Environmental and Resource Economics
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Introduction to Environmental Economics and Environmental Kuznets Curve Hypothesis
Part - 3

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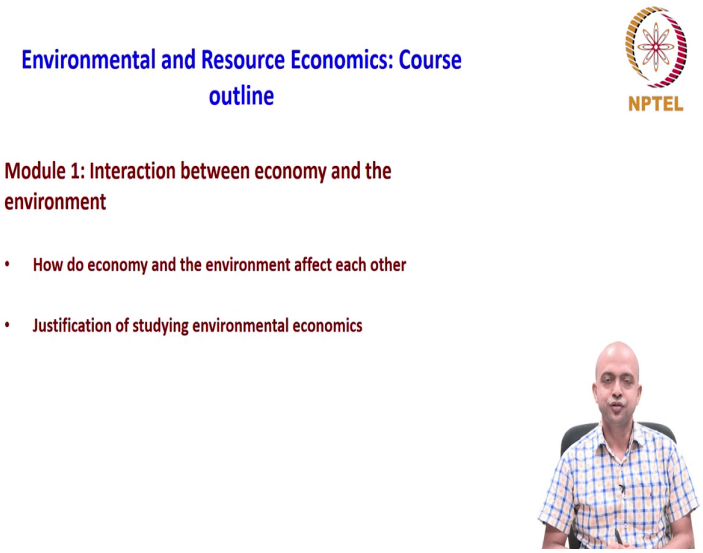

So, welcome once again to our discussion on Environmental and Resource Economics. Yesterday, what we discussed the inter linkages between the economy and the environment and we have also discussed about the justification for studying Environmental and Resource Economics Course. So, what we will do today, today we are going to discuss about the course outline what are the what are the topics that we are going to cover in this particular course.

So, our module 1 is what we have discussed yesterday, it is interaction between economy and the environment. And two things we have discussed how do economy and environment affect each other, if you recall with the flowchart, we have discussed how the decision making of economic agents affect the environmental quality and in turn, how the environment also gives feedback to the decision makings of the economic agents.

And then, we said that there are two justifications we have provided for studying this course. First of all, environmental economics even though it is an extension of our microeconomics, which we have already studied, and we are still following the neoclassical paradigm of utility

maximization. In this course, we are extending that utility function by including the environmental quality as an additional factor in the utility function.

And secondly, we said that, in microeconomics what we discussed is that market decides about efficient allocation of resources. But for environmental goods and services, there is no direct market as a result of which we get improper price signal for most of these environmental goods and services, which leads to overconsumption of this goods and services and as a result of which we get environmental degradation.

So, this course, will teach us how to value environmental goods and services, how to determine and estimate the price of it, and that price will help us efficient allocation of these goods and services that is what we have discussed in our yesterday's class that is module 1 of this course, then, in module two.

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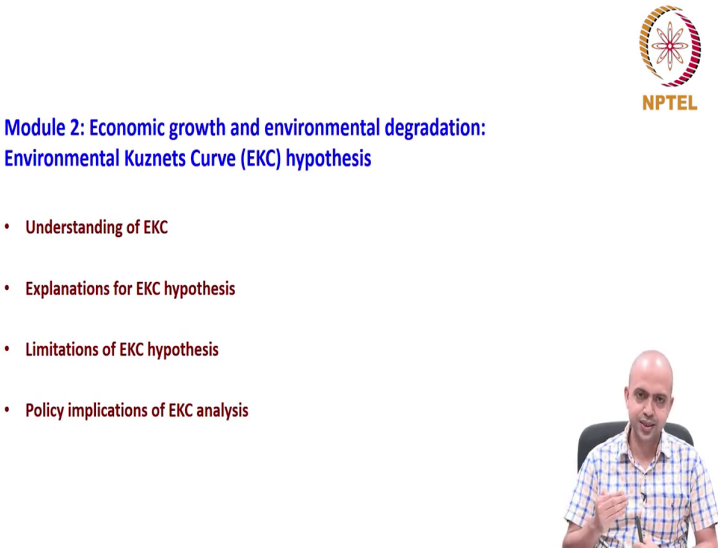

This is our module two, what we are going to do in module two. Once we establish that yes, there is some kind of interconnection, inter linkages between economy and the environment. So, one particular question that comes to our mind immediately then what is going to be the impact of economic growth or economic activities on environmental quality. That is why this module says, in module 2, we are going to discuss about economic growth and environmental degradation, when you talk about the impact of economic growth on.

