Sustainable Transportation Systems
Professor. Bhola Ram Gurjar
Department of Civil Engineering
Indian Institute of Technology, Roorkee
Lecture No. 18
EIA Case Study II

Hello, friends. In the series of case studies pertaining to environmental impact assessment, so today we will discuss the second case study, I would say and this is related to inland waterways project of China that is EIA, we will discuss about the EIA report of that inland waterway project that was Hunan Xiangjiang inland waterway, which is the name of this project.

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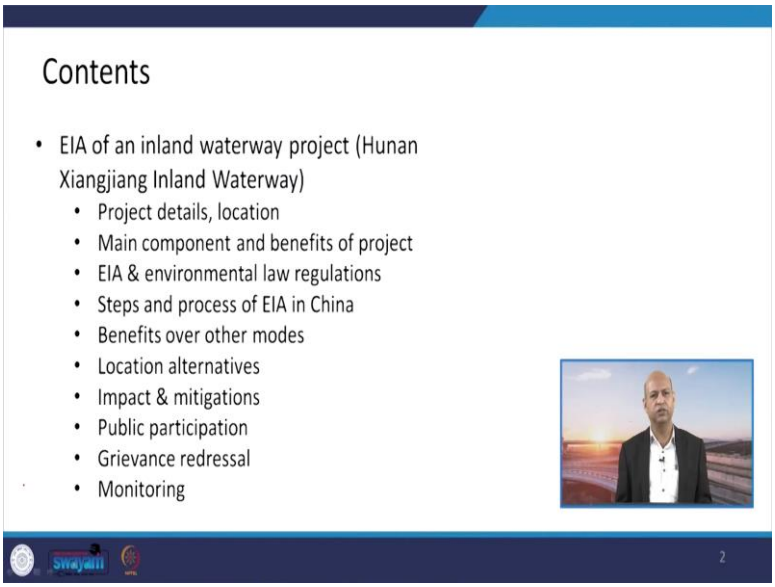

And the project details and the location we will discuss about, then the main components and benefits of the project which were, included in the report and then EIA and environmental law regulations which were taken care of during preparation of the report and the steps and processes of EIA, particularly in China that would be discussed.

Benefits over other modes like we can compare if there were highways, then what would happen or something like that, and then location alternatives because EIA also discusses at times like alternative routes or alternative methods, so, that comparison can be made a logical or rational comparison can be made to make a proper informed decision. And then impact and mitigations, public participation, grievances redressal system, monitoring all those things we will discuss before the concluding remarks.

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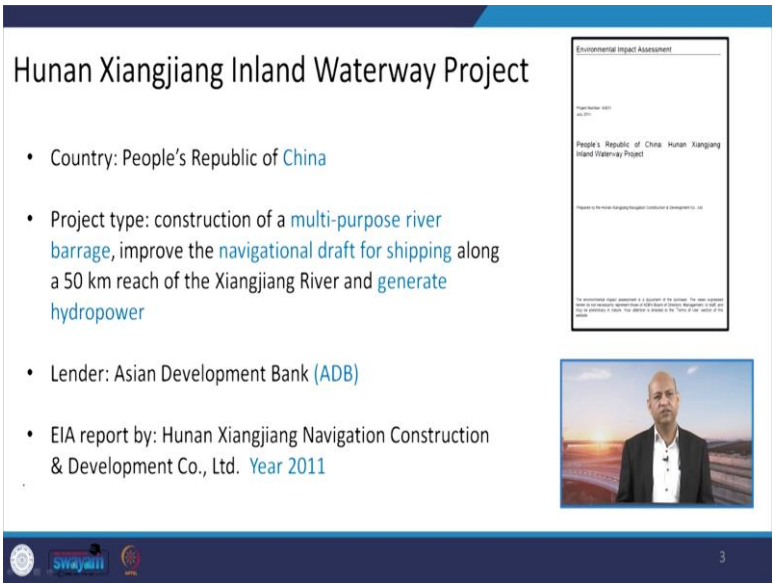

So, this is very brief and preliminary information about the project. This is Hunan Xiangjiang inland waterway project of China. And this is multipurpose river barrage project, basically, providing navigation draft for shipping along a 50-kilometre stretch, but also generating some hydropower.

And this project grant was given by Asian Development Bank ADB, and the EIA report was prepared by this Hunan Xiangjiang Navigation Construction and Development Company Limited in 2011.

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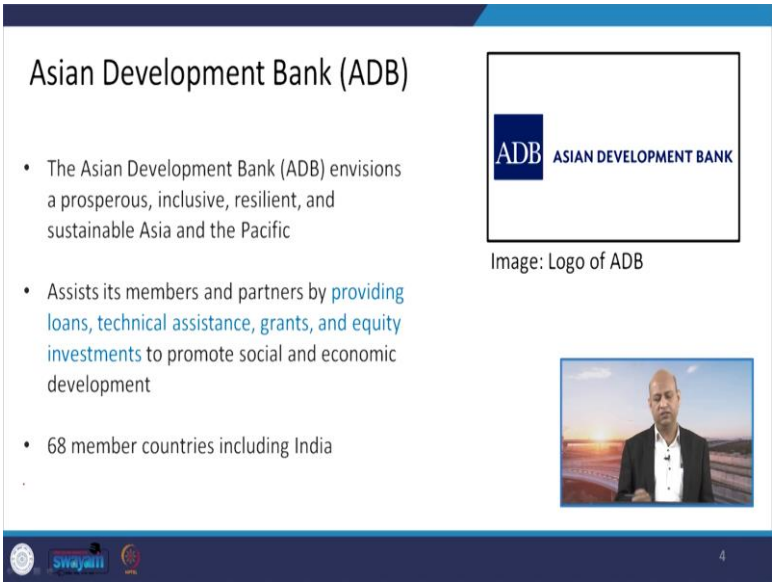

Well, you might be knowing about Asian Development Bank, which is basically to give money for various socio-economic projects in Asian countries, and this is like projects which

are inclusive, which has resilience and sustainable from environmental and economic point of view. And for that purpose, ADB provides soft loans and technical assistance also, sometimes grants, sometimes equity investments also they do. So, there are various products they use for these particular activities. And there are 68 member countries including India in the ADB.

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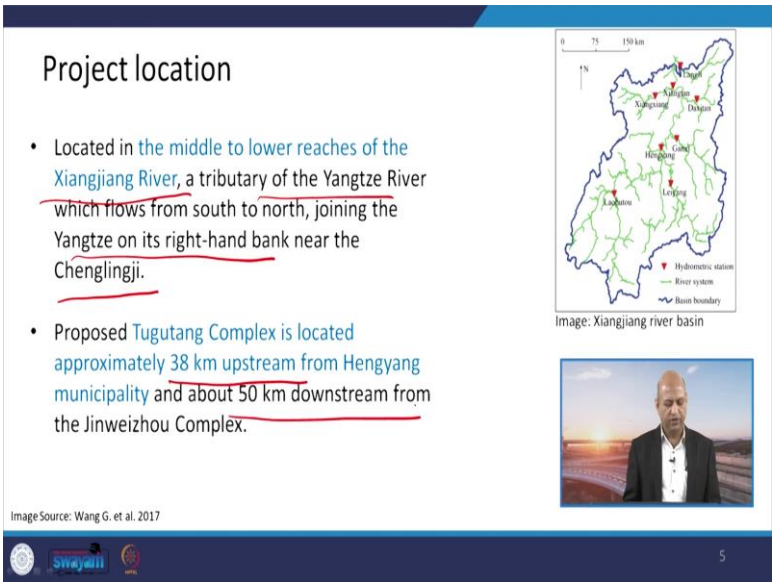

This is the project location, if you see this map, and that is basically in the middle to lower reaches of the, this Xiangjiang river, a tributary of the Yangtze river which flows from south to north and it joins Yangtze on its right bank near the Chenglingji. So, these are different location related points, and it was proposed that it should be located approximately 38 kilometre upstream of Hengyang municipality. This is the town's name and about 50 kilometre downstream from Jinweizhou complex.

