Environmental Impact Assessment
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Lecture 46
EIA Method – Landscape and Visuals

Welcome to the course Environmental Impact Assessments. And in today's lecture, we are going to cover EIA methods. And we will look into how we undertake EIA when we do landscape and visual assessments. So we have seen this before. But then when we talk about the landscape, it is considered to be important for the quality of life for all the people in different contexts.

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So you can see what the European Landscape Convention talks about this. So, if you look at the function of a landscape, like why, why it is important. The landscape provides a setting for us to undertake day-to-day activities of our life, and then it allows us to undertake activities to support our livelihoods, and then we also connect with a place where we have a sense of place, we have a sense of belongingness to a place.

And then we also enjoy the vital elements of the flora and fauna. And then we also have like, the cultural connection with the place, we have a historic connection with the place, there are all sorts of associations with the place in terms of what we have done in that place, our memories are related with a place.

And then we also have these landscapes that provide us recreation opportunities and then to enjoy the beauty of that place. And then we also see health benefits. So there are a lot of benefits and services that come from the landscape, and then it becomes an important part when we deal with EIA.

So whenever the project comes, there are likely to impact the landscape. So there is a term landscape effect. So landscape effect means that there is a change in landscape, this the change, which happens in the landscape, and it changes the character, the quality, which it has, and it is assessed as an effect on the environmental resources.

So we evaluate what kind of change has happened, what kind of core, what change in terms of quality has happened, what change in terms of character has happened, and then what it has effect on other resources, environmental resources, because of that kind of change in that landscape. So that is termed as Landscape Effect.

Then, if you look at the landscape, what does that include, the landscape can be in rural areas, and the landscape can be in urban areas also. So you must have seen the Townscapes of various cities, how the Townscapes are, you can also have marine landscapes like seascapes, so they can be a range of landscapes.

Then there is another term, which is Visual Effects. So Visual Effects is like, what kind of change you see in the appearance, how things appear in front of you, because of the kind of change which is happening so that is the visual effects. And this is also looked at through the perspective of what kind of change has happened. And what kind of change that has happened in the visual eventually impacts us the people. So, for this particular component, we have already seen the legislative the legal aspects of it.

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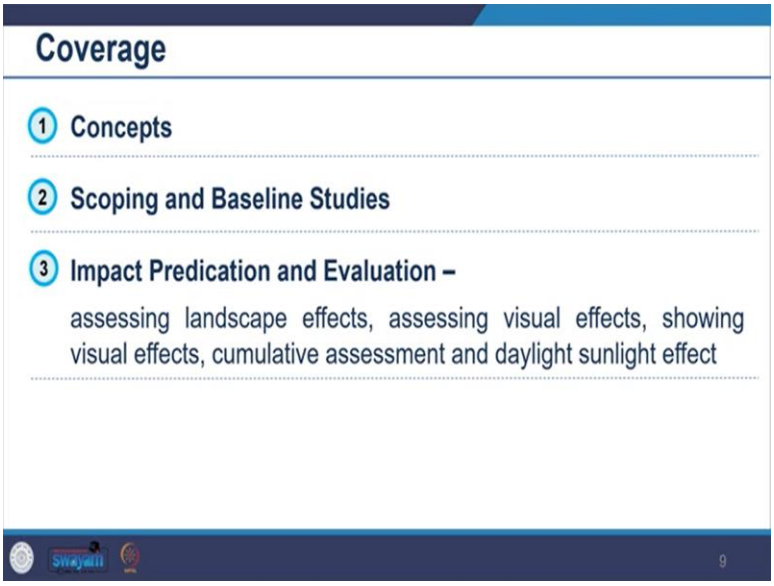

So for this particular session, our coverage will include that we will look at the concepts involved in this, and the few more concepts we are going to look at. And then we will look at various like what is done at the scoping and baseline studies stage about landscape and visual assessment.

And then what do you undertake an impact prediction and evaluation? How do you assess the landscape effects? How do you assess the visual effects? And how do you indicate that how do you present your results or how do you really present your perspective of what kind of change you are seeing and then how do you undertake cumulative assessments and then how do you also see how they affect my change in terms of daylight, sunlight, and things like that.

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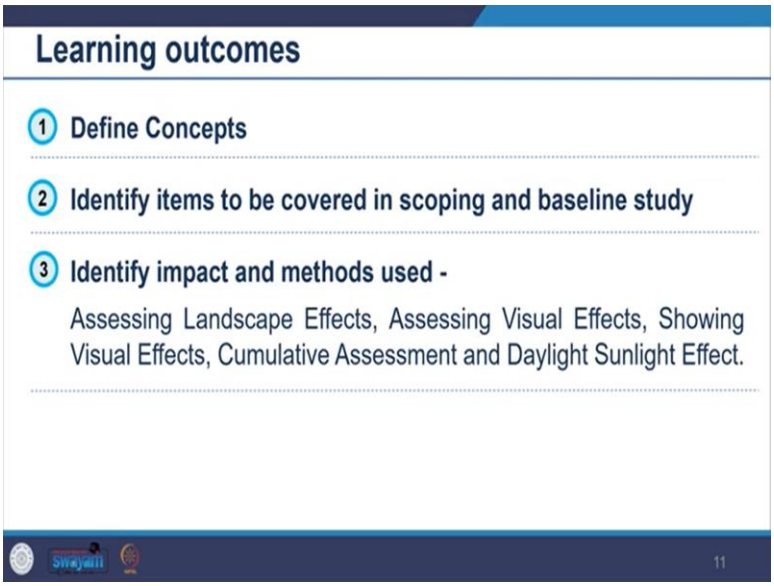

So, according to the learning outcomes, the expected learning outcome is that you should be able to define concepts after the completion of the session, and you should be able to identify items to be covered in scoping and baseline study. Then you should be able to identify impacts and methods used to assess landscape effects, visual effects, and all the methods used for showing all these kinds of effects.

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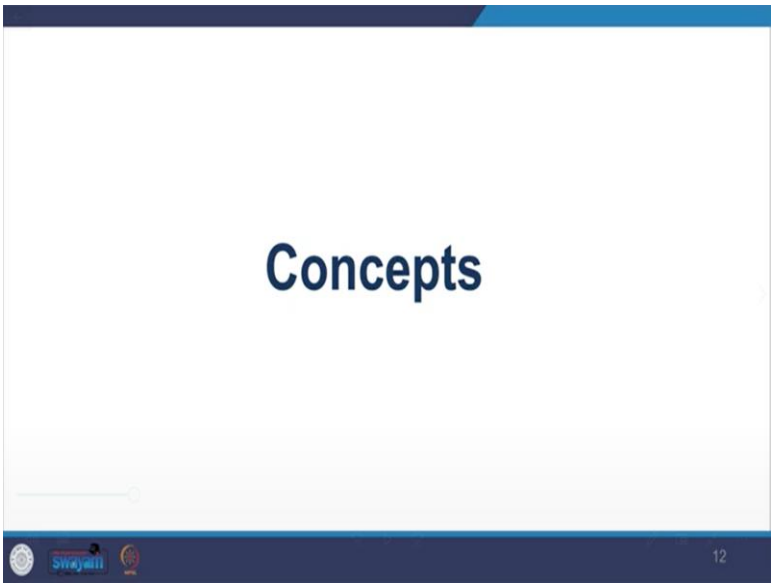

So, moving on to the concepts part, the first part.

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So what do we do, how do we define landscapes? So, landscape as defined by the European landscape convention is the landscape as a zone or area as perceived by local people. So, it is the local people or visitors who come to a place whose visual features and characteristics are the results of the action of nature and the culture that is there. So, the human factors are how we see it, how the local people see how the visitors see it because of the context because of whatever is at the back and what is the story behind it and how, how it visually appears. So all that connects or relates to landscape.

So, if you look at the key aspects of this definition, you will see that if you think of all the places through which you connect. So, the landscape changes through time, and then it would all have all kinds of forces working natural forces as well as how we interact with that place and you would also see that landscape is a composite of all the natural and cultural elements.

