Introduction to Environmental Economics

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Lecture - 29
Non-market Environment Valuation: Revealed Preference Methods

Hello everyone. So, today we will be discussing the Non-market Valuations. And, in this context we will be talking about the Revealed Preference Method that is one of the methods under this non-market valuation approaches. So, as you understand that in the last class, we discussed about the cost benefit analysis corresponding to the environment. So, that is cost benefit analysis and the environment. So, this is this lecture is in continuation with the previous lectures related to the cost benefit analysis.

So, here we will be focusing on the non-market environmental valuation itself and what are the different methods or approaches in order to a value the non-market environmental goods and services right.

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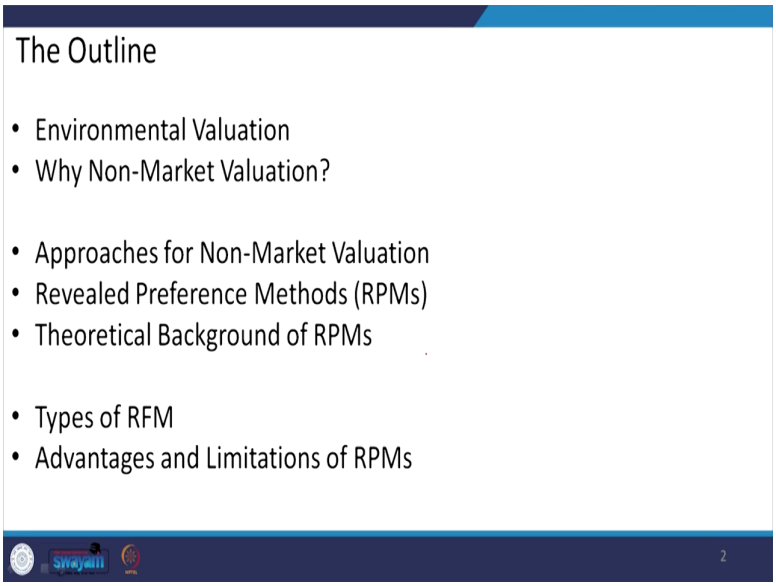

So, in this context we will be discussing the, what is environmental valuations, then why non-market valuation is necessary? So, what is the urgency? Because of which we are talking about non-market valuations. Then, we will be talking about different approaches for non-market valuations. How we are going to measure this non-market valuation? And, then we will be discussing what is the specific methods under this non-market valuation that is revealed preference methods.

So, in this context once we are defining this revealed preference method or what are the different types of revealed preference method, will be discussing the theoretical background of revealed preference method, what are the typologies of different forms of revealed preference methods that we are using, and what are the merits and limitations of revealed preference methods? So, this is the offline the overall contents of this current lecture.

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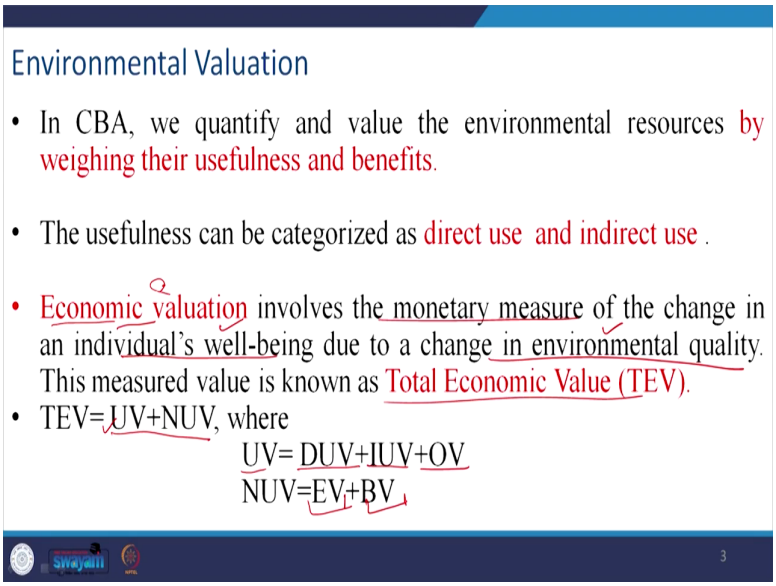

So, let us discuss from the environmental valuations. So, as you understand from the previous lecture, that is cost benefit analysis corresponding to the environmental context.

So, how we are valuing this environmental goods and services or you are saying these environmental valuations. So, in this context we are talking taking the approach of the appraisal technique of cost benefit analysis. So, they are we quantify to evaluate the environmental resources by taking to their benefits.

We are weighing their usefulness, we are weighing their benefits and cost and hence we are quantifying and valuing the environmental resources, environmental goods and environmental services. And, here when you are saying this we are weighing the cause and benefits or usefulness of this environmental resources. Here, we are saying these resources are of two types; one is your direct use value and the second one is indirect use value.

So, when you are saying that this non method market valuations and we are using this usefulness of environmental goods we are saying, this usefulness are divided in two parts direct use and indirect use. And, accordingly we are saying direct use value the value that we are putting towards the direct use of environmental goods and services. So, this is directly use value. And, similarly when you are saying the value we are putting towards the indirect use that is indirect use value. So; that means, in this context we are talking about the valuations.

So, what is valuations here? So, just like when we are talking about a market, situations and we can say, how you are valuing a particular good that is available in the market right. So, what you are doing you are talking about the corresponding prices and the quantity that you want to purchase. So, you can find the value or that is the valuation of those goods that are available in the market.

So, this is economic valuation, but when you are here we our concern is not the market valuation of goods and services rather than, the non-market economic valuation of good goods and services. That means those goods and services which are not available in the market itself. And, traditionally when you are saying economic valuations and we are talking about the environmental quality or environmental goods or environmental services.