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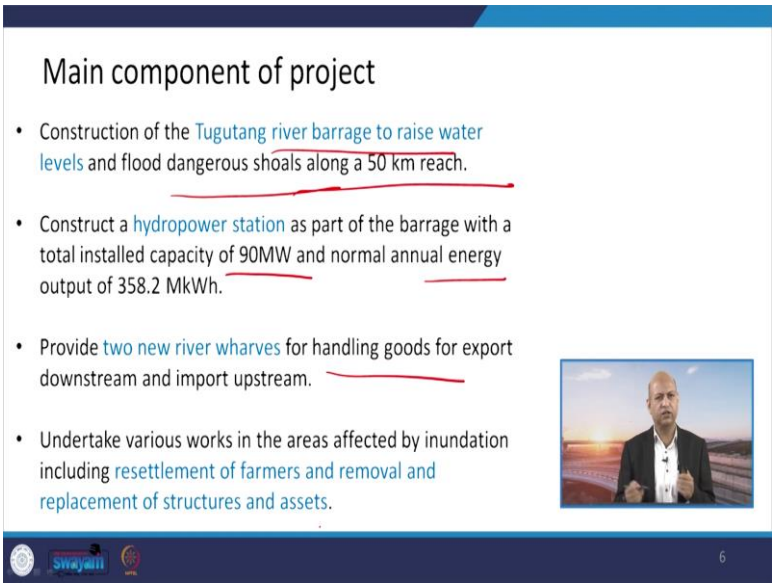

So, this is information about the location of this project. And the main component of the project is basically one river barrage to raise water levels. So, that they can avoid the floods etc., which can store lot of water and along this 50 kilometre stretch floods related possibilities can be reduced downstream.

And then hydro power station of capacity 90 megawatt and which can produce annual energy like 358-million-kilowatt hour and it also provides like, for handling goods in certain rivers which are located in downstream side. And there are also components related to like inundation areas where people are living.

So, there will be resettlement of the farmers and removal and replacement of the structures and assets of those farmers. So, those are the components of the project which were properly taken care of as per this EIA report, we have taken information from the EIA report.

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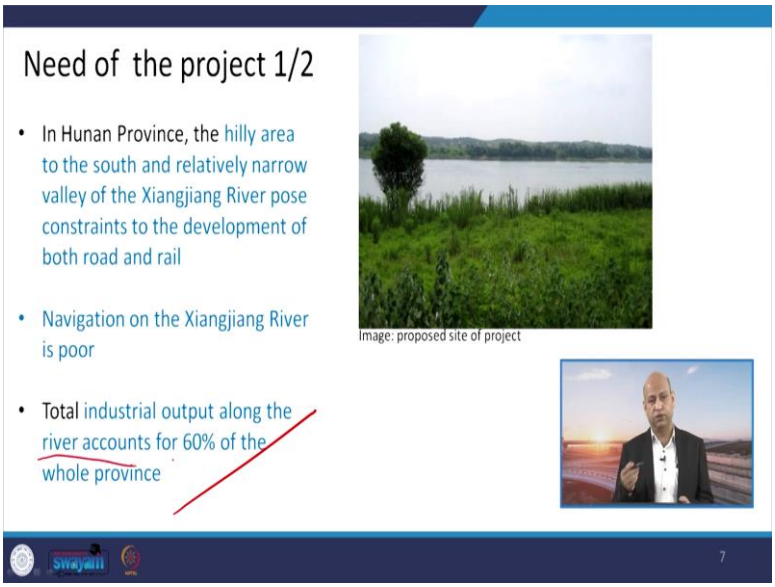

Well, the need of the project is because the terrain is very rough and tough, it is hilly area and the roads and railways are not so, conveniently constructed there and there is this river. So, if proper draft is available for the shipping purposes, for navigation purposes then it can really fulfil the need of that particular area which is like 60 % of industrial output in that particular province, province means state of that particular state or province. This is in that particular area and that can be catered by this particular river where this project was launched and implemented.

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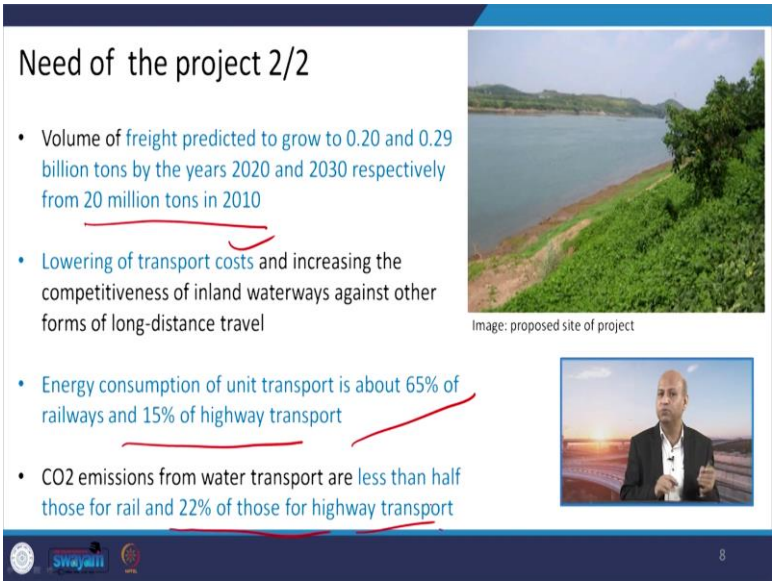

Well then, you can see like the freight predicted to grow because of this particular project from 0.20 to 0.29 billion tonnes, this is billion tonnes, that is why decimal is there from 2020

to 2030 that is the prediction of the growth of this freight in that corridor and 20 million tonnes only in 2010. So, from 2010 to 2020, 0.20 billion and then 0.29 billion, so, huge freight possibility is there. So, there is business opportunity.

And then it can lower the transportation cost. The reason is because, you might be remembering when we discussed about inland waterways characteristics and we compared with highways or railways, we gave you data that this inland waterways transportation cost is bare minimum, bare minimum and also it is very good in terms of very low amount of GHG greenhouse gas emissions.

Energy consumption is also very less, it is around 65 % of railways in that particular area, our study was different, where please do not mix up those data and then 50 % of the highway transport. So, cost wise also there is a lot of saving means 85 % saving is there if you compare with the highway cost.

And the 22 % of the highway transport GHG emissions is only 22 % in this particular way of transportation, inland waterways transportation means if like 100 units are being emitted by highway, then only 22 units will be emitted in this particular navigation system.

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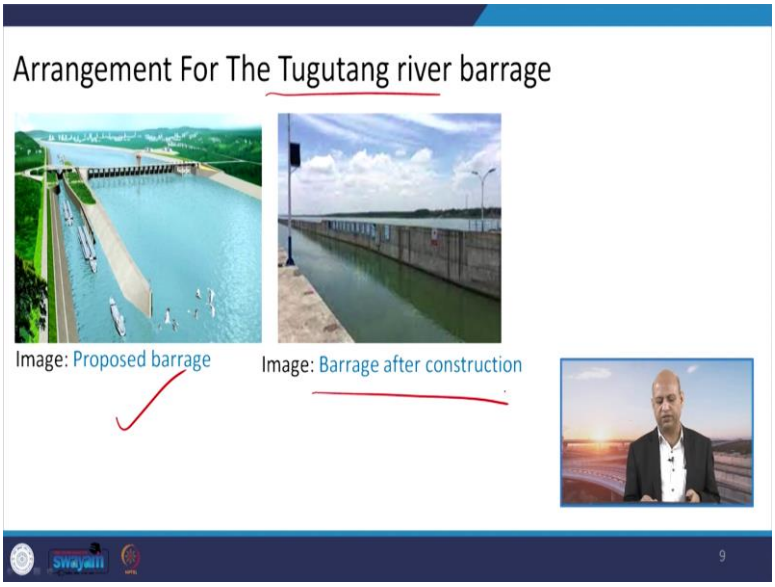

This is a pictorial representation of this Tugutang river barrage. So, proposed barrage, the design is there and then barrage after construction. So, that there is navigation system in parallel.

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And then the EIA requirement of Asian Development Project because Asian Development Bank has given certain guidelines, World Bank also has certain guidelines when they provide loans for development projects, those EIA has to be conducted. So as per this ADBs requirements, similar to World Bank, this is under the category A, this project was considered under the category A, means significant environmental impacts were envisaged.

That is why this EIA was compulsory for this. And those potential significant adverse environmental impacts that should be avoided, that should be addressed. So, EIA report must be there, this study must be there. So, requirements were there for this particular loan and the project funding. And that is why this project report was prepared after a long-term study.