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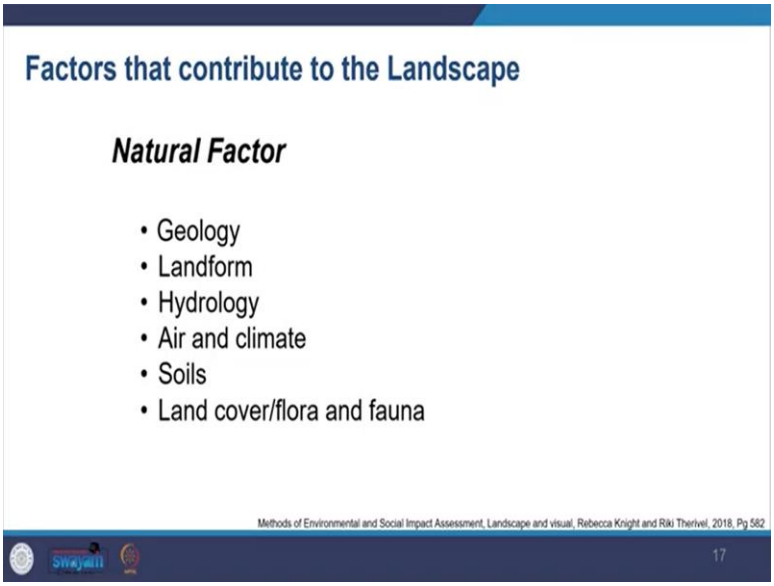

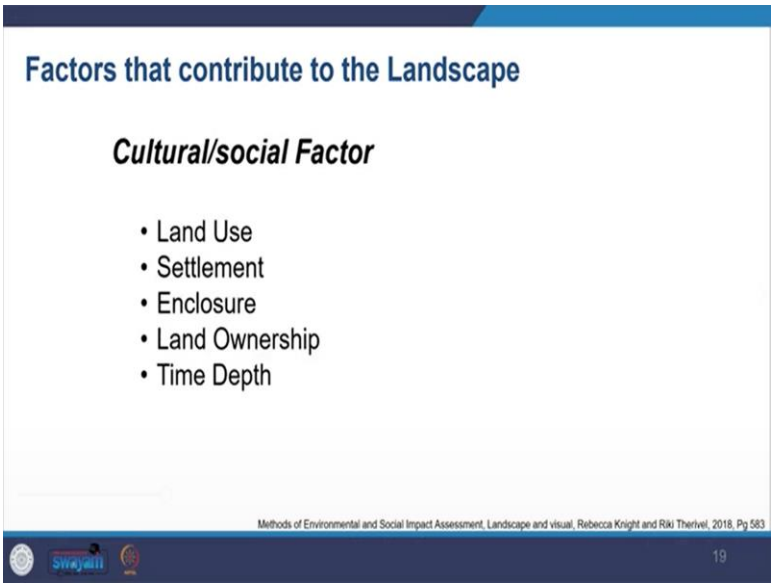

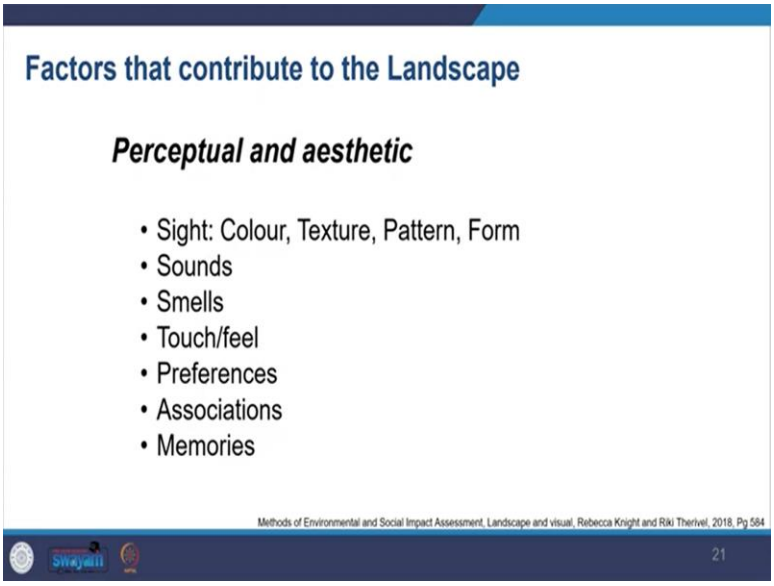

So looking at the factors that contribute to the landscape. So, there are natural factors such as geology, landform, hydrology, and so on then you also see the cultural, and social factors like what kind of land use is there, what kind of settlement pattern is there? How is the place, is enclosed, or open? How is the ownership and how much time has gone behind the evolution of that landscape?

And then also, depends on the perception and what kind of aesthetic sense we connect with. So, how do we perceive that place in terms of what we see how we feel about that place, what sense we get from that particular place, and what kind of memories are there for this space?

So, landscape evaluation has been done for quite some time for EIA purposes, but then there has been a change in terms of how we have approached the subject. So, we see that there is like landscape quality, earlier we had looked into more of a landscape quality. So, now, rather than looking at the quality, we have started understanding the landscape character. So, there has been a shift. So, it is said that since the 1980s we have moved from preserving, whatever is the best, we have only focused on the best and then have not taken care of

the other components of it. But from the 1980s we see that rather than good or bad, we have tried to retain the character of its place as it is and what value it has to the people there.

So, rather than just focusing on the best part of it. So, we see that this involves the process, the landscape evolves through time, and then you also had designated areas because of the first approach where you looked at the quality like where you had you would only emphasize the beautiful places.

Then you had designated areas and then all the resources would be focused on that. So that would lead to the negligence of the other places. So that approach has changed and now it has also changed because the taste of people also changes what they consider beautiful at this time may not consider beautiful later.

So understanding the character landscape character had much more value than just looking at the quality of the beauty part of it. So we see that there was a shift from landscape assessment. We moved on to the landscape assessment from the landscape evaluation part. So when we did the quality, then we did landscape evaluations, if you understand that term landscape evaluation where we looked at the landscape quality, now we look at landscape assessments where we look at the landscape character.

So, the difference between this landscape assessment and landscape evaluation is that in early evaluation, we tried to find out the value and beauty it has. But then, now with the landscape assessments, we try to find out how different they are, how distinct and unique they are, in their terms.

So, looking at the characteristics of an individual landscape, which is there. So that allows us to take a diverse range of landscapes and then what kind of services and benefits we get from that landscape. So earlier, we saw it as a beauty but then now we see it as an environment like complete environment, which is unique in its way distinct in its way.

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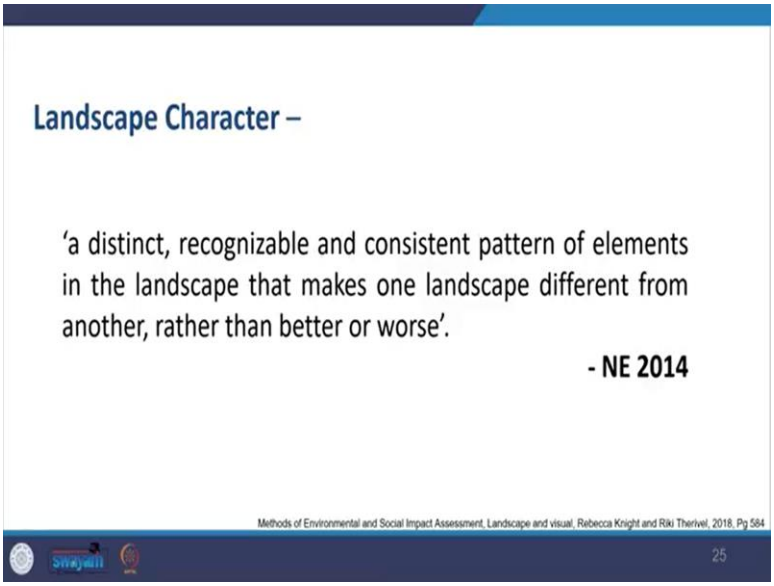

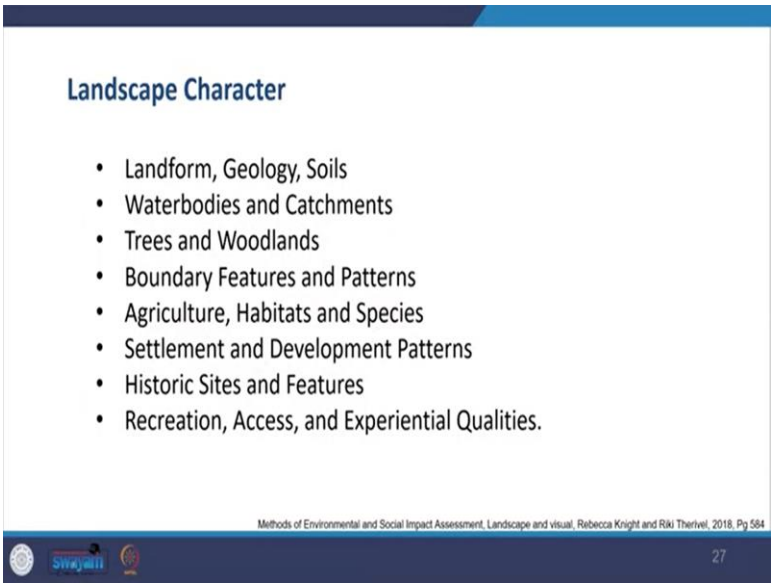

So if we define landscape character, it is like a distinct, recognizable, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. So, what does landscape character comprise you will see that landscape has elements and characteristics. Such as you have all these landforms, Geology soil, you have water bodies, catchment trees, and Woodland.

Then you also have features and patterns of the boundaries, how they are, then you can have habitat to all kind range of species which are there. What kind of settlements and what kind of patterns they have followed in terms of development? And then what history is connected with the side what kind of features are highlighted how do you interact with that place, and what kind of experience do you have in that?

