Introduction to Environmental Economics
Prof. Diptimayee Nayak
Department of Humanities and Social Sciences
Indian Institute of Technology, Roorkee

Lecture – 48
Property Rights & Coase Theorem – I

Hello, everyone. In the last lecture we discussed about the issue of externalities and there we talked about; how to find solution for externalities. So, there we talked about different approaches like; 5 standard approaches for internalizing the externalities so, that we can avoid the problem of externalities and inefficiencies can be avoided.

So, the first approaches that we talked about is the private bargaining and negotiations, right. And, in private bargaining and negotiations we get emphasis that; without even though the government is not interfering in the inefficient market still we can have an inefficient market provided, we will be having if we will be having the private bargaining systems.

So, let say there are two parties are there and one party is actually creating some kind of externalities and others is being adversely affected by it. So, if it is so now, both the parties both the private parties they can come together negotiate and bargain and they can have their, they can actually avoid this externalities.

So, in this context we do have an established theory which is known as the Coase theorem. And the second thing that we discussed that another approach for internalizing the externalities is legal status and procedures or legal rules and procedures.

So, there we talked about if at the initial assignments or initial property rights are well defined, then this problem of externalities can be avoided. So, in this regard we need to discuss about; what is the property rights and what is well defined property rights. And so, that in the presence of well defined property rights the problem of externalities can be solved. So, based on these two different approaches on how to internalize the externalities will be now today, discuss what is the property rights and what is the Coase theorem.

So, broadly we will be saying that, we will be discussing the Coase theorem and the property rights and how this Coase theorem can be an instrument in internalizing the externalities.

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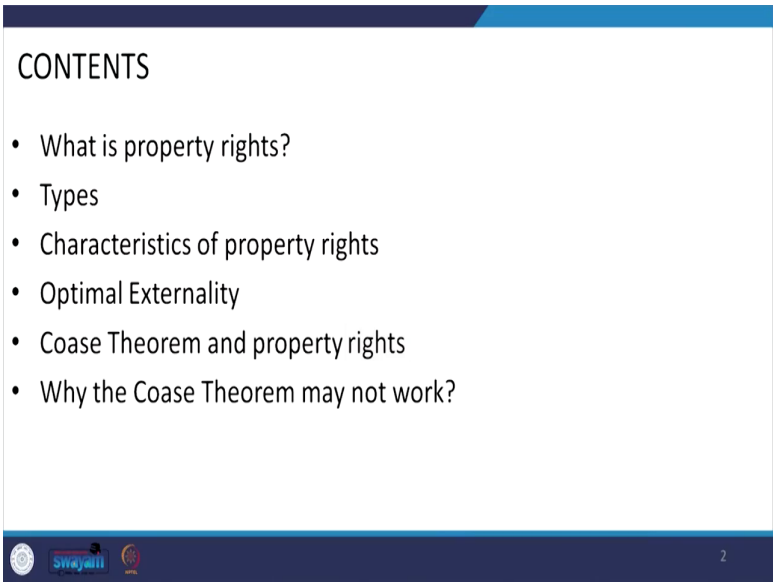

So, the contents that will be discussing in this lecture is; what is the property rights and what is the well defined property rights, what are the different types of property rights and then we will be discussing what are the properties of property rights and what is optimal property sorry, optimal externalities, then it will be followed by the Coase theorem and property right. And, at last we will be a talking about some of the limitations of this Coase theorem in solving the externality problem.

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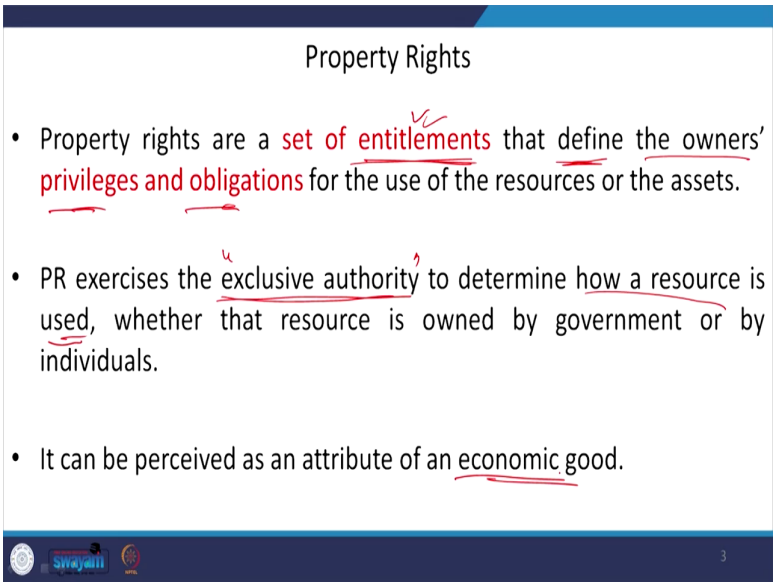

