Sustainable Transportation Systems
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Lecture No. 19
EIA Case Study – III

Hello friends. So, in a series of EIA related case studies, we are today discussing the case study third related to hilly roads and I forgot last time to include that one more case study will be there related to EIA of airport. So, there will be total 4 case studies I mistakenly said that only 3 studies are there, but we have 4 case studies so that you can have a complete picture whether of like we have done related to high speed railway corridor and then inland waterways, this is hilly road and then the airport. So, all air, water, road and railway all four components will be addressed properly through these case studies.

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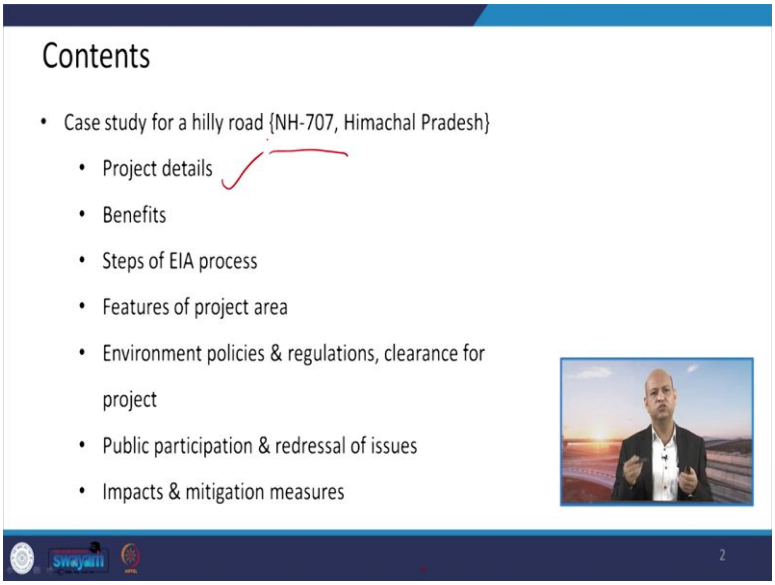

So, in this case study of hilly road, we will discuss the EIA of national highway 707 which is in Himachal Pradesh, one the state of India. First of all, we will discuss project details, what are different components and features of the project and what are the benefits which have been envisaged through the study and then different steps of EIA, the complete EIA process and features of the project area and environmental policies and regulations or clearances of the project which have been combined in this study and then the public participation and redressal issues and impacts and mitigation measures all these will be discussed before concluding the case study of hilly road.

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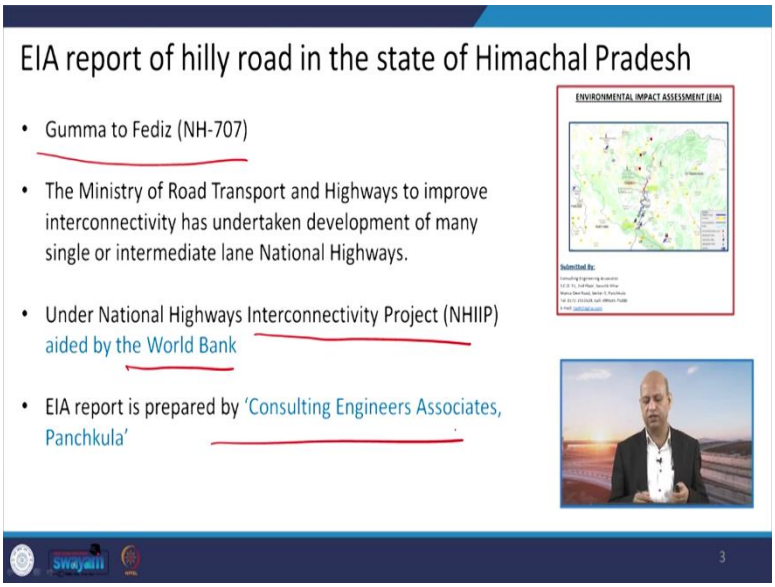

Well, this report basically, from this national highway from Gumma to Fediz, this is in Himachal Pradesh and under National Highway interconnectivity project, NHIP, National Highway Interconnectivity Project. This has been funded by the World Bank and Ministry of road transport and highways to improve the interconnectivity between within the state as well as connecting with other highways, interstate highways, those were promoted through this particular project and this is part of that bigger scheme and one consulting engineers associate they prepared the EIA report.

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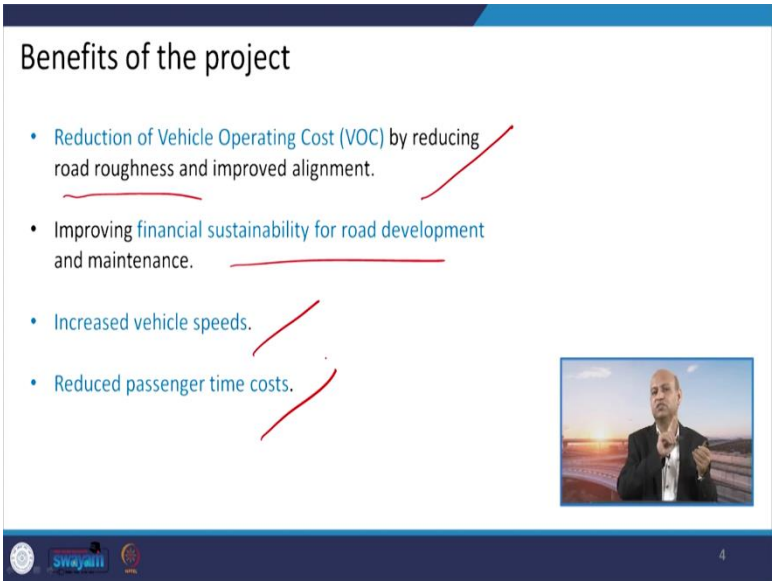

So, we have taken from that particular EIA report this information which is the part of the presentation. What are the benefits of the project, why should we go for this project? So, like,

if we go to this project or this was a studied and found and observed that reduction of velocity operating cost, vehicle operating cost. So, by reducing the road roughness, because if there is no proper highway, then the speed is slow and vehicle movement is not so good in terms of the speed and velocity.

And so, if we have this highway, then the speed will be more and the time will be saved. So, operating cost will also be saved, because when we can move that very slowly speed, then lot of fuel consumption is there then financial sustainability for road development and maintenance because, otherwise, if we do not have good roads, then we do not have much money for that particular project also, because any project also gives some money through different taxation.

Increased vehicle speeds as we have discussed then reduced passenger time cost. So, time is the something or resource which is equally distributed to all, but traveling a particular distance if more time is taken and rather than in other modes of the systems which takes less time, then that slow system is costly. Basically, we are investing more time which can be used for other gainful purposes or productive purposes. These are the steps which have been included in the EIA study.

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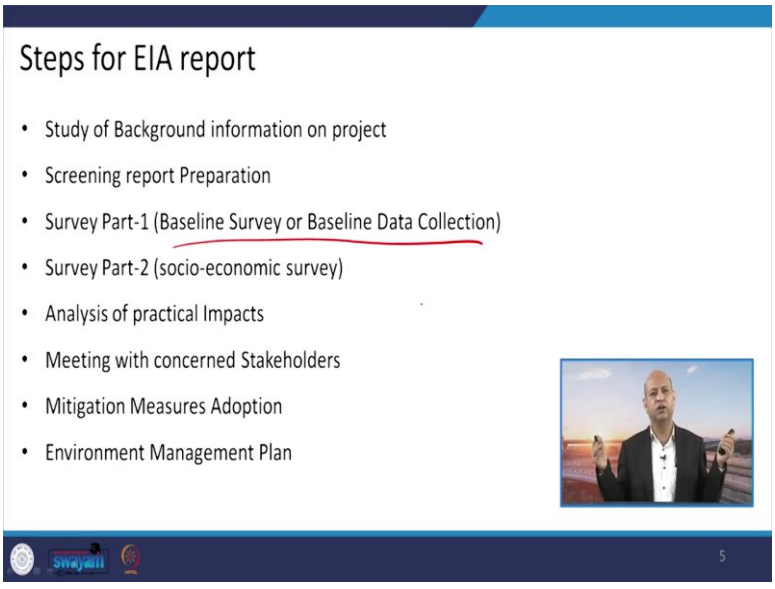

First of all the background information on the project was studied, we call it baseline data collection that means, what is the type of soil, what is the air quality, what is the water quality in and around the project area and then the screening report is prepared so that we can know that how much EIA is needed whether quick EIA is okay or detailed is needed or it is not needed all those information we do.