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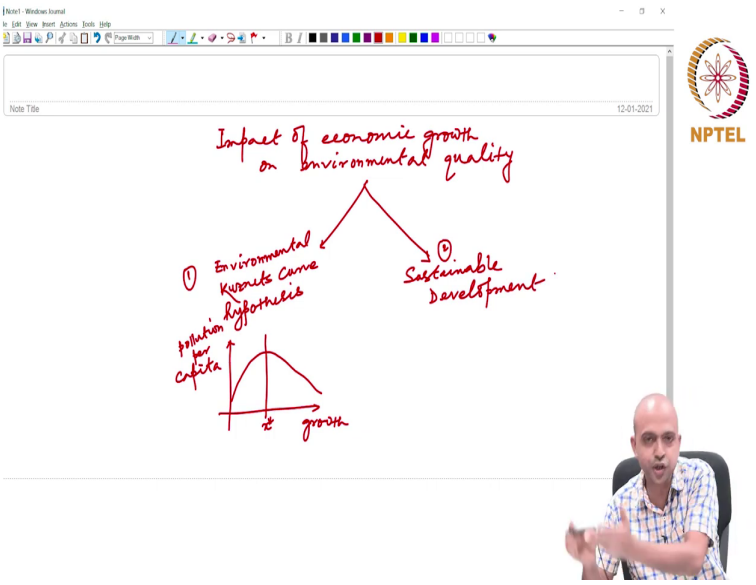

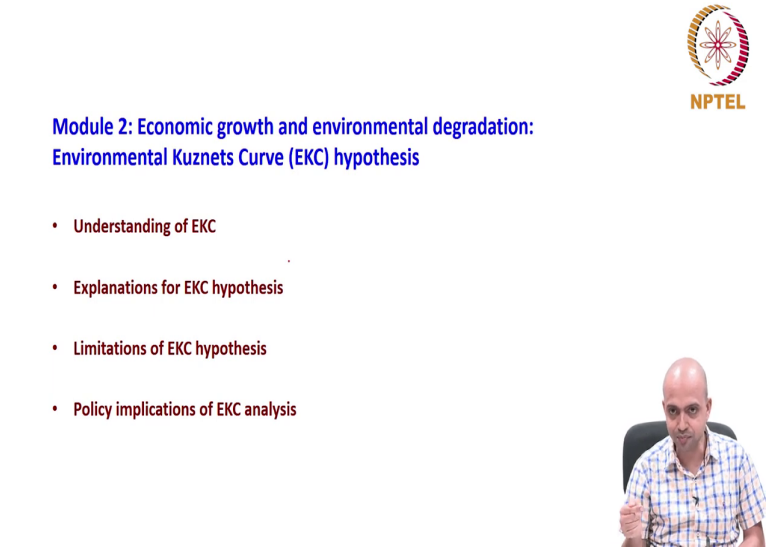

So, this is impact of economic growth on environmental quality. So, this is what we are going to discuss next. So, first we have established that yes there is an interconnection between economic and the environment and next is impact of economic growth and environmental quality. And here, two schools of thoughts are there.

When we conceptualize the impact of growth on environmental quality, there are two schools of thought, one school of thought is guided by the Environmental Kuznets Curve Hypothesis. This is called Environmental Kuznets Curve Hypothesis, which says the relationship between growth and environmental quality, if you measure growth in the X-axis and environmental quality in the Y-axis, then it says that there is an inverted use of relationship, there is an

inverted use of relationship between these two, inverted use of relationship. What does it mean?

It means that as environment as the economic grows initially the instead of environmental quality I would say, let us say pollution per capita. So, initially pollution also increases, but once a certain per capita level of income is achieved, then pollution per capita starts declining that means, environmental quality starts improving.