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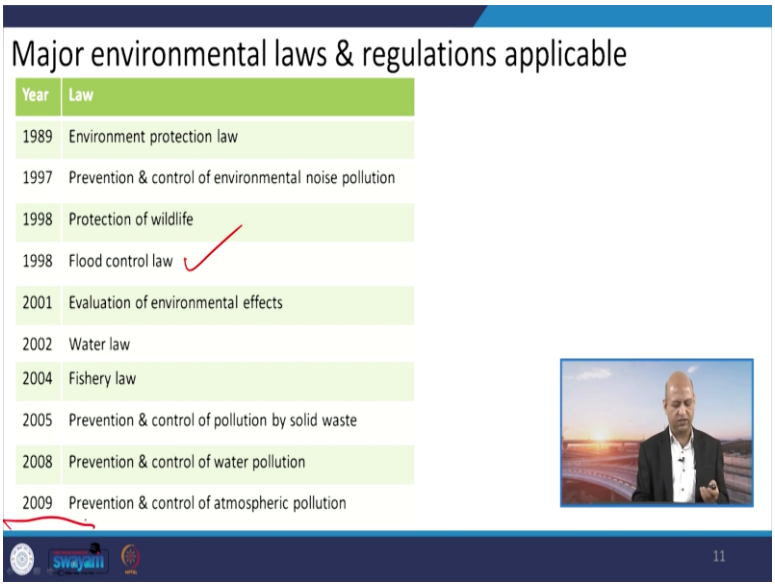

Then there are laws and regulations related to environment within China like this is the time series in different years, they had different laws in 1989, environment protection law; 1997, prevention and control of environmental noise pollution; then in 1998, this protection of wildlife and in the same year flood control law was enacted.

And then evaluation of environmental effects, water law and fishery law, then prevention and control of pollution by solid waste, water pollution. And atmospheric pollution in 2009. This air pollution related laws so all these laws were properly incorporated, the guidelines or regulations were fulfilled in this EIA report, those properly addressed because the land, law of the land as well as the requirement of the lending or funding agency is the requirement you can see.

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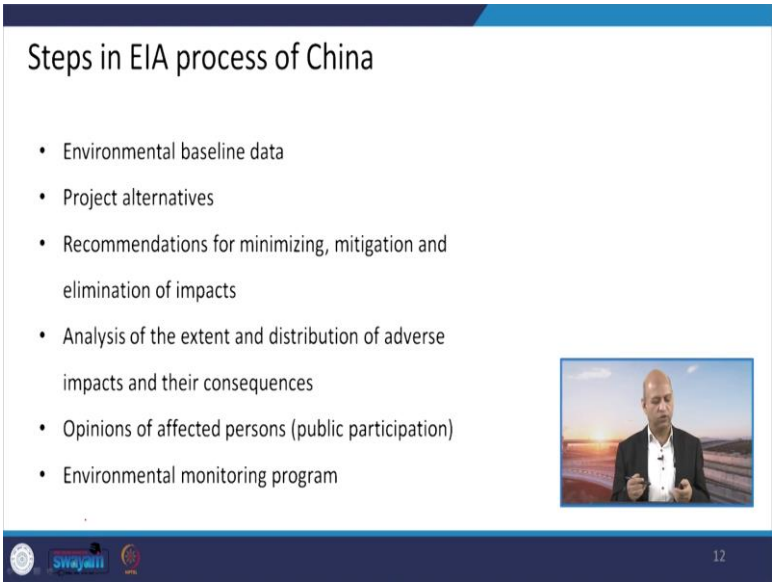

Well, in EIA process, these were the steps, major steps which were properly fulfilled like environmental baseline data collection means what is the stage of air quality, water quality or socio-economic data, then what are the different project alternatives if we go for alternative projects, whether cost effectiveness is there or not.

Then recommendations for minimising and mitigation whatever impacts are there to eliminate them, to mitigate them or to minimise them, some recommendations were made the according to the study. And then analysis of the extent and distribution of whatever adverse impacts or consequences were envisaged.

And then the opinions of the affected people through public participation meetings were also gathered and tabulated. And then the environmental monitoring program was also put in proper place.

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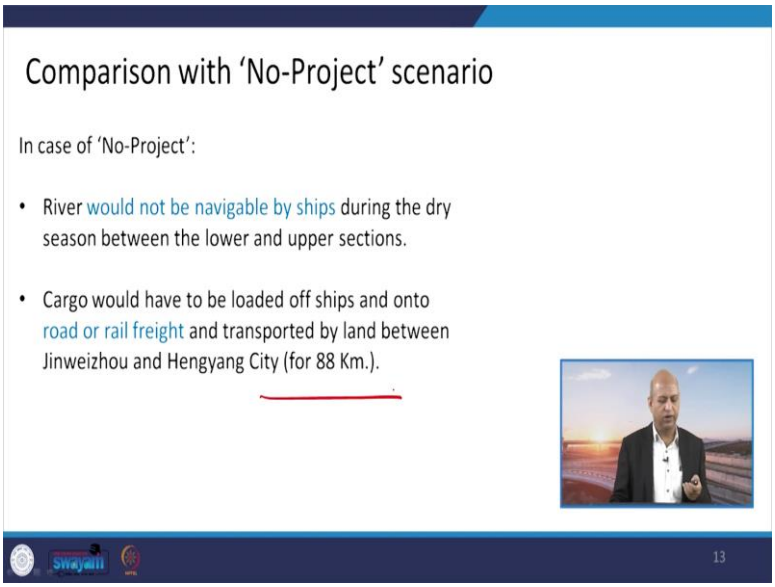

Well, when we compare with no project scenario means because when we talk about alternatives, then one is like BAU, business as usual scenario which this is the term you might be knowing. So, like, there is no project whatever it is, let it be like that only. Then project A scenario, project B, project 3 like that, those kind of scenarios can be constructed.

So, no project then, no river would not be navigable by ships, because draft is not available, proper construction work has not been done. So, no shipping, no navigation, and then the cargo will be taken through road, or rail freight, which is around 88 kilometre and that would be the scenario which was estimated that it is very costly and kind of unsustainable in terms of all aspects of the environment.

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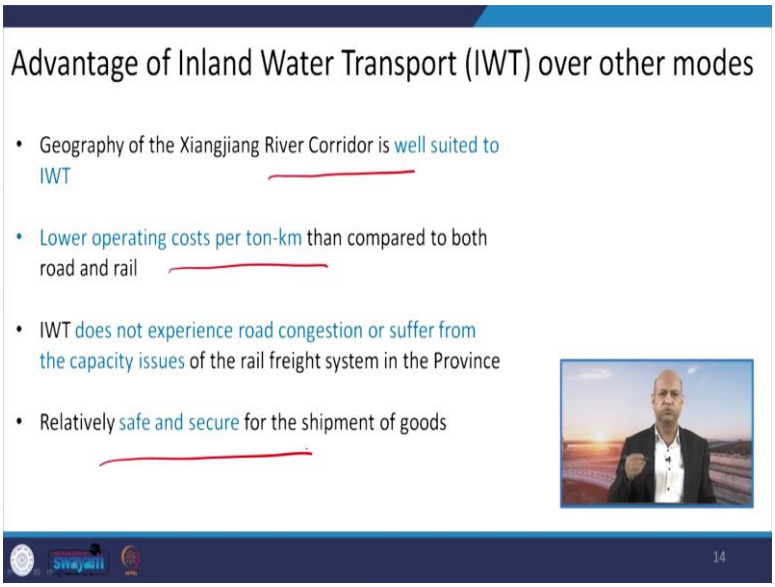

So, we were discussing about comparison with no project scenarios and other issues. So, we listed like advantages of inland water transport over other modes. For example, roads or rails, so, in this River Corridor, basically, this is well suited for IWT, that is Inland Water Transport and it has very low cost for transporting goods from upstream to the lower stream in that particular stretch of 50 to 80 kilometre.

And as we have also seen that cost parameter in our case, in Indian case like to compare with railway and highway and we found that inland waterways is quite cheap, the similar thing is there and it is also like there is no congestion otherwise on roads there are several times congestion, traffic jam those kinds of problems, but in this case nothing like that, and it is more safe and secure.