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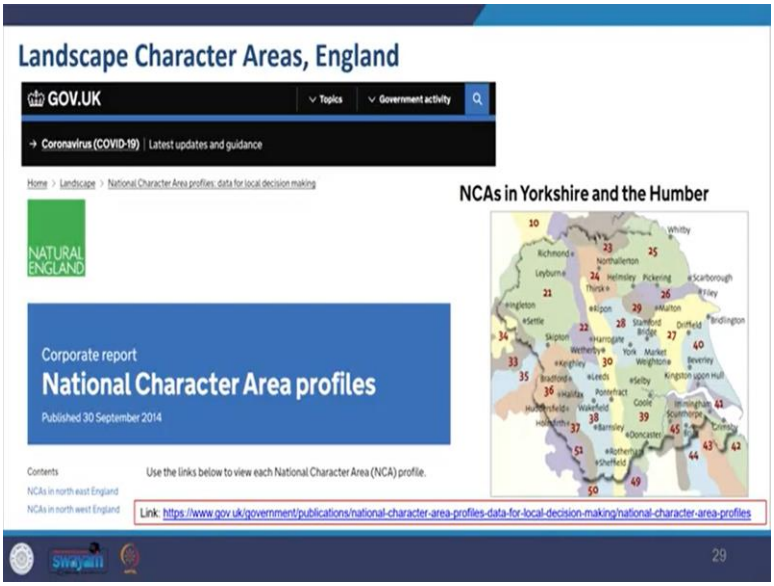

So, you see that landscapes are also categorized, and with this new concept you see that there are 159 landscape character areas in England, you can see that. So, you use this landscape character concept for identifying a lot of landscape areas.

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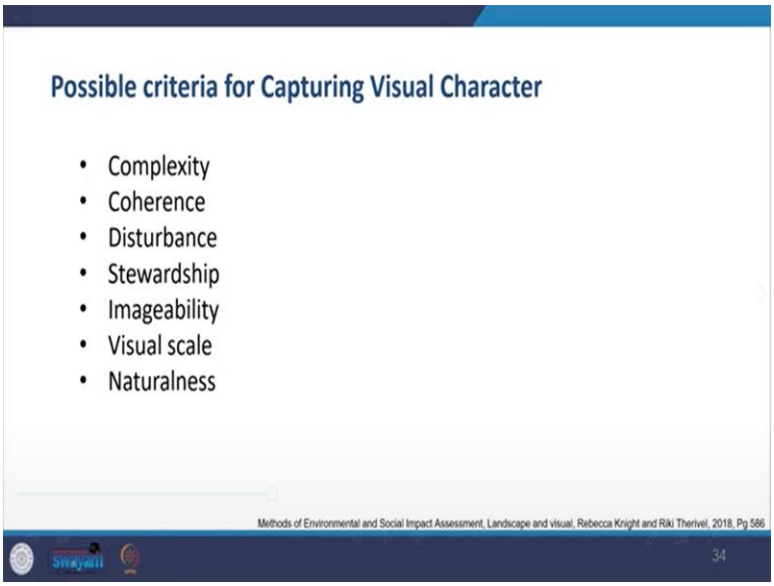

So, the way you capture this is like you look at the complexity, how complex it is. Then you look at how coherent it is in terms of how they are arranged how they are distributed and what kind of relationship you have with stewardship you have the place. How do you imagine the place, how do you perceive that place? And at what scale is that and what kind of naturalness does that space bring? And then what kind of history the story behind is there, and then also, how whenever you see it for a short period, what kind of ephemera it creates and for that particular short period knows what kind of experiences it creates for the people there.

So, in that way, we look at all the criteria that are used for capturing these elements here landscape elements. You have these resources and approaches to landscape character assessments, this is available then you have Scandinavian resources, which also give you how to identify these landscape characters.

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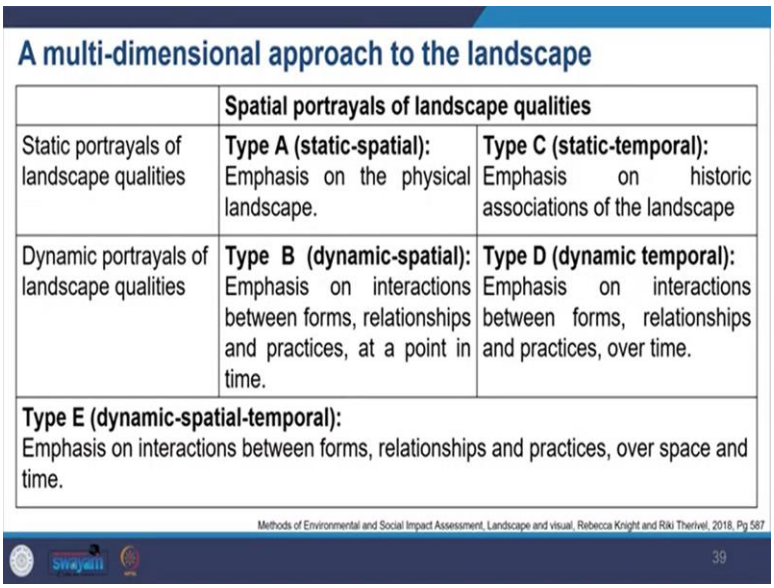

So, here through the system, you see that five types of landscape models have been created by Stefansson. So, this is related to like, whether the landscape is static or dynamic or it has spatial or temporal portrayal. So, you see that in this table, you have static means it is very stable, it is as it is or dynamic it continuously keeps changing, and evolving.

So, based on that, five types have been involved. So you see Type A which is like static spatial, so it is distributed around an area and the emphasis in this is much more on how it physically appears the landscape appears. Then you have another type which is type B, where you have dynamic and it is also in the space in the area. So emphasis on the interaction between forms, relationships, and practice at that time.

So you also find type C, which is static, you see you look at the historical emphasis on how you connect with this place. And then you have dynamic temporal, where you see that how you interact with that place has values. And then you have another last type, which is Type E, which has a dynamic spatial-temporal emphasis on the interconnection between various forms, and how these plays relate over space from time to time and from space to space so, that you see.

So, how static or dynamic, and how these things are there. So, that is also the space that has been identified and those categories have been developed with can be used, when you do your EIA here. So, to capture this like, whether it is static or dynamic capturing dynamic can be very difficult. So, there are some methods which are there to capture the dynamic component of a landscape.

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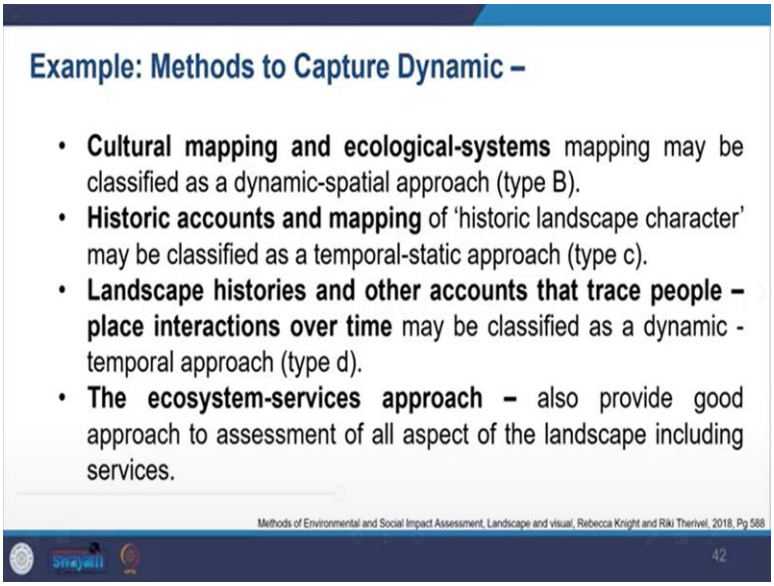

So, you can do cultural mapping of where you can like what kind of festivals and what kind of rituals take place. So, that can be mapped and then you know, cultural mapping and ecological system mapping can be done, which can capture all these dynamic spatial approaches. And then you can also have historic accounts and mapping, so, you can take auditing of all the historic things which are happening and then you can map it. And

then you can also have landscape histories and other things that can be documented over time like how things are changing. So, you can have all those narratives, which can be used for this.

And then you also find the ecosystem service approach to be very useful, which can take care of all these dynamic static approaches. It can also take care of all the services which nature provides. So, the ecosystem service approach can also be adopted, and you have already seen this and the ecosystem services part where we did the EIA method. So, those are the typologies, that you have seen, and then some methods to capture different components of those types of logic.

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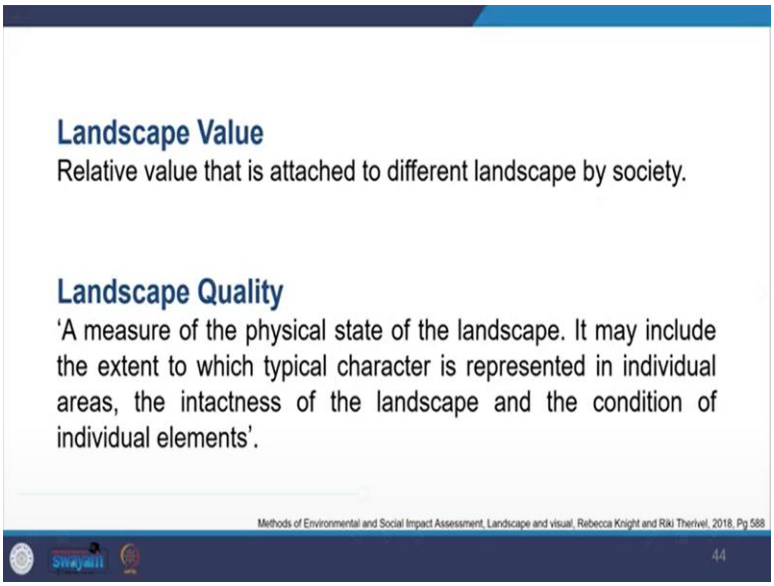

Then now we see another term which is landscape value. So, landscape value means the value that we attach to different landscapes, so, that is landscape value. And then there is another term landscape quality. So, this is said to be like the condition of that landscape, the physical condition of that landscape, which might include how much area is there, how much intact it is there intact it is, in terms of landscape, why and how intact are the individual elements within that, so it will look at the landscape quality. Then you have another term landscape quality, if you see that it will also relate to the landscape value, so the better the quality, they might have more value to it.