So, we have this method to measure this environmental goods and services. So, that is known as the total economic value. What exactly is this total economic value we can define it, we can say that when there is a change in the environmental quality. Then; obviously, the individuals well-being or individuals welfare in terms of utility it will be changed. So, what is our task, when you are saying economic valuations?

So, if the environmental quality changes, then the individuals well-being will also change, but in economic valuation our task is to find out, that what is the monetary measure of the change in the individual's utility, because of change in the environmental quality. And, if you are doing this monetary exercise or monetary measurement of change in individual's well-being, because of a change in environmental quality, that is known as the total economic value.

So, these are the things we have already discussed in the previous lecture. So, I am just trying to refresh the memory, that how this environmental valuation is still expanded to different kinds of method in terms of non-market valuations methods. Again, in total economic value,

we know that this is composed of two types of values that one is use values and the second one is non-use values. So, what is use value and what is non-use value that we have all already discussed in the previous classes. But, to just to sum up this use value is consisted of direct use values, indirect use values as well as the option use values.

Likewise, the non-used value is consisted of 2 values; the first one is the existence value and the second one is bequest value. So, accordingly we are finding the this total economic value for any environmental, change in environmental quality. And, how this change in environmental quality is leading to change in the individual's welfare?

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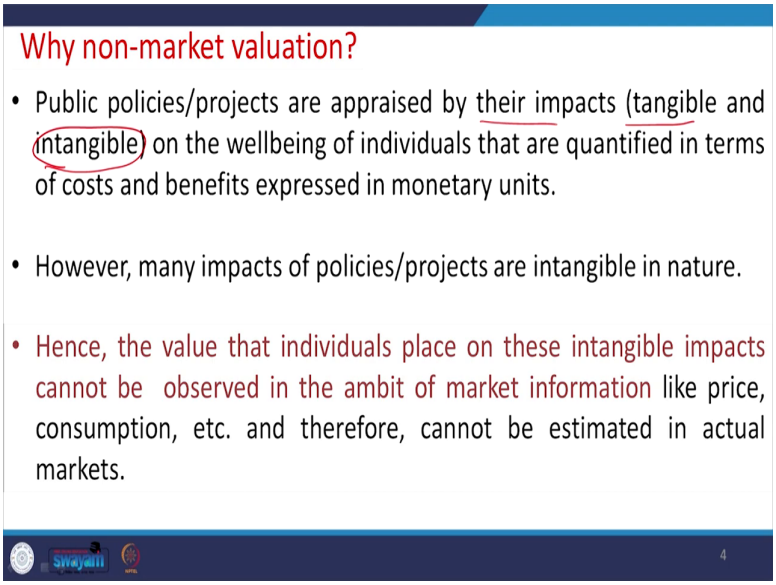

So, in this context now would like to highlight, why non-market valuations? So, what is the context here? So, you can just remember the previous lecture that is the cost benefit analysis.

So, they are we talked about what is the necessity of this cost benefit analysis. Just to remind you that this cost benefit analysis is nothing, but a, but an appraisal technique and these are always used for apprising the public policies or public projects. And, as you understand that in

this public policies and public projects, they are designed in such a way that, they will be having their impacts generally in order to boost the a utility or welfare of the individuals.

So, in the context of this cost benefit analysis, what you are trying to appraise. We are trying to appraise this policies the public policies and projects, by measuring the impacts. That, how this public policies or projects are impacting the utility of the individuals? And, again when you are saying this policies are having their impacts on individual's welfare. So, these impacts can be like your tangible impacts. So, the public policies can be, can have tangible impacts and simultaneously it can have intangible impacts. So, in the policies or projects, they are having this tangible impact.

So, it is not difficult to measure. Because, it is tangible and we are actually concerned about the intangible impacts of this public projects or public policies, that how we are going to actually measure, what kind of impacts this public policies or projects they are having on the individuals well-being. And, we are focusing the intangible impacts of these public policies.

So, when the we need to measured the intangible impacts of this public policies, or projects on the individual's well-being, then and we need to express everything in terms of monetary units; obviously, it is the common measure for quantifying, these impacts, then we need this non-market valuation average.

And, as you understand that in case of this public policies most of these impacts of this policies they are intangible in nature. Because, if the impacts are tangible it is easy to measure the impacts on the well-being of the individuals or the society itself, but when the impacts are intangible it is difficult to measure the this impacts.

So, therefore, in order to measure this intangible impacts, because it is not actually reflected in the market information. So, this intangible impacts cannot be actually measured in terms of market information like your price or consumption of these goods and services, you cannot these market information cannot actually be useful in measuring the impacts of this intangible impacts right.

So, that is why these market information are not actually useful in order to measure this intangible impacts of any policy or any projects. So; that means, this actual markets cannot be of any help in measuring this these impacts of the public policies or public projects, especially

the policies or projects when they are having intangible impacts on the individuals. So, that is what; that is how we are needing with non-market valuation approaches right? So, which is beyond the market where the market is not available.

So, now if this is so, these are the scenarios where intangible impacts of policies are there and we need to measure this. So, and there is no stereotype market, then what can be the different approaches or different methods? So, that we can measure this intangibility or intangible impacts of this these projects or policies. That is what we need to discuss. We can actually measure these intangible impacts by different approaches, which are known as the non-market valuation approaches, we have already viewed what is the non-market valuation approaches.

