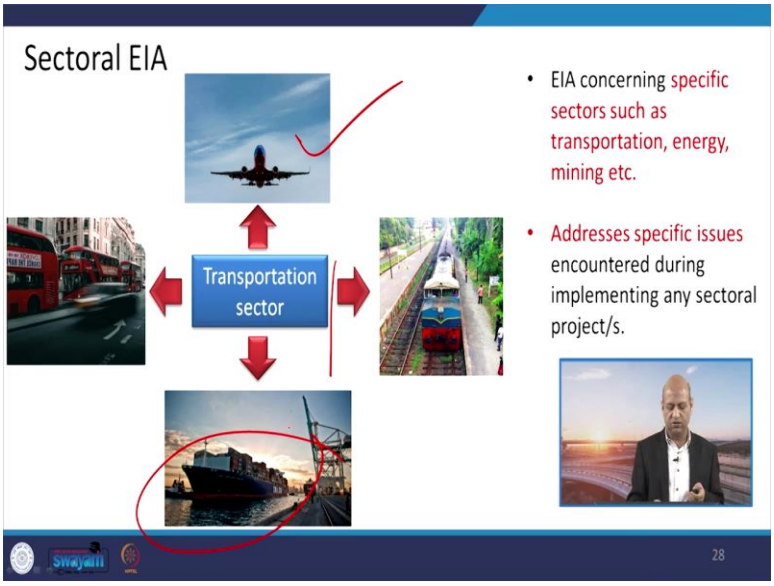

When we talk about sectoral means, industrial or house building activities or transportation or urbanization or power plants or railways something like that. So, transportation sector can be seen, whether it is air traffic then you need a lot of land for airports also. And of course, industries which will make the aircraft. For railways, you need a lot of land for tracks, and for roads, you need again the land. For ships, you have other infrastructural facilities at the ports. And also, the fuel which will be burned for running all these things. So, those are the sectoral related EIA activities.

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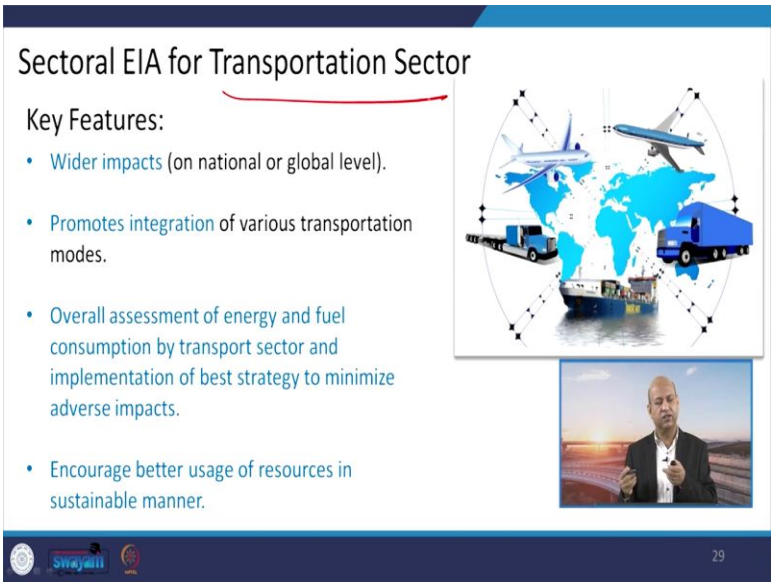


Well, when we talk about the key features of transportation sector, so we need to see from local to the global scale their impact, because, they are related. Transportation activity is also local, is also regional and also at the global level. So, the impact has to be seen in that context.

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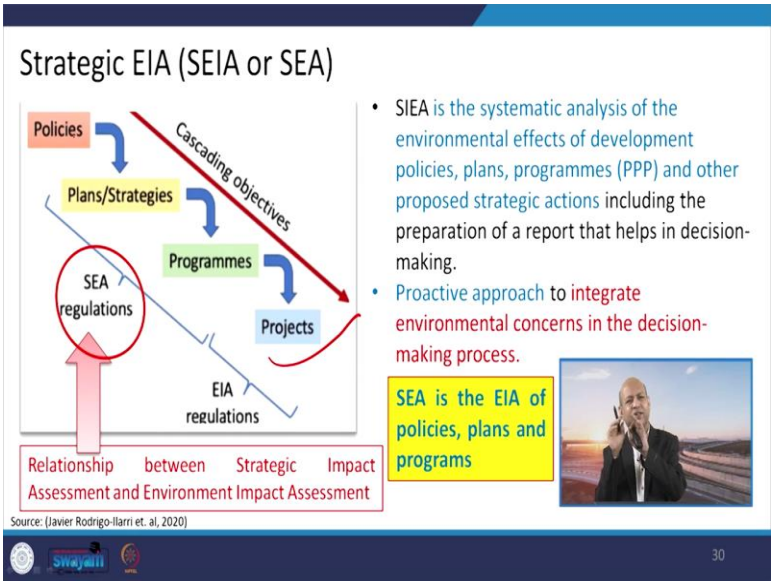