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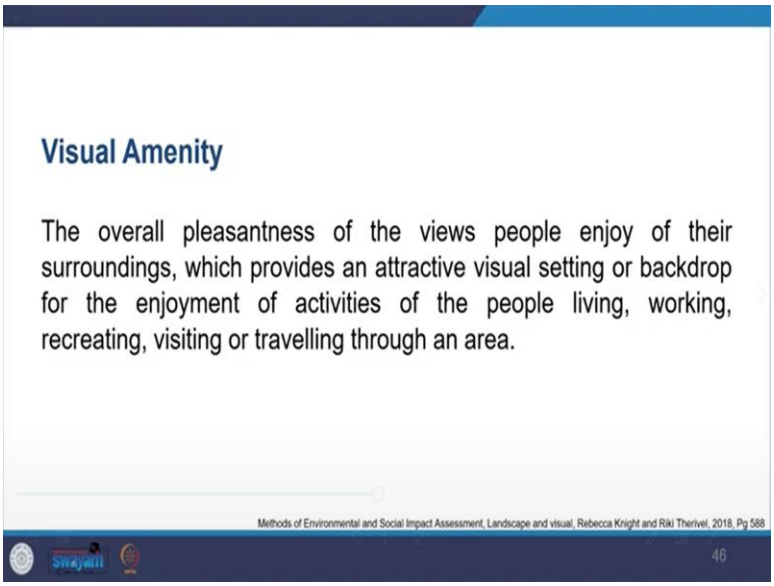

And then you have another term which is visual amenity. So this is described as, how pleasant, the entire environment is and how people enjoy it and cherish it. And how it attracts people visually attracts people. So that is a visual amenity. And then you also see that when you are dealing with landscape, and now by now you have seen several other topics as well. So you would also feel or think that it is so much connected with the other subjects. So yes, this particular domain has a lot of like, interlinkages with the other domain.

Whenever you do EIA for this component, you might have to cross-reference with the other areas like you might have to link with geology, you might have to link with terrestrial, aquatic ecological, heritage, and all these dimensions, you might have to cross reference here. So that was about the concepts.

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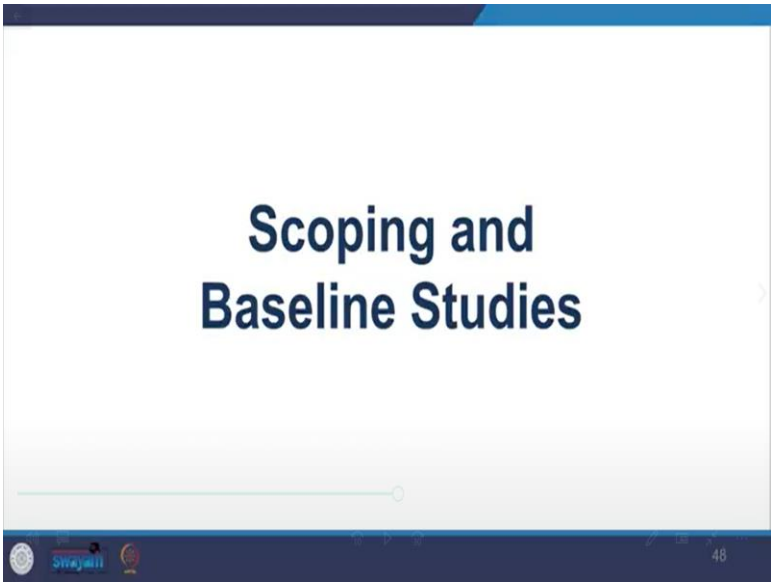

Now looking at the scoping and baseline studies. So here, it is this is an important stage we have been saying. In this stage when you are dealing with landscape and visual assessment, in scoping, you determine to what extent you are going to do it how far you will go what kind of data you will collect.

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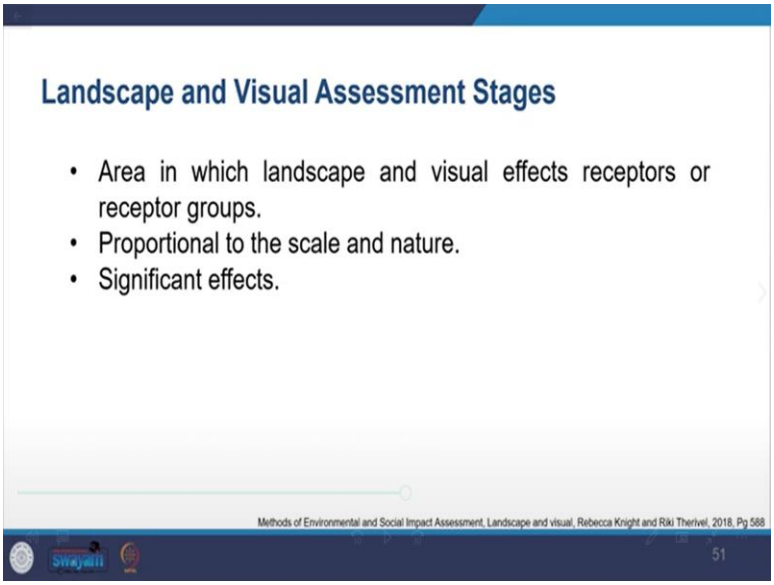

So here you identify, like which area you want to cover for your landscape and visual assessments to identify the changes. So you have to demarcate and delineate the study area. Then you also need to identify different receptors or receptors who would be there so you need to identify them. Further, you need to see how big the intervention that you are going to do, and how big the landscape or the context in which you are is going to make an impact.

So you need to see those things in proportionality between the proposed project and the landscape you are talking about. And then like, we have been repeating it like whenever you do the scoping stage, you look at only these significant effects. So, if things that might not have a significant effect in effect, you might drop those team areas.

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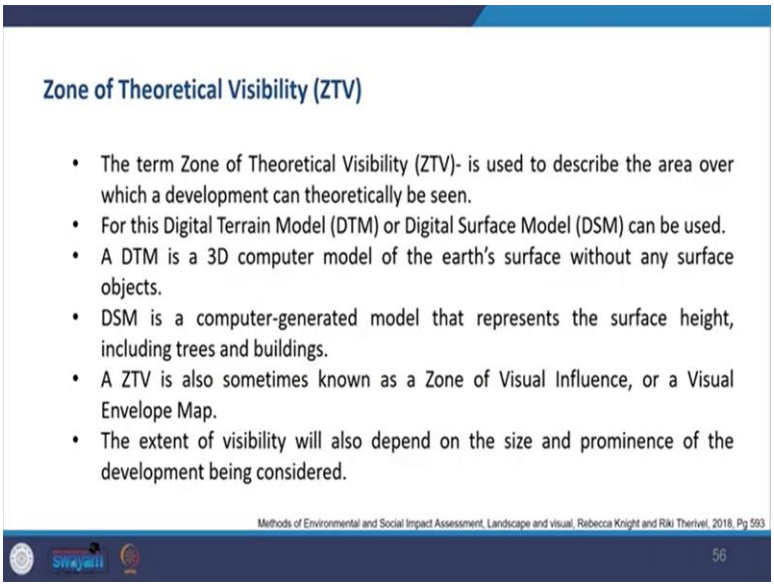

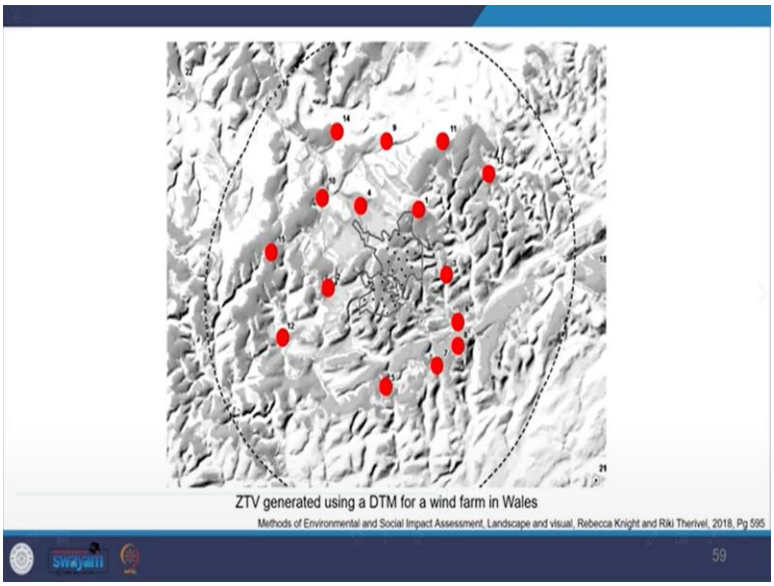

So, there are like, when you identify these study areas, there are certain terms which you need to take care of that zone of theoretical visibility. ZTV, or ZTV. The way you might be pronouncing it. So, ZTV here, this is like the project area where you will undertake the study, where you will assess, and where the significant effects would happen.

