Infrastructure Planning and Management
Risks and Challenges in Infrastructure - Part 1

What we are going to do now is essentially going to phase 3 where we look at what are the risks that these projects face, what makes majority of them fail, so this part is going to be about crash and bang. So it is going to be about failures. So we are going to look at a variety of risks and of course we are going to do this through case studies. So the idea is to pick up real world cases, look at what happened on this project. So we are going to start talking about risks first and then we will figure out who is going to present the cases. So group 7, are we?

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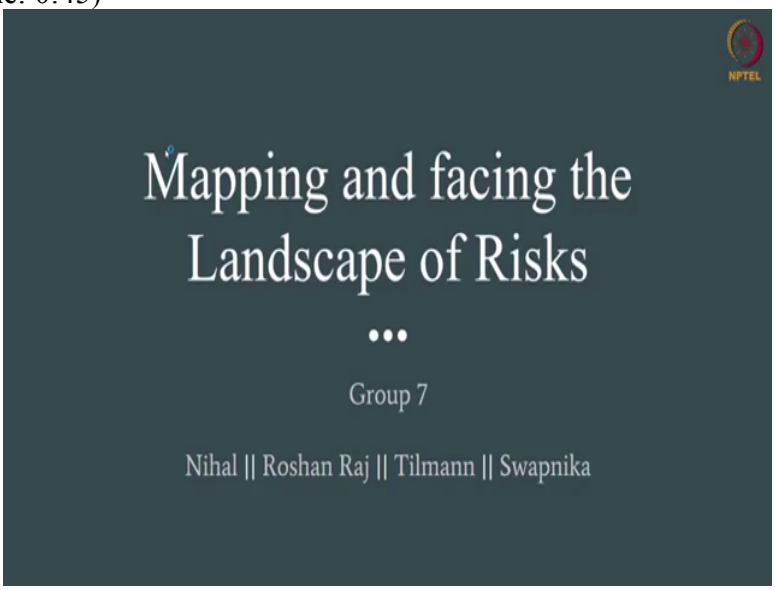

Good afternoon everyone. So we are group 7 today and the topic which we will be discussing is the risk, the type of risks and how to mitigate them.

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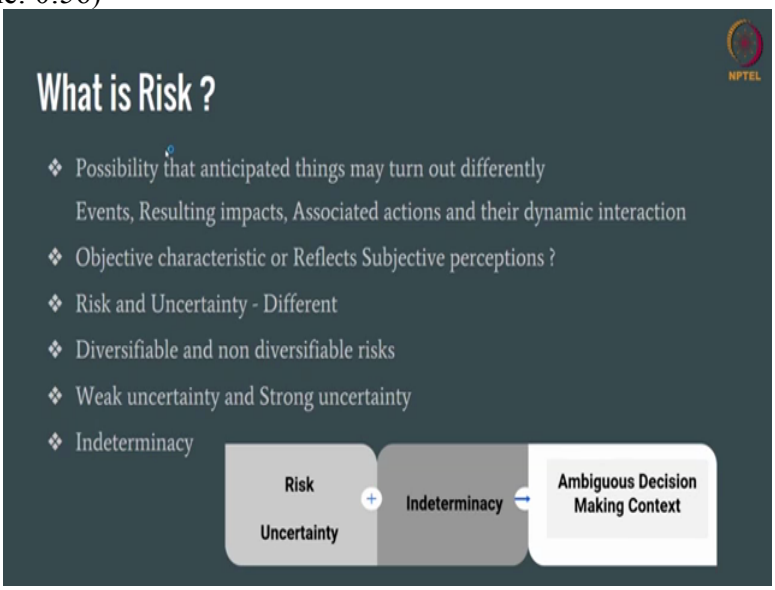

Basically what is risk? We usually anticipate some things to happen but they do not happen the way we think. So the possibility that the anticipated things may turn out differently is called a risk. The anticipated things can be the events, or the impacts which are resulting from the events or some other associated actions. There is always a debate on if the risk is objective characteristic or it reflects subjective perceptions. It is like we may think that some event happening is a risk but it might differ from perspective to perspective.

There is always a confusion between risk and uncertainty. Risk is when you know the outcomes, you know the future outcomes but uncertainty is when you do not know what the future outcomes are, so both are different. Few people actually differentiate the risks into diversifiable and non-diversifiable risks. So okay, we will get into it later, when coming to uncertainty, uncertainty is when you do not have knowledge about what is going to happen in future.