Then the survey part 1 that is the baseline survey, as we discussed for baseline data collection survey 2, socio economic survey. So, these two surveys were conducted to collect the data and then analysis of practical impacts which could be on flora, fauna or on society or the topography all and meeting the concern the stakeholders, that is again the public participation, that has to be ensured and mitigation measures have to be adopted according to the feedback and according to the study findings.

And then the detailed environmental management plan or EMP is prepared so that, according to the plan steps, all those issues are addressed properly.

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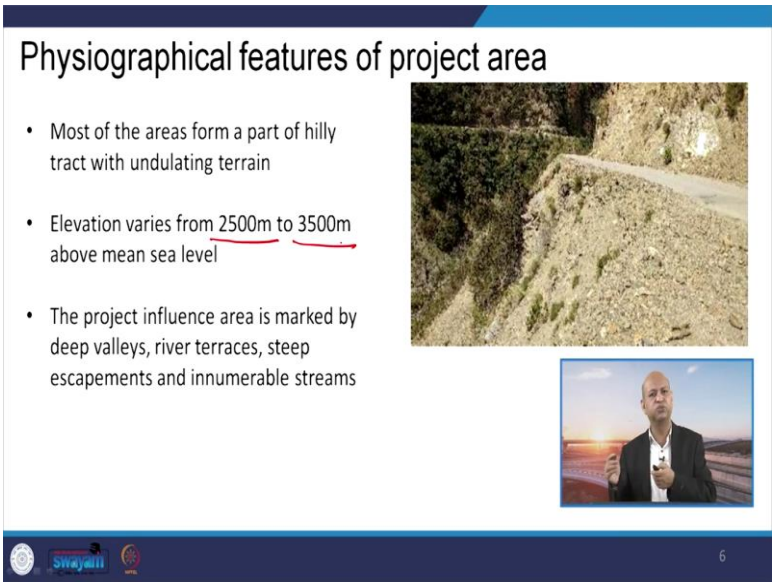

Well, when we see about physiographical features of the project area, so this is hilly area so, elevations can vary from one place to another and it can vary from 2500 meter to 3500 meter above mean sea level. So, 1000 meters difference can be there, you can imagine what kind of challenging project it is.

So, there are deep valleys, then some drainages are there, rivers terraces are there is steep slopes are there and many streams are in between. So, all those features have been mapped to which this highway has to cross or has to traverse.

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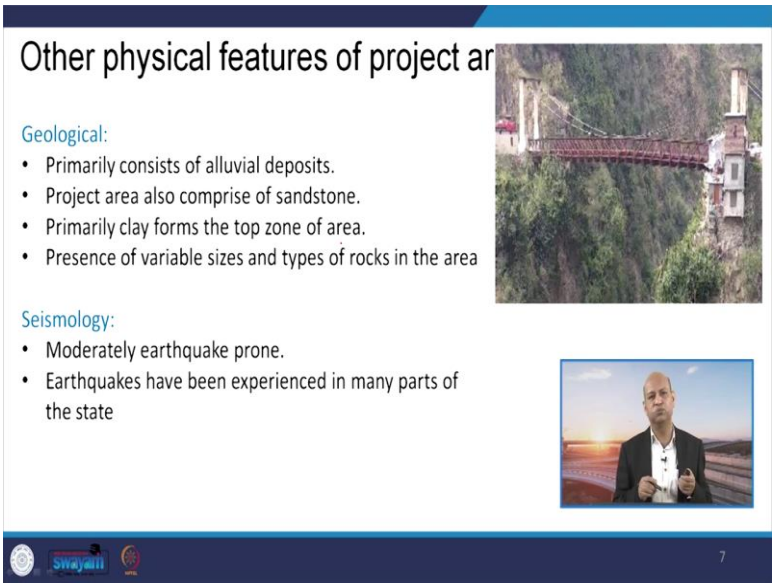

Well, other features like geographical or geological features, so, like what kind of deposits are there. So, according to the soil treatment is needed, whether it is clay or alluvial deposits or some other kind of soil, then there are certain stretches where sandstone is there. So, for that other treatment would be required and what are the top zone of the area clay form is there. So, what kind of treatment will be required to stabilize that soil and presence and size of different rocks and gravels all those things have been studied and noted in the project report.

Then, seismology because moderately earthquake prone area it is and some experiences are there in different parts of the project length stretch that those earthquake related issues should be addressed properly.

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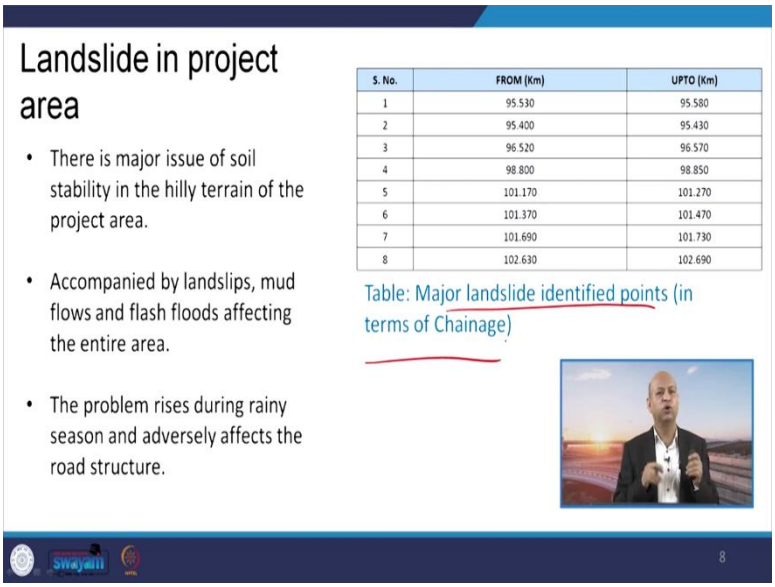

Well, then there are because this is hilly area and steep slopes maybe they are at certain locations, landslide possibilities can be there. So, those points are noted. So, these are the major landslide identified points in terms of the chainage, means distances from the particular point. And like flash floods or very mudflow those kinds of observations were properly noted and listed so that, at those particular locations, some treatment must be done to avoid those kinds of incidences.

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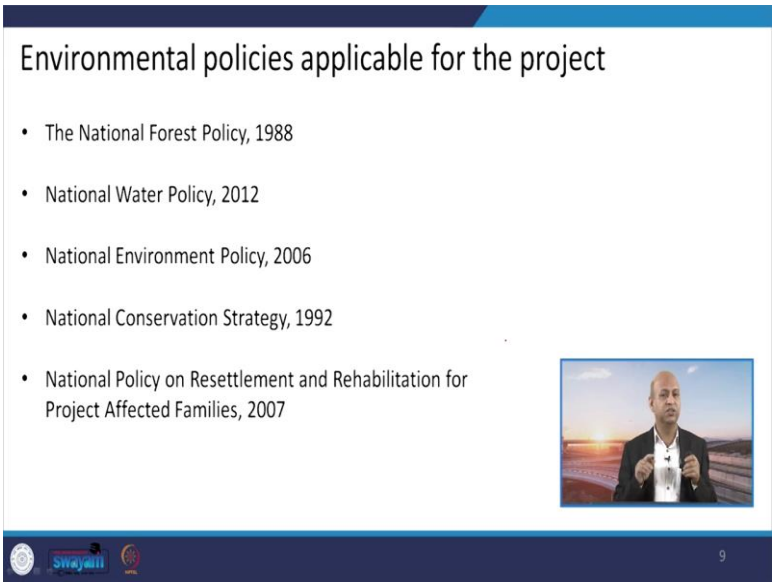

And as we do in all EIA studies that the law of the land should be followed. So all environmental policies which are applicable for the project were listed and those policy parameters were properly taken care of. And these include like National Forest Policy of

1988 or National Water Policy of 2012, National Environmental Policy 2006, National Conservation Strategy of 1992, National Policy on Resettlement and Rehabilitation for Project Affected families of 2007.

