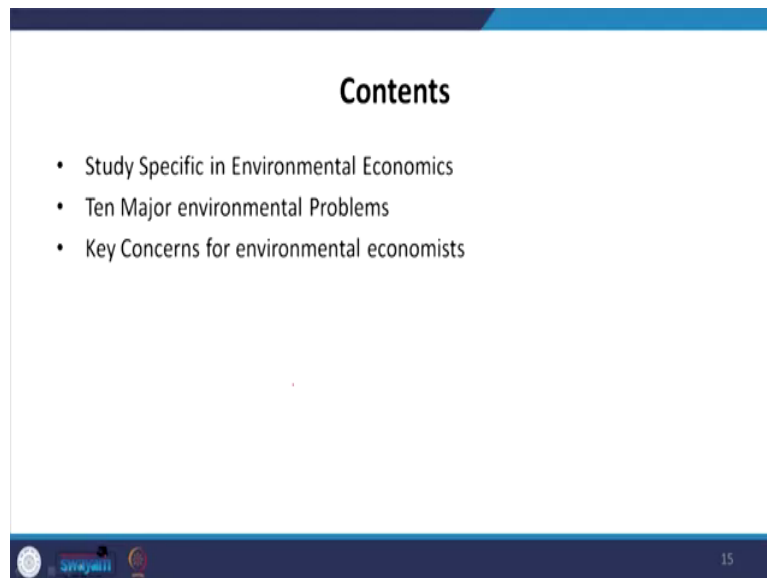


Introduction to Environmental Economics
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Lecture – 04
Study Specific in Environmental Economics, Major Problems and Key Concerns

Dear students, in this lecture you will study about the specific concepts which are used in environmental economics. You will also study about the major environmental problems and key concerns for environmental economist.

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In the preceding lecture I discussed the relationship between environmental economics and several sub discipline of economics like environmental economics and energy economics;

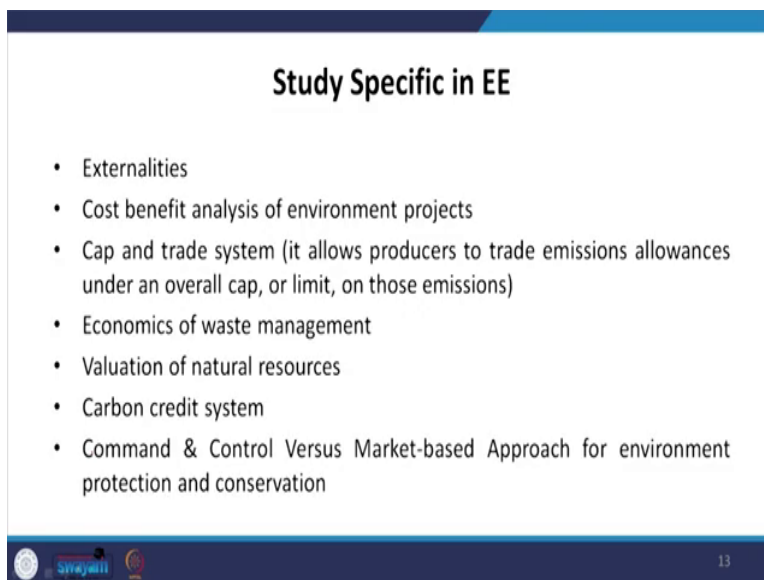
environmental economics and ecological economics; environmental economics and this environmental science etcetera.

In this lecture you will know more about the specific issues related to environmental economics like externalities, cost benefit analysis for environmental projects, cap and trade systems, economics of waste managements, valuation of natural resources, carbon credit system and command and control systems. So, these are some of the specific topics which will be used in environmental economics and you will also study about the key environmental problems like acid rain, ozone depletion, deforestation, chemicalization of agriculture.

So, environmental problems different countries are facing and they are having some adverse impact on the well being of the society. So, major environmental problems will be discuss and finally, you will study about the key concerns related to environmental economics like inter generational equity and intra generation equity, development versus environment institutions for environmental resource management, community base versus market oriented regulation, ownership rights of the natural resources, how population affect the environment.

So, relationship between population growth and environment, measurement of demand for non marketed goods and services, trade and environment, climate change as public goods etcetera. So, all these things you will study in this.