When we talk about, EIA then there are other forms of the EIA like strategic EIA. Strategic environmental impact assessment or sometimes simply we call it strategic environmental assessment. So, these are the systematic ways of assessment from policy formulation to making the plans or strategies, and then implementing the programs and constructing the projects, all these things have to be combined.

So, that is the part of strategic EIA, otherwise, the simple EIA used to focus only particular, like engineering perspective, what will be the impact on the air or water or soil, those kinds of things. So, strategic means the, again the holistic way of looking at things.

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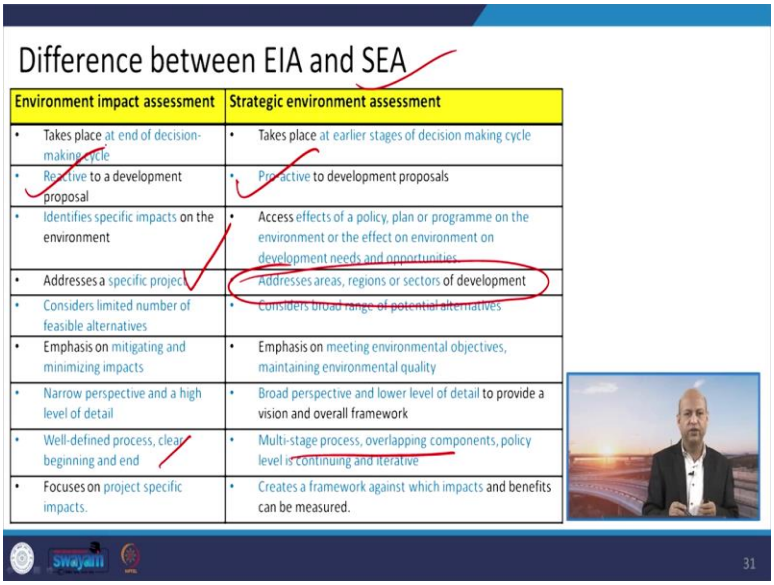


So, the difference between, EIA and this strategic environmental assessment is given in this particular list. As for example, as I said it addresses only the specific projects. Wherever, this SEA look into account of the complete region or all the sectors in an, in an integrated way. And then, well defined processes or clear beginning and the end. Whereas, it has multistage processes, so lot of feedback mechanism is also there.

And proactive, whereas this is reactive. EIA is a kind of reactive, some project is there, so we need to have the impact assessment of that, in terms of the environment. Whereas strategic means, proactive means, before even having that project in mind, we have to think its relationship with complete scenario, where this project will be implemented. So, from planning a stage or from envisaging a stage, we have to see the impact.

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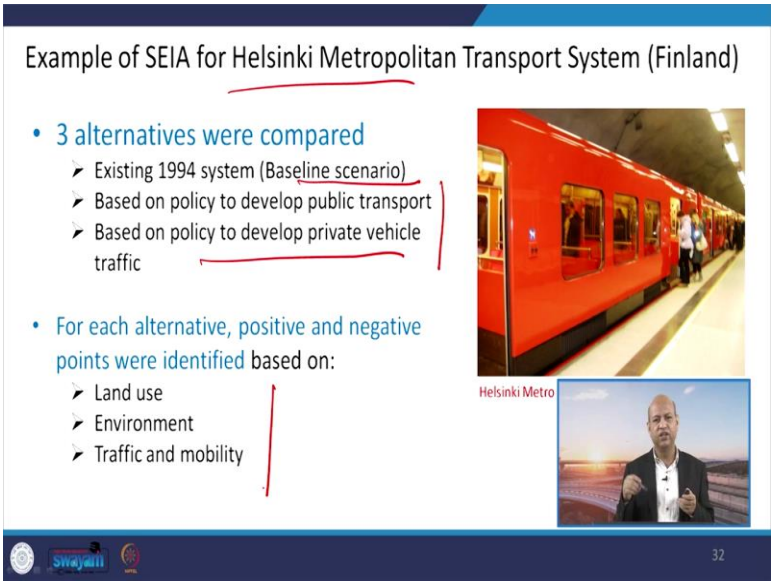


Well, one example of a SEIA or strategic environmental impact assessment is Helsinki Metropolitan Transport System in Finland. So, to do that, three alternatives were compared. So, existing '94 system baseline scenario was there, and then some policy development public transport was included. And policy to develop private vehicles. So, viz a viz private or public.