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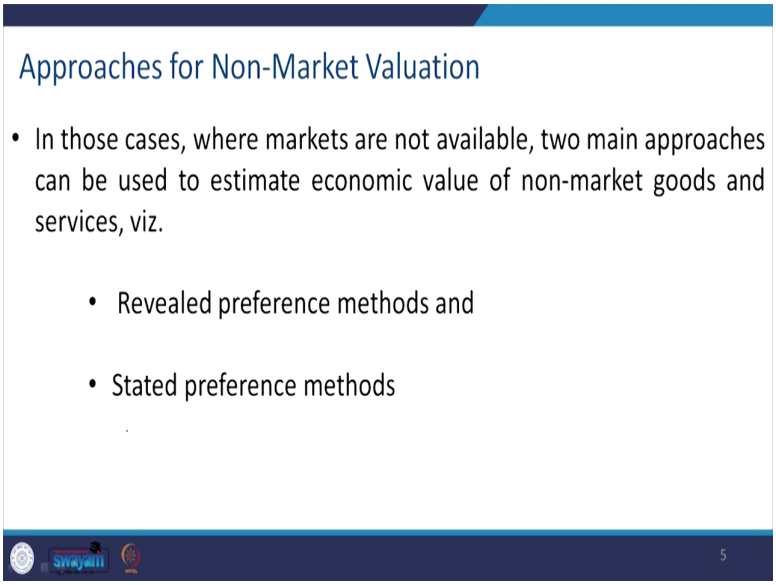

So, in this situations, where we are leading the non-market valuation and approaches right, where the markets are not available generally we are having two broad cases or two broad approaches, that are used for estimating the economic value of non-market goods and services right.

So, what are these two approaches? So, that we can estimate the economic value of the non-market goods and services. The first approach is known as the revealed preference methods and the second one is known as the stated preference methods. These are the standard measuring approaches for estimating the non-market valuations.

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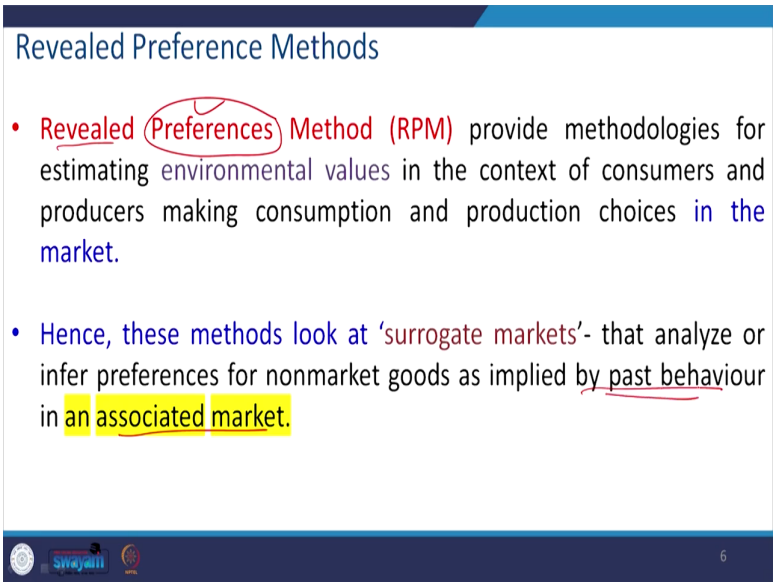

So, now let us understand this first approach that is revealed preference methods. So, what exactly is this revealed preference methods? As, the main source; obviously, you need to actually find out, from it is from the very name of this terminologies, that here the consumers of or the individuals they are revealing their preferences.

So, I am here highlighting the word preferences. These preferences are revealed and by revealing these preferences, then we can measure the non-market valuation of this goods and services or how to estimate the economic valuation of this non-market goods and services. So, universally you can say that here this these revealed preference method they are providing a kind of methodologies or approaches right.

For estimating the environmental values, where the consumers and producers they are; obviously, making using the consumptions of goods and services and they are also making the choices so for, which kind of products on is to be; is to be done in the market system. So, here this, this, this method is providing though a kind of methodologies for estimating, this environmental values.

And, therefore, this these reveal preference methods, they are searching after a market, because this is not the actual markets right, because these environmental goods and services are not traded in the market system. And, if you have to estimate the environmental values of these goods and services right, then we need to have a market, which is known as the surrogate markets.

So, this surrogate markets they try to analyze or you can say inferred, the preferences for the non-market goods and services. And, it will be actually found out by the first behavior of the of individuals in the associated market. So, I am again here highlighting this, what associated market.

So, we are searching the past behavior of individuals or consumers or producers, who are exercising their consumption of production behavior over there. So, for choosing the goods and services, which goods and services is to be consumed and which goods and services is to be produced.

So, that is what it is not reflected in the actual market or true sense of market, you can say, but it is known as the surrogate markets. In surrogate markets, we are finding we are trying to analyze the inferences sorry the preferences of individuals for non-market goods, by analyzing the past behavior of these consumers or individuals in an associated market. So, what exactly is this surrogate markets and we are searching or this is a kind of market which is helpful in finding, the economic value of this non-market goods and services.

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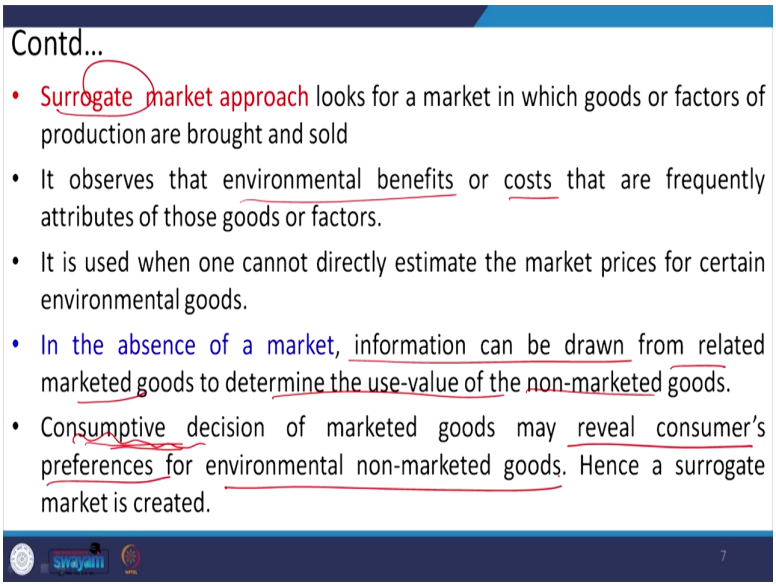

So, here this surrogate market this approach actually searching for a market is a kind of market in which the goods or other factors of productions, they can be transacted right. And, this market observes the environmental benefits are costs that are very frequently in the attributes of those goods and services of those factors of productions right.