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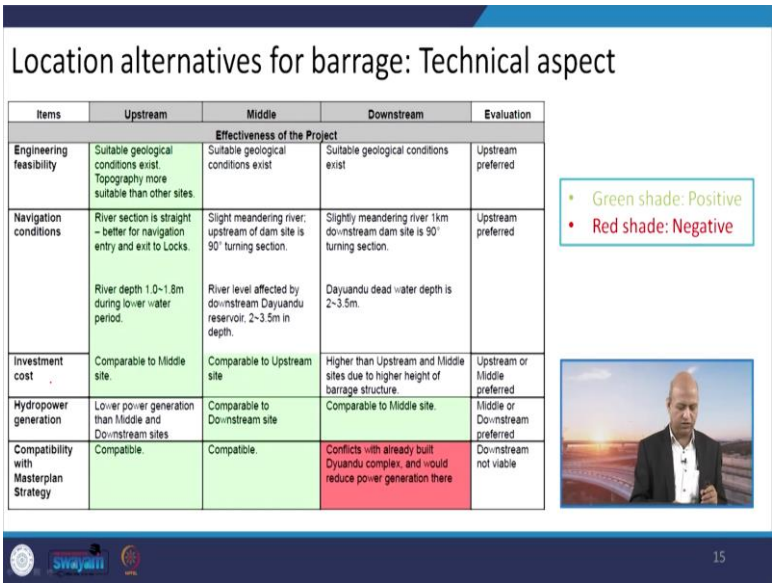

This particular table gives us location alternatives for the barrage construction and its technical aspects for example, engineering feasibility, or navigation conditions, and then investment cost, compatibility with master plan strategy, all these green colour text gives the advantages that means, upstream location is much more advantageous in comparison to the middle or downstream position. And the red sheet gives the negative aspect that means, the downstream has certain disadvantages.

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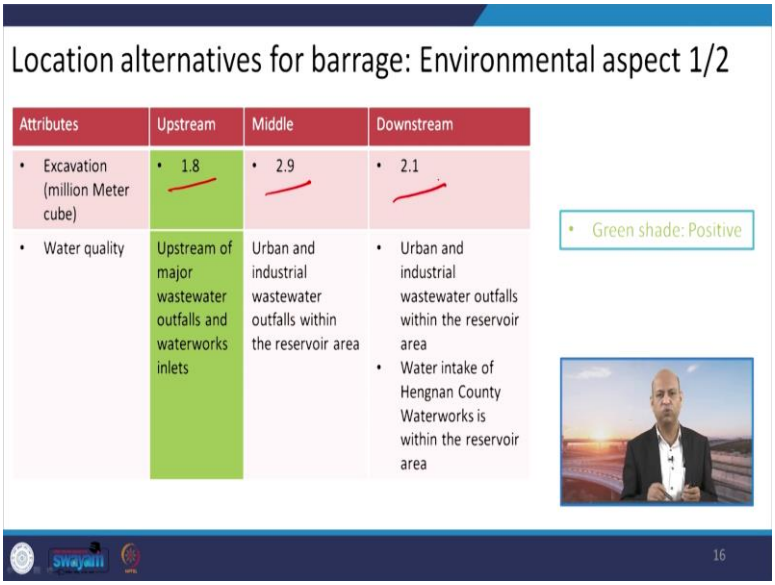

Similarly, if you see like excavation, how much soil or the dredging will be done and then the water quality impact all these things. So, only 1.8 this million cubic metre excavation will be

there whereas in middle location around 2.9 downstream around 2.1. So, again the less impact is there in upstream location.

Similarly, like urban or industrial wastewater outfalls in the barrage, so, in this middle and downstream location there are many chances those sewer lines or the waste effluents from industrial and urban locations will come whereas in upstream there is no such chance. So, positive aspect is there.

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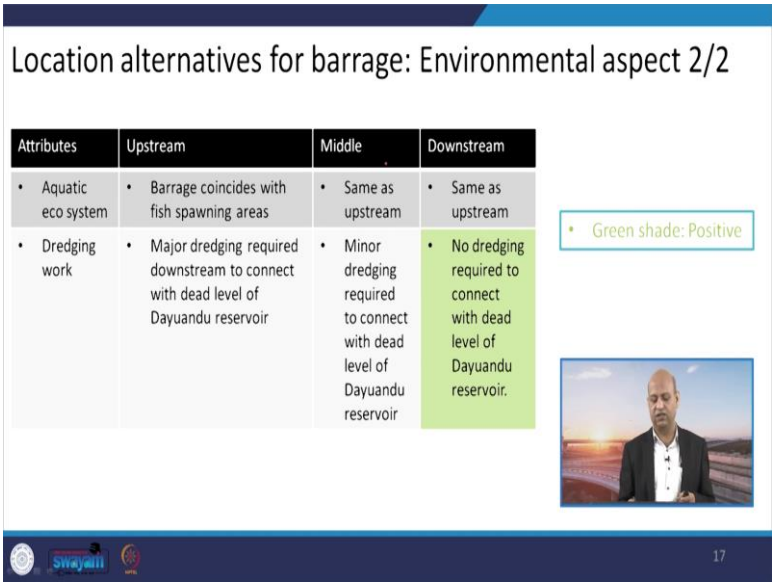

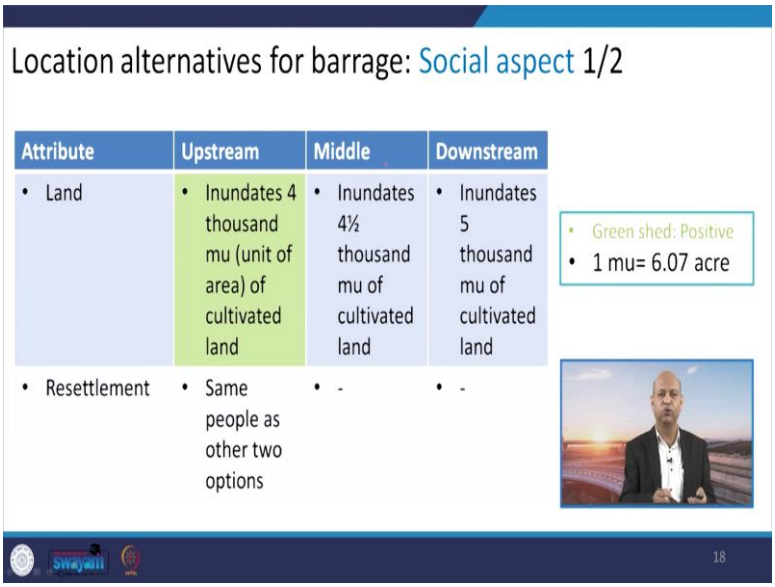

And if we talk about aquatic ecosystem and dredging work, so, in downstream there is one advantage that no dredging work is required. But in totality if we see the positive aspects are more into upstream you can see these green kind of like how much land will be inundated.

So, it is only the 4000 mu that is the unit of the area and this 1 mu is 6.07 acre and it is more in middle and downstream location. Resettlement will be there some people will be resettled, but the proper appropriate measures have been taken to resettle them, to provide them jobs and other facilities.

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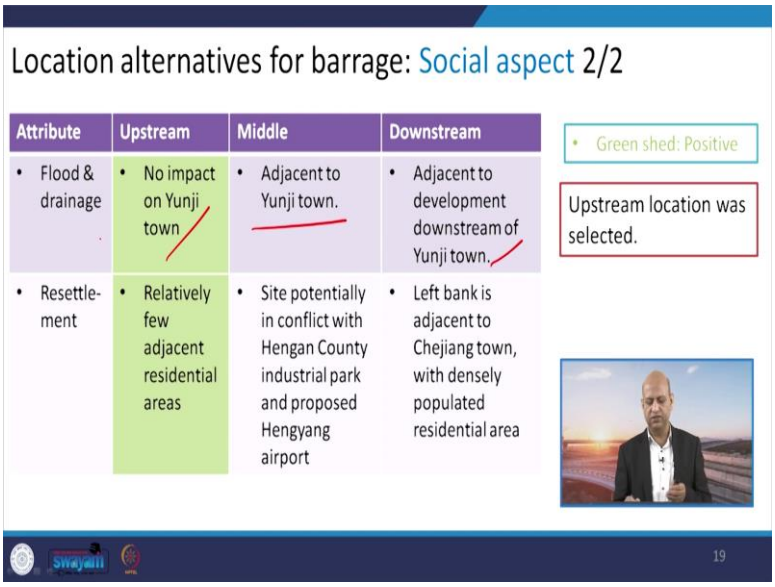

Then flood and drainage, so, no impact on this particular town on the upstream whereas this is nearer to the Yunji town in middle location. So, this is not good location. Similarly, it is adjacent to development downstream of Yunji town. So, the near location, it is not good but in upstream it is quite far away from that particular time, town. Then the resettlement relatively few adjacent residential areas. And in these there are some issues which are not that good which is in upstream direction.