Means, how those scenarios will impact the environment, whether what portion will be, if we make it completely public, then what will be the impact? If we make it completely private, what will be, the implications of those. So, the different three scenarios were considered and the land use, environment traffic mobility, all, alternatives and their positive and negative points were identified for decision making. So, this, this was a complete scenario in terms of a strategic assessment.

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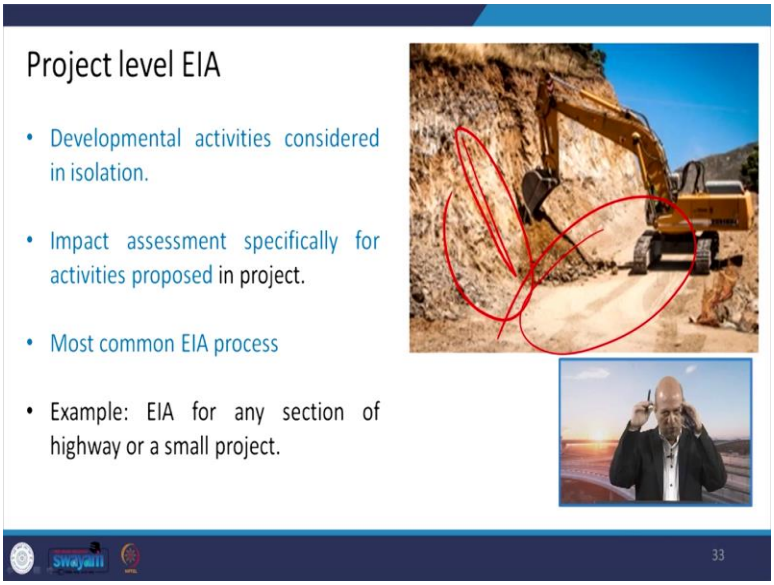


Then when we talk about project-based EIA, so this is one example like, if we talk about only one isolated project, so let us see how this land change because of, making some road. So, will it impact this hilly area or some landslide, it will induce or something like that. So, very narrow, in a narrow phenomena, in a narrow context, one can analyze those impacts in terms of EIA. So, that particular section of highway has to be considered.

Whereas in SEA, not only the highway, but it will take into account where traffic will come from, where it will go, what will be the complete impact in terms of socio economic and ecological, from the planning stage to the utilization stage.

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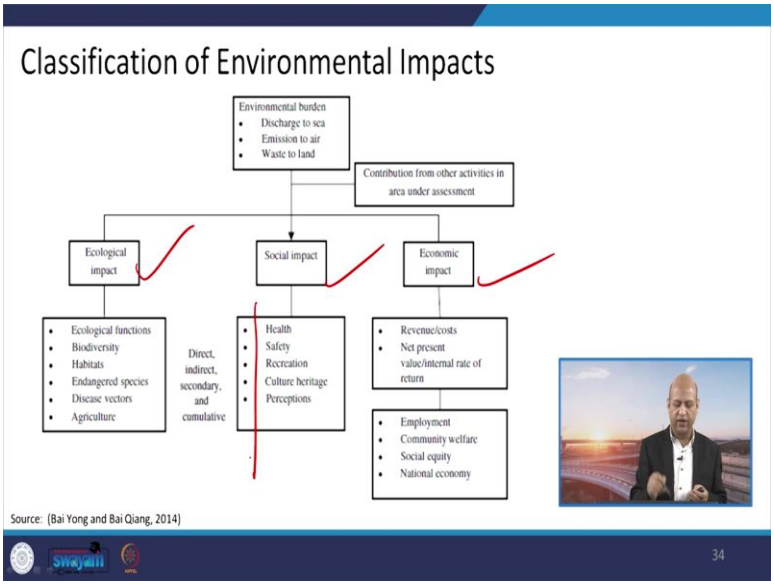


So, when we talk about the classification of environmental impacts, as I said ecological, social economic. So, social when we talk health issues, safety issues, all these things we have already discussed in detail. So, I can just skip it.

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Well, when we talk about, beneficial or detrimental impact, so as again, I think discussed earlier also that beneficial means, we have, like mobility, accessibility, economic activity, those are the benefits. And detrimental effects, because the pollution will cause the air quality deterioration, all those negative impacts are there.