So, that is called the zone of theoretical visibility. And zone of theoretical visibility is used to describe the kind of area discovered and what development will happen in that area. And then the best way to undertake this is to have it through a digital terrain model DTM, or you can also do a digital surface model.

So, looking at the difference between the two, you have a digital terrain model is like you have the differences that you have water 3d computer models. But it is like a digital terrain model is just the profile of the land how it is. The digital surface model will also include all the trees heights and buildings, which would be covering that terrain as well. So you can have both of them as per your requirement DTM or DSM and ZTV is also called

a zone of visual influence, or it is also called a visual enveloped map as well. So you might come across these terms, also, and how far this study area has to be.

So this also varies depending on the nature of the project, or the proportion of the project versus the landscape. So the range can be like, from 10 kilometers to 30 kilometers or even beyond that. So that was about scoping.

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Now looking at the baseline part, so we will see how we undertake the landscape baseline study.

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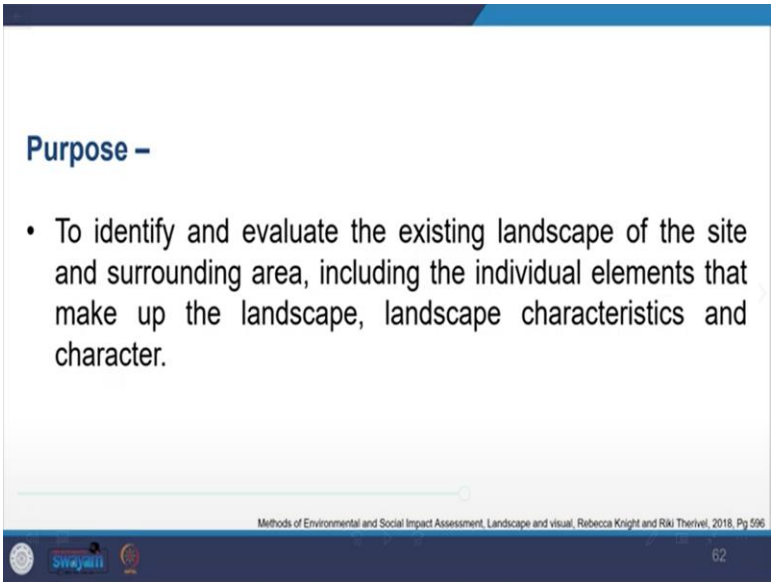

So the key idea about landscape baseline study is that you identify and look at you assess how is the landscape in what study area you have decided to take and how the surrounding area is. And then you also need to identify all the individual elements which are of importance. And, then look at the characteristics of it like how the proportion is, and look at it from the perspective of the local people. And then look at what you should cover in value during the baseline study.

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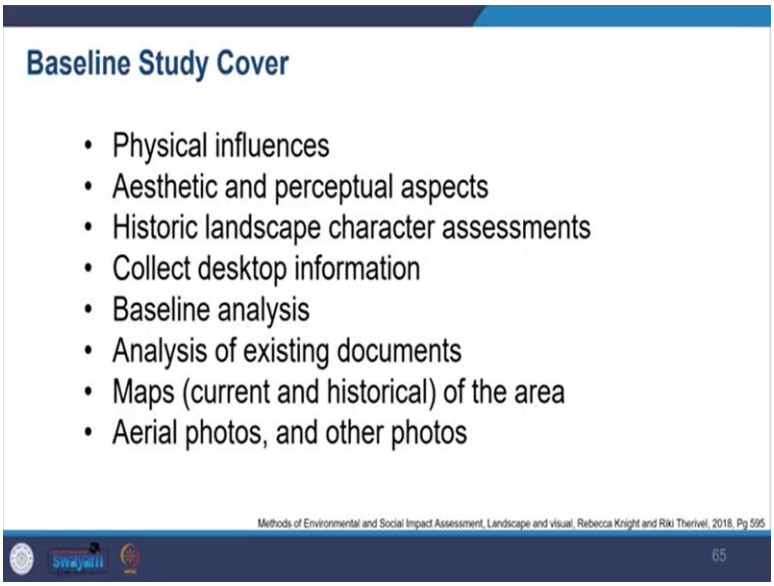

So you look at the physical aspect, the geology, and all those things. And then you also see how human activity influences it. And then what is the aesthetic part? How do you perceive it how all of these come together and how is the historic landscape you have already seen different characters, different factors which influence these things. So all those factors have to be seen when you are undertaking the baseline study. You can undertake this baseline study to the desktop data collection, as well as when the field survey has, has to be also taken if required.

So based on this, you would be taking baseline analysis and you would be doing an analysis of the existing documents, and maps, you would be looking at the current maps, you would be looking at the historic maps of the areas, and then maps of the landscape and all the other designated areas. So there are certain techniques to find out the study area.

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So you can use the participative consultative technique. So you can have all this technique you can walk along with the people and then try to find out what areas are important and what areas they take pride in. So you can ask people about what they use and what they perceive about a place. And you can document them.

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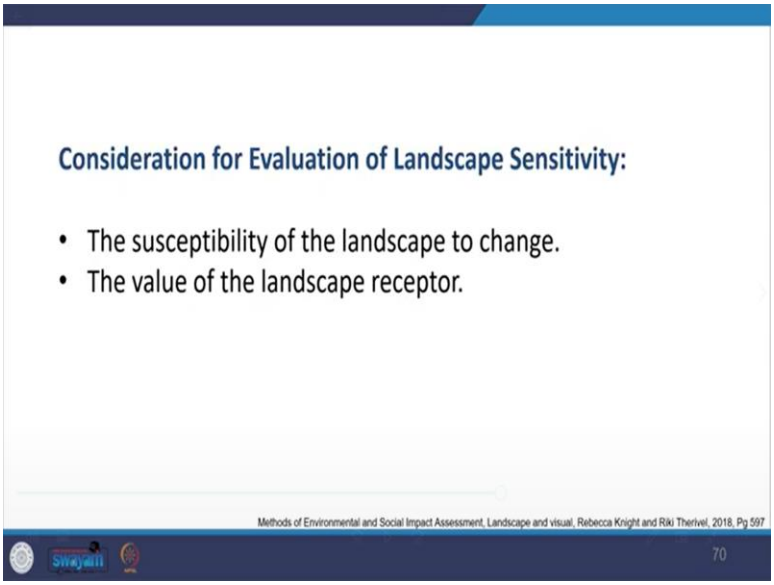

So further, how do we evaluate the sensitivity of the landscape? So to check the sensitivity of the landscape, you see how susceptible the landscape is there to change whatever change will happen, whether it will be able to adapt to those changes or not, and what kind of value the receptors give to that landscape. So that is about the landscape assessments.

Now we are going to look at the visual baseline. So for the visual baseline also need to undertake depth studies that would involve ZTV and base maps have to be prepared. Based on that you will be undertaking the visual assessment.

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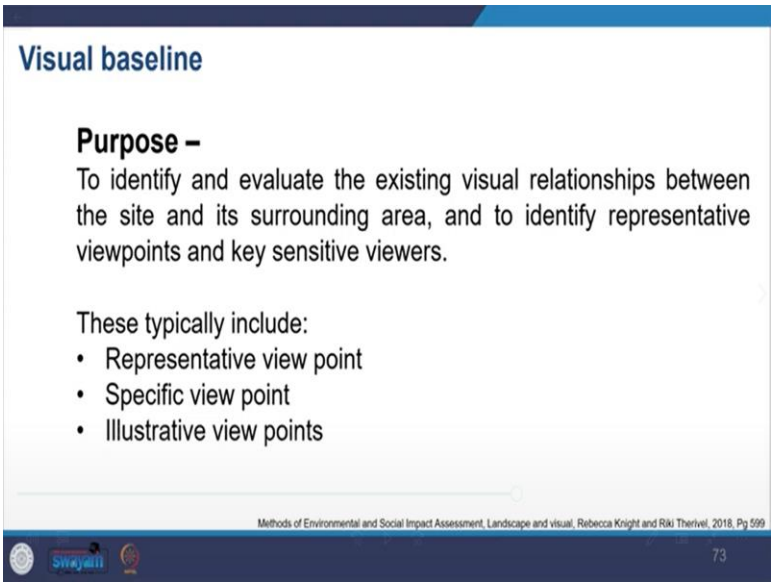

And then the key idea of taking a visual baseline assessment is to identify and find out like what are the visual relationship between the site and the surrounding areas. So how do they work together, and you need to identify different viewpoints. And then you also need to identify key sensitive viewers who might be very protective of those places.

So, these spaces might include like representative viewpoint, where you have visual receptors, where you identify them, then you can have a specific viewpoint, then you will also have an illustrated viewpoint where you might have restricted areas, but you might illustrate that how possible views could be.