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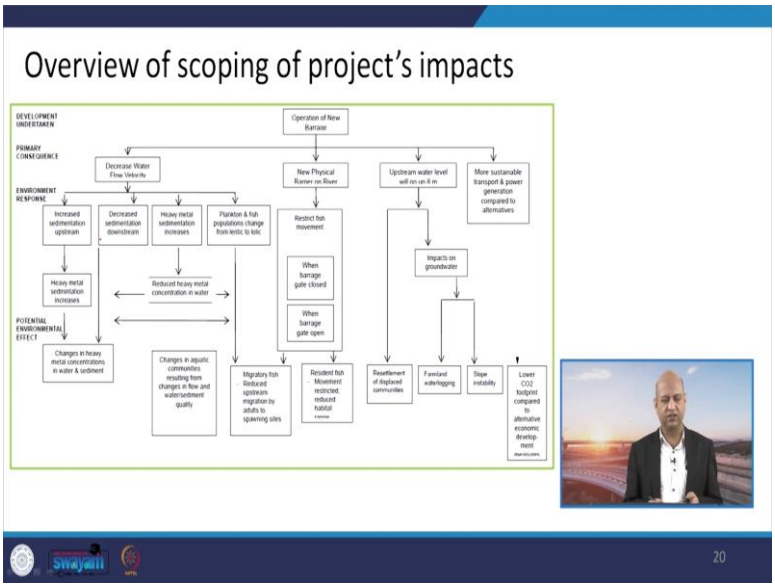

This is the overview of the scoping of the project impact. So, it has given like different kind of agencies and different kind of activities step by step, which can be seen that all the scopes have been given in this particular chart.

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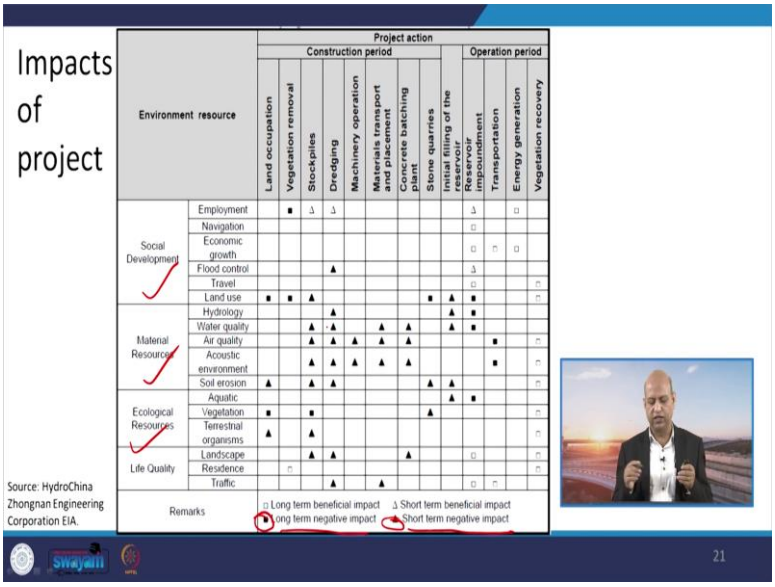

And impacts of the project like social, development or material resources, ecological resources, all these are like these triangular, solid triangles are short term negative impact and whereas this, this cube square long term negative impact. So, you can see short term negative impacts are much more that means, after construction of that barrage, and that particular navigation track, those short-term negative impacts will be gone and there will be only the positive impacts.

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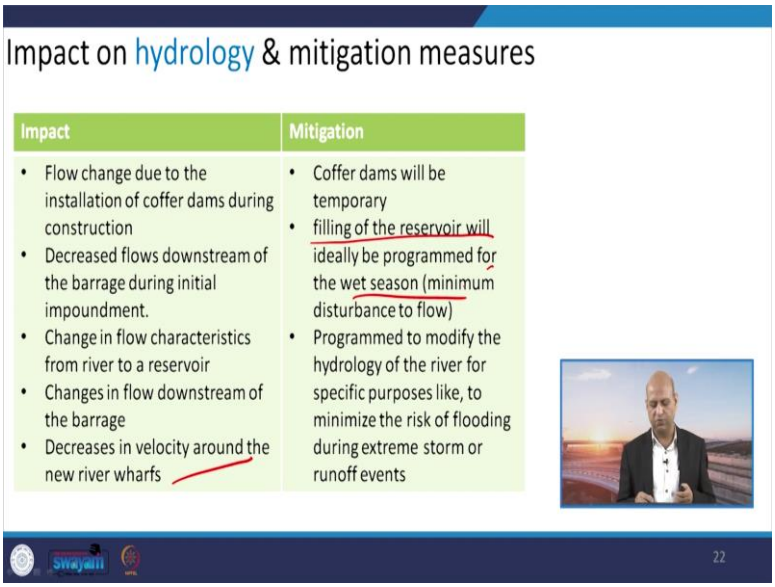

Well, when we talk about hydrology and impact on the hydrology and mitigation measures, so, you can see like, there are some flow changes and decreased flow or the downstream, change in flow characteristics also and decreases in velocity around the new river those kind of tributaries and those downstream.

So, these mitigations can be taken care of by proper like filling of the reservoir will ideally be programmed for the wet season, so, that floods can be avoided. So, in summer season, more water will be released and that way, fluctuation of the flow rate can be controlled. So, those kind of mitigation measures have been taken.

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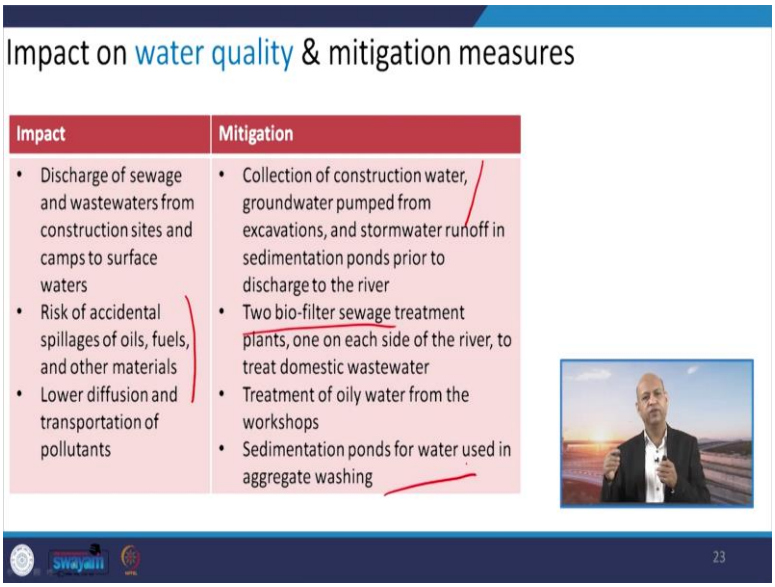

Then water quality impact are there like, because of dredging and the construction work, some solid waste will be there. So, that would be disposed of properly and there may be some accidentally spillages of oil or fuel. So, proper measures have been incorporated in that mitigation plan.

So, that like two bio-filter sewage treatment have been put there, then collection of construction water, groundwater pumped from excavations, all these things will be taken properly and treated then only discharged. Sedimentation ponds will be there before this water taken downstream otherwise, lot of soil and turbidity will be there, that can be avoided.

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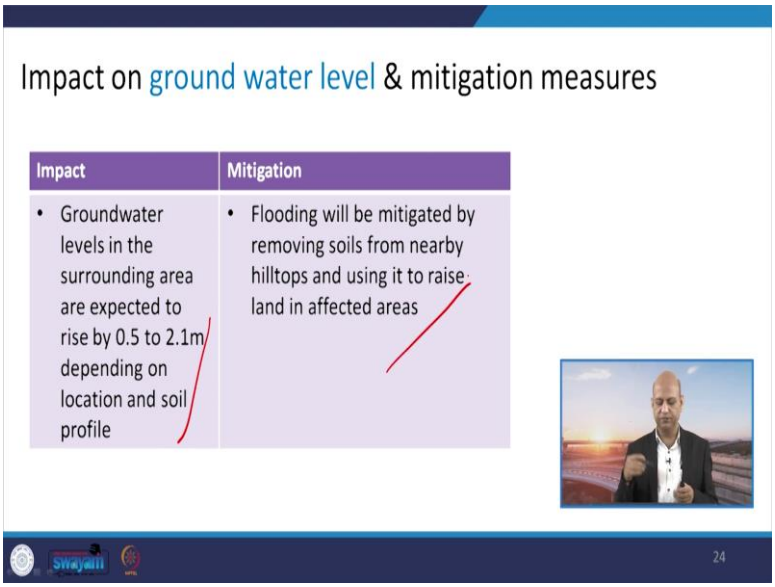

Groundwater level, there will be some impact because, if there is barrage, lot of water is there. So, the groundwater level will increase around 0.5 to 2.1 metre depending upon the location and the soil profile. So, for that again to avoid the flooding, to mitigate those flooding possibilities, some soil will be removed from hilltops and it will be place where, like some areas are of very low elevation. So, those affected areas can be dredged by those soil.