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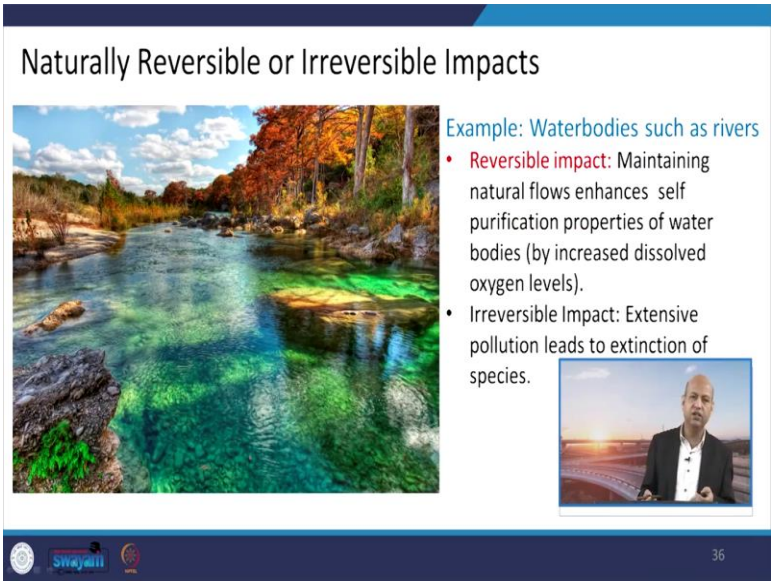


Similarly, like reversible impacts or irreversible impacts, because every ecosystem has some, stretchable or you can say, they have some dimensions that up to that, can bear the losses. And then, they again have this recreation capacity of particular, like DO. If you, put some organic load, then DO will be reduced, dissolve oxygen will be reduced. But after that again it will be maintained.

But, if you put so much waste that completely DO gone and anaerobic conditions occur, then it may be just, that particular pond will be converted into marsh. So, those kinds of things, we have to see that reversible or irreversible kind of phenomena. If extensive load is there, then irreversible phenomena may occur. So, that should be avoided.

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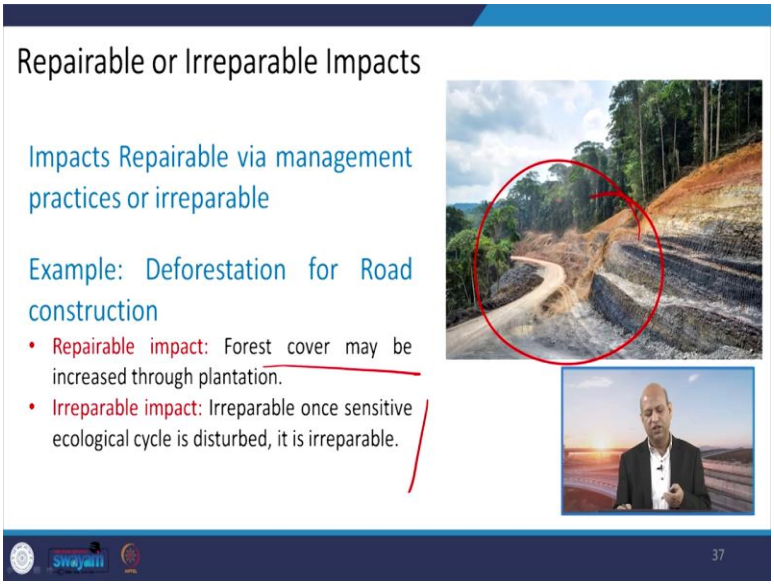


Well, similarly repairable or irrepairable impacts. So, repairable like forest cover, if there is a loss of some forest cover, we can plant trees and we can increase the cover of the forest and, there are certain guidelines for that. But, because of this local activities, suppose some particular species were living there of some kind of animal. So, they will shift their location, that is irreversible or irreparable for them. Maybe if some endangered species are there, they may finish. So, those things we have to keep in mind. And again, so those irreparable impacts should be minimum, bare minimum.