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Study Specific in EE

- Externalities
- Cost benefit analysis of environment projects
- Cap and trade system (it allows producers to trade emissions allowances under an overall cap, or limit, on those emissions)
- Economics of waste management
- Valuation of natural resources
- Carbon credit system
- Command & Control Versus Market-based Approach for environment protection and conservation

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Now, let me tell you what are the specific things which are actually studied in environmental economics in brief. First is externality which I discussed earlier. So, externality is one of the important topic which is studied environmental economics, second is cost benefit analysis of environmental projects. So, different governments they initiated various development projects.

And now in India also it becomes mandatory to know the impact assessment EIA Environmental Impact Assessment of many development projects. So, how to conduct cost and benefit of the development projects is studied in environmental economics. As you know that the cost and benefits of development projects may squared only longer periods. Investment is made today, the benefit may be received after say 2 years, 3 years, 5 years.

So, how to convert future benefits and future cost at the current price is also a measure challenge and in cost benefit analysis we study all these things. Then another topic which is very relevant for environmental economics is cap and trade system. What is cap and trade system? It is nothing else, but allowing that trade in the emissions. Under the Kyoto protocol now clean development mechanics carbon credit mechanics.

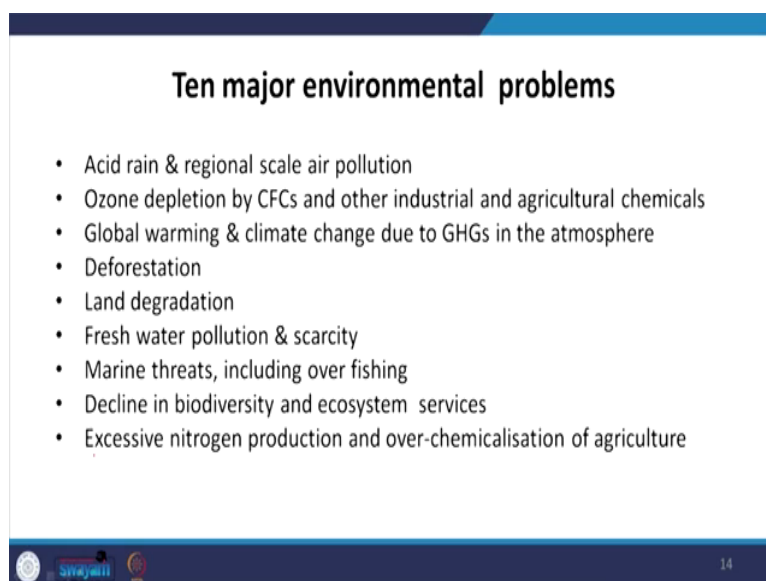
So, different kinds of mechanics have been evolved and under cap and trade systems we can allow the producers to trade the emission allowances under and overall cap. Cap means limit is fixed that you can be given a quota of generating emission up to this level and if you can save the emission, then you can trade that emission in the market.

Then economics of waste management is also an important topic study in environmental economics and most important is valuation of natural resources. As we know environment provide us various kinds of goods and services. So, how to evaluate these ecosystem services is a major contribution of environmental economics and sometimes in other lectures you will be able to know more about how to estimate the ecosystem services.

Then carbon credit is also a one kind of instruments developed under the Kyoto protocol and that allows the trade of the carbon and many developing countries have including India have completely advantage in the carbon trade. Next topic which is also quite relevant in environmental economics is command and control versus market based approach for environmental protection and conservation.

Now before the government there are two key approaches should we follow the command and control approach to achieve the intended policy goals of environmental protection or should we and in case the market and there are merits and demerits of both the systems and you will study in detail later on.

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Ten major environmental problems

- Acid rain & regional scale air pollution
- Ozone depletion by CFCs and other industrial and agricultural chemicals
- Global warming & climate change due to GHGs in the atmosphere
- Deforestation
- Land degradation
- Fresh water pollution & scarcity
- Marine threats, including over fishing
- Decline in biodiversity and ecosystem services
- Excessive nitrogen production and over-chemicalisation of agriculture

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Then ten major environmental problems being faced by the different countries first is acid rain acid rain and regional scale air pollution. So, air pollution is the major problem and that air pollution create a public bad product like global temperature may increase due to the sure to emission, climate change is a important issue. So, if climate is changing then this climate change becomes a public bad product.