So, all these guidelines and policy frameworks are to be taken care of because they provide us proper way how to deal with those situations which are related to these policy parameters.

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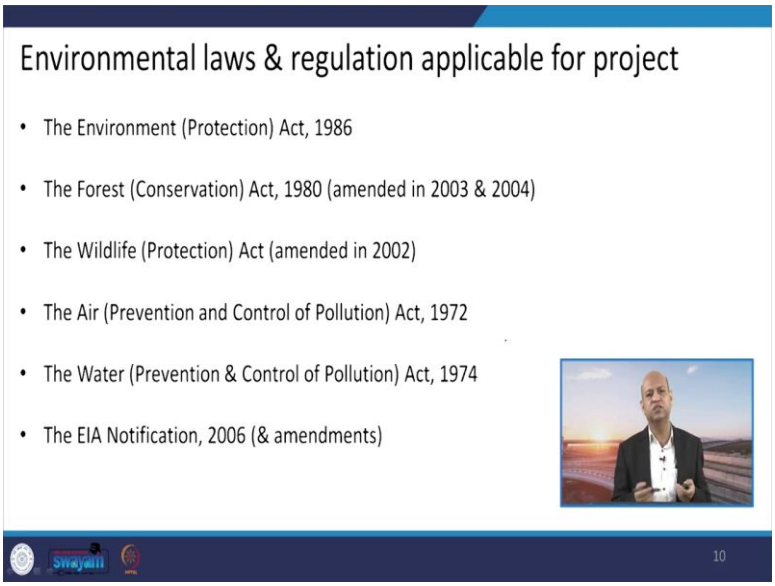

At the same time, there are certain laws and regulations related to environment like Environment Protection Act of 1986 which is the backbone of all later on acts and regulations. And then Forest Conservation Act 1980. That was amended later on in 2003 and 2004. And Wildlife Protection Act which was amended in 2002.

The Air Prevention and Control Pollution Act of 1972, Water Prevention Control of Pollution Act 1974, the EIA Notification of 2006. And now new EIA Notification draft of 2020 all these what are the recommendations or features or aspects all those things have been taken care of for this project implementation.

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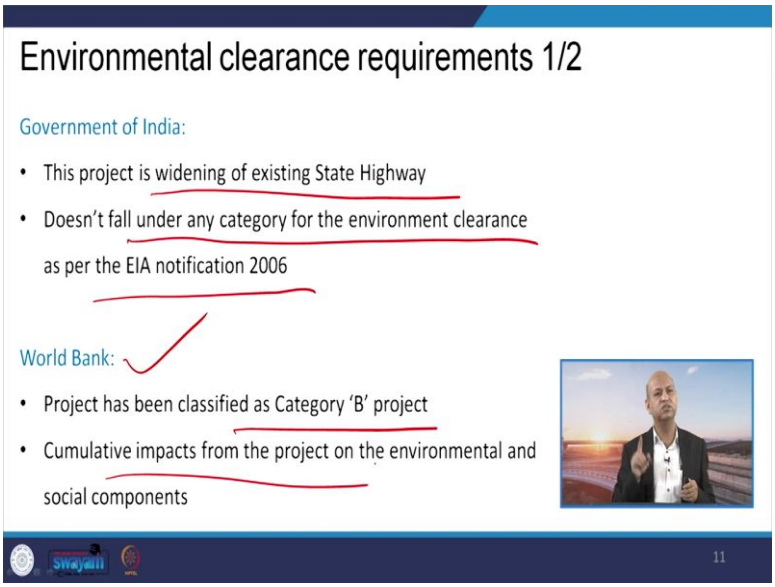

Well, the environmental clearances related aspects are very interesting in this particular slide I would say like as per government of India rules and regulations. This project is nothing but widening of existing State Highway. So, that means it does not fall under any category of the environmental clearance as per EIA notification of 2006.

So, no EIA is required detail EIA is not required. But the funding was from the World Bank right and they have this category of the project was B category in according to their guidelines and depending upon the cost and the stress and the assessed impacts. So, cumulative impacts from the project on the environmental and social components are to be taken care of. So, that is why this EIA was necessary.

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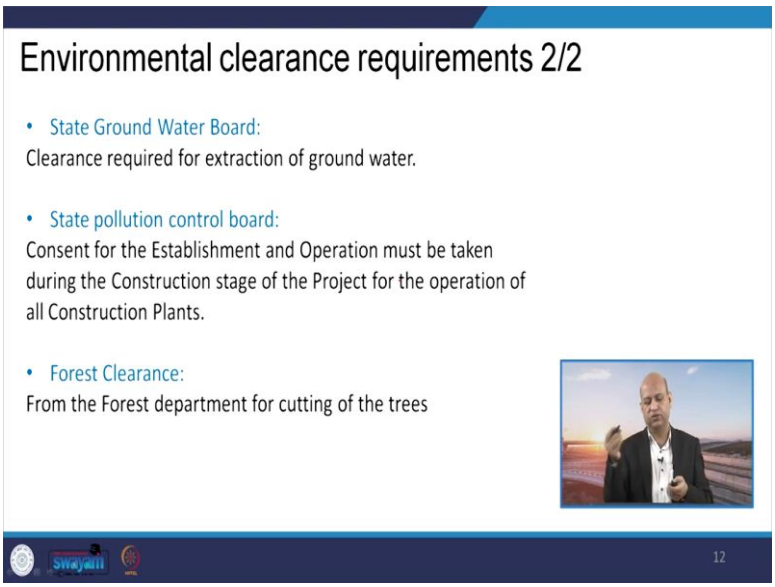

Environmental clearance is related issues were from like a state groundwater board they have different agencies are there which provide some clearances like if you want to extract some groundwater for some activity their construction activity et cetera. Then clearance is required from the state ground water board. And then a state Pollution Control Board is there. So, consent of this establishment and operations are required for different operation or activities during the construction.

Forest clearance is also required because there are certain trees which were marked that they will be cut for this particular highway project. Well, when we compare this is also one aspect that what if this project is not there. And what if this project is there so what will be the changes in connectivity and development.

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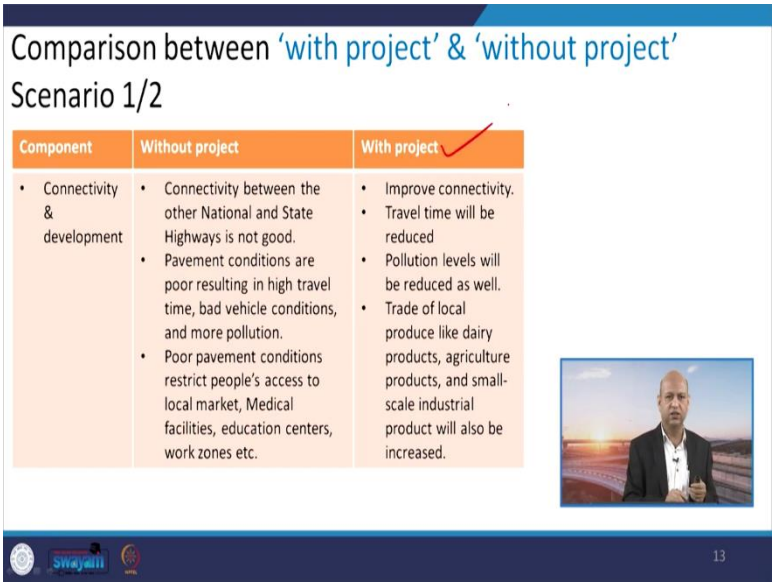

So, without project connectivity is very slow roads are not good. And with project lot of improvement in their connectivity travel time will be reduced significantly pollution levels will be reduced because in undulated those parts a lot of fuel is burnt and lot of emissions are there and then trade also increases because local population has good accessibility to the nearby towns or cities they can take their produces they can go for their services.

So, economic activity enhances so those are the benefits with the project in that sense through the connectivity and development parameter.

