Environmental and Resource Economics
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Policy Implications of Environmental Kuznets Curve and Economics of Sustainable Development part – 4

Now, next question that we are going to ask which is quite natural, if you look at the rationality, the concept of rationality in the neoclassical framework.

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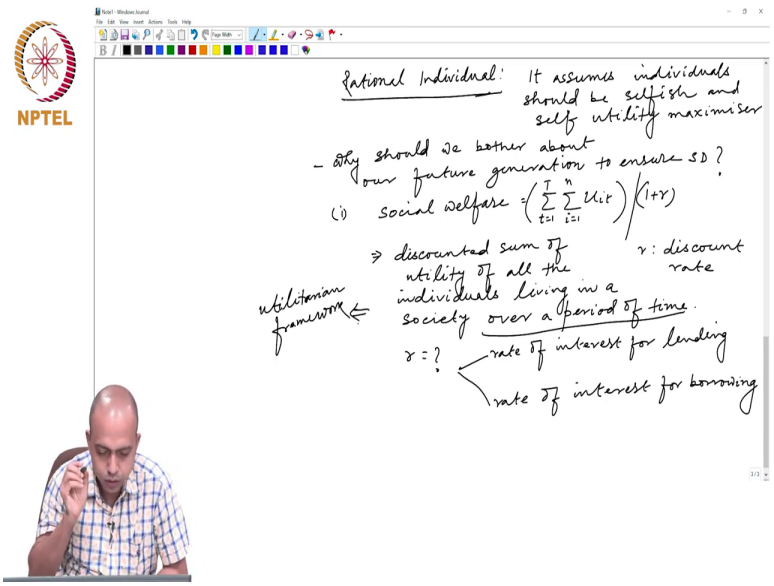

So in neoclassical economics paradigm, the rational individual, the assumption of rationality is there in the core and what does that rational individual indicates? The rationality assumes, it assumes individuals should be selfish and self-utility maximiser.

Now, while the selfish individual, self-utility maximiser individual is the assumption what we make in the neoclassical paradigm and in environmental economics literature also we still follow the neoclassical paradigm only, does that mean that there is some kind of contradiction? Previously, we assume that individuals should be selfish and self-utility maximiser and now while discussing about sustainable development, we are saying that no, no, no individuals should not be selfish and self-utility maximiser, rather they should bother their future generation also. Now, the question is, why should a selfish individual or self-utility maximiser bother about the future generation?

Is there any scope of sustainability question then in the neoclassical paradigm that is the question, I am asking. So, I will repeat this once again. The neoclassical economic paradigm, the micro economics for example, when we studied, we assume that all the individuals should be selfish and self-utility maximisers that is what even Adam Smith also said long back. That individuals should bother only about their own utility maximization.

If that is the case, where is the scope for this discussion of sustainable development, where we are asking the individuals to bother about their future generation, then the question what I am asking, why should the question is, why should we bother about our future generation to ensure SD? That is the question. This is very relevant question, because there is some kind of contradiction we are experiencing between the rationality assumption, what is there at the core of neoclassical paradigm and what we are discussing now right now, in the context of sustainable development.

Now, to answer this question, there are two ways by which actually you can answer this question. First of all, yes, when we considered about social welfare, it is basically how do you define social welfare? Social welfare is defined in this way, this is Uit were i running from 1 to n and t running from 1 to T, entire thing is divided by 1 plus r where r is basically discount rate.

So, that means, what is the definition of social welfare? It is the, the definition of social welfare is discounted sum of utility of all the individuals living, all the individuals living in a society over a period of time, this over a period of time is very important here. So, that means social welfare does not consider only the utility of the present generation, rather it is the discounted sum of utility of all the individuals living in a society over a period of time.

So, it is double sum of Uit, i running from all the individuals, i running from 1 to n and t running from 1 to capital T. So, that means it does not consider only present generations utility rather it considers utility of all the period of all the individuals for all the periods. If that is the case, if that is the idea of social welfare that means the idea of social welfare itself, so that means when we are trying to maximize social welfare in the context of neoclassical paradigm, when we say that individuals should be rational and self-utility maximiser to ensure maximum social welfare, what is social welfare?