So, at the initial phase with the growth, environmental quality degrades, pollution per capita increases, once the economy achieves a certain per capita level of income, let us say x star then environmental quality starts improving pollution per capita starts declining. So, that means, this school of thought says that, while growing an economy should not bother much about the environmental quality.

Because growth itself will take care of all sorts of environmental problems, once a certain level of per capita income is achieved. This is one school of thought which says that impact of economic growth on Environmental Quality is self-correcting, you should not bother much about this, when you start growing you concentrate only on growth and then growth itself will take care.

So, growth is a cure not a cause for environmental degradation. So, this school of thought, this is one school of thought, this is supported by Environmental Kuznets Curve Hypothesis or EKC Hypothesis, EKC Hypothesis. That is why, that is why in this module, what we are going to do then?

We will try to understand EKC that means, what exactly is EKC, then what are the explanations for EKC Hypothesis. In this school, the economists who believe this type of inverted usage relationship, they have given certain explanation for this particular shape, for this particular relationship between economic growth and environmental quality.

So, we will try to understand those reasons in detail. There are several reasons, several economic reasons, economists they have provided for this particular relationship between economic growth and environmental quality to happen. Then we will also learn about whether environmental quality, whether Environmental Kuznets Curve, is it a universal

phenomenon or is it context dependent that means we will try to understand the limitations of this EKC hypothesis.

Limitations, any theory as you all know, any economic theory is not universally true, because theories are built based on certain assumptions. So, while formulating this type of hypothesis between growth and environmental quality also, there are certain assumptions, if those assumptions are violated, then it will not hold good, and that is the reason we will try to understand the limitations of EKC Hypothesis.

And then lastly, we will also try to understand what are the policy implications of Environmental Kuznets Curve. Because ultimately, our objective is to derive policy implications because growth is, economic growth is one of the most important objectives that almost all the economy wants to achieve.

All the economies they want to grow, but growth has certain inevitable consequences on Environmental Quality, that is why these two important schools of thought we need to discuss and the first school is the EKC school and these are the subtopics understanding, explanation, limitations, and policy implications of Environmental Kuznets Curve that we are going to discuss in module 2.

Then, the second school of thought since there are when we discuss we learn that there are several limitations of this EKC school, EKC Hypothesis is not always true, and that is why the second school of thought, second group of economists they say that, since growth is not a cure for environmental degradation all the times. What is the solution? Then, the solution is we should grow in a sustainable way.

So, that means, the second school of thought says that growth with accountability is the solution and growth with accountability for the environment is known as sustainable development. So, this school of thought is known as sustainability school. First one is the EKC School and second one is sustainability school. Here, we are going to talk about sustainable development.

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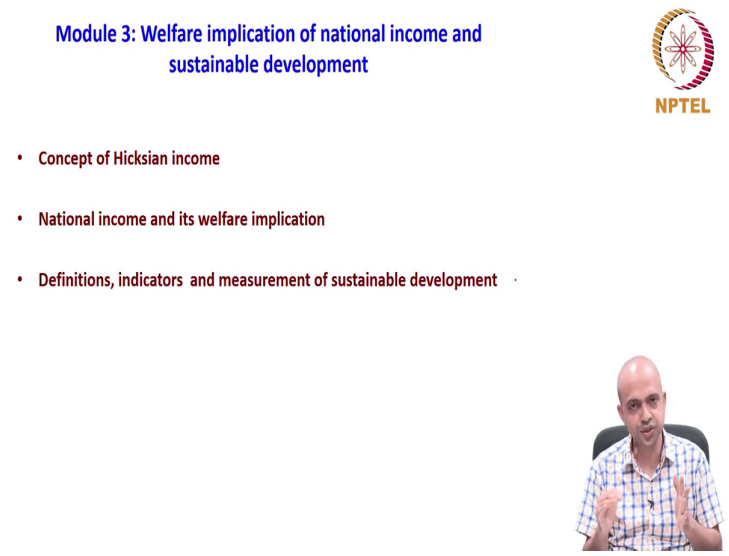

Now, sustainable development as you know, that development is related to income, sustainable income. Because economies they want to grow and they want to generate income and economies need to grow or generate income in a sustainable way then what is relevant here is sustainable growth or sustainable income. Now, here first of all, if we want to discuss about sustainable income.