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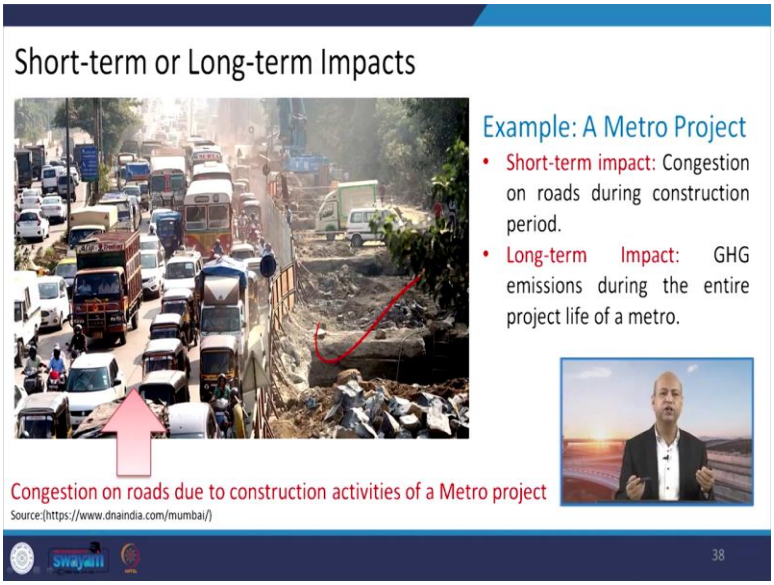


Then short term and long-term impacts. Short term means, like when some project is going on like, widening of the road etc. then there will be congestion because these activities are going on, this is not available for transportation. So, this narrow lane will be there for movement of the traffic. So, congestion will be there, but that is short term.

After this project is over, when road is constructed properly then lot of space will be there and again, there will not be any congestion. But long term, like when vehicle will be moving, then always emissions will be there unless we have some clean fuel or electric vehicles or those kinds of things.

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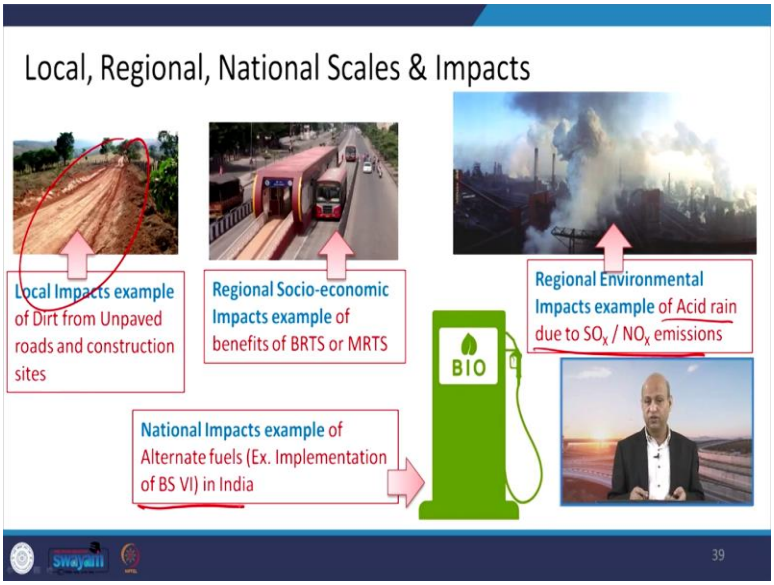


Well, in terms of local, regional, national scales and impacts if we see, so these are the local things like making a stretch of the road. So, only the local impact you can see, but when you are having, one network of metros and BRTS system etc. they can cover complete region. Similarly, if you have like acid rain, due to SOx or NOx emissions, that can cover a big region, regional scale.

And the national impacts because of, some policies, if you implement in entire country, then it can have positive or negative impact of like, if you are implementing a clean fuel like this BS VI Bharat Stage VI, so this will improve the air quality all over the country. Because the cleaner fuel will be there to run the transport system.

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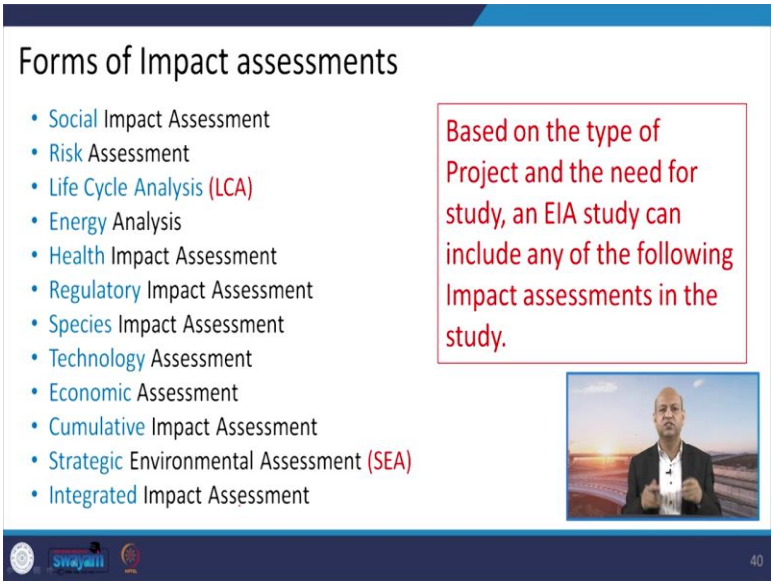


When we talk about different forms of the impact assessment, then this list can be there like social impact assessment or risk assessment, lifecycle assessment we have seen. Energy analysis only the energy flow, mass balance equation, those kind of things. Health impact assessment exposure and what means, then we convert it into like Dose-response curves and they give the health impact assessment.