So, you can say, that this surrogate market approach it is used when we cannot directly estimate the market prices of those environmental goods and services, because there is no stereotype or there is no typical market for it, but we are trying to find out those markets, where some attributes of this environmental goods and services are traded in different forms of goods and services.

So, you can say that in the options of a true market for those for these environmental goods and services. We can gather the information from the related markets, where related goods and services are traded over there. And, we use this market information right to determine the

use values of the non-marketed goods. So, here we just want to highlight that, this decision that, which one is to consume right.

So, this decision or this behavior on that which goods and which services are to be are to be consumed, this behavior reveals the consumers preferences for this typical environmental non-marketed goods. That is why in this way we are actually searching or we are actually creating, or in a kind of market is created which is known as the surrogate market here.

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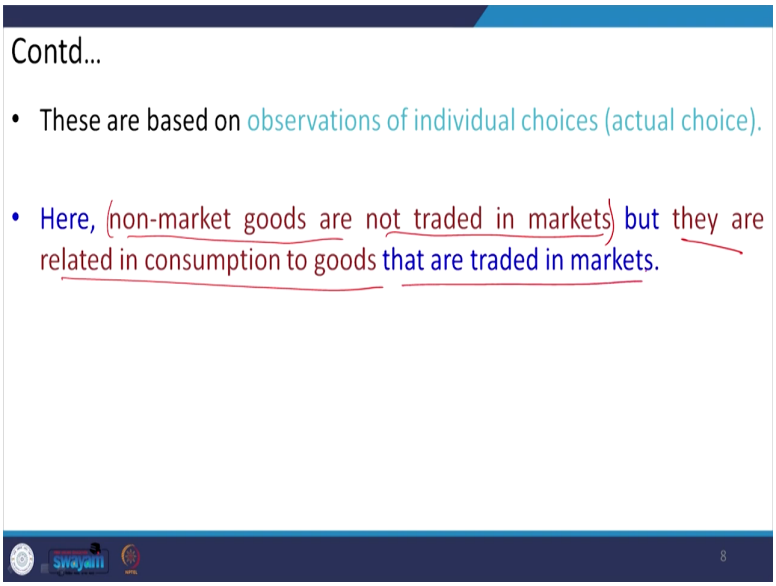

So, we can say that, this revealed preference methods; they are based on the observation of individual choices or actual choices. So, we will be having some example examples once we are done with the very theoretical portions of this method.

So, here we just want to convey that, this non-market goods are not traded in the typical market, that is why we are saying non-market valuations. But, they are related in consumption to goods that are traded in the markets; that means, some form of some attributes of these

goods and services they are similar; that is why they are related in the consumption to the goods that are already traded in the markets, in the form of different goods.

So, that is why we need to actually have this example to make this definition clear, that here for this non-market valuations, or the non-market valuation of this goods and services, or the economic valuation of non-market goods and services, we are trying to explore a market right. And, we understand that there is no market, direct market, for these goods and services. So, that the transaction can happen we do not find anyone.

So, in order to search for these the markets, where this these goods and services can have some option to be traded right. So, in this exercise we are trying to find those markets where some attributes of these non market environmental goods, they are having in terms of the consumptions of any other goods and services right. And, these any other goods and services they do have these attributes of this environmental goods and services and this any other goods and services, which are trade in the markets. So, there do you have all market informations, by using those market information we are actually trying to infer it.

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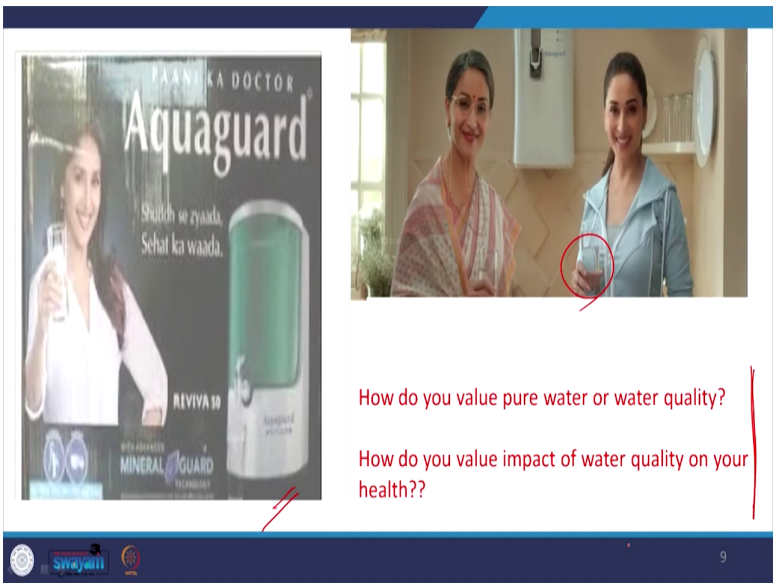

So, we can have this example. So, what is this picture is about? So, you can say that this picture is actually talking about the importance of aquaguard right. So, what is the function of this aquaguard; obviously, when you are preferring or when you are choosing for the quality of the water drinking water, then you can actually explore is there any mechanism to have this better quality of water, or pure drinking water, that is why you explode some mechanisms, that is available in the market.

So, this is what, so let us say this is aquaguard. So, after looking to this these two pictures of aquaguard; the importance of aquaguard and the importance of pure drinking water. So, you can have this questions in your mind, the first can be how do you value pure water or water quality that is why. So, if you are really valuing the pure water, or you are really concerned about the water quality, and it will be actually impacting your the your health or family's health, then you will be seeking for some mechanism, some instruments. So, that is in form of this aquaguards.

