Water Economics and Governance
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Lecture – 19
Valuing Water: Water Valuation Methods

Hello everyone. So, we are into the ninetieth lecture in the fourth week. What we have discussing earlier was the different methods for valuation of the water resources as well as water services.

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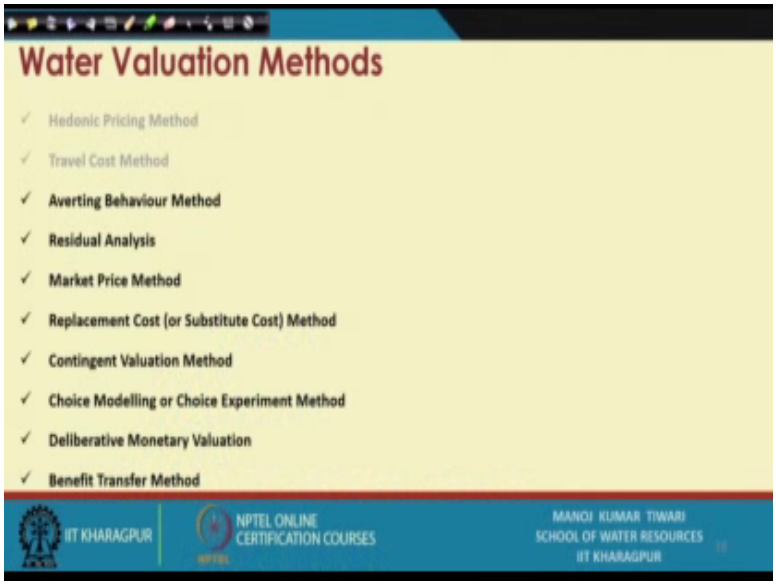

So, we will continue from where we left in the previous session. We did discuss couple of methods that is Hedonic Pricing Method and Travel Cost Method, we have already discussed where Hedonic Pricing Method takes clue from the availability of resource, how much it is going to impact when the resource is available or it is unavailable, like in case of land prices or farm prices whereas Travel Cost Method is specifically for recreational sites. So, how much people are willing to expand to sort of willing to expend for visiting a particular recreational site.

There are various other water valuation methods which we have which we will be discussing in today's this session, that includes Averting Behaviour Method, Residual Analysis, Market Price Method, Replacement or Substitute Cost Method. So, there are a few other. The methods are not limited to these only; there are other methods available,

other approaches are possible to be adopted for valuation of water resources or water services. However, these are the major ones which we will be discussing and of course there are ah other alternate ways available as well.

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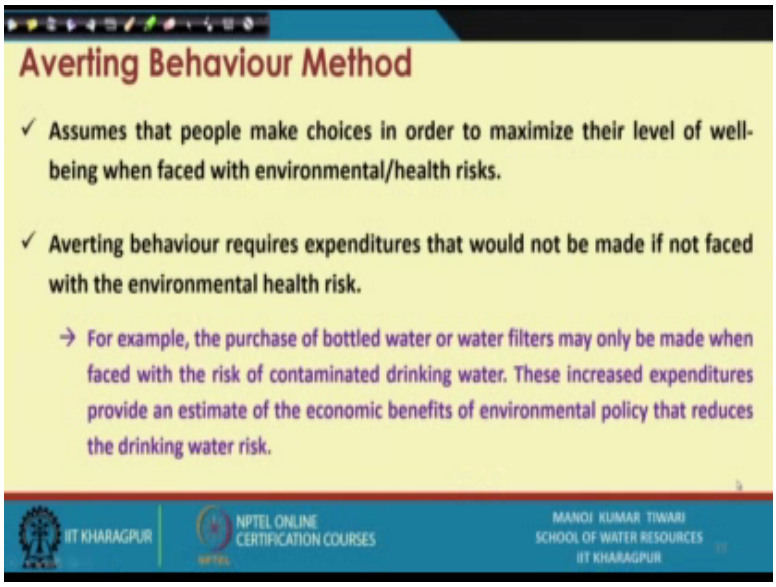

To start with, there is approach which is typically referred as Averting Behaviour Method which assumes that people make choices in order to maximize their level of well-being when faced with health risks or environmental adverse environmental impacts. So, for example, let us say let us say, we are drinking tap water in a household and people realize that the quality is not good and it is causing some sort of adverse health effects. So, they procure an RO system.