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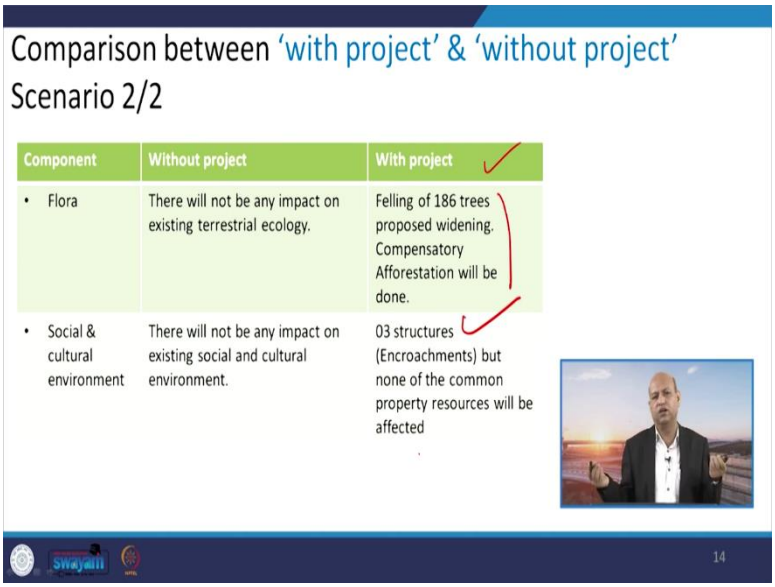

Similarly, like flora and if there is no project there will not be any impact. But in with project there will be impact what impact is estimated like felling of 186 trees. So, some policy is there that if we have to cut some trees, then we have to also plant certain number of trees that is much more like twice or thrice social and cultural environment there will be no impact if we do not do any kind of activity.

But if there are this project is there, then three structures which are basically encroachment they have to be removed. So, that is a positive aspect I would say but none other common property resources will be affected. So, there is no big intervention in that sense.

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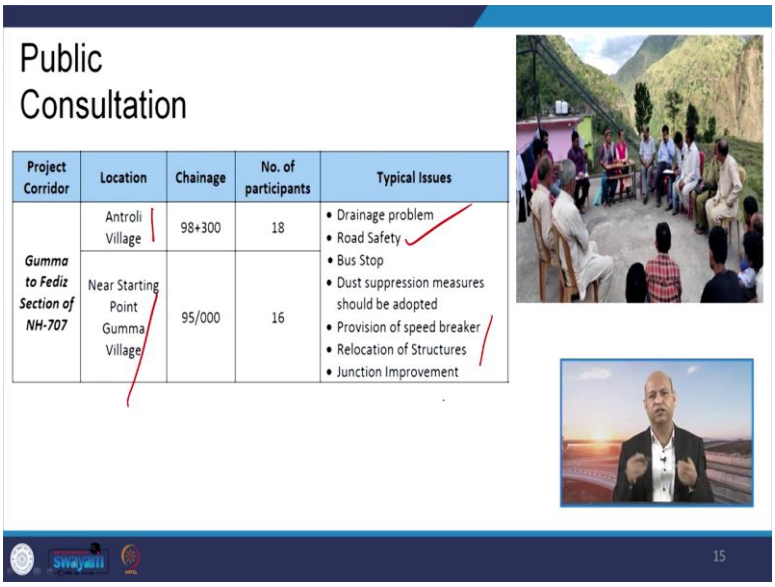

Well, when we see like public consultation. So, there were different locations of one Antroli village and near a starting point of Gumma village. So, at two locations this public participation activity was conducted public hearing was conducted. And all these issues were discussed like what are the problems related to drainage. Because local population has given the feedback drainage related problems or road safety issues.

Because when construction activities going on or when the highway will be good, then a speedy vehicles will be there. So, they feel that suppose their children are working or they are working they are doing some work how to avoid those accident related situations. So, road safety issues then bus stops should be at which place so that they can take the services of the bus. And dust suppression because during the construction activities lot of resuspension of dust occurs.

So, to avoid that what measures will be taken by the company all those things are the issues the provision of speed breakers and relocation of structures. As I said, those encroachment were there. So, that was not a big issue. Then junction improvement means wherever some routes are crossing so again chances of accidents maybe there. If there is no proper signage or proper ways to cross those locations.

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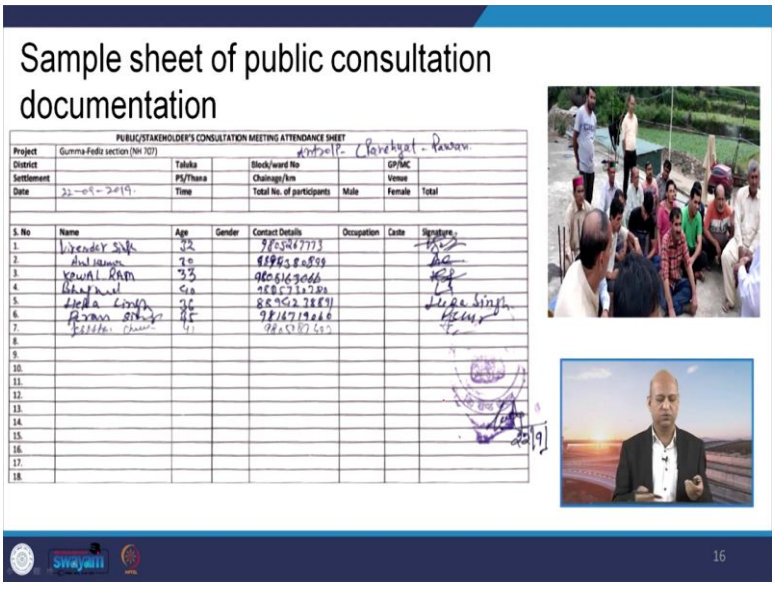

These are the sample seat of public consultation means whosoever were invited they were requested to give their information like mobile and their signature. So, this is just a list that this public hearing was conducted.

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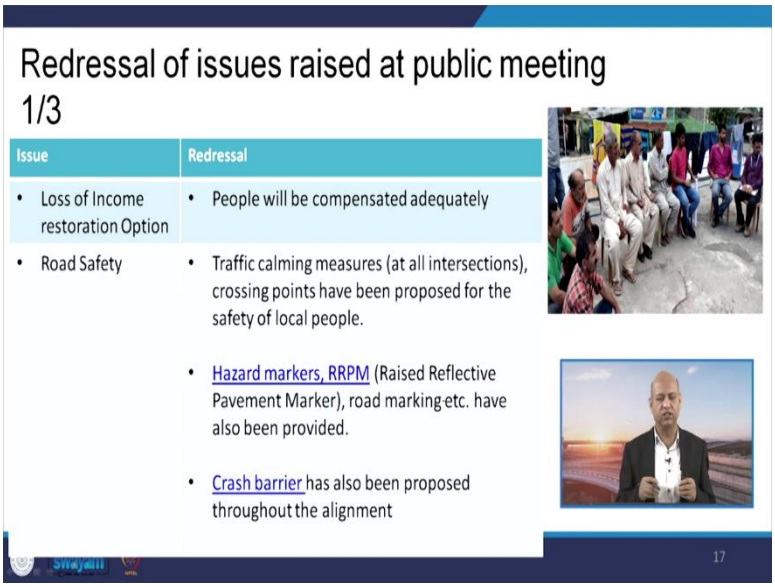

Well, for redressal issues for public meeting so there are like hazard markers and RRPM. Which is raised reflective pavement markers. Those things were properly applied and then the crash barriers to avoid falling of the vehicle or to avoid the accidents. So, those things were taken care of.

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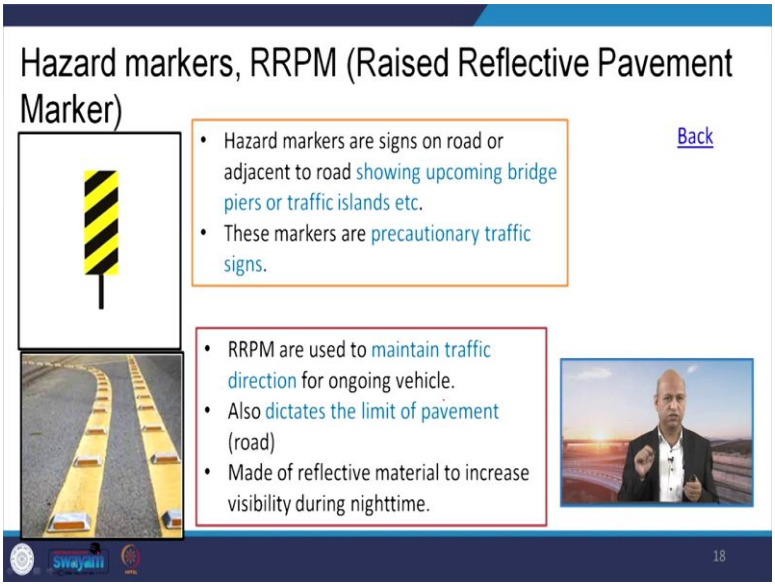

These are the hazard markers and raised reflective pavements. So, that they reflect the light particularly in the night. So, people have proper direction where they have to turn or not to turn or they should not cross those limits. So, those kinds of signs were properly used means this was ensured that these will be used. Well, so after hazard markers we have these crash barriers. So, these are the structures of steel.