Firstly, we need to understand what is income. All of us income is a very simple word, all of us we are using this word income every now and then. But interestingly, economist if I asked you what is income different people will give you, will give me different type of concepts and definitions. And economists they have a specific definition of income and that definition of income was first given by famous economist John Hicks.

That is why we will first try to understand what is Hicksian income? As you all know, that an economy's income is measured by Gross Domestic Product or GDP. What is the implication? What is the meaning of that GDP value? For example, if I say that India's GDP in this year is 200 billion dollars, what is the meaning of it? Have you ever thought about this? What is the, what is the meaning of that GDP value?

We have never thought about that. And then implication the exact meaning of that GDP value you will understand once we know what is the meaning, economic meaning of income given by John Hicks. That is why we will first try to understand the concept of Hicksian income.

Once we understand the Hicksian income concept, then we will see what is the implication of national income on welfare.

Because ultimately, why we need income? We need income to increase our welfare, well-being. So, we will try to understand what is the implication of the income on welfare and that will tell us then what is the link between income and sustainability? Income and sustainability.

Once we establish that link between income and sustainability, then we are going to discuss about definition, indicators, and measurement of sustainable development. Sustainable development has become nowadays a buzzword, we all are talking about sustainability, sustainable development particularly in the context of global warming, we all are talking about sustainable development.

But if you ask what is the definition of sustainable development, then 10 people will give 10 different definitions. But economists they have a specific way of defining things, economists will always define certain things, which is measurable, that is the beauty of this discipline. Economists will not tell you something which is absorbed, which is abstract. So, economist will define the concept of sustainability in such a manner that we can get certain indicators to measure sustainable development.

So, these are the things we are going to discuss in this module, which is going to be about module 3, we will understand welfare implication of national income and sustainable development. Understanding Hicksian income concept, then national income and its implication on welfare, and then we will understand definition, indicators, and measurement of sustainable development.

There are two ways to measure sustainable development, two definition; one definition is called weak definition, another definition is called strong version of sustainable development, then we will also discuss about several indicators of sustainable development. So, that at the end of this discussion, we would be in a position to measure whether economy is on a sustainable path or not.

With all these indicators, global policymakers, they can measure country's relative position on a sustainable scale that is where the indicators become so important. So, this is our module 3. So, that means in module 2 and 3, we will discuss about the impact of economic growth on

Environmental Quality, one school, guided by EKC and second school guided by sustainability or sustainable development.

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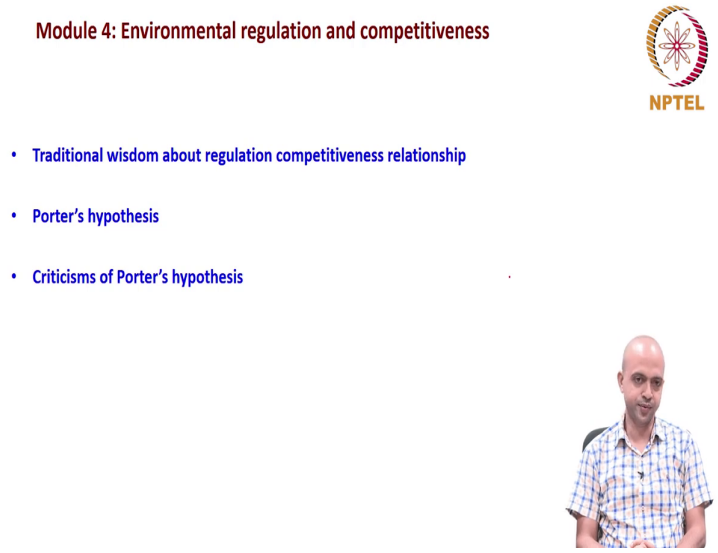

Then, in module 4, what we will discuss once we establish the importance of sustainable development, the next question comes to our mind is how do you ensure sustainable development. Sustainability requires growth or production in a micro sense with accountability, growth with accountability, production with accountability for the environment.