So if the sponsors are ignorant about the information, they have no information, then it leads to uncertainty. Weak uncertainty is when you have information but you are not able to do anything but strong uncertainties like you do not even have the information. Indeterminacy is the events which you think are going to happen depend on some other external and internal things. And the future is indeterminate. So risk plus uncertainty, combine with indeterminacy and there gives the ambiguous decision making context.

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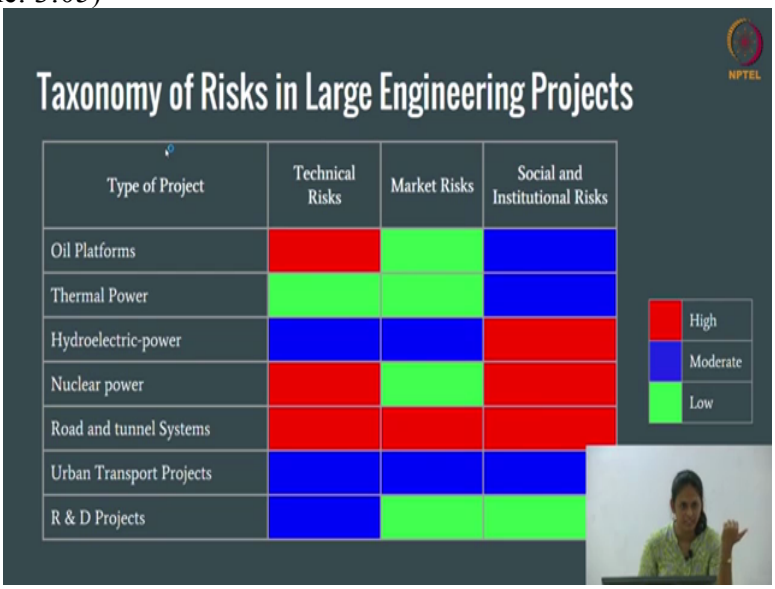

So these are the different types of projects. And the risks, the major kinds of risks faced by them, the red portions denote that high risks, green are like low risks, blue is moderate risk. For example, we can take hydroelectric power. The technical risks are moderate but they face

very strong social and institutional risks because that leads to environmental disturbances and it might even lead to resettlements and rehabilitations of people surrounding it. So you can understand about the other risks of other projects from this table.

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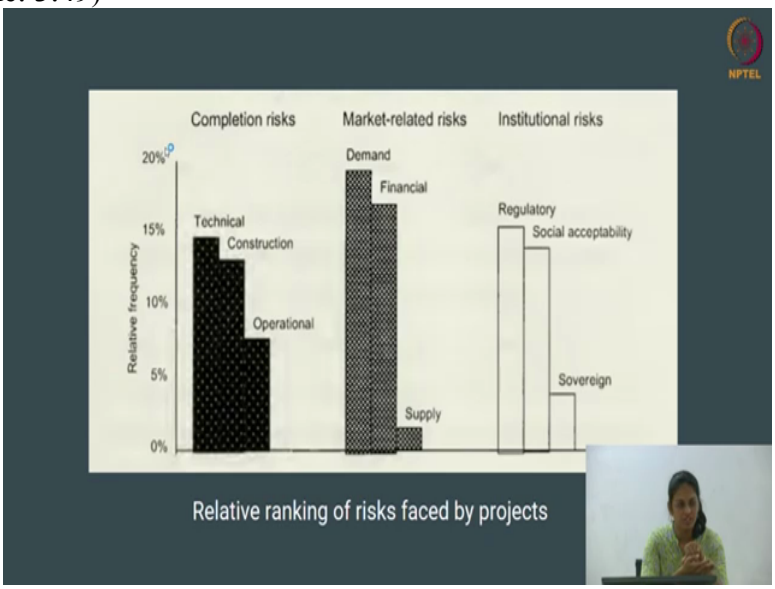

So they did an analysis from several managers of various projects and they divided all the risks into three categories. They are completion risks, market-related risks and institutional risks. They found out that the dominant risks were market-related risks followed by completion and then institutional risks.