And every country is badly affected to this and therefore, how to address this sure to emission is a major challenge before environmental economics. So, acid rain and regional scale air pollution. Regional air regional scale air pollution means, that in some pockets the intensity of air pollution maybe very high in some we have better environment etcetera, but overall these emissions affect the overall environment and directly lead to the change in the climate or increase the global temperature.

Then secondary is ozone depletion by chlorofluorocarbons CFCs and other industrial and agriculture chemicals, they are also affect in the ozone layer and lot of study have been done on these issues and environmental scientist are working on this ozone depletion due to the various gases released due to our industry and agriculture production process.

Global warming and climate change is basic issue these days and that occurs due to greenhouse gases released into the atmosphere and green house gases are generated due to our production of different kinds of goods especially in the most polluted industrial products.

Deforestation is another problem and when we increase our land for agriculture, we cut forest clean the forest to do farming, we also deplete our forest resources to meet out the requirement of wood and other natural resource resources used in the other production process. So, therefore, deforestation is also the major issue.

Then land degradation. Land degradation due to pollution of our soil, water is also the major challenge. Then fresh water pollution and viscosity water bodies are being continuously polluted due to release of waste into the water bodies and it is creating the viscosity of fresh water and water become a major issue in many countries of the world including India. Marine threat including over fishing.

So, now our seas becoming the dumping ground, many waste are ultimately goes through river systems into the sea and then they are also affecting the aquatic life. Moreover or fishing is also creating shortage is of fishes and many aquatic lifes are badly affected due to or exploitation of fishing that is also a major challenge.

Decline in biodiversity and ecosystem services. So, over a period of time biodiversity is also affected and therefore, various kinds of goods and services which are supposed to be provided by the environment they are also declining and finally, access in nitrogen production and over chemicalization of agriculture.

So, you know meet out the food securities, now in many countries is starting providing more chemicals to the agriculture. So, chemical intensive farming system is also leading to the leaching of chemicals into the water bodies, soil and that is creating not only soil degradation, but also affecting the health of the people. So, because all these pesticides and chemicals they are entering in the food chain and affecting the health of the peoples.

So, these are the major problems related to environment and environmental economics must deal with these kind of issues. So, how to develop the better institutions, how to develop the better policies, how to develop the better theories to deal with these kind of challenges are the major issues in environmental economics.

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Key Concerns for Environment Economists

- Inter-generational and intra-generational equity
- Development versus environment
- Institutions for natural resource management
- Community based versus market oriented regulation
- Ownership rights of the natural resources
- Population growth and environment
- Measurement of demand of non-market goods & Services
- Trade and Environment
- Climate Change as public bad (ecological footprint—US 12.22 ha; India: 0.9 ha, China 1.84 ha)

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And finally, let me also discuss the key concerns before the environmental economics. First concern is inter generational and intra generational equity. What do you mean by inter

generational and intra generational equity? Let us take first inter-generational equity. Inter-generational equity means we have to maintain the equality between the current generation and the future generation. For example, if we are exploiting all our natural resources today, then we would not be able to provide these resources to the coming generation.

And sustainability of our life becomes questionable if we are plundering or exploiting our resources at the rate higher than the rate of regeneration, then we would not be able to provide these resources to the coming generation. As Gandhiji has given a concept of trusteeship. So, many people believe that this current generation is not the owner of these resources, they are and this generation is only the trustee and we have to keep intact all our resources for the future generation.

For example, if you have deposited some money in bank and if you survive on the interest received on that deposit, you can live or sustain your life on a longer period. But if you start eating your capital deposit in the bank, then one day you will not be able to have that resource and your survival will be questionable. The same thing is related to our natural resources. So, if we are depending only on the rate of regeneration of natural resources and we are keeping intact our existing resources for the future generation, then we would be able to keep all these resources for the future generation.

So, that is what I meant by intergenerational equity. As far as intra generational equity is concerned that is the equity related to the same generation. We know some section of the societies may have better access to resources, some may have less access to the resources. So, making an equitable distribution of resources for the current generation is also an important issue so, that inequality, poverty all these things can be properly addressed.

The second issue is concern is development versus environment. I can explain you the interface between environment and development as in the very beginning, I made a statement development is must, but environment is first. So, how to make a proper balance

between environmental concerns and development needs is also the major concerns before the environmental economist. Third is institution from natural resource management.