Our, second questions related to this can be how do you value the impact of water quality on the human health or maybe your family health. So, if these are the questions, that is actually approaching you right, that these are the questions which are the troublesome questions we are searching for different mechanisms. So, how to how do you; how to have the pure water quality or how to maintain the health, by maintaining or by using the good water quality or pure water quality for drinking purposes.

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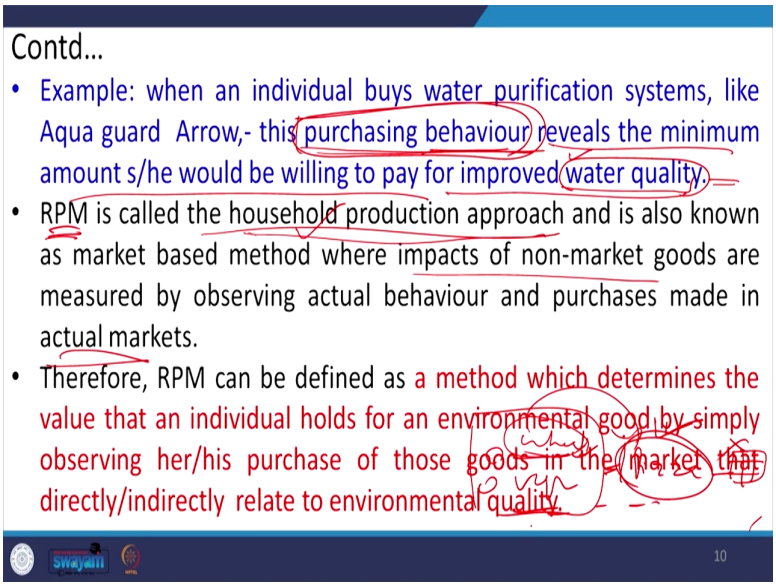

So, this example is clear from this two pictures. Let us narrate this example that, when an individual purchases this purification water purification systems Aqua guard Arrow. So, it is like when he or she is purchasing this system is he or she is displaying or revealing it is preferences right. So, this purchasing behavior is a preference and this purchasing behavior reveals the minimum amount the person is willing to pay for quality water or for improved water quality right.

So, that is why he or she is interested in purchasing this and these, water this purification system, water purification systems and purchased already purchased it. So, here what you are emphasizing is the behavior, which behavior this purchasing behavior of this Aqua guard Arrow, these actually this preferences, this behavior, or the preference of the individuals, it reveals the minimum willingness to pay, the minimum amount of payment forgetting the pure or improved water quality.

And, as you understand that, this pure improved water quality, it is not transacted in the usual market there is no market for it, but when you are purchasing this instrument which helps us to find to get this pure water quality. So, this is your behavior and it is revealed.

So, although we do not have any market, which is where you can trade the water quality right. But, we do have some instruments, or some machines, which can be used or when you are purchasing the same, then indirectly it is actually a referring, that you are interested or how much you are valuing, the improved water; water quality. Or what is the importance of improved water quality for you and that is why you are valuing it.

So, this revealed preference method that is why it is known as the household production approach. So, what is household production function approach? So, generally if you go to the theory of household production approach, then you will be finding that. Generally, in the households, let us suppose say you are you wish to consume pizza at home right.

So, that is why although you are interested for pizza, you want to consume it you do not have. You cannot actually directly you do not want to directly purchase pizza from the market, from different vendors you do not want.

So, what you are interested? That you need to consume, you wish to consume, a homemade pizza. So, your interest your preference is pizza, for this reason if you want to make it at home what we want; obviously, you need the ingredients for preparations. When you are needing so that is why, what you are purchasing? You are purchasing wheat, you are purchasing vegetables and other materials that are useful for making pizza.

So, what is the, what is the household production approach it is states? It states that, when you are needing pizza, you are not directly purchasing it. So, you are purchasing something else, what is that? That is in terms of different raw materials right. And, this example is the example of your household production approach, because households they prefer for different things, but it is not actually there; it is not actually there, which or preference to consume. And, they produce it for having something final target or final consumptions right. So, here the similar thing is happening.

So, what is the similar thing you can say, that we are needing the pure water quality right. And, the pure water quality is not available in the market; you cannot actually purchase it that is why in order to get this pure water quality. What we are purchasing?You are purchasing some machines that is Arrow Aqua guard in order to have this water quality. So; that means, you are revealing your preferences in terms of this purchasing behavior towards different raw materials or towards now right, now in this example towards this machine.

So, this revealed preference method as you understand that it is also called the household production function approach and it is a market based approach; obviously. Here the impacts of the non-market goods are measured, by observing the actual behavior of individuals. So, this actual behavior that is in terms of purchases are made in the actual market. So, although there is no market for water quality, but there is the market actual market for these machines.

So, which help us in providing the this water quality. So, therefore, from this example we can define this revealed preference method, that this revealed preference method is a method, which determines the value that an individual holds for an environmental good or environmental services. By simply observing the preferences or the here the purchase preferences of the goods and services in the market, and these purchase preferences are directly or indirectly, it is related to the environmental quality. So, here in our example this is the water quality.