So, that RO system, the cost of RO system, the installation and operation and maintenance cost of RO system for that household is actually a cost which is due to the improper quality of the water supplied. So, if you try to, if one is willing to get or if one is willing to value the good quality tap water supply, one should exchange that price for the additional unit which has been avoided, which has been included in order to, in order to avoid the health concerns of impure water.

So, that is what is covered under Averting Behaviour Method. And this averting behaviour requires expenditure that would not be made if one is not facing that environmental health risk. So, it is the behavioural avertation that is made in order to, in

order to counter that environmental risk or adverse health risk, that is what that is how it is valued a resource or a services is valued.

So for example, the purchase of bottled water or water filters may only be made when faced with the risk of contaminated drinking water. So, this increased expenditure provides an estimate of the economic benefit of environmental policy that reduces the drinking water risk. So, if one is going to put through a policy that will reduce the drinking water risk or one is going to put a service, it is not necessarily for policy it is for service as well.

So, if one is willing to, if one is willing to start a service which irradiates the contaminated drinking water risk, how much that be valued can be estimated using this approach by like how much people will otherwise spend in order to counter that risk which is being covered by the particular services or policy or equipment. So, that is the Averting Behaviour Method.

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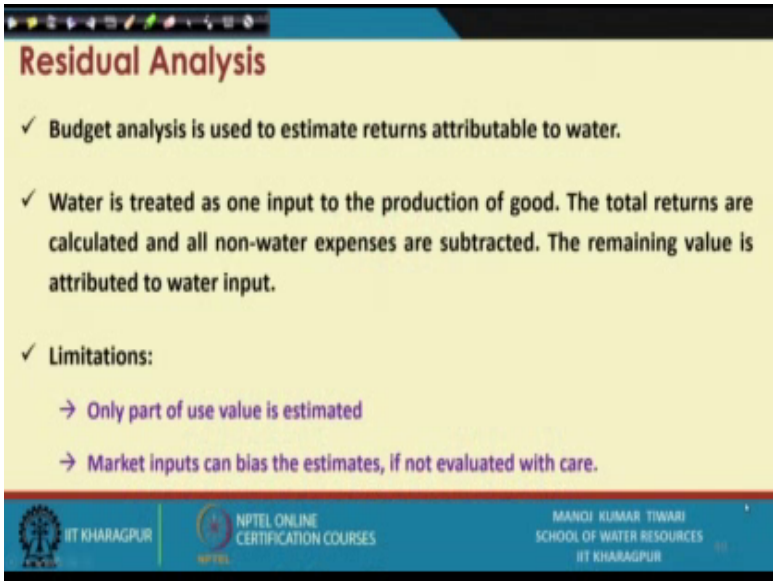

Then there is another approach which is on to the Residual Analysis approach.

Now, what Residual Analysis suggest that the, when water is treated as one input in the production of good then the total cost involved in the production, total cost involved in the production or we can take away inform of the total expenses made in the cost

whatever cost of that product is perceived or is fixed. So, total cost of production of non water expenses is to be subtracted from the total cost.

So, when you get, you let us say assign a total value of a product, and you substrate the non water expenses made in order to manufacturing of that product. So, when you do that, the additional value, the remaining value is attributed to the water inputs. So, this is kind of a budget analysis which is used to estimate the returns attributed to the water. So, because we do not have, we often we cannot compute the water inputs in straight terms, in tangible terms. So, what is done, we rather take the total value of the product and take the total non-water inputs.

So, what are all the inputs which are not related to water, what is their value and then when we substrate it from the total value or total cost or total return, I mean if you are talking about services it becomes return. So, in the total return, what is the total non-water expense, if you subtract that the rest is considered as the water value. It has a couple of limitation, not only couple actually, there would be several other limitations, but the major ones are that only a part of value is estimated.

And market inputs can basically be can have a huge degree of bias at times. So, if it is not properly evaluated, if it is not properly calculated with a precise care and other considering the all other non-water inputs and estimation of the cost correctly, then there could be bias towards particular services, towards a particular product that needs to be taken care of.