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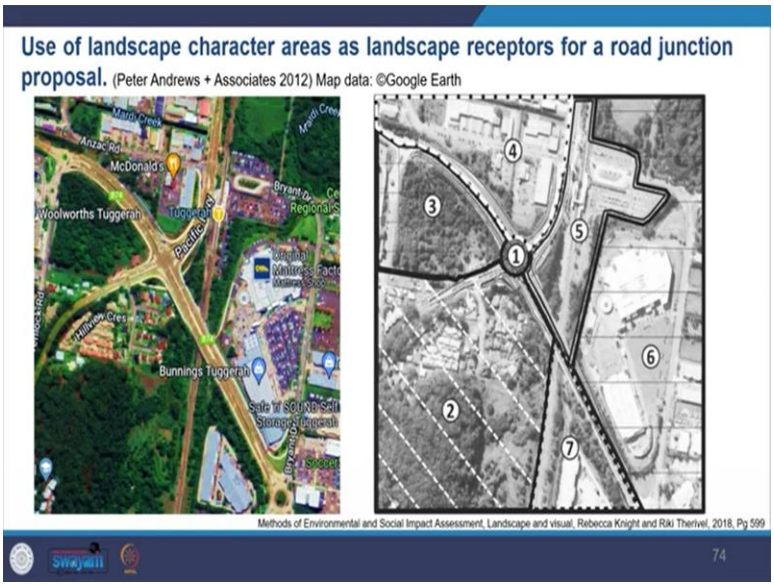

So, you can look at certain examples here about various landscapes. And then you can also have impacts which can affect the living conditions of the residents, they can be noise, they can be dust changes in the daytime sunlight. So how the street lighting is there, what is the time of working and how does that impact the land

landscape, you can see in cases of wind turbines, then they can be a shadow area. So the impact can all be seen, you have to see all those impacts in and cumulative manner and EIA assessment.

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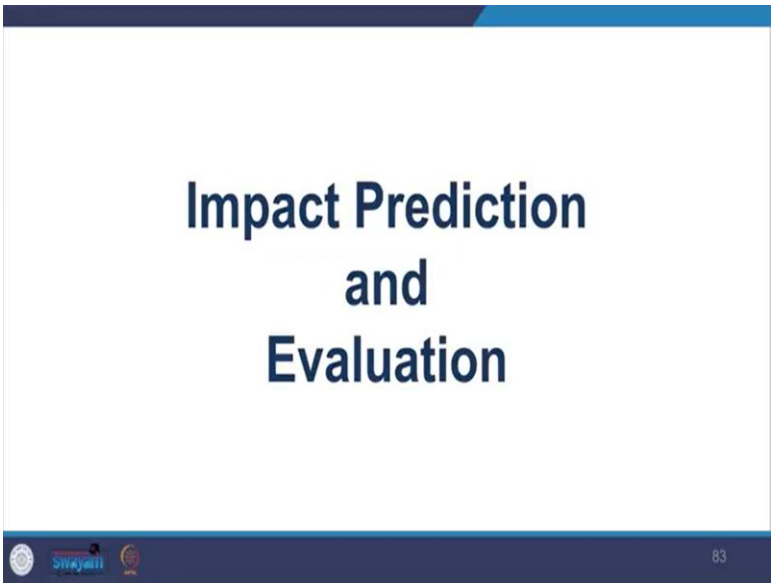

And now looking at the impact prediction and evaluation. So when we undertake impact prediction and evaluation, we look at how effectively we can tell about what is going to happen with the environment, like what is the nature of the change. And what is the likelihood of change, and what is the significance of the change? So it is very subjective. So it is going to be a really difficult part to handle. So what is going to happen because of the kind of change, which is going to happen here?

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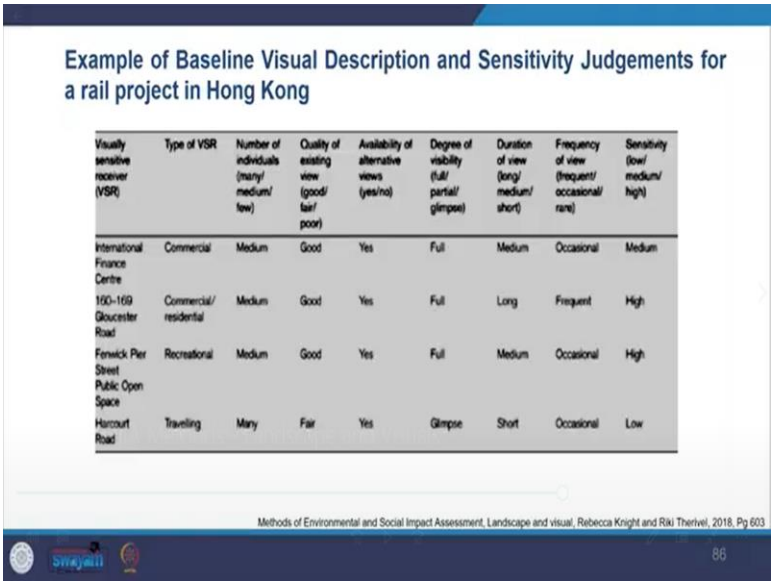

So here, you can see how they are assessing the sensitivity of the different visual receptors. So here you can see the visually sensitive receptors, different receptors and different kinds of changes, what type of receptors are

there? And to what level that environment will change? And what is their sensitive sensitivity towards their environment?

So how do we assess the landscape effects? So landscape impact assessment would like really through this, you would like to tell what is the nature and the scale of change, which is going to happen, and then because of those changes, what kind of impact it would happen on the character, and then the entire landscape character might change because of those effects. So that is all you need to tell.

You need to also look at the characteristics of the project. And then you need to identify all the sensitive areas, which might be affected because of your project. So whenever you check the significance of that you generally tell what scale of change is happening. So whether there is a very common scale adopted like whether you tell it is a large scale change, it is a medium scale change, it is a small scale change, or as like there is no change. So you tell me about that. So you can see the change scale of change.

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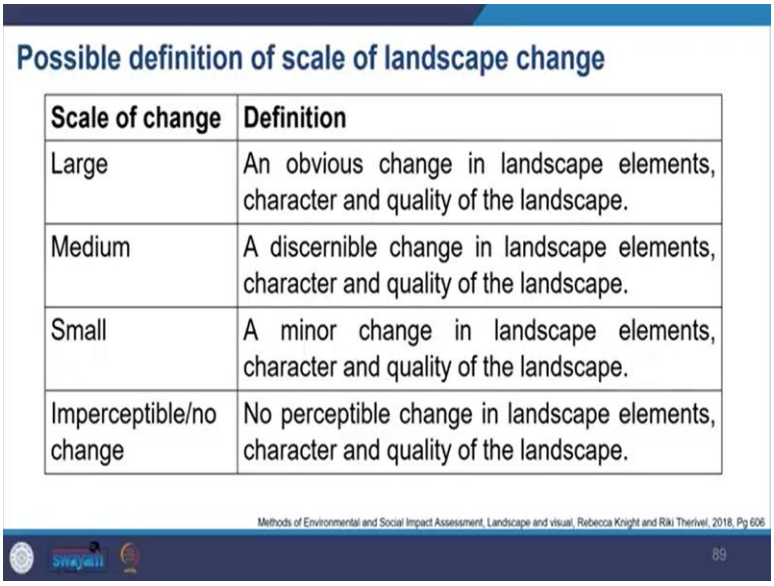

So in this table, you can see, whether that is changes larger, medium or small. So depending on that you make your decision. How much is to be acceptable or not?

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Example of Landscape Assessment

Summary	• Industrial and commercial area incorporating one- and two-storey buildings. • The rear of the Petbarn, and McDonald's and Hungry Jack's restaurants adjoin Wyong Road; however vegetation screens this view.
Topographic features	• Landform slopes away from roadway

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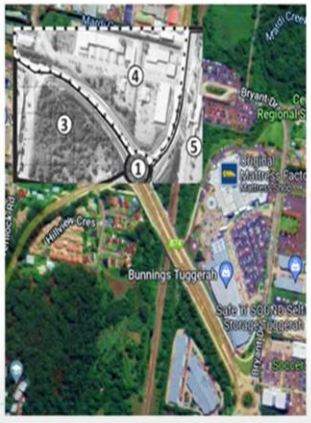
Example of Landscape Assessment

Drainage/ hydrology	• Engineered drainage associated with road corridor. • Flood prone low elevation land north-west of road corridor.
Geology/soils	• Vegetation adjoining the roadway edge generally growing on fill batters. • Adjoining low lying soils associated with broad floodplains with restricted drainage.



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Example of Landscape Assessment

Vegetation type/cover	• Vegetation with Casuarinas (8–10 m) on western side of roadway. • Open character associated with development along Anzac Road includes turf grass with new planting of Cupanopsis anacardodes along section opposite railway station. • Mix of individual tree planting of semi-mature Findersia sp. and Gazania sp. ground cover in the median.

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Example of Landscape Assessment

Spatial quality of area – open or closed	• The area is generally open.
Infrastructure – scale/pattern	• Bus lane • Street lighting • Turning lane to Anzac Road • Signalised intersection at Anzac Road with pedestrian crossing and bus stop.