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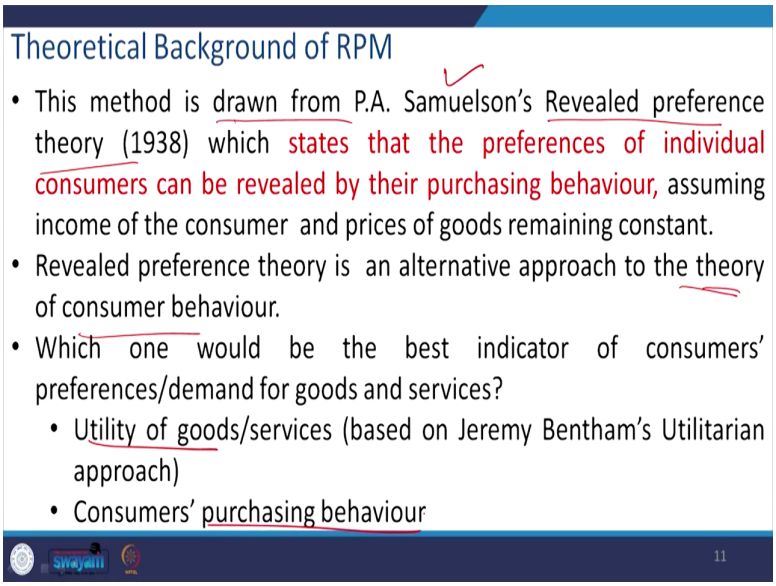

So, after having a discussion on this the very meaning of revealed preferences. Now, you can just pause on the theoretical aspects of the revealed preferences. Is there any is this method having any theoretical background that is established theory or not. So, here as you understand that we are saying the revealed preference method. And, this revealed preference method it is drawn from the Revealed preference theory, which is propounded by P. A. Samuelson; Samuelson in 19 and 38.

So, what is this Revealed Preference Theory, which is propounded by Samuelson? So, this theory states that, the preferences of individuals can be rebuilt by their purchasing behavior. So, the example is clear, the last example that we have discussed the water quality and your Arrow Aqua guard, it is states the same thing that preferences of the individual consumers, it can be rebuilt by their purchasing behavior. And, here we are assuming the rest of the things, that is the ceteris paribus assumptions, assuming other things to be concerned we are only highlighting, that preferences of the individual consumers can be rebuilt by purchasing the behavior.

So, therefore, you can say this revealed preference theory is an alternate approach to the theory of consumer behavior right. So, in microeconomics you have already gone through that, what is this theory of consumer behavior right? So, how the consumer behaves in different situations right? How the demand is how the consumer is demanding for different goods and services. So, the theory is like the cardinal utility approach, the ordinal utility approach. So, these are the approaches for the consumer behavior.

So, in this context when you are saying that P. A. Samuelson's revealed preference theory it is an alternate to the established theory of consumer behavior. Now, you can pose this question that which one would be the best indicator, for consumer's preferences or demand for different goods and services. Whether it is the utility approach that the demand for goods and services it depends on the utility it is going to provide for to the consumers, that is based on the logic of Jeremy Bentham's utilitarian approach.

When a particular good a consumer is saying that it is having some utility right, that is why he is demanding or using this goods and services. Whether this is the factor behind this consumers behavior in the market, or it is the consumers purchasing behavior, which is actually a revealing the demand for this goods and services.

So, you can decide that, you can analyze that which one approach, which one of these approaches is the best on indicator for these consumer's preferences. Whether it is the utilitarian approach or a whether it is the revealed preference method.

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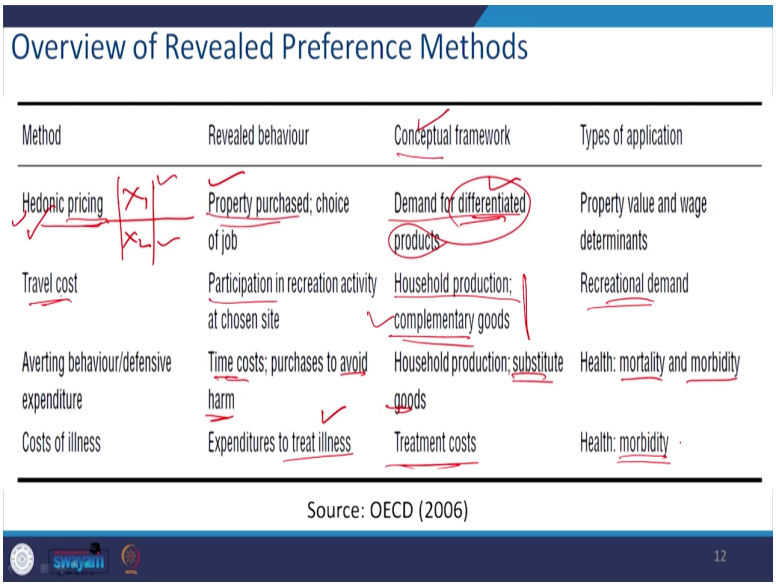

So, now we will be having after understanding this, now we will be having a broad picture of revealed preference approaches. What are different methods we are having under this revealed preference approaches? So, generally we do have for this establish established four different kinds of revealed preference method; one is the hedonic pricing method, second one is travel cost, the third one is averting behavior, or averting expenditure, and sometimes it is also known as the defensive expenditure method and the last one is known as the cost of illness.

So, this all these four types of method are under this revealed preference method. So, what is the highlight? Obviously, we will be discussing each of these methods in detail, but the highlighting is that if you see the because all these are kind of revealed preferences, or they are actually revealing the behavior of the consumers individuals. This hedonic price pricing method it is used, in revealing the behavior of individuals or consumers in terms of property purchased, or in terms of searching a job that, whether a particular job is a riskier job or it is less risk, which one is to be preferred, the less risk job or the riskier job?

So, again this hedonic pricing method it is having this conceptual framework, that is based on the this the concepts that the demand for differentiated products. So, in property markets let us say, that how the consumers are revealing the behavior towards purchasing the property. So; obviously, we are having the case of differentiated products. What is differentiated products? The usefulness is same, if you have two different types of products; let us say two different types of property here, X 1 property and X 2 property.

So, the both these properties they can serve the same purpose, that you will be having your property and you can have a house, accordingly you can build your own house. But, the very nature of the properties may be different, there may be different attributes to this property, that is why it is dealing with differenced differentiated products. So, this hedonic pricing method it is typically applicable to the property value generally or voice determinants.