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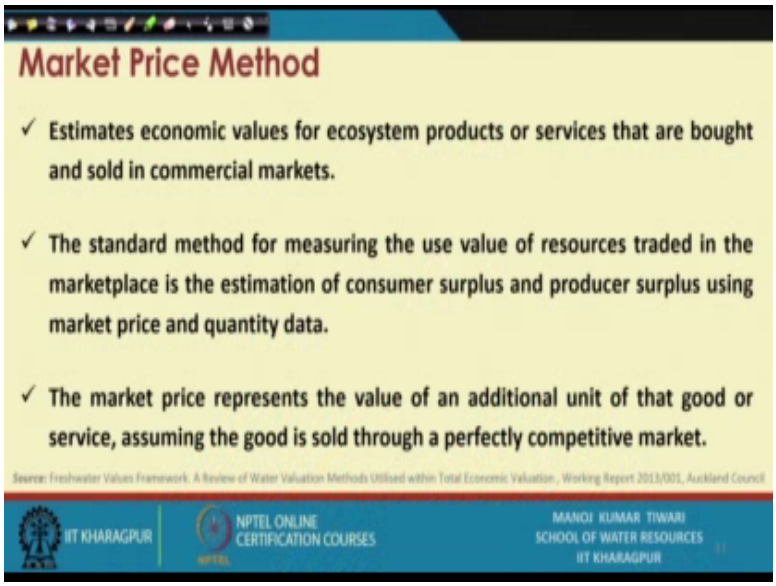

Ah, then we have Market Price Method, which is, which estimates the economic value for ecosystem products or services that are bought and sold in commercial market. So, it is sort of based on the competitive market; what price a product or services will fetch in a competitive market? So, that is simple and straightforward Market Price Method. So, this is a standard methods for measuring the value of resources traded in the marketplace, in the sort of for the estimation of consumer surplus and producer surplus, using the market price and the quantity data.

It is typically done based on the marginal cost aspect which is unit, which is additional cost or the cost in order to cost involved or cost spent in order to add 1 additional unit of that particular good or services. So, that is what marginal cost is we will discuss about this in detail later weeks.

So, generally it is based on the market marginal cost pricing and the what assumption we take that the good or the product is sold in a competitive fashion. So, when there are competitions from other sectors or other service provider or other goods, how much a particular service provider will fetch a price, that is based on the competitive market pricing.

Like for example, we have in several products available in the market or for other services, we have several telecommunication companies. So, we get our mobile, sim card or recharge, we know that there is a Airtel is a service provider, BSNL, there is a

Vodafone, there is a Reliance. So, when we have multiple service providers and we basically evaluate and evaluate their plans, their services in terms of our need and then we choose something.

So, similar fashion for water also, when it is a product or service is released in the open marketplace, what price is it is fetching in the market that is simple market price assessment. So, that is a market price assessment method has again a few limitations.

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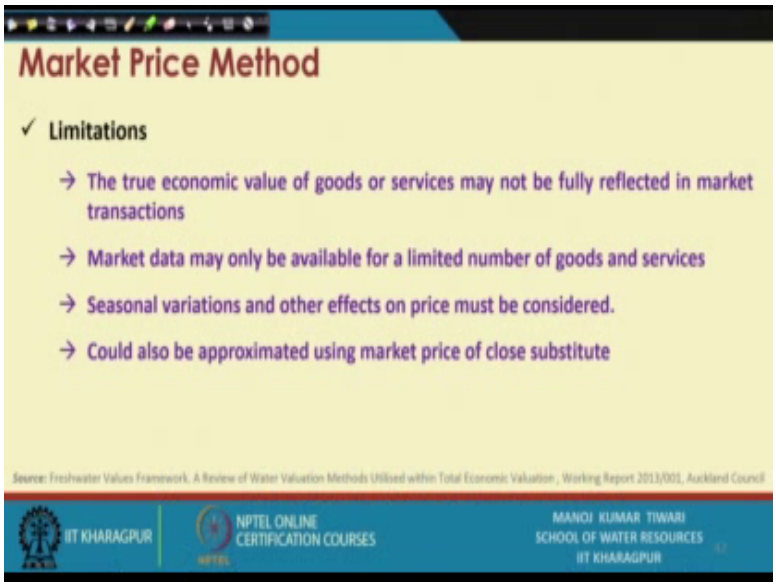

The major one includes that the true economic value of the good or services may not be fully reflected in the market transactions; because again there is comes a concept of willingness of pay and the prices involved market strategies, marketing aspect.