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Sensitivity	Low	Comments
Magnitude	High to moderate	The proposal would remove most of the existing roadside vegetation and expose the road and proposed retaining walls.
Impact	Moderate	

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This is another case where you see where you assess the landscape, with all those aspects, the factors, which you saw in terms of topographic features, how much it is changing the components elements, how much they are changing the drainage or hydrologic, geologic, and soil. So in the landscape, you are cumulatively seeing everything. So the vegetation type cover, then archaeological history, how it is changing the spatial quality of the area, the infrastructure scale pattern, what is the magnitude, and then how is the impact of that?

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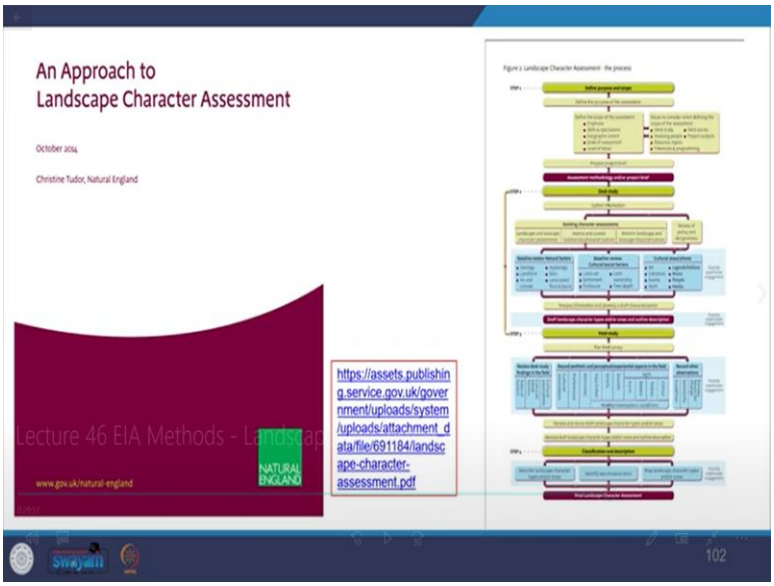

So here, have also given you a link to the landscape character assessments, the guidelines which are there. Then you can also look at the process they adopt. So the process, you can see, how you define why you are doing the assessment. Then you look at the what is the scope of your assessments you look at where all the emphasis would be what kind of specialization what kind of study area has to be taken what level of detail has to be done. Then you would prepare the project brief and then you would undertake a look at the mythology you would undertake the test study then you would gather information.

Then you will create all kinds of baseline information on natural factors social factors cultural factors. And then you would do a detailed field study and then you would undertake a review and then you would classify them and then you would undertake a final landscape character assessment.

So this link I have given to you for this. And then now looking at visual assessments how do you assess what kind of visual effects will happen? And then what you look at it is when you do the visual impact assessment so you look at the likely nature and scale of changes that will happen from the developments. And then what will happen to the receptors of these elements?

And here again, you might have to look at the sensitivity of the subject and then the nature of change which is happening and then you have to make an overall judgment. So if you have taken note then you see that we have seen so far geology separately and water resources but when you deal with this landscape you are seeing everything in a very cumulative manner everything together and then making a judgment. So while looking at the magnitude of what kind of change will happen would depend on the scale and size of the change and to what extent the change is happening.

So when we look at the scale of change we see to what extent the change is happening and what kind of change is happening in terms of composition of the view. And what kind of laws or what kind of new elements are

coming in and then what kind of contrast we are creating in that particular place so all those things you look at it.

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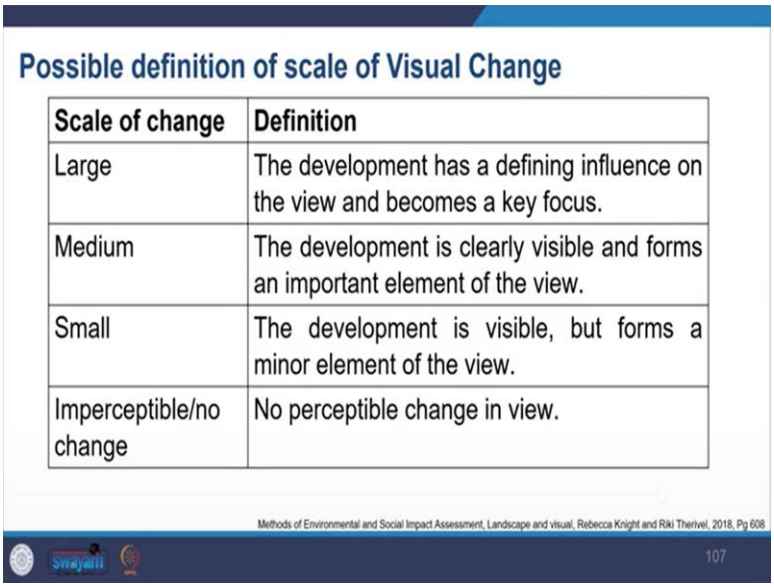

And you can describe these changes in again large, medium and small and no change kind of thing. So here you see again the visual change like that is the commonly used scale here so is this a large-scale scale change or a small-scale change if there is no change in the view which you are looking at? So you need to find out what kind of geographical extent this change is happening and what is the sensitivity and magnitude of that when you are dealing with the visual changes also. So that will also again depend on the project magnitude.

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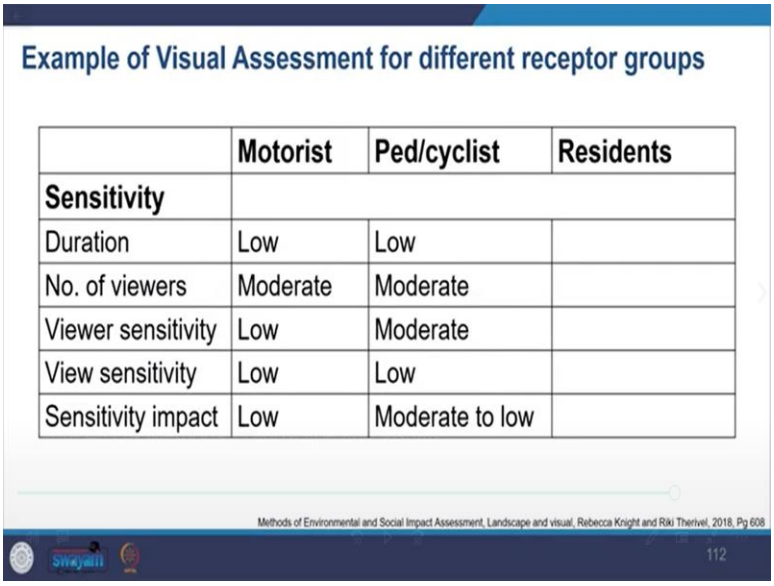

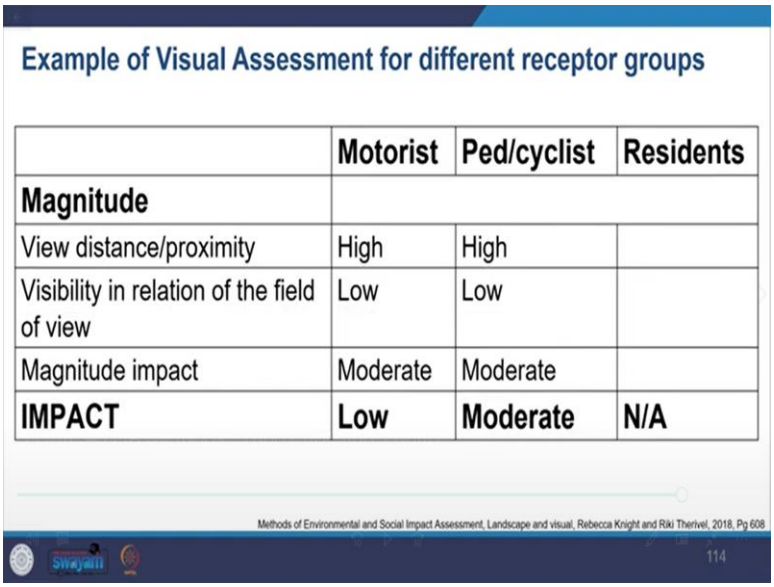

So here from one of the examples you can see how they are looking at the sensitivity. And then what kind of users what kind of impact it would have like motor, cyclists or residents and cyclists over there so how sensitive they are and then what impact it would have on there. So now, there can be different ways how you can show the visual impact that is happening. So you might have to graphically show the visual effects for your project.

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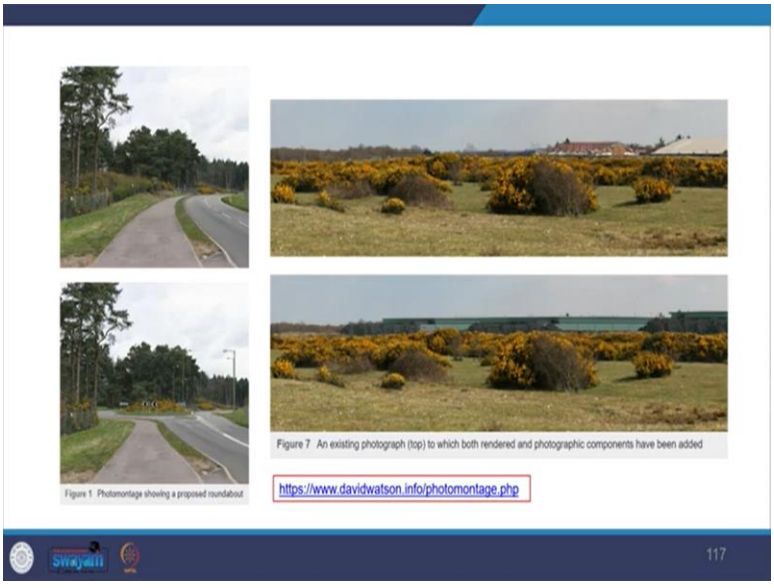

So you can use photography you can use photo montage which means overlapping the real scenario with the projected scenario. So you can have virtual reality and then the form of visualization that can be used to depict the landscape and the context that is there. So a photo montage means you show the observer what the proposed development would look like.