But do you think that the producers will automatically become accountable for the environment? The answer is no. Why should I bother about environment, all the productive units, the private producers, they are all profit makers, all business entities, they are profit making entities. So, they have no intention, they have very less intention to become sustainable concerned for sustainable development and concerned for environmental quality.

Then what is the solution? Private entities, the private corporate business, they are mostly interested for profit making and less interested for environmental quality. That means, sustainability is something which cannot be achieved, automatically. We need to impose the regulation on the productive units, and that regulation will reshape their behavior.

Now, when you talk about, the moment we talk about regulation, then the question comes to our mind what is the impact of this regulation on competitiveness. Now, there is a traditional wisdom that regulation, any sort of regulation is bad. Regulation is bad for the private entities, because if you impose the regulation, then the firms, the polluting firms, they need to divert some of their resources from production to pollution abatement.

So obviously, that will reduce their competitiveness, that will reduce their competitiveness, compared to others who are not subject to that type of regulation. This is the traditional wisdom. So that means, there is a tradeoff, there is a tradeoff between firms environmental performance and the financial performance.

If we want to achieve environmental performance by imposing regulation, then that will make the firms less competitive, their financial performance will go down, there is a tradeoff, this is the traditional wisdom. But then in this module, we will see that how Michael Porter, he challenged this traditional wisdom about the relationship between firms environmental performance and that financial performance.

He said, by collecting several examples, several hundreds of case studies, hundreds of case studies, mostly from the U.S., he showed that regulation is not always bad. Rather, if the regulation is well designed, and if it is implemented properly, then it can enhance the financial performance of the firms by motivating them for innovation. So, then we will try to understand what are the arguments that Michael Porter provided to challenge the traditional wisdom?

And how did Michael Porter establish the fact that regulation and well designed and will implemented regulation is good for the polluting entities, it is not bad. So, that we will try to understand, that is very interesting, we have never thought about this, that regulation can also be good for the competitive firms. So, to understand and appreciate that we need to go and follow the Porter's line, that means Porter's argument.

But then there are other group of economists, they challenge this Porter's argument, they said that if regulations are good, then if a pollution abatement is good, then why the forms are not doing it. So, that means if something is good, people will do it automatically. You do not have to impose something to achieve that.

So, they built a theoretical framework by which they showed, that yes it is true that Porter has collected hundreds of case studies and by those case studies, he established that fact that regulation can also be good for the polluting firms. But what they said, Michael Porter could not provide any theoretical framework to establish his argument. Case Studies, case study-based argument cannot be generalized.

So, all these group of economists, they build a theory, a framework to show that Michel Porter's argument is not true all the times, it has several limitations. So, we will first understand Michel Porter's argument, then we will also understand the other groups arguments. And we will see how they challenge the Michel Porter's argument. So, in this module, then our entire focus would be to understand impact of environmental regulation on firms competitiveness, is it performance enhancing or performance dampening?

This module 4 will concentrate on these things where we will be discussing in detail about firms environmental performance, with respect to regulation, and how does this environmental regulation impact their financial performance, this is module 4.

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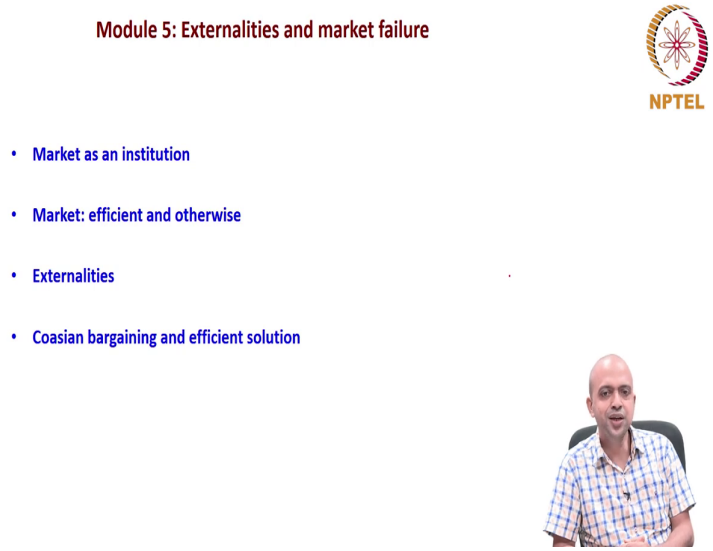