Regulatory means whatever regulatory framework is there, what will be its impact on transportation sector as we have seen like, when we implemented CNG in Delhi, so air quality improved. So, those kinds of regulatory impact are there, sometimes positive or some negative depending upon what kind of regulatory implications are there. Then impact on the species or technological assessment, means better technologies are available.

Then, if we can implement that if they are for green kind of technologies, or having benefits to the environment. But then economic implications are there, because technology is not free, when you are converting from one technology to another, then you have to invest a lot of money. Then there may be cumulative impact assessment means taking multi dimensions together.

And as we have already seen the strategic environmental assessment or integrated impact assessment, all these things, different names have different meanings and different, coverage for the assessment or analysis exercise.

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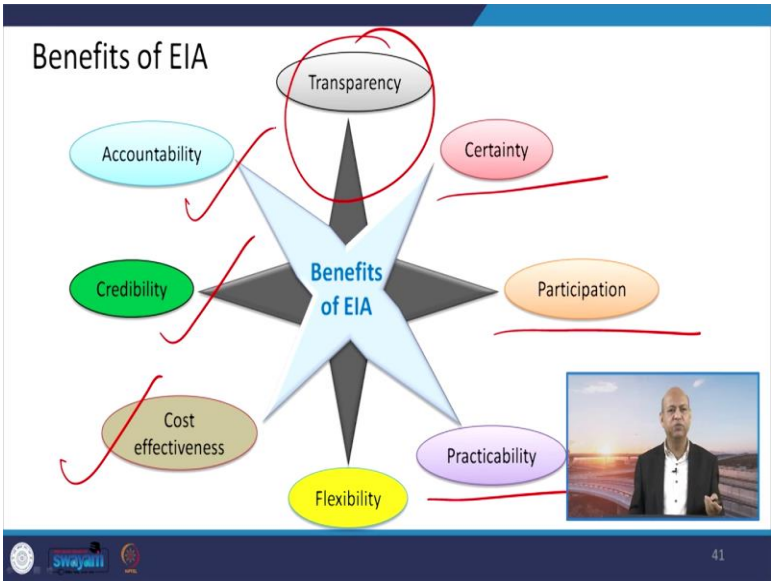


So, benefits when we talk about EIA, very many benefits are there. Like, it gives us the transparency means, public has the trust when we are having the EIA. We make the reports public, so public can see what will be the impacts. So, transparency will be there in our decision making or project implementation. Certainty means, we have a, kind of this perspective, these mitigation measures, if we implement then some impacts will be minimized.

So, that kind of certainty we can have. Then, participation scope is also there for public and government participation. Because, when we are implementing some project and we are having the public hearing, so public has the chances to give some feedback. So, participation is there. Practicability, because of the feedback and the flexibility again we can change, if negative impacts are there more as per feedback, then we can have better alternatives. So, flexibility is also there.

Cost effectiveness, because when we get a lot of ideas, then we can zero down to the best possible alternates, which can give the same facility with minimum investment of the money. Credibility also increases, when we are doing EIA in a nice way and we are sharing with all the stakeholders, then credibility is, increased. Accountability is also, when we are involved some

agencies in EIA and decision making, so, they are accountable to implement those recommendations of the EIA. So, all these things are benefits of EIA.

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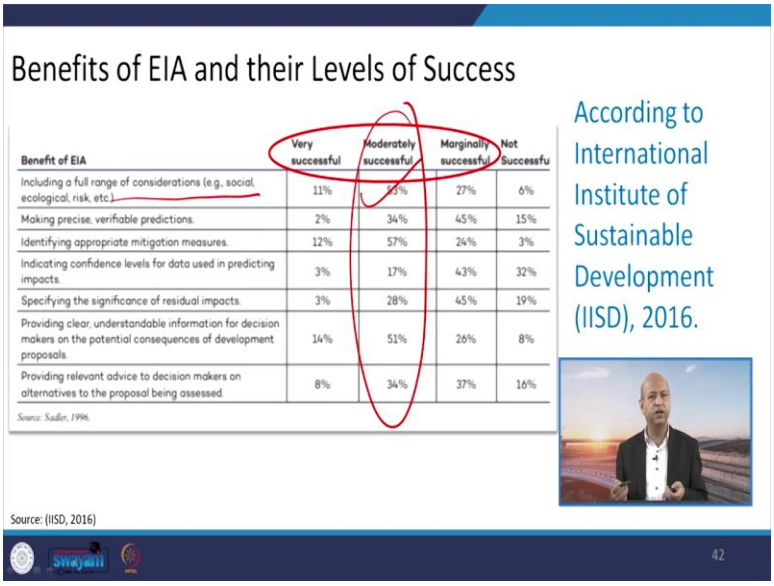