So you also have video montages where you can have like animated photo montages and you can show how it is happening so these are also getting very popular and these can give a good understanding. So here you see how the photo montages you can see on the upper that there is no change and then with the new island how the

changes are happening. And then the lower side you can see without project and then project how the landscape is going to change so you see that here.

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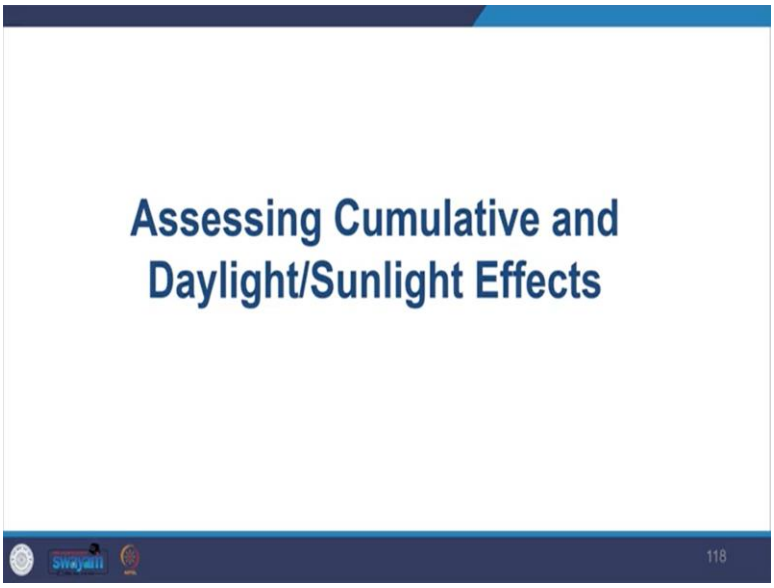

Then you might also have to assess with cumulative daylight and sunlight effects. So it is very difficult you might see that the landscape itself is a cumulative aspect. And then looking through the time pattern looking it through all the kind of projects that might come up that would add a lot of complexity to the process.

So, it is very complex and it is still an evolving process the complexity is because of like what future projects might come up because of the policy and what kind of change can happen. And which project future project might get passed or not passed so all those complexities are there. So it is said to be like really complex project to assess the cumulative impact.

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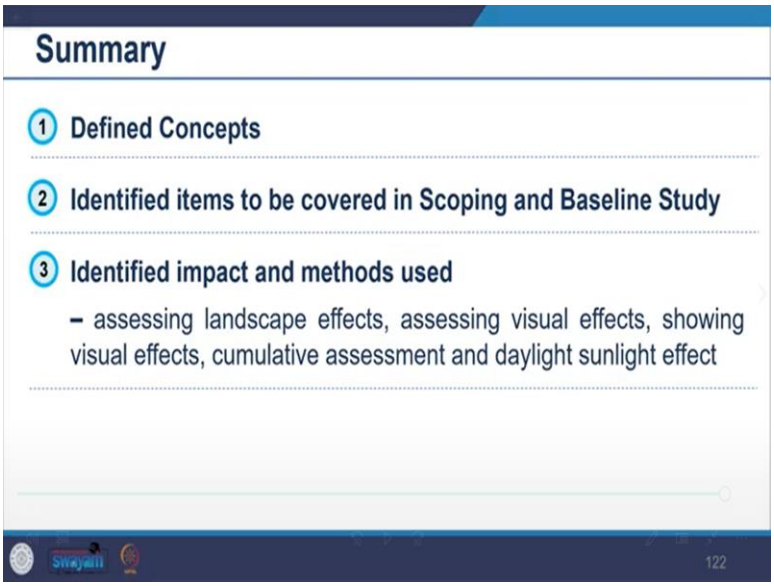

So this was about the landscape and visual assessments summarizing what we covered today we looked at certain concepts. Then we identified items to be covered in the scoping and baseline study then we looked at different impacts and methods tools and techniques that are used in this domain. And we do landscape effects and we also understand the visual effects so that was our coverage for today.

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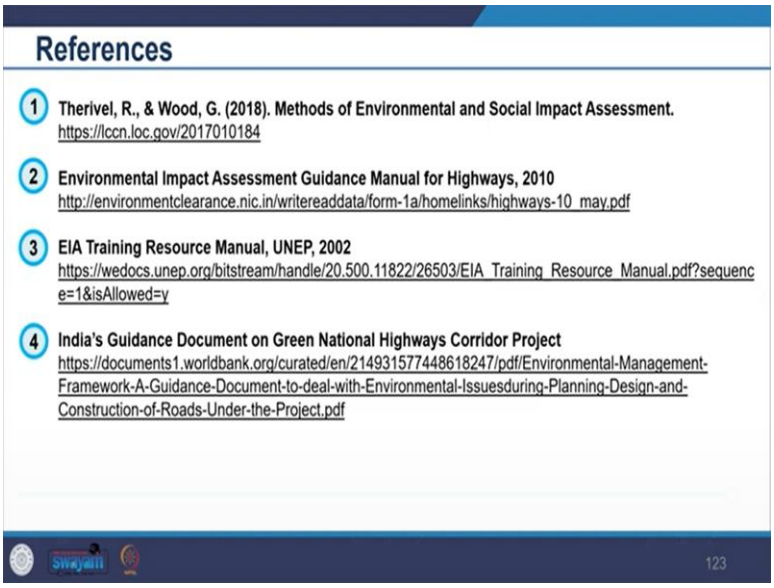

So these were the references which we used for this part.

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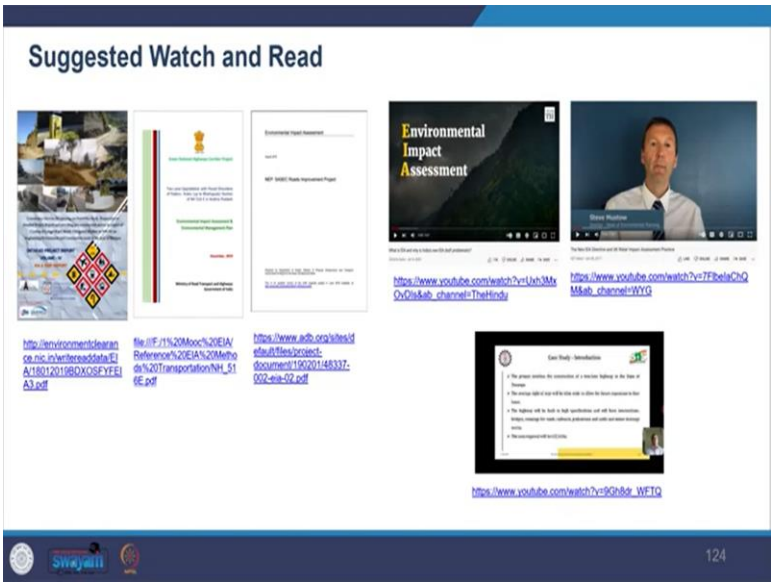

So these are the suggested watch and read.

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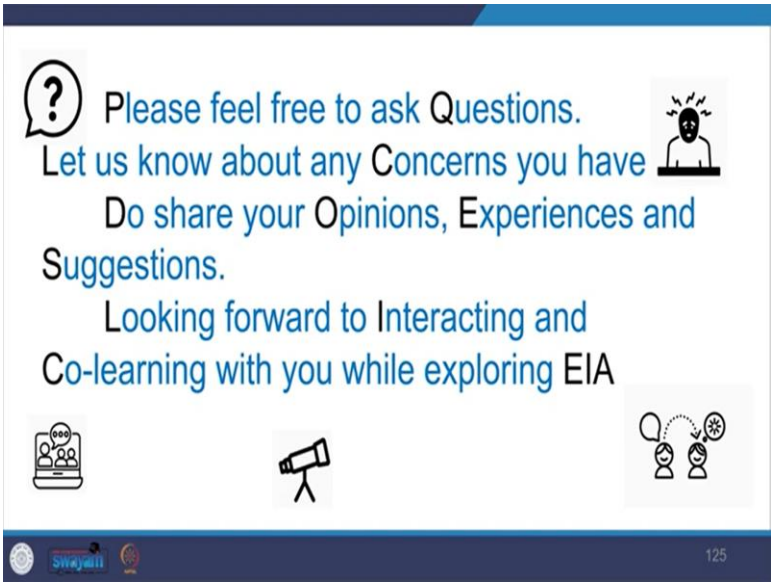

Please feel free to ask questions and let us know about any concerns you have. Do share your opinions, experiences, and suggestions looking forward to interacting and co-learning with you while exploring EIA. Thank you.