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You can see here and on the sides of the road. So, that this can limit the vehicles going off the road if there is some accident or some kind of imbalance so that it can avoid or prevent the falling of the vehicle from the road to the valley or going to another side. So, these kind of crash barriers are also applied.

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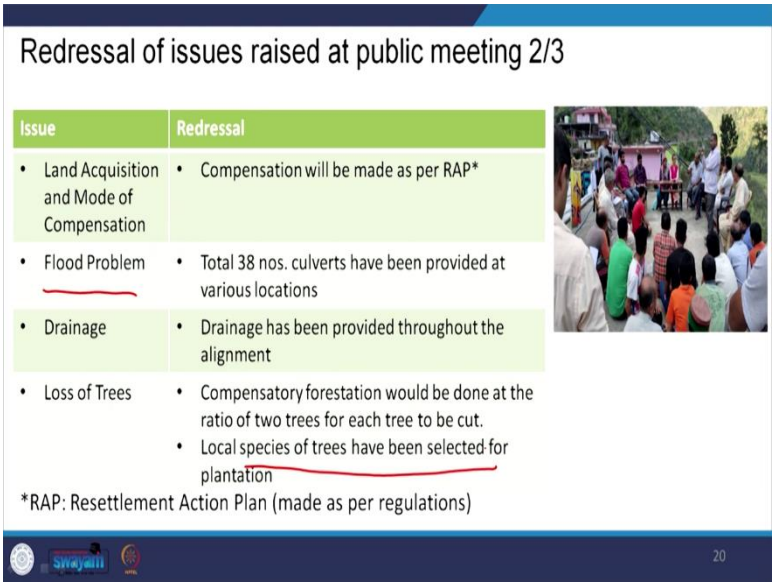

Well for redressal issues. So, public participation has been there. And like around 38 culverts were decided to build to avoid this flood problem. So, that proper drainage system is there. Proper drainage system can avoid flood problems also those channels has to be cleared time to time and then loss of trees. So, whatever trees have been cut so twice or thrice of number of those trees will be planted.

And local species of the trees have been selected for plantation that is very important because earlier we had seen in certain projects that foreign species which were easy to just to grow were given chance. But that was kind of very negative impact on the local species. So, locally species have been identified those trees will be planted. So, in the redressal issues of the public feedback impact on health like due to air pollution due to other pollution emissions.

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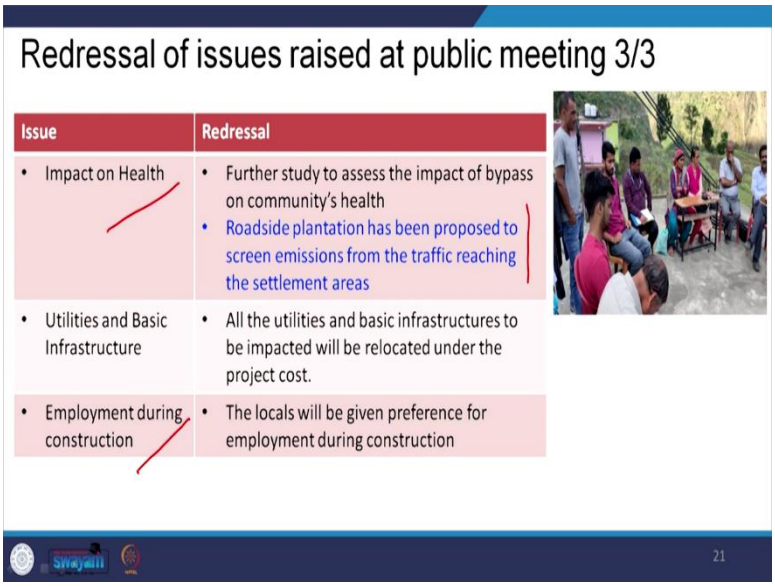

So, roadside plantation has been implemented so that these greenbelt can reduce the air pollution emissions or dispersion. Similarly, from the employment perspective the local people have been given preferences during the construction of the project. So, they will be employed. So, again some economic benefits are there.

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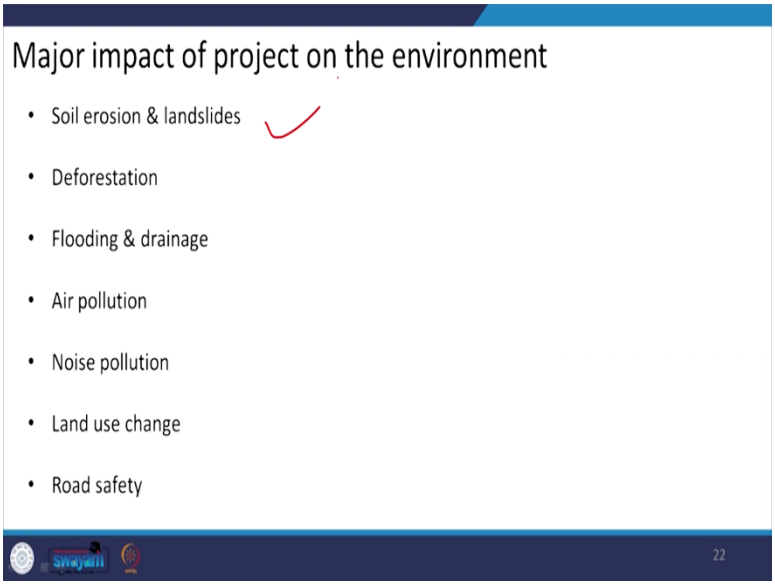

Well, there are other major impacts of the project on the environment like soil erosion and landslides because there are sloppy places there. Then deforestation and the flooding and drainage which we have just discussed about air pollution, noise pollution, land use change, road safety, and these are issues which are not only taken care of after the this construction of the road that is operation of the road. But also during the construction of the road. So, what to do when soil erosion is the issue.

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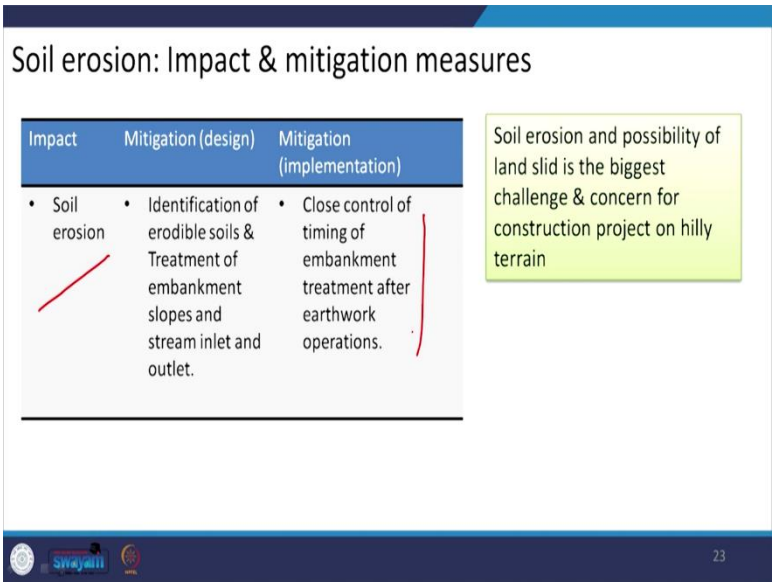

So, to avoid the soil erosion some embankment treatment has to be their proper earthwork has to be there so that soil erosion can be prevented.