So, benefits of EIA in terms of levels of the success, has been given to this. So, moderately successful have been there, lot of projects. So, as per the survey like 53% percent, including full range of considerations, social ecological risk etc. they have been properly addressed. So, this was the study of the international institute of sustainable development. So, again, this is again the feedback, positive feedback that benefits are more, and that can be really achieved by proper EIA implementation.

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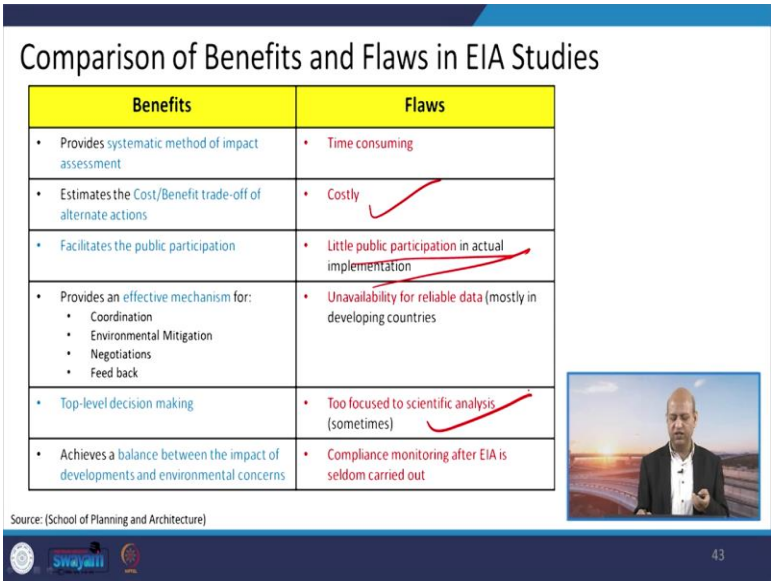


When we compare, benefits and flaws, then there are issues like, we have seen that because of EIA, we have better decision-making opportunity. But of course, there are limitations or means, negative externalities you can say that, because, it is time consuming when EIA will be done, then the project cannot be implemented unless EIA exercise is complete. Costly, it needs money to do some exercise.

And little public participation in actual implementation, that is one issue, but that can be addressed by making committees of stakeholders, they can also look into implementation of that part. And, sometimes very highly scientific and the general public does not understand, for that, there are people who can convert scientific things into, common folks language and they can share with them. So, those are the very minor flaws, which can be easily addressed.

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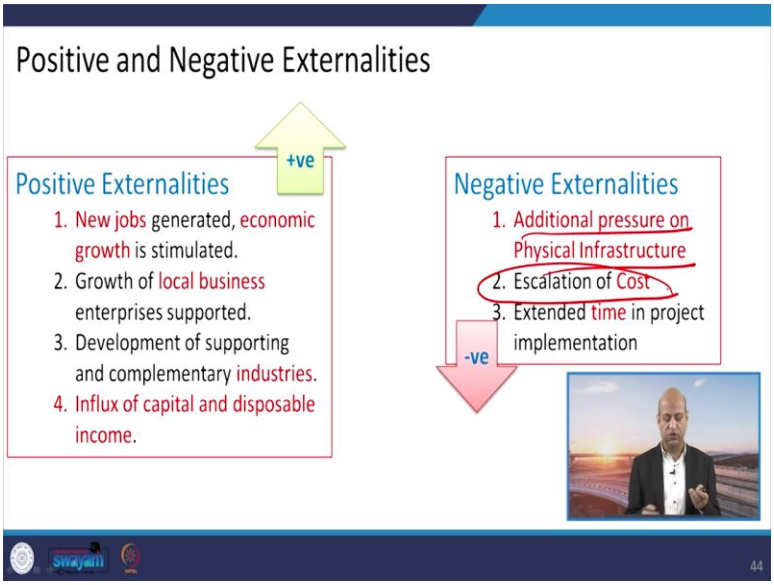


And the positive and negative externalities as such, most of the positive externalities are like every development project or even EIA activities, they also help in generating some economic growth or growth of the local business or industries and in a better way, in a sustainable way. And the negative, because it additional pressures on physical infrastructure because of development. And then addition of the cost, because of these activities, and time taken into project is more.