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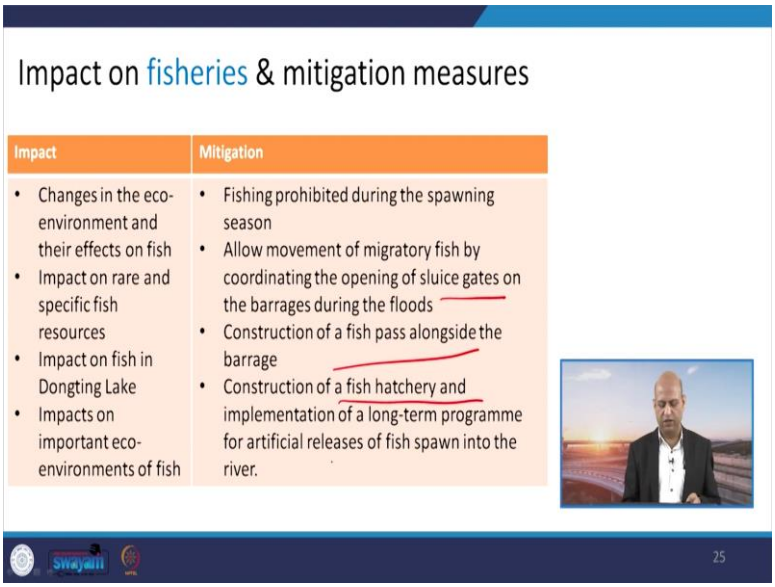

Well, fisheries impact, maybe there so, again mitigation measures are required, because, fishes has their own way of travelling from one place to another. So, because of these barrage activities, their movement will be affected. So, according to that, some particular measures have been taken like allow movement of migratory fish by coordinating the opening of sluice gates on the barrage during the floods. So, those kind of activities will be done.

Then construction of fish pass alongside barrages, there are certain mechanism or construction works, which can help fish to travel from one place to another. So, those kinds of then fish hatcheries and implementation of long term plan all those things have been taken care of.

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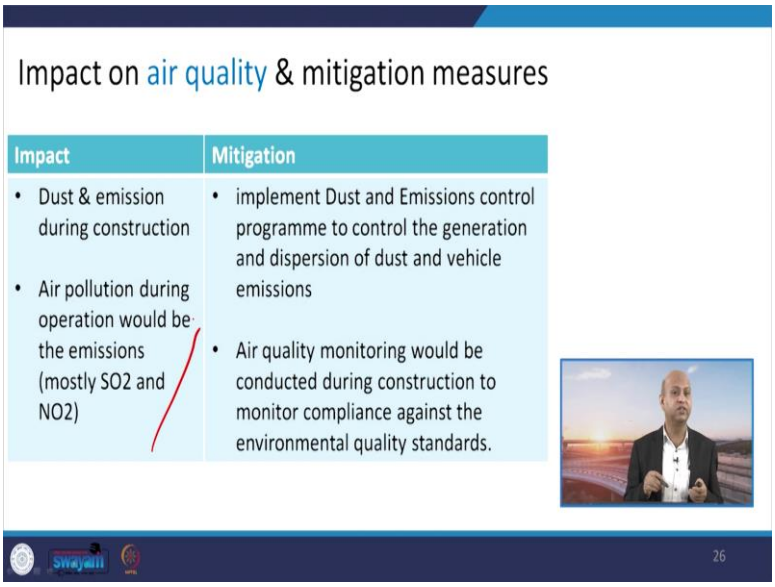

Air quality related impacts will be there during construction like fugitive emissions, dust emissions or resuspension. So, all those things will be taken care of by sprinkling water and other things. Then air pollution during operations would be like SO2 or NO2 because of fossil fuels, usage like diesel etc. So, the air quality monitoring will be done and checks and balances will be taken care of.

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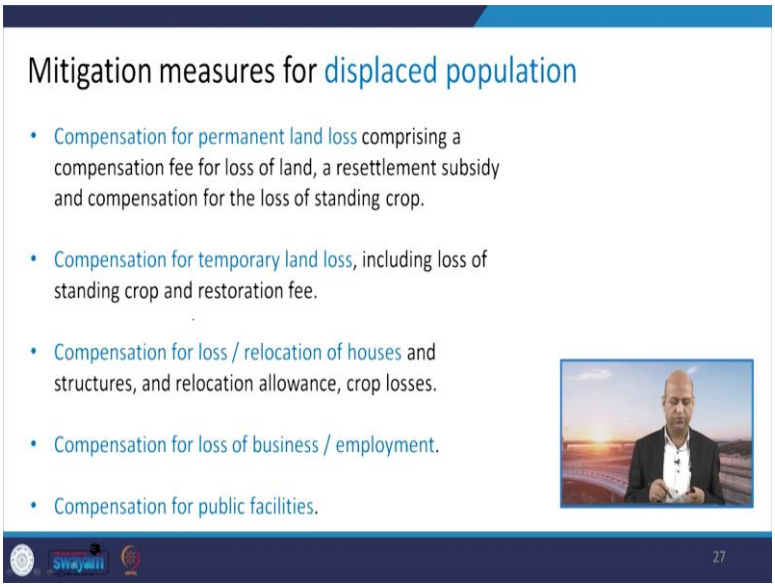

Mitigation measures for displaced population, this is one big issue. So, the compensation plan was properly done as per the study and the temporary land loss or, compensation for permanently loss of the land or their houses and business and employment opportunities, all those things have been placed in that particular plan.

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Public participation by EIA hearing so, on August 4, 2010, this forum was organised for public participation. And it was seen that people were having some queries related to, like, what will happen to their livelihood, etc.

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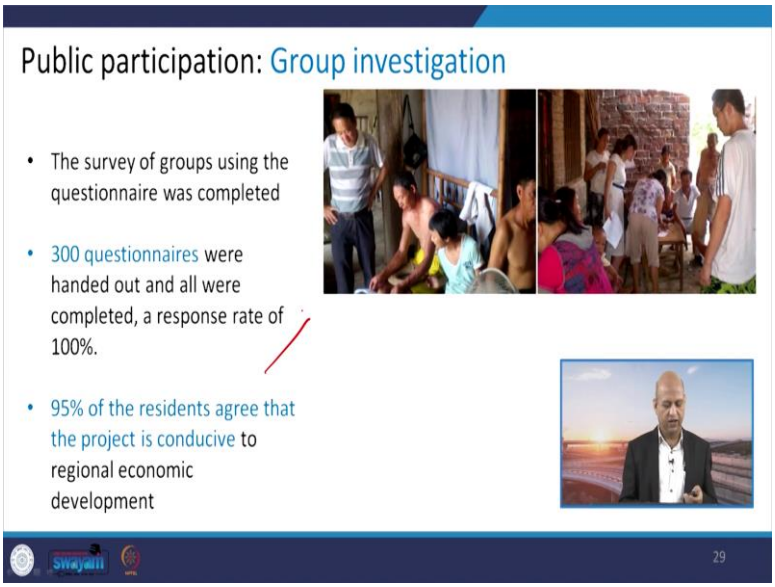

So, those were properly answered and it is said that 300 questionnaires were filled by those people and the response was 100 % and 95 % residents were happy with this project, because they got several benefits from the project.

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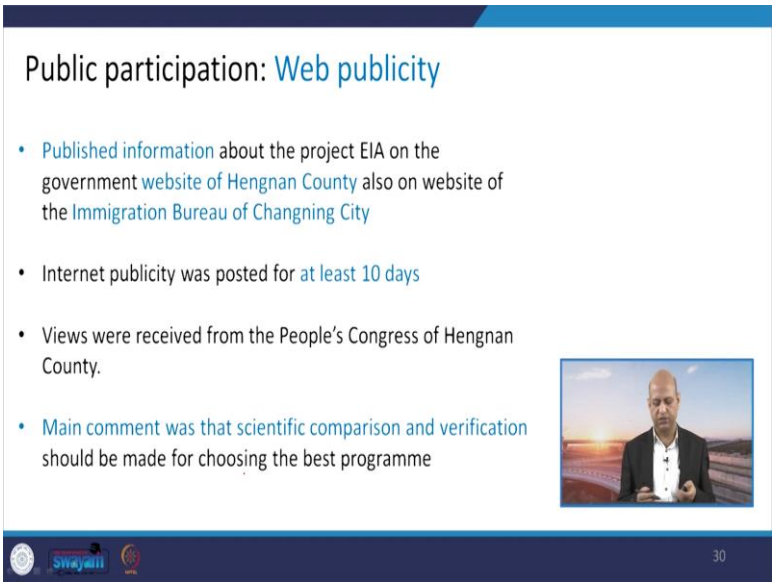

Well, then publicity was also done properly and timely. So, in the town's, in the public, all those through internet or through via media, social media or other newspapers etc., proper

publicity was done so that people are informed timely, and they can give their feedback if there is any.