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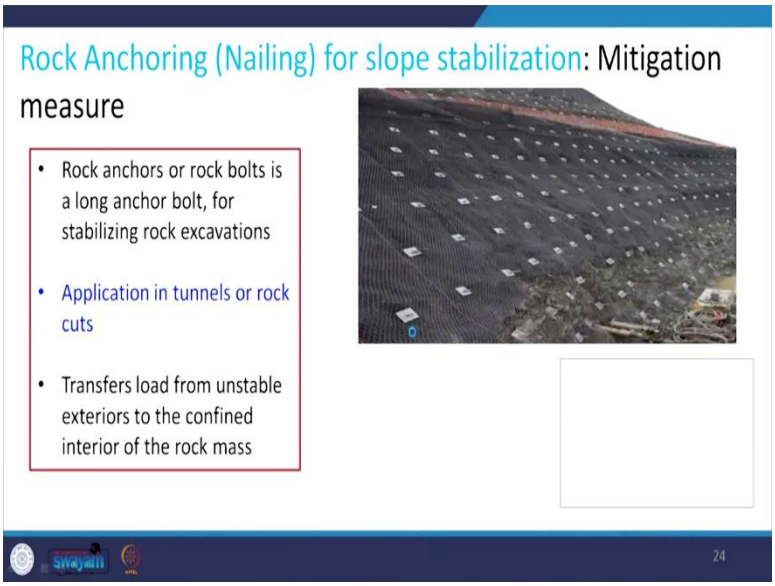

Similarly, some rock anchoring or it is also known as nailing. These kinds of treatments are to be done. So, that slopes are kind of reinforced properly and they get a strength they have this capacity to keep eats slide with each other and they have intervened with each other so that they do not fall. And the slide does not landslide does not occur.

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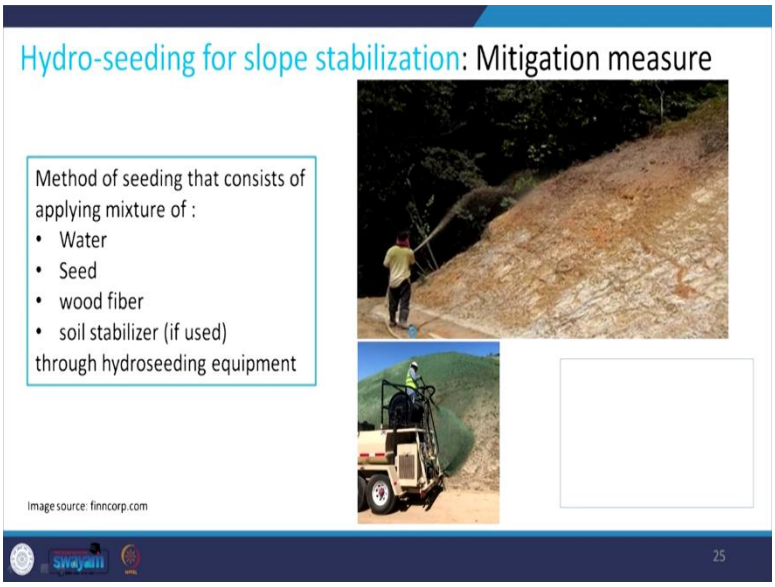

There is one interesting thing like hydro-seeding for slope stabilization. At certain places when slope is needed to again strengthen to stabilize. So, what they do? They mix the water and some seeds like the seeds of the grasses and this wood fiber and soil stabilizers so that it can stick to the soil surface. And this hydro seeding is done by like some sprinkling kind of thing. And these seeds then grow and they capture the soil

And they do not keep it loose and the strength is provided to the soil. So, that erosion is prevented. So, it is better than for like grass and growing after having grass transferring from one place to another that is quite time consuming as well as sometimes it does not work properly. So, this hydro seeding is one interesting thing.

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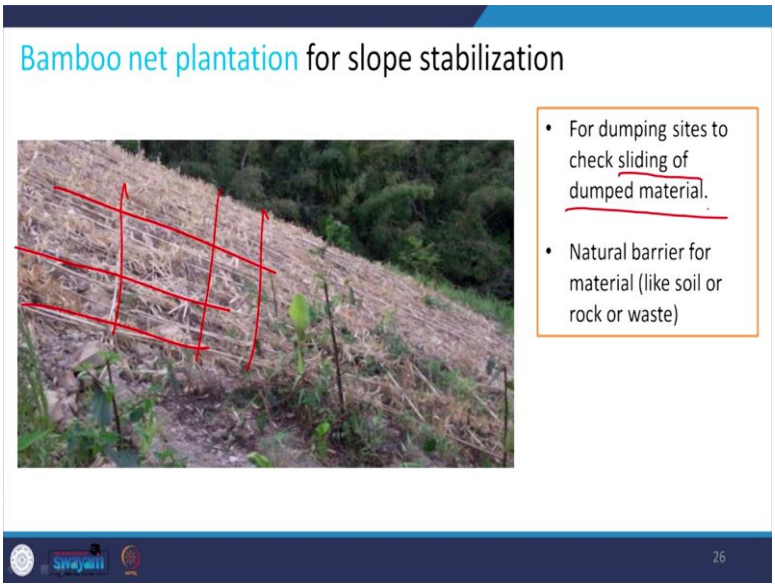

Another one is bamboo net plantation. So, you can see like they have been in a cross kind of thing. So, these kinds of fences will be there for the, this stabilization of the slopes. And it can check the sliding of the dumped material means some metal has been the loose material has been dumped at certain places which has tendency to slide down. So, to prevent that these kind of nets of the bamboo kind of plants or that can be used as a natural barrier.

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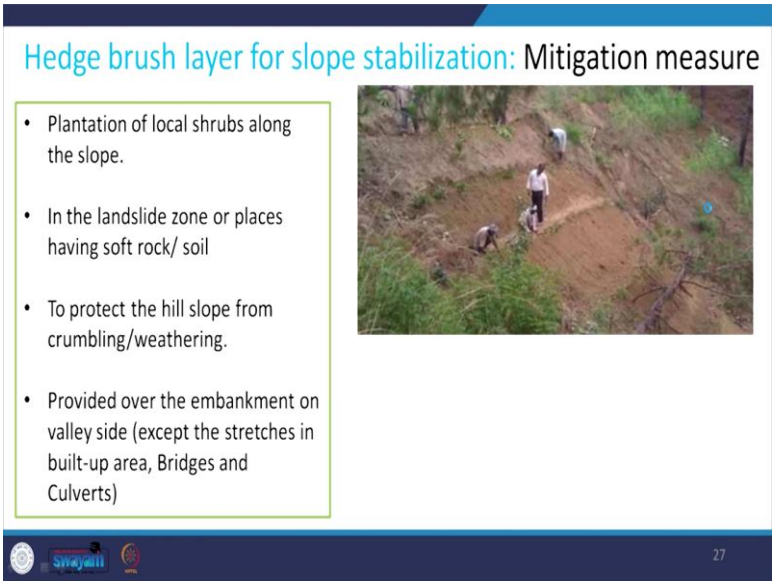

Similarly, some hedge brush layer of slope stabilization like the steps they cut and then some hedges are used for preventing this landslide as well as erosion of the soil.

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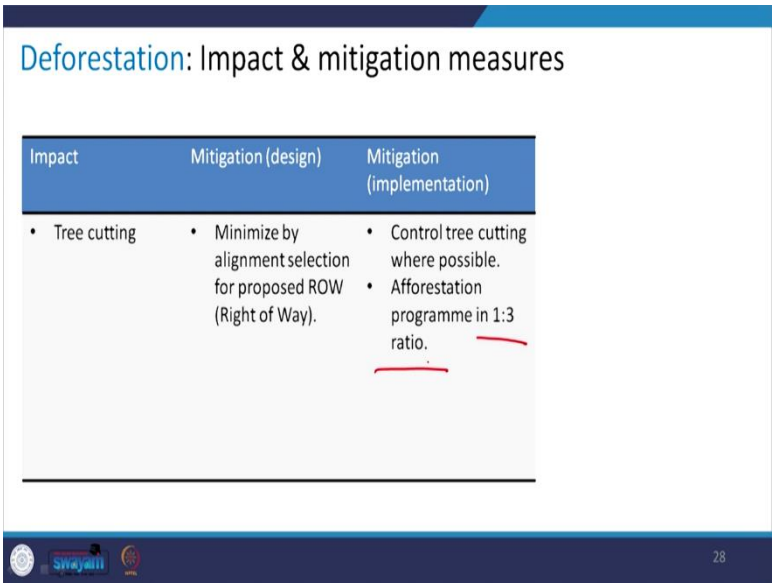

When we talk about the deforestation then there are rules and regulations. So, 1:3 in this ratio the trees are planted wherever deforestation occurs because of certain projects.