Social welfare is basically the sum, discounted sum of utility of all individuals living in a society over a period of time. So, this definition ensures sustainable development. Now, the question is, what is the discount rate? There is no specific value for the discount rate, economist they are still struggling debating to fix a proper amount of discount rate, some people, some economics they say that it is actually the rate of interest by which the bank lend money, some economic say that it should be the rate of interest by which banks borrow money.

So, that means indirectly we can say that rate of interest for lending or rate of interest for borrowing. So, there is no clear cut rule to fix the discount rate, but the idea is this, whatever might be your way of fixing the discount rate, the idea of social welfare is the discounted sum of utility, because the future generations utility also you need to convert into present value and how do you convert, by using a proper discount rate.

So, the first way of answering the question what we posed earlier, why should we bother about the future generation, this is the utilitarian framework. So, utilitarian framework, they say that social welfare is the discounted sum of utility. So, this is called utilitarian framework, this is coming from utilitarian framework. Now, there is one more reason.

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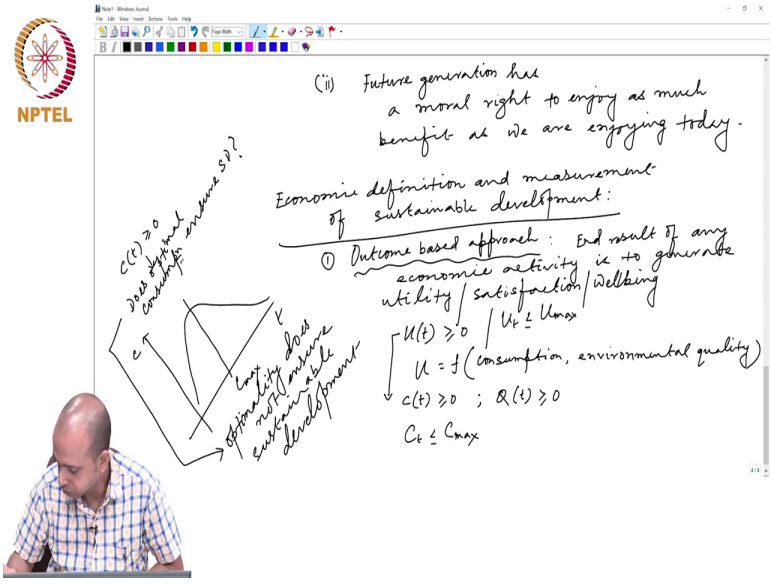

The second reason which may explain why should we bother about future generation, they say that future generation has a moral right to enjoy as much benefit as we are enjoying today. So,

this is not coming from the economists, because this is some kind of philosophical argument that future generation they must also have some kind of moral right, they have a moral right to enjoy that much benefit which we are enjoying today if not more.

So, these two explanations actually we can provide as a supporting mechanism to discuss about sustainable development, because apparently, we may feel that there is some kind of contradiction between what the neoclassical economic paradigm assumed and what we are discussing in the context of sustainable development, because the self-utility rational individual does not gel well with the sustainability concept.

And how do you counter that? We say that no, no, this is basically coming from the utilitarian framework, where we say that social utility is the discounted sum of the all the individuals living in a society over a period of time, so that means, we should not bother only about the present generation, but also future generation and secondly we say that future generation they have a moral right to enjoy as much benefit as we are enjoying today, if not more. This is the way we can justify the discussion of sustainable development.

Then next question comes about economic definition and measurement of sustainable development. There are basically two ways by which economists they define sustainable development, the first approach is called outcome based approach.

Now, in this outcome based approach, economist they tell us that when you try to define sustainable development, you try to think what is the end result of any economic activity, what is the end result? End result of any economic activity is to generate utility or you may call it satisfaction or you may call it wellbeing.

So, end result of any economic activity is wellbeing whatever we do, ultimately we try to be happy at the end, why we are studying today? Because we feel if we study then we will get a job, we will earn money, we will enjoy our life that means we will generate utility or satisfaction, any economic activity, why the firms are producing? Because they feel if they produce, they will generate profit with that profit they will enjoy their life.

So, end result of any economic activity is basically utility or satisfaction or wellbeing. If that is the case, then what we can say that, we can say that, how do you define then sustainability? Utility should be non-declining. If the end result of all economic activity is utility and utility is non-declining that means I am enjoying sustainable development at each and every period my utility or satisfaction or wellbeing is at least what I was enjoying earlier.