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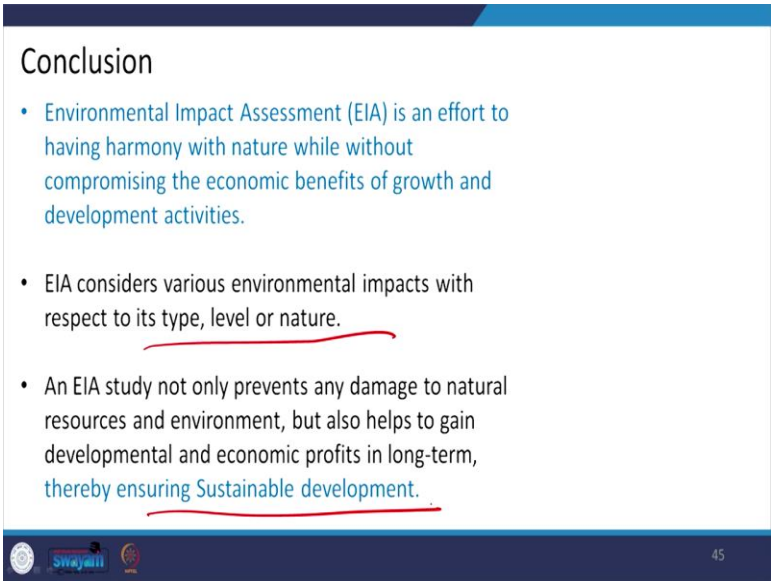

So, in conclusion, we can say that EIA is very good development, when we talk about the development versus the environment story. And we want to protect the environment, but also have to have the development, then EIA is a very good tool to help us, minimize the damage to the environment. Because it will give us an idea of the extent and the intensity of the impact. Because of those development activities, which will occur to the environment.

And environment is not only the natural environment, but socio-economic environment and geographical or regional environment in all terms, social, economic, and environmental, all those three pillars, we can look into. And at all levels, and it can really help us to protect the nature. So, that way it is a very good tool and we will consider in next lectures, how it is done, what are different tools and techniques, which helps us to do the exercise of EIA.

So, that is all for today and, for ensuring sustainable development, EIA is very, very important, tool and technique or process, which we should really respect and we should do it in a religious way. That means in a dedicated, in a very sincere way. And it is not like just fulfill the requirement, official requirement or formality. We should do it with integrity, and with having the thought in the mind that it will really help the, having this project in a holistic manner.

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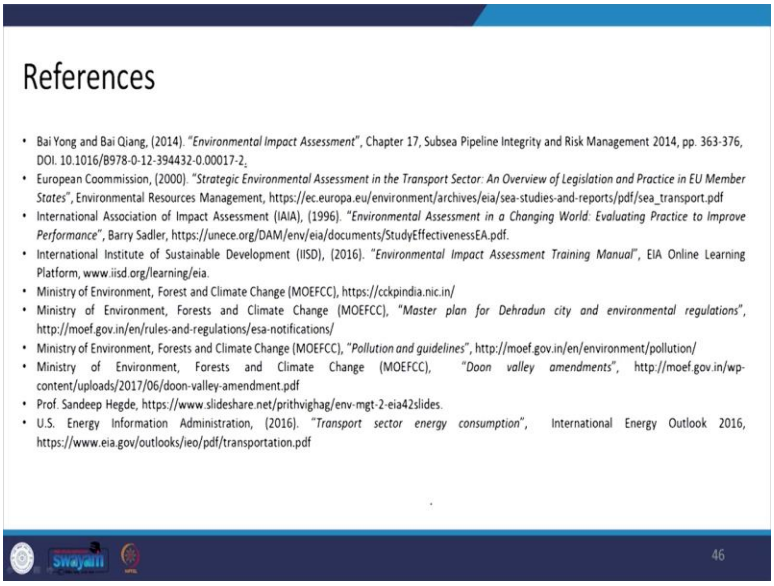


So, that public is benefited, all stakeholders are also benefited. Because, it will help us to minimize the damage to the environment. So, that is all for today. This is the reference list as in every lecture, we give you the additional sources or resources, which you can go through if you

need additional information. So, thank you for your kind attention and see you again in the next lecture. Thanks.