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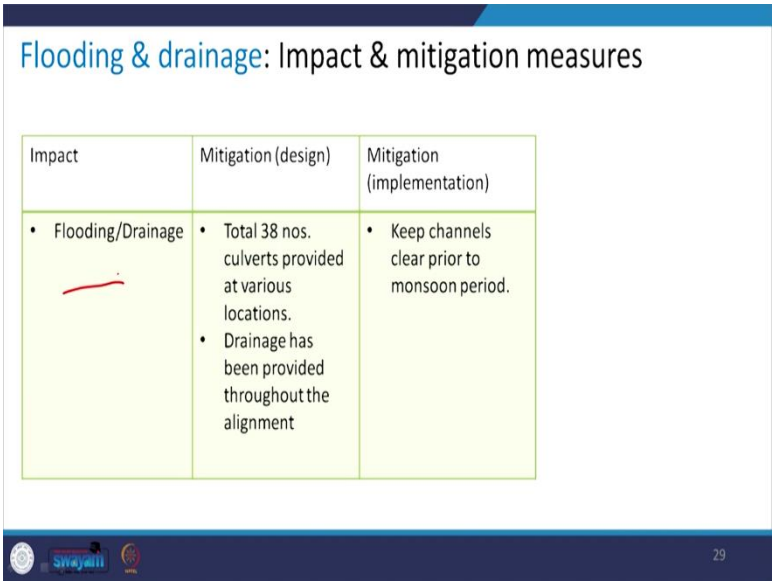

Flooding and drainage s, as we have already discussed that 38 places were identified, were these culverts were made so that proper flow of water is ensured. And the channels are kept clean if there is solid waste material et cetera that should be cleaned before monsoon. So, that there is no flood etc.

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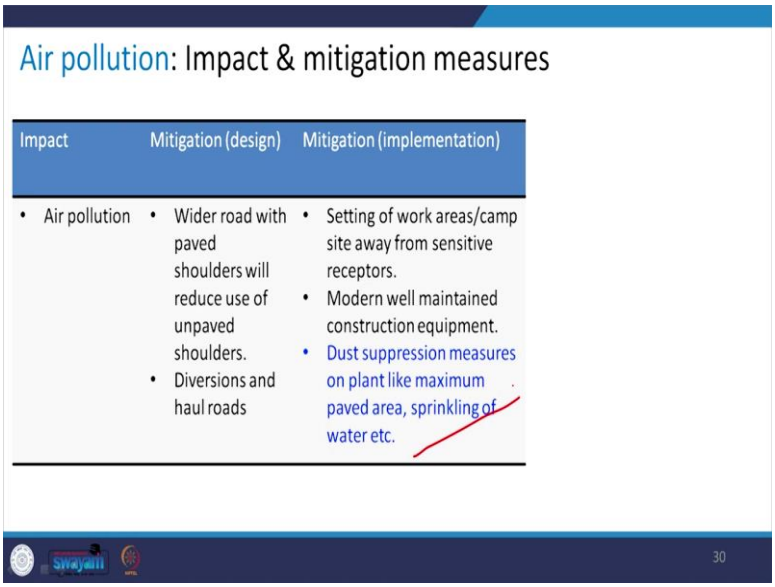

For preventing air pollution this dust suppression measures can be used. And like a sprinkling of water and then some other means are there for preventing the air pollution some equipment should be used those very efficient. And new ones not the old ones which emit lot of fumes those should be avoided.

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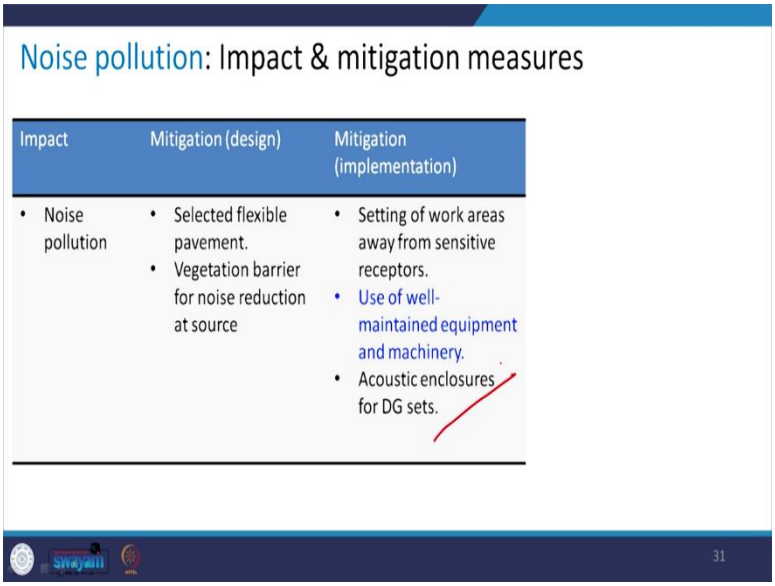

To prevent noise pollution again good equipments can be used well maintained equipments are mandatory. And those kinds of machinery acoustic enclosures for DG sets so that the sound gets dissipated at that particular localized place. So, those kinds of things and people can be provided with some means so that you if there is like excavation or some kind of noise producing activity so people those workers can be prevented from the exposure of the noise.

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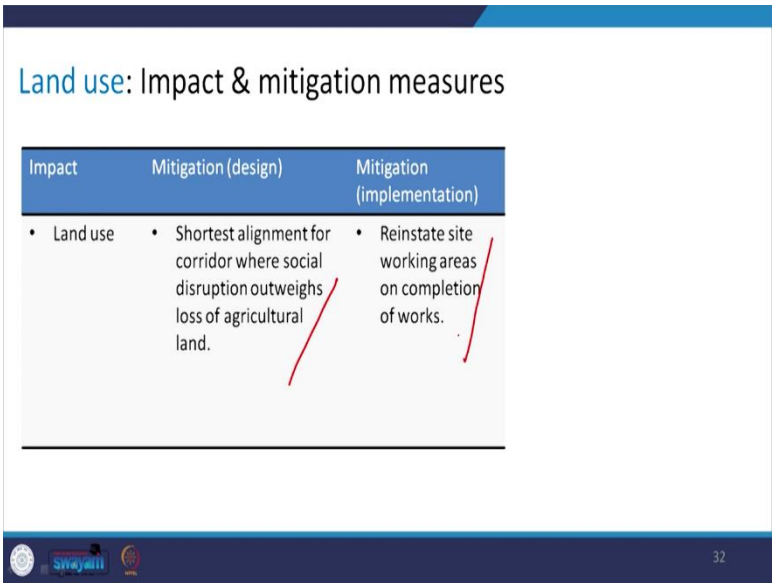

Well, land use when we talk so shortest alignment has to be taken care of. Because otherwise you go for lengthy routes then in hilly areas it is very difficult to work. So, shortest routes has to be designed. And to reinstate the site working areas on completion of the work that means all debris should be disposed off properly. There should not be left anything otherwise, it will damage the location and topography.