Now, this utility is a function of, utility is a function of what? Consumption and environmental quality that is what we assume, utility is a function of consumption and environmental quality that means to ensure utility non-declining, what we need to ensure? That consumption should be non-declining and environmental quality should be non-declining. This is how we can actually define and measure sustainable development which is outcome based approach, outcome based approach.

Now, when we talk about non-declining consumption that means we may think that this non-declining consumption, how do you achieve non-declining consumption? Non-declining consumption. means actually apparently we may think that that means optimal consumption, so the question is, does optimal consumption ensure SD? That is the question.

Now, if you think of the optimality, this is t, let us say this is C, so optimality will always tell you that it should first go up and then come down and this is the maximum, this is C max. So, that means optimality is some way or the other is related to present value maximization which says that an inverted U shape curve, so that means utility, so consumption should go up and then come down which basically ensures efficient consumption or optimal consumption.

Now, it is very clear then to understand since the consumption is falling down after the C max, so that means optimal consumption also may not ensure actually sustainability that means optimality does not ensure sustainable development. So, that means, what we need to do here, the alternative way of defining sustainability at each period your utilities should be less than equals to U max, we should not actually consume this maximum, at each and every period that means Ct should be less than equals to C max.

This is the alternative way of defining sustainability, because if you consume C max by following this curve, this curve itself shows after C max the consumption is falling and the

moment consumption falls, then your utility falls you cannot actually ensure sustainability. So, non-declining utility is you can ensure by only consuming less at a particular period, then what is the maximum allowed from this present value maximization curve. This is about the outcome based approach or outcome based definition of sustainable development. Then there is another approach of defining sustainable development which is called means based approach.

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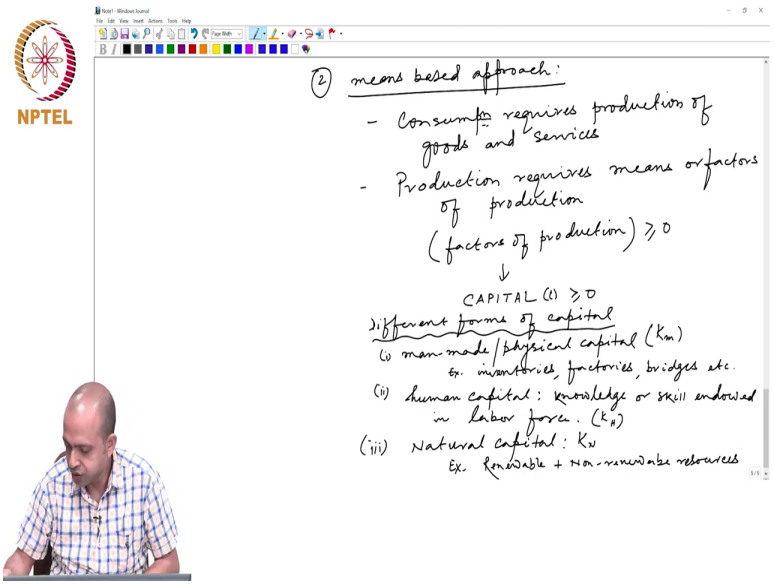

The second approach called means based approach. Now, to generate consumption we need to have production. So, that means consumption basically requires production of goods and services and production requires what? What does production require? Production requires means of production, means or factors of production.

So, in means based approach the economy say that you basically ensure that the means or factors of production, factors of production at any part factors of production is basically non-declining, factors of production should be non-declining and economist they consider what is the major element of this factors of production? What is the main factor of production? Economist they think this is capital.

So, that means capital stock of an economy should be non-declining, capital stock of an economy should be non-declining this is what is called means based approach. Now, there are different forms of capital, first one is called man-made or physical capital.

Whatever we see in front of us which is made by the human being, they are all physical capital for example, this machine, this pain, this classroom, this projector, there is a bridge, a vehicle, factory, inventories, that means what the firms produced last year and what the firms could sell the difference between sell and production inventories, they all add up to the physical capital.

So, that means as an example, we can say that inventories, inventories, factories, bridges, these are all some way or the other they are all physical capital, this is called man made or physical capital. Then second one is called human capital. What is human capital basically, it is the knowledge or skill endowed in labour force. So, human capital is denoted by KH, man-made capital is denoted by Km, thirdly natural capital denoted by KN and what is the example of natural capital?