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Then this public notices were, in the towns were pasted and people could read like you can see here, people are reading what is going to happen. So, those kinds of things they have taken care of as per ADB guidelines, Asian Development Bank guidelines.

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Field publicity, the second round, first round, then second round according to the feedback all those updating the information previously posted. So, some feedback got, so those who were addressed and the new guidelines were given to the people.

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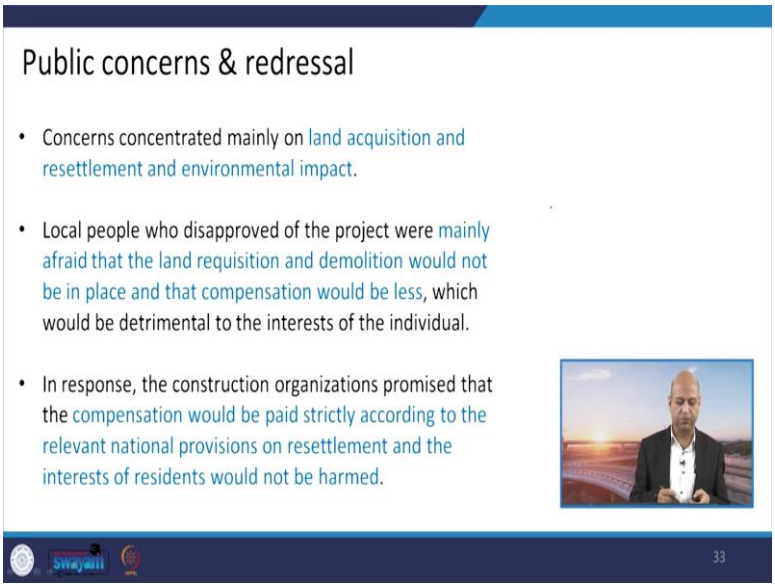

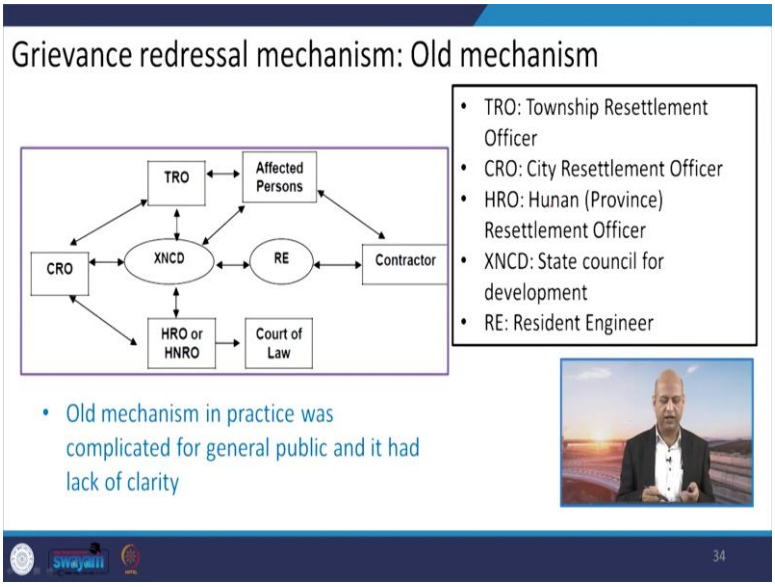

And there were some concerns for the redressal of grievance related issues. So, proper organisational input were given and those concerns were properly addressed. And this is very interesting thing like, this was the old mechanism, which used to be followed earlier, like this township resettlement officer will be there, and then city resettlement officer will be there, it was quite complex.

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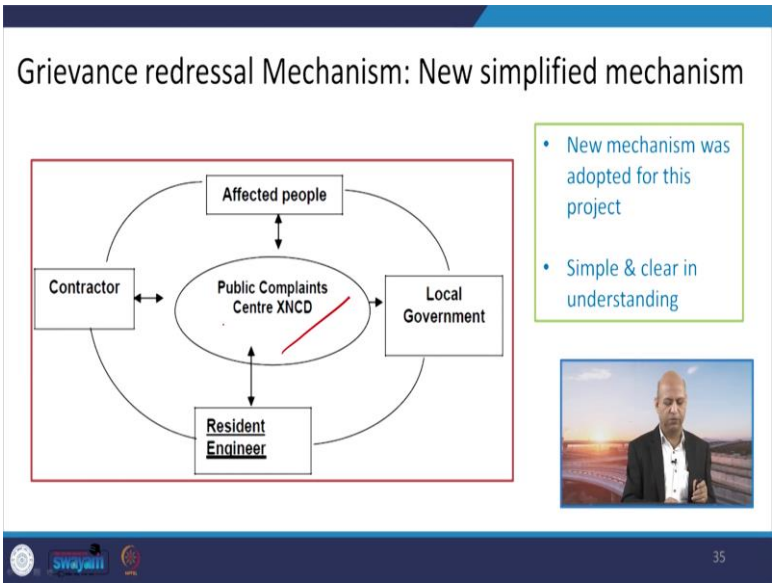

So, people will give feedback to here and there and there is no centralised and coordinated efforts, but in new mechanism for this project, they implemented this very simple way of getting feedback and addressing the affected people's concerns. So, this public complaint centre was there and this dealt with all kinds of feedback whether from stakeholders, public contractor, local government, resident engineer. So, this was the single window service, this was wonderful thing, which people appreciated.

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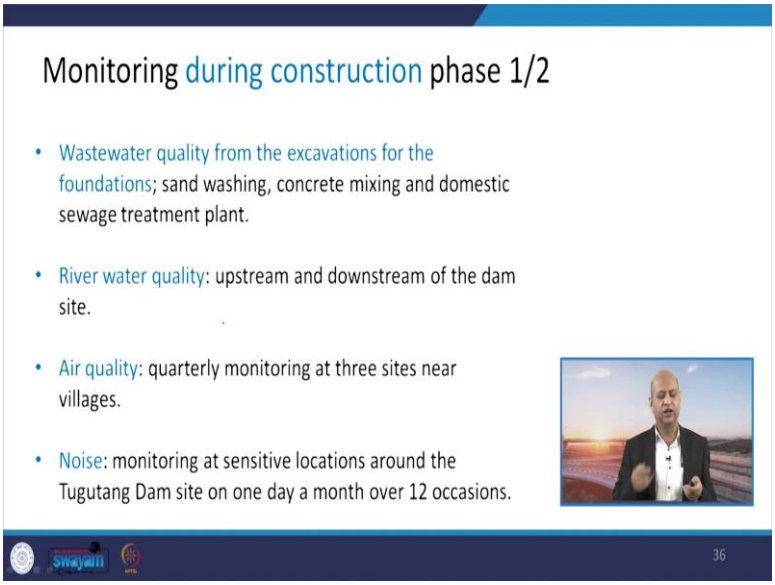

Monitoring during construction phase was done for like wastewater quality or river water quality. So, at certain locations, these monitoring stations were established, including air quality, noise quality, and frequency was there as per the guidelines.