Nowadays, we do have some other applications of this hedonic pricing method that we will be discussing in this particular lecture that is hedonic pricing method. And, second method under this revealed preference method is travel cost and as you analyze under this, this revealed behavior that how this travel cost method is revealing the behavior of the consumers or individuals.

So, it is revealing terms of participation in the recreation or recreational activities towards a particular recreational sites right. And, again so, for the very conceptual framework is concerned it is adapting to the household production and you have all we have already discussed what is household production approach. And, it is not dealing with differentiated product rather the complementary products. That we will be discussing that, how this travel costs is dealing with the complementary products. And, generally when you seek for this and these uses or application of this travel cost, it is generally applicable to the recreational demand in order to find this recreational demand of the consumers.

The third approach of this revealed preference method is known as the averting behavior approach, that is the defensive expenditure approach, where the preferences are revealed or behavior of individuals are revealed in terms of take into account, that what kind of different to goods and services. The consumers are purchasing in order to avoid the negative effects or any types of harms or in order to actually take into account the importance of time costs. And,

so, far this conceptual a framework is concerned, it is take into account the substitute goods not complementary goods. And, again it is also under the approach of household productions.

So, for the application of this method defensive expenditure method is concerned which is applicable to the mortality and morbidity. So, far the health issues of individuals are concerned. And, the last method the under this revealed preference method is the cost of illness. So, here the preferences are behavior are revealed in terms of treating the illness.

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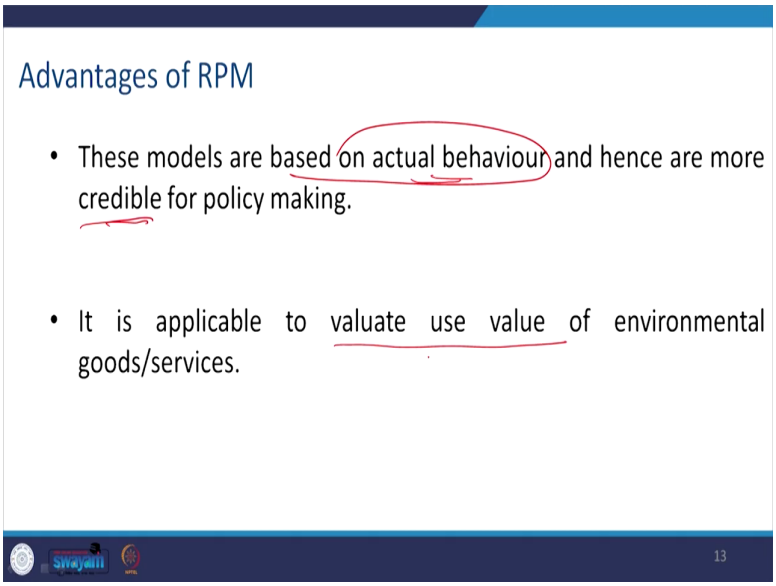

So, it is based on the concept that, how a particular individual is treating it is illness and what kind of what amount of expenditures or cost he or she is incurring in treating the illness. So, again the application is that how in order to maintain the health, how the particular individual is maintained is spending and it is related to the morbidity; so that the particular portion will be less prone to diseases.

So, what are the advantages of this method? Once, you understand the basic revealed preference framework and the revealed preference methods. We can say that this revealed

preferences revealed preference models that these four methods that is based on. So, it is based on the actual behavior.

The consumers are displaying their actual behavior, whether it is for the health or in order to avoid the harm effect of x y z environmental goods or environmental servicer or x y z policy effects. And, or it is the case that, how the a the properties having different and differentiated attributes can be possessed. So, this is based on the actual behavior.

So, when the models are based on actual behavior then; obviously, the policy makers are more interested to use this method in order to have the solutions, in order to take into account the cost benefit of this environmental goods and services or policy aspects or projects aspects. And, that is why it is very credible for the from the viewpoint of the policy makers. And, the second advantageous can be that this revealed preference method, they are used generally in order to estimate the use value of the environmental goods and services. So, this is the benefits of revealed preference methods in the non-market valuation approaches.

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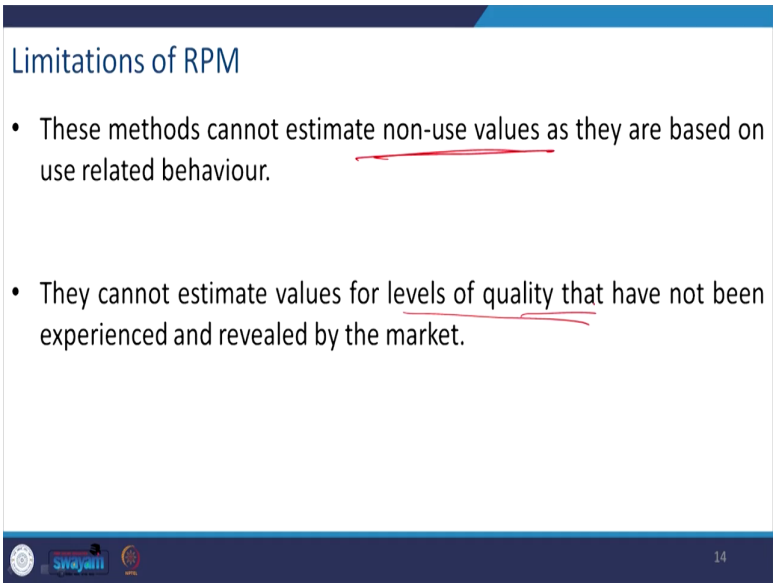

So, what are the different limitations of this revealed preference method? So, again from this merits you can find out the limitations or what are the shortcomings of the revealed preference methods. So, what is that when you are saying that in merits we are saying that this revealed preference method it is especially applicable in estimating the use value; that means, it is not capable or it is not actually used for estimating the known use values. And, known use value is also a part of your environmental values. Then, how do you how to actually calculate non used values?