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So market-related risks, the first part of the market-related risks is market risks. This usually happens in some power projects or transportation projects. We assume that the demand is going to be a certain value but we might not be able to achieve that demand or because of

wrong prediction or because of some changes in the economic growth. There are financial risks, these are the difficulties which we face when we want to get lenders and investors. These are different from technical and economic risks.

So if you do an initial study, and if the project shows insufficient returns, then it comes under economic risks. But if the initial studies show that the project is viable, that you will be getting sufficient returns but you are not able to go forward, that comes under financial risks. The third type of risks are supply risks. These are similar to market risks but here okay, I will give an example. For example, hydroelectric power project, it depends on the precipitation levels. If rainfall is low, then it is risky or suppose we can take an example of oil platforms. If the fuel is, if the raw material is less, then it is risky.

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The second category is completion risks. So there are technical risks, the designs can be complicated or the technologies can be complex, otherwise the technologies even though they are complex we might be able to achieve them. But the conditions might turn out bad. This gets worsened because once we are stuck in, it is difficult to come back. Suppose we are in the midst of tunneling and something goes bad, we cannot come out of it.

Construction risks, these are the difficulties faced by sponsors and contractors. The sponsors usually rely on contractors; they think that they can do the difficult tasks well and they can manage. But if it is a risky project, the construction becomes risky. Operational risks, the construction is done, the technical risks are over but there is a possibility that the equipment will not function adequately. So it can be reduced by investing in high-quality systems from initial stages itself.

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Institutional risks, again the first kind is regulatory risks. The private parties, they face many oppositions and resistance from the public authorities and there will be delay in getting approvals for environmental plans or design plans and so every project has some rules and regulations governed with it. If they are not well defined, it becomes riskier. For example, in emerging economies the rules are defined but they are not strict. In that cases, there is a greater chance of regulatory risks happening. Also if the private investor does not have the bargaining capacity or if he does not have the experience, these risks might happen.

Influence of politicians and bureaucrats also give rise to these risks. Social acceptability risks, like we discussed in the (())(08:44) water supply there were many social risks that was like we got opposition from the people, from some agencies and treasure groups. Sovereign risks is when the government which has actually given a contract initially but now it renegotiates the contracts. So it can happen if there are regime changes and it gives rise to hostile environment to private investments. Of if there is Pro competition policy changes also. Pro competition policy changes is when suppose decrease the toll fares or decrease the tariff rates and you try to encourage competition. That time the government wants to renegotiate.

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We have seen different kinds of risks till now but it has been observed that there is an interaction between the risks too. Some risks are linked to life cycle of the projects, they are called hurdle risks. For example, financial risks. If you get the financing in the initial stages, then it is done, that risk will not occur later. Technical risks, once you do the engineering experiments, once you select which elements you require to design and construct it, that is done. Regulatory risks is once you get the permissions and approvals, you will not face regulatory risks later.

But some market-related risks are independent of life cycle. For example, the demand of the project, it does not depend on the life cycle, it depends on some external factors. Suppose you have built toll road, depending on the economic growth and the development of the region or the area, the demand might change. These whole risks are again embedded in a layer of global market risks. Global market risks are when there is a change in the world interest rates and all, all these risks arise again.

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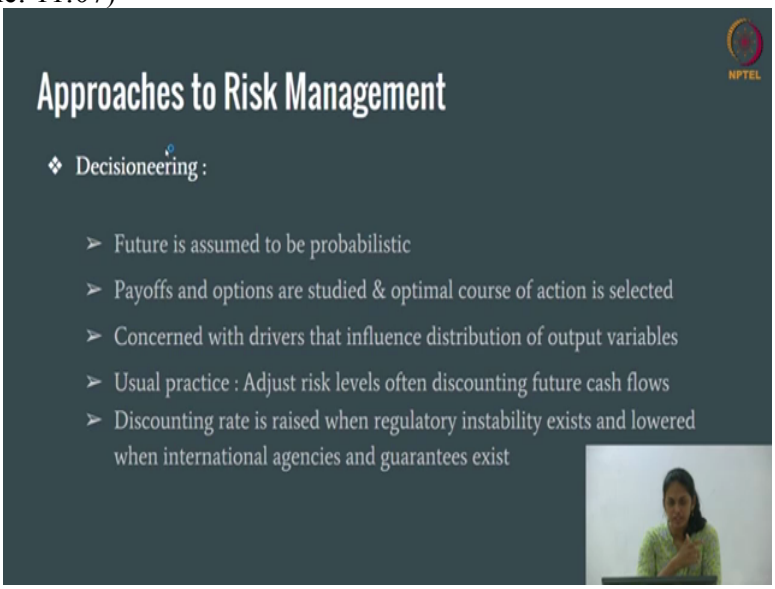