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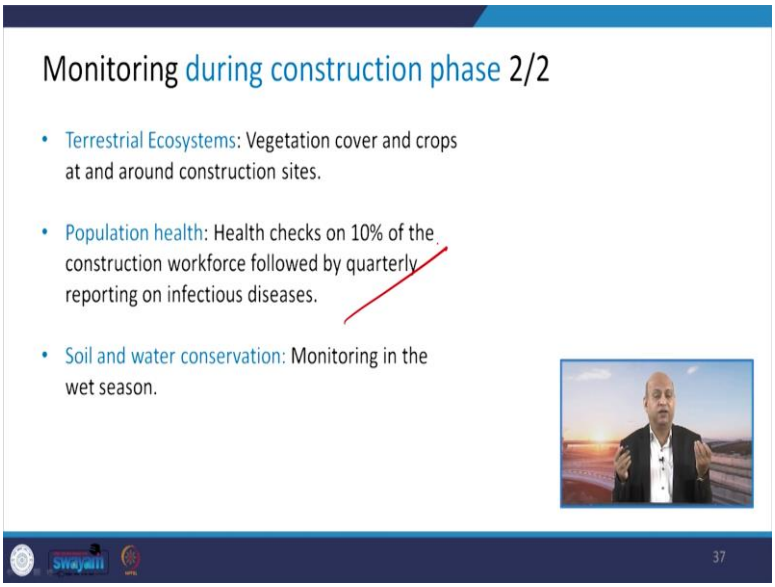

And terrestrial ecosystem like vegetation cover crops, if there is any negative impact is there. So, all those observations were made. Then population health like workforces they are so, their quarterly reporting if like, for example, if they are inhaling some, dust etcetera, if they are having some negative impacts. Soil water conservation, so, monitoring in the wet season, in the dry season, all these things have been taken care of.

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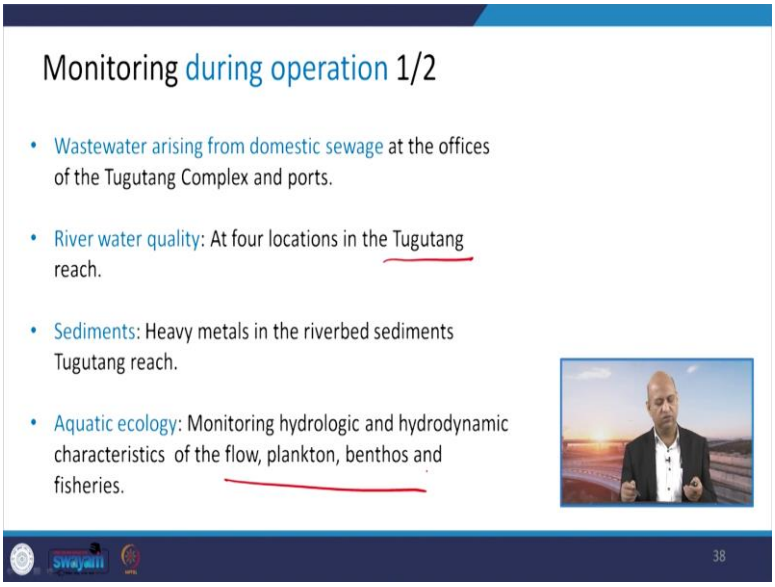

Monitoring during operation. So, again, wastewater arising from domestic sewage, those construction activities, river quality at four locations, in the, this Tugutang reach, that is the town's name, sediments like heavy metals are they are not in the sediments, because of those

construction activities, aquatic ecology, the flow, plankton, fisheries, all those things were monitored.

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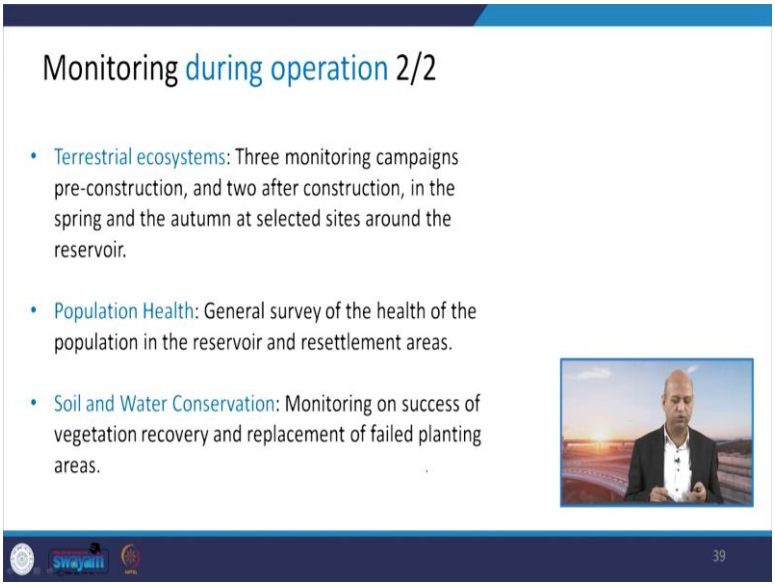

Similarly, terrestrial ecosystems. So, the those baseline data were collected earlier and then during operation it was monitored and it was compared properly whether there is any effect in negative terms or not.

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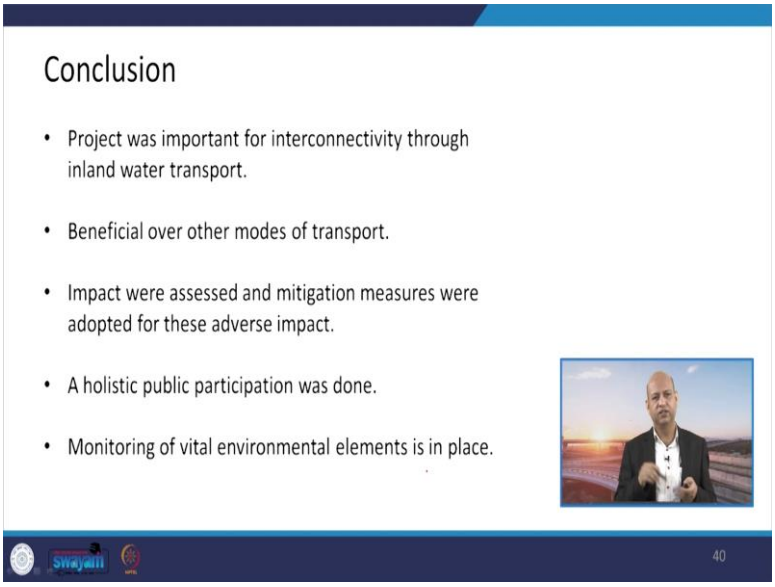

So, in conclusion, we can say that this project was important for interconnectivity and through inland water transport in that hilly area, where this highways and railway was not feasible. And it is also like it was beneficial over other modes when compared in terms of cost or time saving and other issues like congestion etc.

And then the impact it was assessed properly and it was seen that there are lot of advantages even to the local population and the holistic view of public participation was ensured, and their grievances were addressed with very simple mechanism of centralised location, one single window service and the monitoring of vital environmental elements were carried out during the project duration and later on also.

So, all these were insured by ADB guidelines that was the lending bank, funding bank, Asian Development Bank. So, according to their guidelines, all these things were properly addressed.

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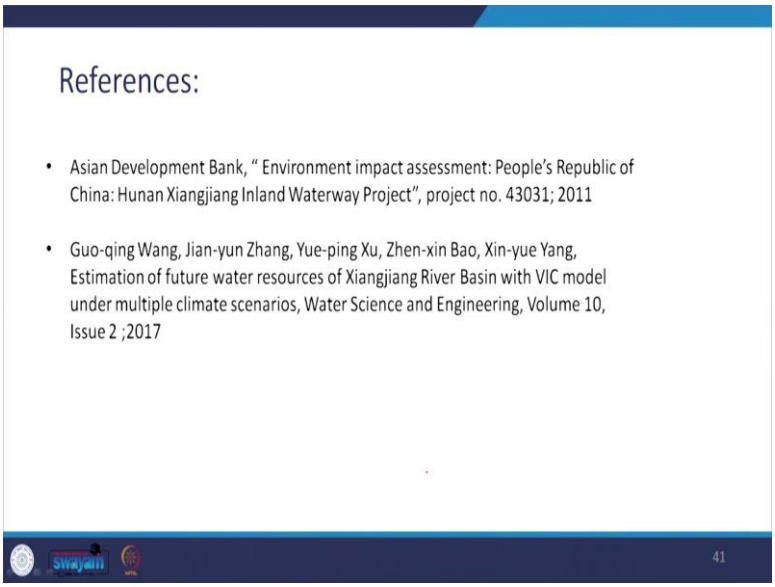

So, these are the references we have taken information from, you can go through if you want to go in detail about this EIA report for submitted with the Asian Development Bank. And thank you for your kind attention, this was the second study on inland waterways. Now, next study will be on the roads in the hilly area.

So, first case study of EIA, we took about high speed railways, the second we did in inland waterways, and third we will do in hilly areas road construction work. So that way you will have three different kinds of cases studies of EIA. And I am sure that it will give you good insight related to EIA. Thank you again for this lecture interaction and attention. Thank you.