So, after to module 4, if you think about starting from interaction between economy and the environment, then the EKC school, sustainability school, then regulation and competitiveness, these are the topics they are discussed at the macro level that means at the country level. So, you can think of the first four modules are part of macro level analysis of this Environmental and Resource Economics Course. From module 5, we will discuss these issues at the micro level, individual level, firm level.

And in module 5, we will start with externalities and market failure. So, what we are going to discuss here? See, we have already established that in microeconomics what we believe that market is so powerful that it can allocate the resources efficiently. You leave everything on

market and market will take care of it that means market will ensure efficient allocation of resources.

From our Principles of Economics, we understood that sometimes, yes market is a powerful institution for resource allocation, but sometimes market also fails to achieve its objective and then government intervention becomes necessary. And when is that context when market fails externality is a context where market fails to achieve its objective. What is externality here?

Externality means an activity of an economic agent which will affect another economic agent for which he or she is neither being compensated nor he or she is paying anything. For example, when somebody starts smoking in a public place, that will, the smoker is deriving some benefit, some utility satisfaction out of smoking. But that will have some detrimental impact on others who are the passive smokers, they are de standard, they are not directly involved in that economic activity.

But still, they are getting impacted. And this smoker, the active smoker is not compensating anything for the loss he or she is making to the passive smoker. So this is a case where market fails. Because there is a presence of externality, in presence of externality market fails. So, what we will do here in this module? We will try to understand what exactly is market. We will say that market is also an institution, then we will also discuss, what are markets rule to achieve efficiency?

And in what context, particularly in what context market can achieve efficiency? And in what are the other contexts where market cannot achieve efficiency? So, we will try to understand market's objective, efficiency, and otherwise. Then we will introduce externalities. And we will see how the market fails to deal with the issues of externalities. And then, we will talk about Coasian bargaining, Ronald Coase.

He said long back, that if you want to solve the problem of externalities, we need to do one simple thing. We need to assign property right either to the polluter or to the pollute. For example, when somebody is smoking, you ensure that whether the smoker has the right to smoke or the others, they have the to enjoy the clean environment.

If you assign the property either to the polluter or to the pollute, and help them costless bargaining, and help them involved in costless bargaining, then there bargaining will end up efficient level of pollution. Now, please try to understand what I am saying here and talking

about efficient level of pollution. I am not talking about zero-pollution. Economist they will never talk about zero-pollution because if you recall in our first module, we said that utility is a function of marketable goods and environmental quality.

So, that means no production is possible without making pollution. Therefore, if you want to achieve zero-pollution, you have to cut your production also towards the zero level. So, that means some level of pollution is inevitable if we want to enjoy both marketable goods and environmental quality. Then what is the solution or economists are talking about? They are saying that it is not zero-pollution or we are interested in, rather, we are interested in optimal level of pollution.

And that optimal level of pollution will be achieved through Coasian bargaining, Coasian bargaining, where property rights are well defined, property rights are assigned and the polluter and the pollute, they can bargain costlessly. So, we will discuss in detail because this is very important.

This is very important theory what Ronald Coase provided long back. That if you assign the property right and that too to any of these either to the pollute or to the polluter, then they are costless bargaining will help us understand how their costless bargaining will lead to efficient level of pollution. But in reality, this assigning property rights always is not possible. And also, the bargaining between polluter and the pollute, what Ronald Coase said that should be costless.

But many a times, in reality, you see, there are many polluters and many pollutes and it is hard to identify who is making the pollution and who are all the sufferers from the pollution. So, when there are n number of polluters, n number of pollutes, then how do you identify that pollutant and the pollute? In that case, bargaining become costly, bargaining become costly. So, that means what Ronald Coase says, the Coasian bargaining many times is not possible in reality.