So, let us start with the definition of the property rights itself. So, what is the meaning of this property right? So, we can say this property right is a kind of norm a kind of guideline a norm or regulations or set of rules. So, that everyone obeys that particular rule. So, broadly you can say, that property rights is a set of entitlements and because of this entitlements, the owners they will be having some kind privileges and some obligations as well so, far the use of resources or use of assets are concerned.

So, we can say that here in property rights we are emphasizing two aspects that; property rights are the entitlements first thing. So, what you can say that; that the very features of this property right is that we will be having a kind of entitlements or it is a set of entitlements and because of this entitlements, we will be able to define the owners, privileges as well as obligations.

So, for the use of resources or use of the assets is concerned, right. And, moreover a because of this property right; we can have exclusive authority to determine how resources is used and whether the resources is owned by the government body or by some private individuals or groups.

So, that is how you can say that, when a person or a group or a society even is having a proper right, so they do have this exclusive authority to that property right or to that particular resources or assets and because of which they can determined; how this particular resource or particular assets is going to be used.

And, moreover this is one of the this property right or exclusive authority is one of the fundamental attributes of economic good. So, we can say that in defining the economic goods also we are using this very features that is the property right.

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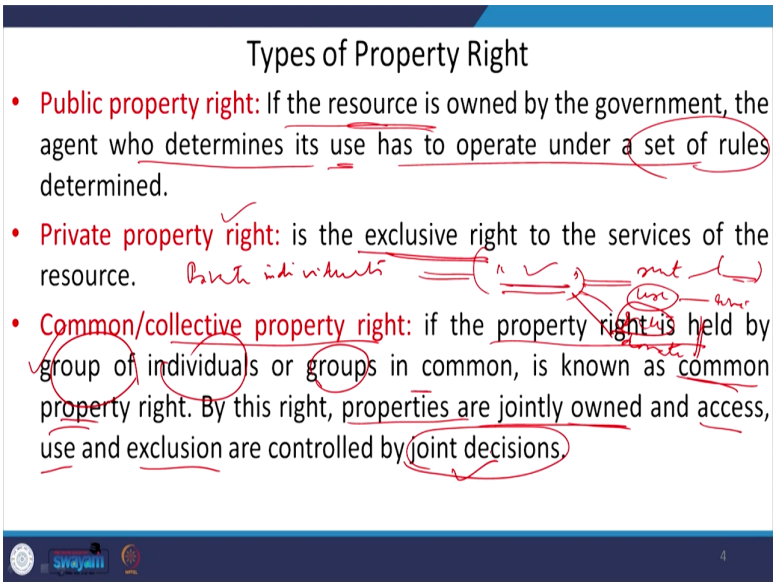

So, after understanding what is property right, we can discuss about what kind of property rights are discussed in literature. So, the first one that we are discussing is public property right. So, what is the public property right? So; obviously, here the a ownership right is on the is hold by the public itself. So; that means, it is the government want.

So, a so broadly you can say that, if the resource a or a particular asset is owned by the government itself or public in a broad view then we can say; the agent who determines its use has to operate under a set of rules that are again determined. So, the first kind of property right we are talking about public property right so, where resources are owned by the government or the public itself. And the second kind of property right is the private property right. So, here the right to use this property or resources is given or is based on the private individuals itself. So, individuals do have this ownership private individuals right.

So, when they are having this private individual rights or property rights so, they do have this exclusive right to the services of the resources so, what is exclusive right? So, they do have they it depends that how they will be going to use this resources, they can get all the benefits out of the use of their resources.

So, when you are talking about this private property right; let us say what about the benefits they are getting out of a particular building, right. So, and they do have this property right. So, in this case this particular building they do have right to rent and get the benefits rented amount or they can use for their own accommodations and leave over there and they can also sell or donate as a gift to somebody, right.