So, it does not, it may. In fact, at times it may not reveal the true economic value of a particular good or services. Then the market data may be available for a limited number of goods and services. We may not have essentially market data available for variety of water services. Many of the water services are intangible. So, in that case it becomes difficult. Then seasonal variation and other effects on price should be considered, which is a difficult one ok.

Because when we are fixing a strategy or fixing a price or sort of evaluating a resource, one needs to consider all these aspects that how seasonal variation will change the price of a particular service. If you see, people's willingness to pay or the market price may

not be the same for a same product under different seasons. Your, if you try to sell water in sort of monsoon season, when there is a plenty available otherwise also you may not get the price as opposed to the one when you try to sell it in the drier season ok.

So, this is a common practice. It happens in many cases. You see that seasonal vegetables, you always get at a cheaper rate when opposed to that, when in the non-seasons because their productivity is not there, their supply is not there. So, demand and supply aspect come into the play, could also be like approximated using market price of clothes substitute. So, what are the alternate substitutes? Ok.

If you are selling a drinking water bottle at, I am just giving an example; if you are selling a drinking water bottle at let us say 50 rupees and there is a cold drink available in 30 rupees. So, people when they feel thirsty they may not go for water, but they may go for cold drink or they may go for some soft drink. So, those kinds of substitutes could also come into the picture when you are trying to assess the value of a product or service based on the market.

Ah then there is a Replacement Cost Method or Substitute Cost Method which is, which sort of considers the potential expenditure that will incur in replacing or restoring of function which is lost.

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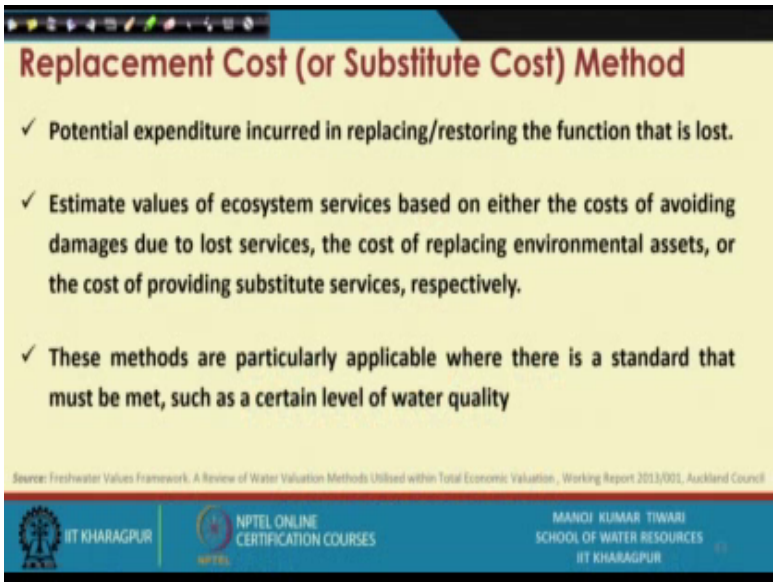

So, the estimated value of an ecosystem could be based on either of the cost of avoiding damages due to lost services. So, the Replacement Cost Method also has a component which you can consider that actually a few people consider this as a avoiding damage method ok.

So, either you compute the likely expenditure in order to replace or restore a particular service or product, or you compute a cost of avoiding damage due to these kind of services. So, the cost of avoiding damages due to the lost services, the cost of replacing environmental assets, restoring environmental assets or the cost of providing substitute services are estimated and that is what is attributed as to the cost of that particular water service.

So, these methods are a particularly applicable when there is a standard that must be met such as a certain level of water quality. So for example again, if you are getting a poor water quality and you need to improve that water quality in order to meet a standard, you need to restore that to a given set of standard level. So, how much cost or how much amount you are going to spend onto that would give you a cost, would give you the value or valuation of the particular resource or service.