All this natural goods and services what we derived from the nature from the environment, that means what we derive from the environment, different renewable and non-renewable resources, so renewable and non-renewable resources they form natural capital, so manmade capital, human capital, natural capital.

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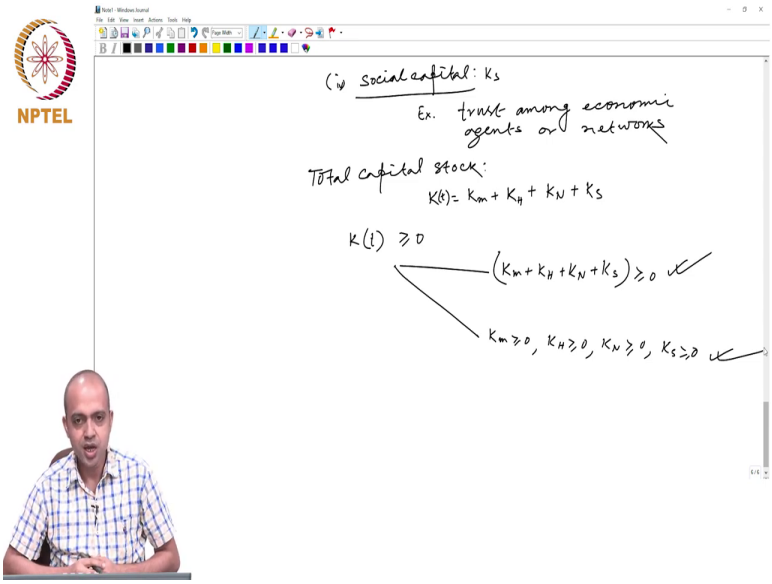

And then fourth one is social capital KS, what is the social capital? Social capital is basically defined as the trust among economic agents, economic agents or networks, these are all examples of social capital. Now, why social capital is also important in economic growth or development? Because, if you think trust among economic agents plays an important role in investment and production. For example, when I keep money in bank then we trust or believe that whenever we require money we may come back to this bank and bank will return this money.

Suppose all of a sudden, no economic agents trust anyone, so that means we would not be able to keep our money in bank, thinking that bank may run away in one fine morning taking all our money, so what will happen if we do not keep our money in our bank because of lack of this trust or belief, bank has no money to lend for the businessman, how does then these business men they will get money, they will borrow or they from the bank and invest?

So, there would be lack of fund in the economic, if there is no trust that is why trust is one form of social capital and then network, network also plays an important role in production, you see all these firms, they are connected by a huge network through the supplier and supplier of inputs and with the buyers.

We also have a network without network even if I have a knowledge, I have some resources, I may not be able to sell that, somebody should know that yes I am the person having so much of

knowledge or this much of the resources, so that person will help me connected with proper economic agents who will borrow my knowledge or my resources and will pay me in return.

So, that is this reason economists nowadays saying that social capital is also one of the most important form of capital that helps in production. So, that means indirectly when we say that, the other approach of defining sustainable development is means based, basically we are saying that these firms of capital should be constant. So, that means the capital stocks should be non-declining.

Now, when we say capital stock non-declining, what are we saying? Are we saying the sum total of this capital is non-declining or any particular component that means total capital stock, total capital stock K equals to Km man made plus KH human capital plus KN plus KS. Now, when we say that non-declining capital stock K t are we saying that Km plus KH plus KN plus KS that is non-declining or are we saying that any component or each and every component of this capital stock should be non-declaring, that means are we saying this.

So, capital stock, total capital stock constant when each and every individual are non-declining, capital stock is non-declining meaning that means it implies two things, either you keep the entire stock constant that means, I do not bother whether KH is declining or KN is declining as long as their summation is non-declining.

Or it may also imply no, no, no, I am not bothering about the stoke rather I am saying when I say non-declining capital stock, then I am saying each and every capital stock, every element of this total capital should be non-declining, depending on which approach we follow, economist, they define sustainable development in two different ways.

So, that means if we follow this approach, then we will get one specific definition of SD, if we follow this approach, then we will get another specific feature of sustainable development and these two specific features of sustainable development that we will discuss in our next class. Thank you.