So approach to risk management: There are two ways in which you can manage the risks, it is they are decisioneering and managerial approach. In decisioneering, you assume that the future is probabilistic but in managerial approach you cannot, you do not assume that the future is probabilistic, you have just no idea about it. Here they, okay, because you know what the future outcome might be you think of the different options and the payoffs and select an optimal course of action. So usual practice is you adjust the risk levels often discounting the future cash flows.

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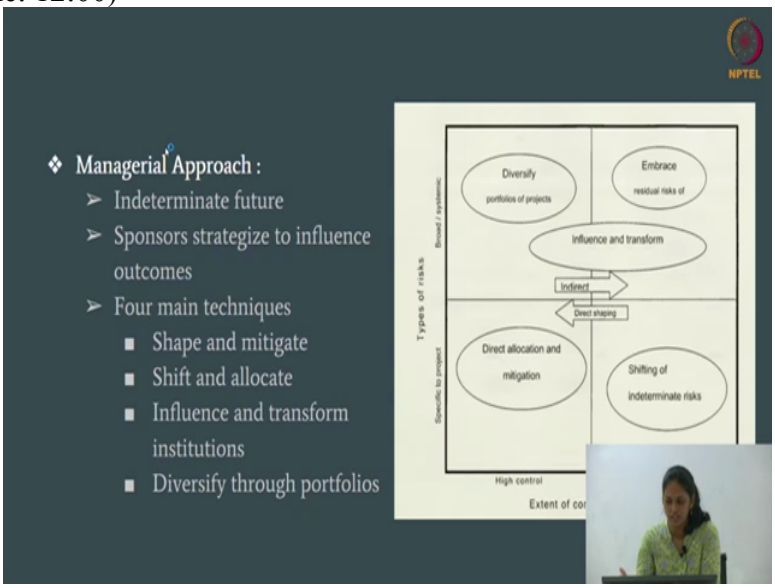

Managerial approach, when the future is indeterminate, so sponsors just do not sit silent till the event gives like it wins or loses. They actually do some strategies to influence the outcomes, they collect some responses, they match with the strategies and they match the risks with some strategies and they allocate responsibilities to parties. It is like division of

risks so that the party which is good in dealing with that risk will take up that responsibility. There are four main techniques in this: It is shape and mitigate, shift and allocate, influence and transform institutions, diversify through portfolios.

When you have more control over risks and these have been divided based on how much control you have over the risks, and how specific the risks are to the project, if the risk is very low specific to the project, but you have high control, then you directly allocate and mitigate. Otherwise depending on the different things, you do that.

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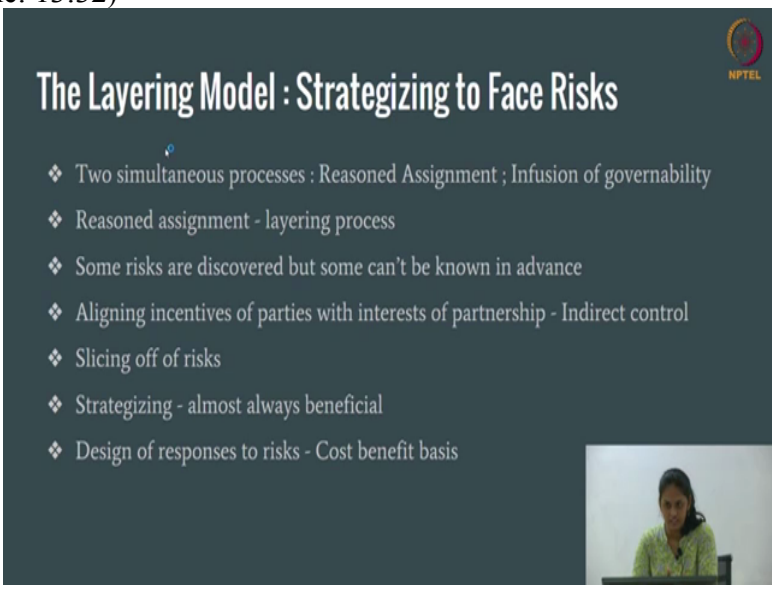

The strategies to face risks: Two simultaneous processes are involved which is you need to assign the risk first and then infusion of governability. Reasoned assignment has a layered process. First, you find out what the risks are, you imagine and then allocate them. Some risks are discovered but some risks are not known in advance. So what the sponsors do is they sit along with the parties, they take joint decisions and they allocate the risks depending on who can control the risk well.