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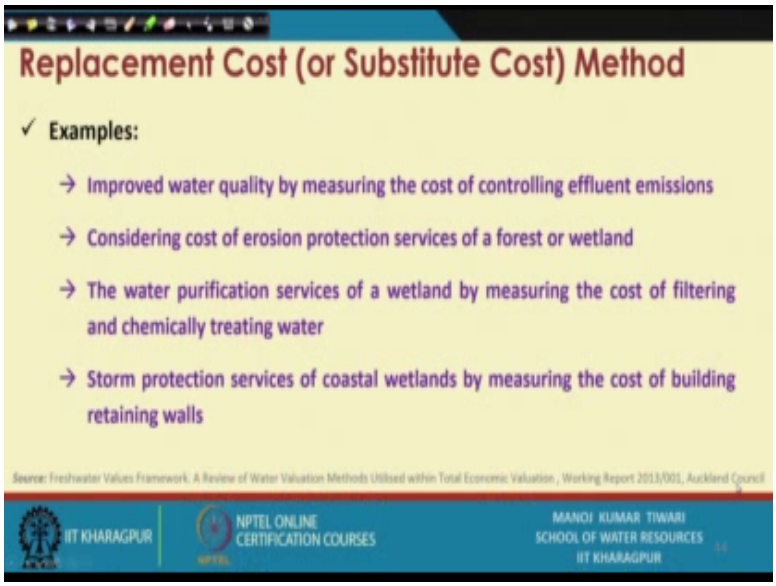

So, for example, you have a improved water quality by measuring cost of controlling effluent emissions so for we do talk a lot about Ganga river cleaning these days. So, in order to restore the Ganga to it is original, if you want to value that in order to restore it

into it is original or near pristine stage, if we can say that, we will need to invest in order to controlling the effluent discharge into the Ganga.

So, the effluent that is being discharged from different locations, different industries or municipalities, if we capture all those treat, all these things recycle or basically manage the affluent let it not go or let it not go untreated or contaminated water into the Ganga in order to restore Ganga. So, the kind of expenditure are being made can be attributed towards the evaluation of Ganga. Then there is a considering of a cost of erosion protection services of a forest or wetland similarly or if you want to prevent sort of coastal wetlands from storms and all that and go on to build a retaining wall. So, what is going to be the cost of that?

What are the water purification costs would involve for maintaining a wetland or maintaining a water resource chemically or physically treat the water. So, all these different aspects of cost would add up and would sort of give you indication of the value of that particular resource or at times services.

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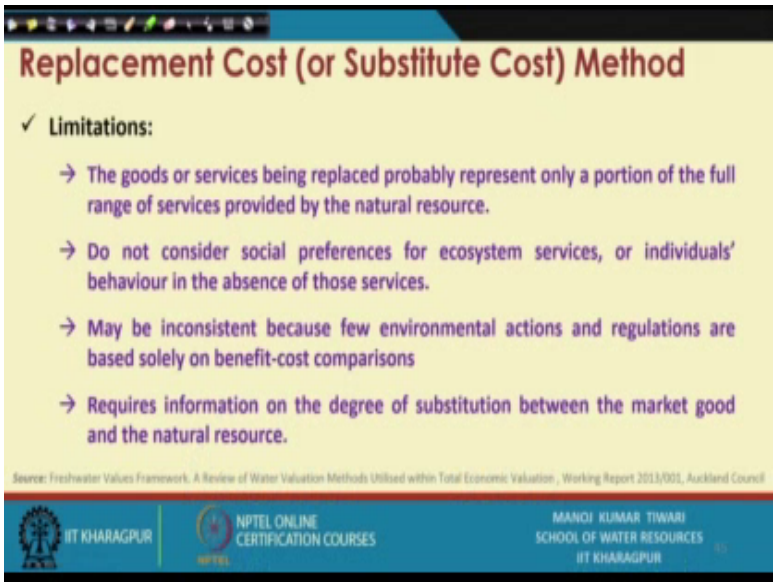

The limitations, well the method, the goods or services being replaced probably represent only a portion of the full range of services. Because as I was giving the example of Ganga, the services of Ganga is just not to maintain the clear water flow, the services of Ganga, a lot many including management of aquatic ecosystem, their livelihood have

several people depend on to that. So, that way the valuation has many more other components as well.