So, what kind of institutions we can develop to pressure to manage our natural resources whether the existing institutions are sufficient enough to make the efficient use of our natural resources and able to manage these resources effectively and if not, then what kind of new institutions are required that is also a major concerns. Then community based versus market oriented regulations.

So, this is also the important issues should we give the control of our resources to the entire communities or should we give the property rights to the individuals which method is more effective to preserve the resources is also the major concerns. Therefore, ownership rights of the natural resources is also the important topic for discussion in environmental economics.

In many cases especially the in natural resources like water still there is a lot of confusion who own the resources; whether water is owned by the government, whether water is own by the community, whether water is owned by the farmers beneath their land. So, these are the important issues and in the absence of proper property rights resource allocation efficiently may not be done.

So, in order to make the efficient use of our resources, how to ensure better property rights ownership right is a major challenge before environmental economist. Then another concern is population growth and environment and lot of discussion have been made on this issues like a population is increasing. So, demand for certain kind of goods and services will increase conjunction level will increase.

So; obviously, if we are producing more, we are consuming more will be the pollution. But at the same time if population is increasing working population is increasing, if (Refer Time: 19:14) temper is ensured if R and D is increase even with the increase in population we would be able to protect our environment we can conserve our resources. So, there is a lot of debate on related to population growth and environment, but as I in the very beginning today

told you that earth is a closed system and carrying capacity of the earth may be affected if the population pressure is increasing.

So, carrying capacity is also the important issue. So, how to maintain the carrying capacity although it is not static, it is dynamic and we can advent the carrying capacity of our environment through developing new technologies research and development. Then another important concern is how to measure demand for those goods and services which are outside the market.

Environmental goods are non rival and non excludable in nature in most of the cases. So, can we develop a demand for such kind of product is a important issue and major contribution environmental economics is towards development towards developing a demand for such kind of product which are outside the scope of market and what is your major contribution of environmental economics.

Then trade and environment is also the important issues why it is important? Because when we try to accelerate the rate of trade then certainly emission level will also increase, but in order to improve the competitiveness of our product in global market may we may have to reduce the cost.

And if you internalize the externality in the production process then cost will increase. So, competitiveness of your product will be badly affected in the international market if more emphasis is given on protection of environment while producing the goods. Therefore, this becomes an important issue globally and under WTO.

Many countries want that this environmental standards should be included in the multilateral trading system. Another important aspect let it to trade and environment is that if environmental standards in a particular country is very low, then many multinational companies they may get incentive to make investment and there may be flow of foreign funds FDI's Foreign Direct Investment in that countries and investment may increase.

So, sometimes if the focus is on improving the environmental standards, they may also have some consequences on competitiveness of the products. So, this is also the important issue there are merits and demerits on the giving more emphasis on environmental protection in contest of the trade etcetera and last is last point is climate change as public back product.

You know ecological footprints of US is around 12 hectares per person while in India it is 0.9 hectare. So, if India also want to achieve the same ecological footprints, then 12 time resource will be required and in that case many several earth will be required if all country started following the conservation pattern of US.

So, therefore, many countries now they are putting pressure on developing countries to limit their growth because if their growth is increasing, their conservation pattern is increasing, then energy conservation will increase and that will affect the climate, but they have already achieve the high level of mass conservation. Now advanced countries may have some pressure on emerging economies to limit the growth or improve their environmentally standard like in case of China.

China is ecological footprint is 1.84 hectare and as I already told you us is 12.22 hectares. So, now if China also started following the conservation pattern of US and how many resources will be required and how much will be the emission level in the global economy that is a major challenge.

Why I am emphasizing this climate change as a public bad because some may be the free riders because if you are not putting efforts to reduce the CO₂ emission and since you have to emission is directly related to your economic activities. So, if you want to cut down CO₂ emission, you have to cut down your economy activity or you have to invest more on clean technologies better management practices etcetera that may have adverse impact on your economic activities and your product may not be computed in the global market.

But if some other countries are using the clean source of energy and affecting projectly the global warming issues, then other will also be benefited. So, that is why it is a public goods

and some countries may be free rider. So, that is what I would like to mention and that is all in this topic.

Thank you.