In this way instead of a big risk, a major risk being handled by like a group of people it is divided, it is called slicing of risks. And the design of responses to the risks is done based on the cause-benefit basis.

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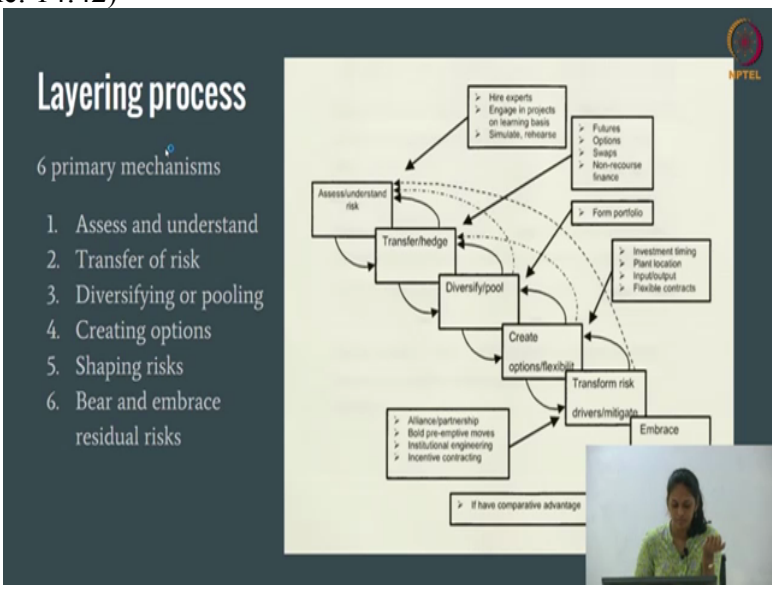

Layering process, the sponsors usually take these six primary mechanisms. First, you assess and understand the type of risk and then you transfer the risk, third step is diversifying or pooling. Diversifying is divide the risk such that the major loss, the total loss which you are getting will be minimalistic and then you create options. You want to deal with the risk in multiple ways. So you create options of the responses in which you can deal with the risks. And then you shape the risks and finally you just embrace the residual risks.

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What is comparative advantage is risk taking? So whenever people want, people or the parties want to become a member of a project, the selection is done based on the comparative advantage in taking risks. If the party is not coming forward or not willing to take any risk, there is no point in giving the membership in that. So the relative superiority can depend on, can vary depending on these three things. Few parties can have more information about the

risks and impacts. Few parties can have influence on the outcomes or few can have the ability to diversify the risks properly.

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So this shows their ability to get information, influence and diversify. So we can take an example of local portfolio investors. And sorry, the color grading was different, it is like green means high and that red means low. So local portfolio investors can have high access to information, they cannot influence well. But they can just moderately diversify.

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So risk management we want to do it effectively. So effective risk management, you allocate the risk such that risk allocation is done in a way that the private parties which are taking the risks they are provided some incentives so that they can perform well. So this gives effective risk management. This can be measured only on outcomes. And so finally management of

financial risks, demand and supply risks, this can be avoided by doing proper market research without doing any errors in estimating the demand.

Then social and institutional risks, you create awareness among the people about the points which are there in the contract, you negotiate with them, you give compensations to them and you can avoid that. Regulatory risks, you can avoid the delays in getting approvals by creation of a separate authority which will just take care of these works. Thank you.

So the first thing I just wanted to re-clarify is the difference between the risk and uncertainty. Risk is when you know enough what the probabilities or what is likely to happen. Uncertainties are when you do not. So if I know there is a 50 percent chance of rain, then that is a risk. If I have no idea what the weather will be like, that is an uncertainty.