So, it actually this method limits to a component what we are considering for the replacement or substitution. So, that is one major limitation of the method. It also do not consider the social preferences for eco system or individuals behaviour. In absence of those services; for example, if the let us get back to the same example, if the ganga water is not that clean, has it avoided the individuals taking dip in the ganga. How their perception or how their valuation, perceptive valuation of that resource has changed that also should be considered.

But this method does not consider because it is purely based on the expenses being done towards the restoration or substitution of that services. May be inconsistent because few environmental actions and regulations are solely based on the benefit cost comparison so in that case, it may not fall particularly in line. The required information on the degree of substitution between market good and natural resource is needed and it is not easily available. So, that would be one further limitation of the method.

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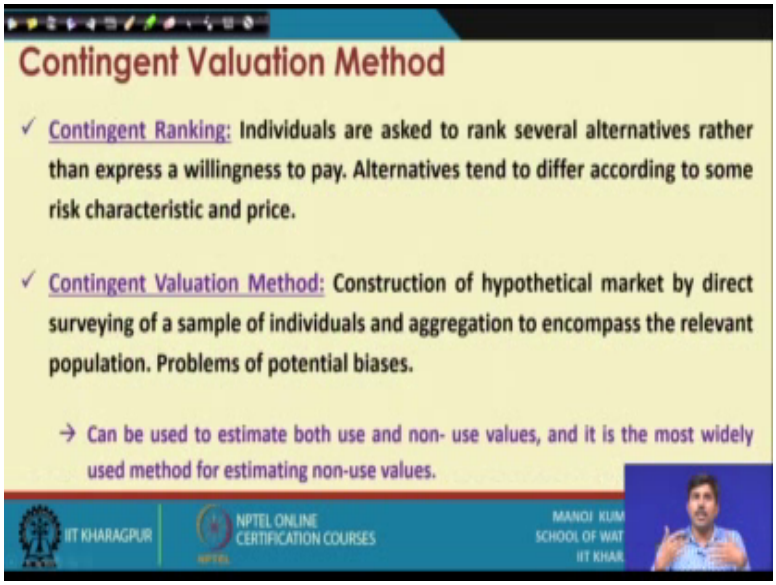

Then we have a Continent Valuation Method which is a simple method. It is again based on the public perception. So, hypothetical market is constructed by direct surveying of the sample of individuals and their aggregation is taken to encompass the relevant population. So, there is problem of potential bias in this, because it is based on the

people's perception. So, how much the people value a particular water resource or water services. So, that kind of survey can be done and based on that the particular resource or service can be valued.

Many times individuals are not asked specific like the value, but they are asked to rank several alternatives in order to their express of willingness to pay. So, how much they will be willing to pay for a particular service; for example, if the residents are asked to manage their sewage inside within the residential block or residential campus by putting a decentralized treatment system or recycling system, how much they would be willing to pay for that or it is collect brought to the central sewer system, how much they are willing to pay for that.

Or there might be a third, fourth alternative. So, they are all be asked to rank the different alternatives and then sort of based on these ranking, the priority or the higher value or lower value options for the water services or resources can be picked. But this provides just a ranking whereas, the in the valuation method, the survey can be made asking the values and then a comprehensive statistical data is collected, analysed and based on that the value could be assigned to a particular water resource or services.

It can be used to estimate both use value as well as non-use value because people can give their, people are opinionated about both the, can give their opinion about the what is the use value like when we use it; for this particular purpose, how much we are going to pay for it. When we do not use it for ecosystem services or for bequest values, how much the people allocate value for that purpose. So, it can be done for both and it is one of the most widely used methods for estimating non-use values because non-use values always depend on the people's perception. It is a non-tangible stuff and other methods would be very difficult to estimate straightforward.

Then there is a Choice Modelling or Choice Experiment Method, again it is a very similar to the Contingent Valuation Method. It is a hypothetical method and asks people to make choices based on the hypothetical scenario. So, it differs from the earlier because it does not directly ask the people to state their value in particular dollars or rupees or in particular units, in particular amount, instead the values are inferred from hypothetical choices of trade-offs' that people make.