So, because you cannot actually apply this revealed preference method in order to measure this value. And, another limitation can be that this revealed reference method it cannot be used for values, where the levels of the quality that is not experienced or it is not revealed in the market. So, without experience without actual observations in the market scenario, this revealed preference method cannot be captured.

So, these are the broad limitations of this revealed preference method and we will be in detail discussing this four different types of revealed preference method in our discussions. So, as you discuss that under these non-market valuation approaches, we do have two approaches, two methods; one is revealed preference method that we have already discussed and the second one is stated reference method. In case of revealed preference method we do have a true market right, actual market; viewers are captured through the observation in the actual market.

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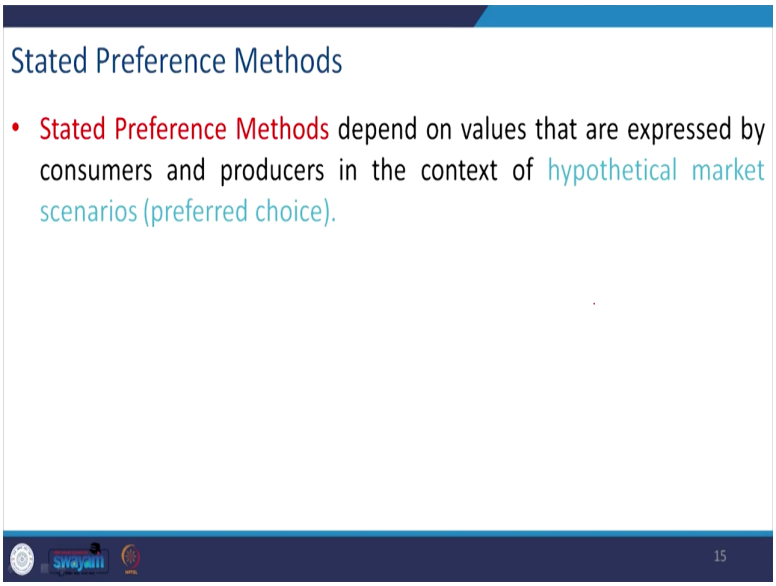

But, in case of stated preference method there is no such markets available right. So; that means, we are trying to have a hypothetical market scenarios in the for this goods and services, for this non-market goods and services right.

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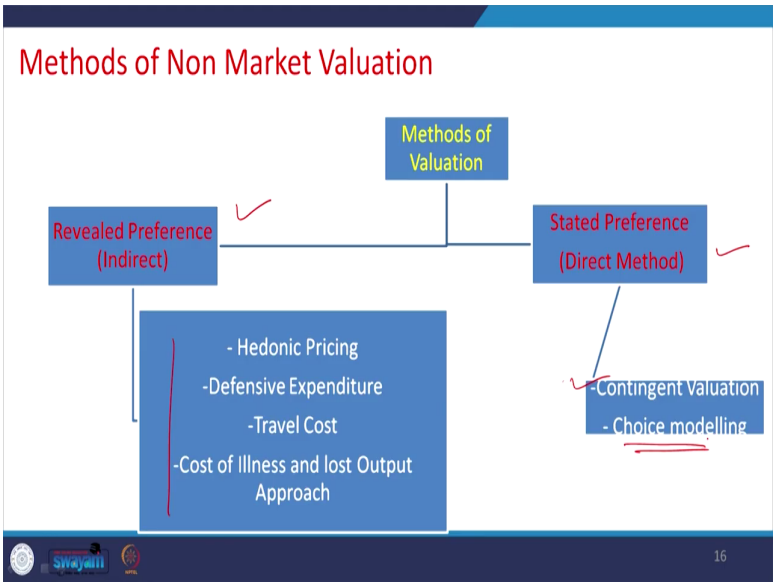

So, a based on this non-market valuation approaches, as you understand that this is of two types; one is revealed preference method, which is known as the indirect approach and this the second one is stated reference method, which is known as the direct approach.

And, under this revealed preference method these are the four different types of methods that we will be dealing with and under stated preference method we are having this contingent valuation, valuation method and choice, modeling approach. So, recently also the developed form of market form of this stated preference method is your this one choice modeling approach, which is based on your choice experimentation also.

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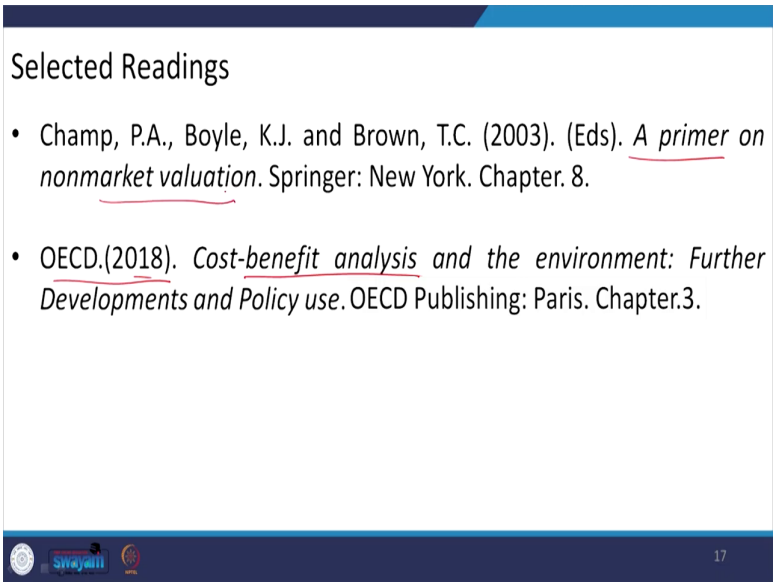

So, for this non-market valuations we are having this two broad type of approaches and for more detailed you can also follow this readings these are the OECD readings for Cost-benefit analysis and second is a kind of text you can use this is the non-market valuations, by these authors right. And, you can follow this chapter 8 in order to find out this revealed preference method only.

Thank you very much.