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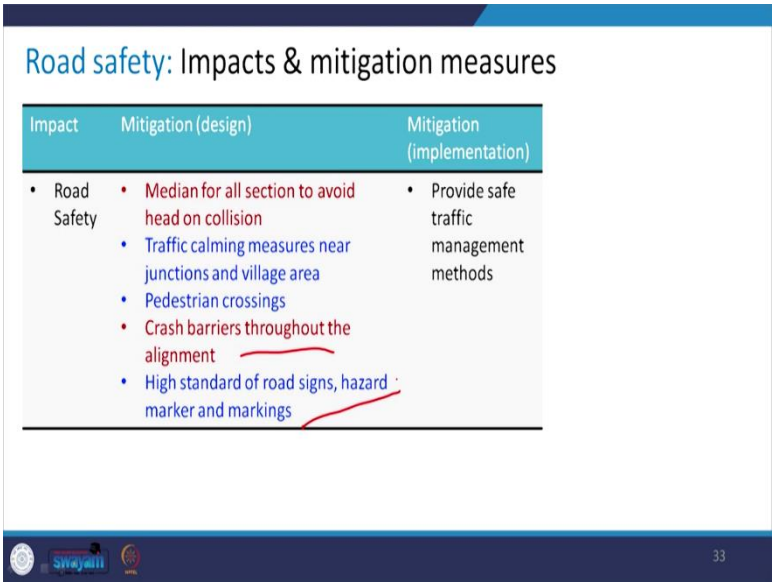

Road safety we have seen like those not on the signage but some other like crash barriers we have seen those pictures and high standards of road signs hazard markers all those things has to be properly placed.

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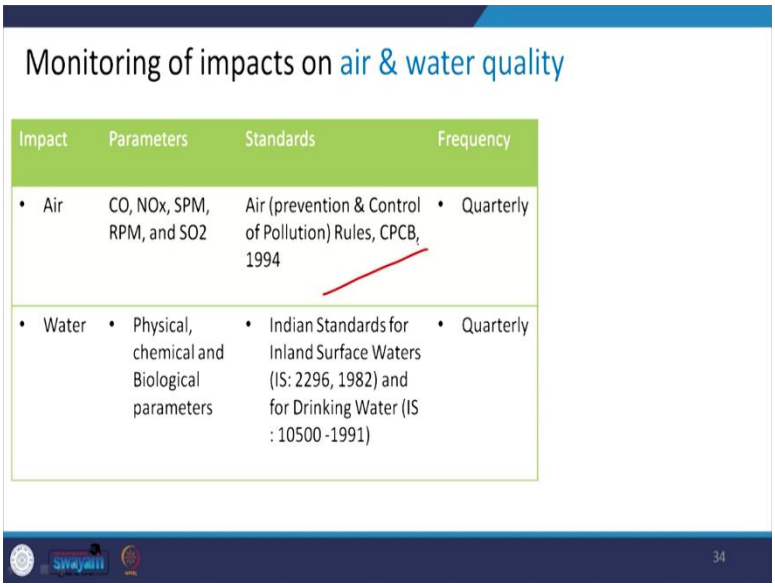

Well, after even during construction and after the project if we want to see the impact of the project then there has to be at certain locations monitoring of air and water quality. So, the quarterly frequency is there for monitoring certain parameters so for air like carbon monoxide, oxides of nitrogen, suspended particulate matter, respirable particulate matter that is pm 10 which are having serious health impacts and sulfur dioxide.

So, according to the standards we have to see whether they are violating those standards or not. Similarly, the physical chemical biological parameters of the water they have to be monitored properly at the same frequency of quarterly.

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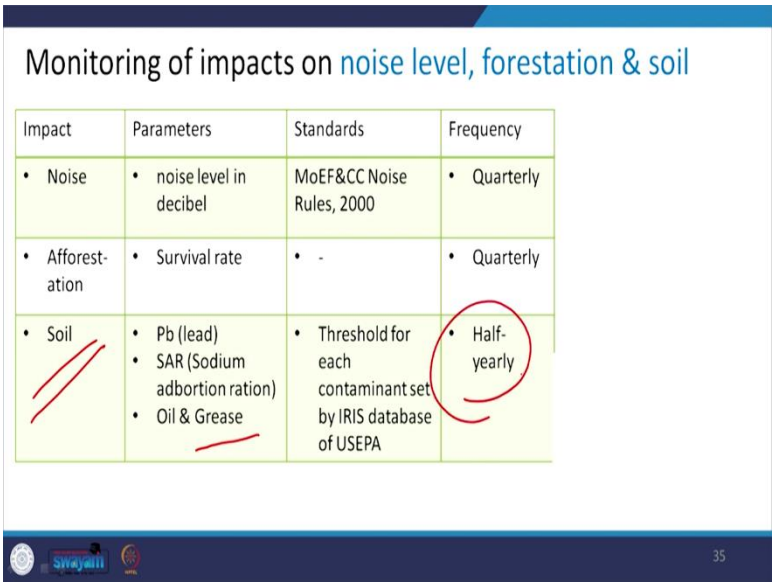

Noise or afforestation, soil all those activities has to be monitored quarterly and they should be reported properly for soil erosion or the quality like sodium adsorption ratio oil and grease in the soil and all these things has to be half yearly. So, for this frequency is only half yearly.

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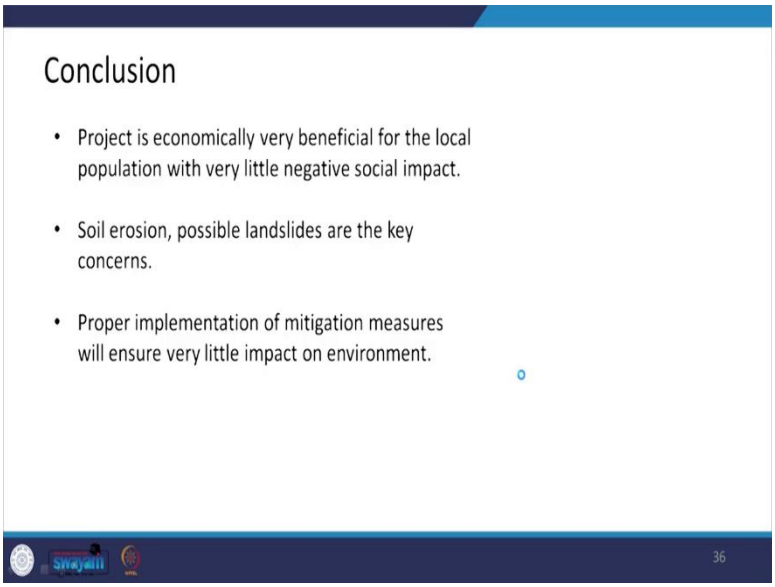

So, in conclusion we can say that the project is economically very beneficial for that particular location in the Himachal Pradesh. And local population will have access to the good infrastructure so that they can have access to the local markets of the towns and cities where they can sell their produce they can travel, they can have access to the medical facilities in case they have to travel from their village to the cities.

And then there are issues of the soil erosion or possible landslides. And they have been taken care of properly as we have seen those measures like nailing and other kinds of activities. And then the proper implementation of mitigation measures for air water quality or noise related issues. They have been properly implemented in the project as per the impact assessment report of the environment.

So, this is the case study of the hilly roads EIA and next we will see the airport related EIA case study.

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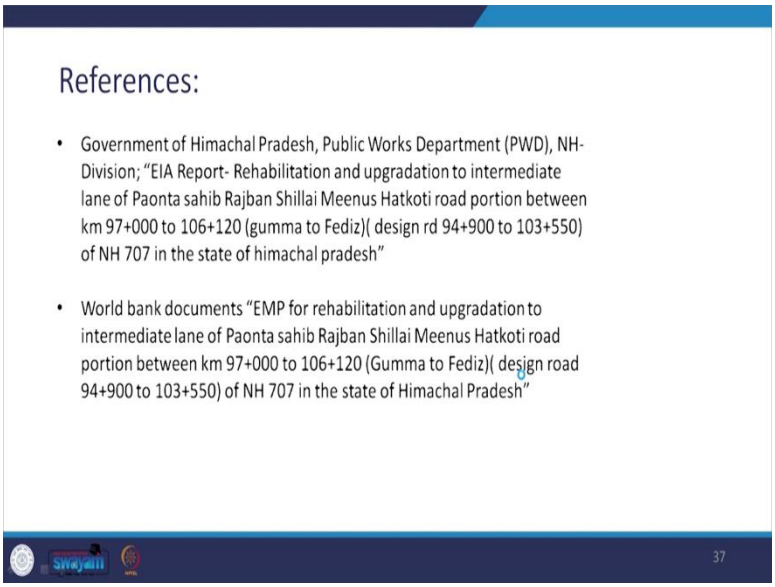

These are the references where we have taken this information from. So, you can go through if you want to have more details, more information about this particular project. Thank you for your kind attention. And see you for the next case study on EIA related to airports. Thank you again.