So, people will be asked to choices in terms of trading off, how much you can, how much like with particular, which particular service you can leave in order to get this type of facilities or those sort of things. So, it will be basically making on choices between the several alternatives available and not just the valuing in terms of specific monetary values. So, that is the difference between this. It can be used to estimate the economic value for virtually an ecosystem or any environmental services and similar to the other one this can also be used to estimate non-use values as well as use values. The concept wise they are very much similar.

Then there is a Deliberative Monetary Valuation, which is again taken from the people perception, but it is not just based on the survey kind of thing and then further statistical analysis, but it is a formal method where the experts or the key stakeholders are invited and made to do the deliberations to express the values for the environmental change or a particular water resources or water services in monetary terms.

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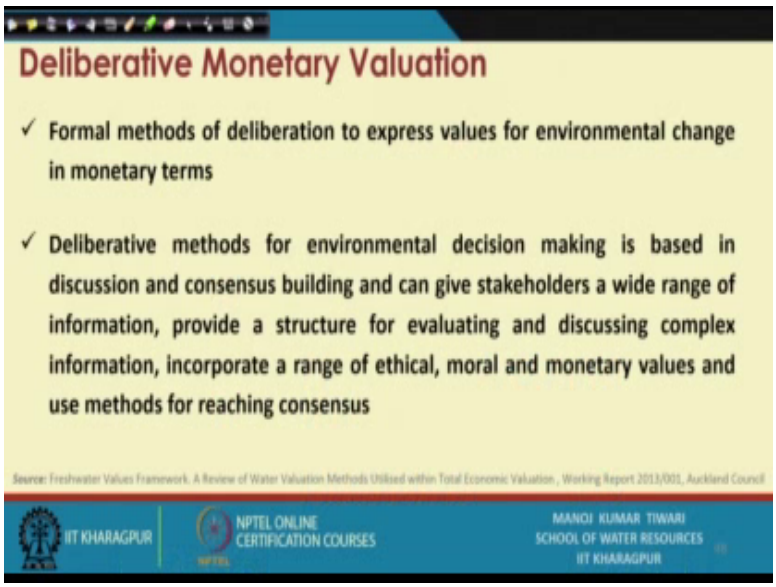

So, this comes out through the discussions, proper deliberations discussions, expert opinions, those sort of approach is adopted over here. The Deliberation method for environmental decision making is based on the discussion and conscious building and can give different stakeholders a wide range of information, provide the structure for evaluating and discussing complex information because the water is such a field that you have we have already discussed this, but you have a stack holders from multiple aspect.

There is a user group, there may be a civil society, may be an NGO, may be a state responsible for doing these municipalities. So, all these different stakeholders, the key person or the key expert from the different stakeholder groups need to sit and discuss, deliberate and then come into the consensus for assigning a value to that water, water in terms of like water resources or water services. So, that way through this discussion process, a value is come up and is assigned.

It also incorporates the range of ethical, moral and monetary values and use monetary values and use methods various methods approaches for reaching to the consensus. So, people has to agree to a certain price and people from different stakeholder group expressed their opinion, try to convince the other group that no this value is far more important than some certain other value, this has to be priced accordingly, this has to be valued accordingly. So, all these options come into the picture and through these expert elaborations, a value is reached and assigned.

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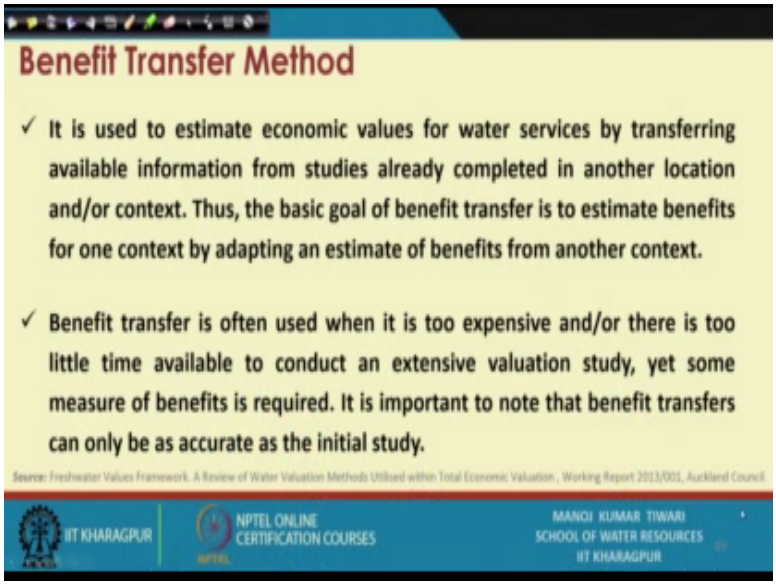

Then we have a benefit transfer method which is used to estimate the economic value of water services by transferring the available information from different analogous study. So, if a study is being done at some other location or in some other context and you are trying to get the finding of that study or the implications of that study and trying to figure out the how much benefit can be driven from certain services or certain water resources

taking clue from the previous study, may be done into the same or similar or some different context.

So, if one is taking clue from the any different study and trying to superimpose it, trying to include the implications of that study for some other set of problem or services or each locality, then it is sort of referred as Benefit Transfer Method. So, the basic goal of this benefit transfer is to estimate the benefits for one context by adopting an estimate of the benefits from some another context.

It is often used when it is too expensive and there is too little time available to conduct an extensive valuation study. So, if one is not able to conduct an extensive evaluation study, they do not have adequate fund or adequate time or adequate facilities to conduct those sort of study. So, this kind of approach can be used; however, again there is a limitation that you have to have this kind of study done elsewhere in some other context which you can transport it this.

So, this benefit transfer again another key limitation is that, it will be as accurate as the initial studies done. If there are errors in the earlier study, in the initial study from where you are taking the implications, you're the valuation in the current scenario is also likely to be going faulty. So, these are the major methods of Water Valuation.

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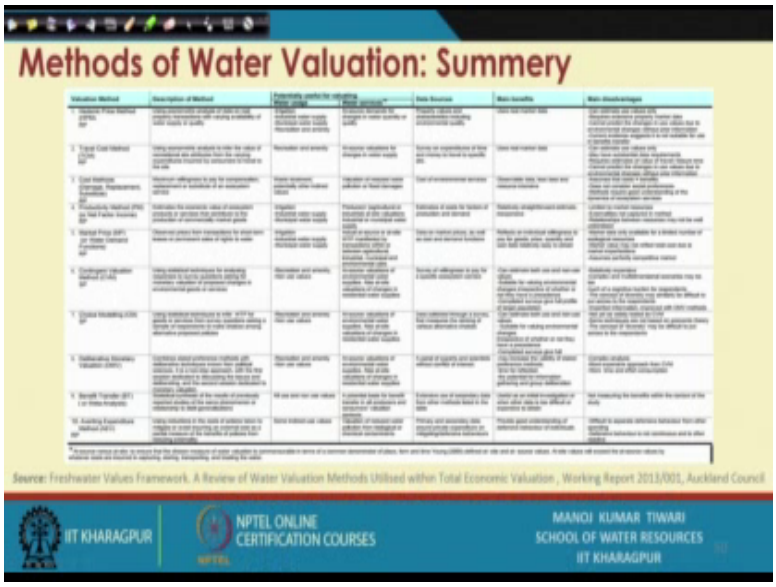

There are a few documents which sort of summarize these methods in order to their description, in order to their potentially usefulness for evaluating whether water uses or water services, what kind of data they need, what are the main benefits, what are the major advantages and disadvantages.

So, one such summary is available here. It is compiled over here and it will be provided you as a support material later on. This is not just, we have discussed majority of all these. So, there is no point in going again. There are similar other sources available like these from another source which again talks about the description of various, which again talks about the description of various valuation methods, which the different valuation method and their description and their applicability for direct use value, indirect use values and non use values.

So, this information would be supplied to you and this summary can be used in order to get a comprehensive idea of which method can be suitably used for evaluating a particular resource or service. So, with this we end this session here and we will continue the discussion about the Different Aspects of Value of Water in terms of losses, how much losses are being made in the water in the next session.

Thank you.