So, this is how we can say if a particular property is having its ownership or property right is hold by the private individual itself. So, this is the way the services the private person they can get the services out of the particular resource or particular assets. And, the third category of property right is the common or collective property right.

So, what is the common or collective property right? So, in the first case public property right here the resources are owned by the government itself. And, the government determines the rules how to use and what kind of uses it can have and similarly, in case of private property right the right or ownership is hold by the private body itself, private individuals or private groups.

But in case of the common property or collective property rights so, here the property right is hold by group of individuals or groups in common. So, maybe a particular town or particular village and that is why, this is also known as the common property, right. And here by getting this right collective property right so, here the particular asset or resource are jointly owned and access use and exclusion are controlled by joint decisions only. Because the property right is hold by a particular group of persons or particular individuals in common, so; that means, they are they may belong to a particular group, particular sections of the society like; your village communities right.

So, how they are going to use this particular property it depends upon the joint decisions. So, this is how broadly we are saying the different types of property rights and based on this property rights, the economic goods would be different. So, now, after understanding the very definition of the property right let us talk about what are the characteristics of the property right itself.

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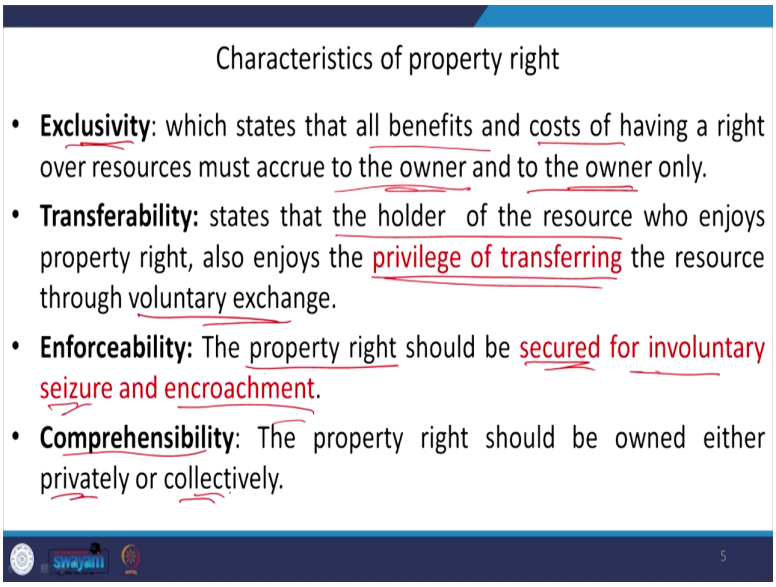

So, the first characteristics that we need to (Refer Time: 10:35) is the property of exclusivity. So, what is exclusivity? So, what is the meaning of this exclusivity? So, it states that what about the benefits and what about the costs that can be generated from a particular asset or resource which is owned by someone, then these benefits and costs will be received by the owner itself.

So, we can say that exclusivity states that all the benefits and called costs if the owner is having the property right over the resources or assets, they can be accrue to the owner and to the owner only no one else. Only the owner can get the all the benefits and all the costs of having this particular resource, if he or she is having this property right. And, the second property of this property right is transferability. So, what is the meaning of transferability? That means; if you are having the property right you do have the freedom to transfer the ownership right of this particular property in discussions.

So, this transferability can be discussed as that, the holder of the resource who enjoy the property right, they can also enjoy the privilege of transferring, they do have privilege that how they are going to deal with this property. They can if they wish they can transfer from one generation to another generation or they can donate to some third party, they can sale to the third party as well. And this is through the voluntary exchange.

So, another characteristics of this property right is enforceability. So, what is enforceability? That if someone is having the property right on a particular resource or a particular asset, then the others cannot encroach on that particular property. So; that means, this a having this property right gives a kind of security over the resources or assets. So, the so, in case of this enforceability the property right; property right should be secured for involuntary seizure and encroachment. No one can encroach no one can seiz, if you are having the property right over your resources or on the on your asset.

And, the last characteristics of this property right is comprehensibility. So; that means, it is it must be well defined right. Who is owning the property? Whether it is owned by the private persons, whether it is owned by the public authority or a government, whether it is owned by collectively that is a group of persons or group of individuals they are having this right users right or property right on this particular resources or the asset in questions. So, this is how this characteristics helps us defining the economic good.

So, now let us discuss about what is the optimal externalities. In the last class we talked about what is externality and what are the types of externality. Now, we will be having another concept on externality before understanding the Coase theorem.

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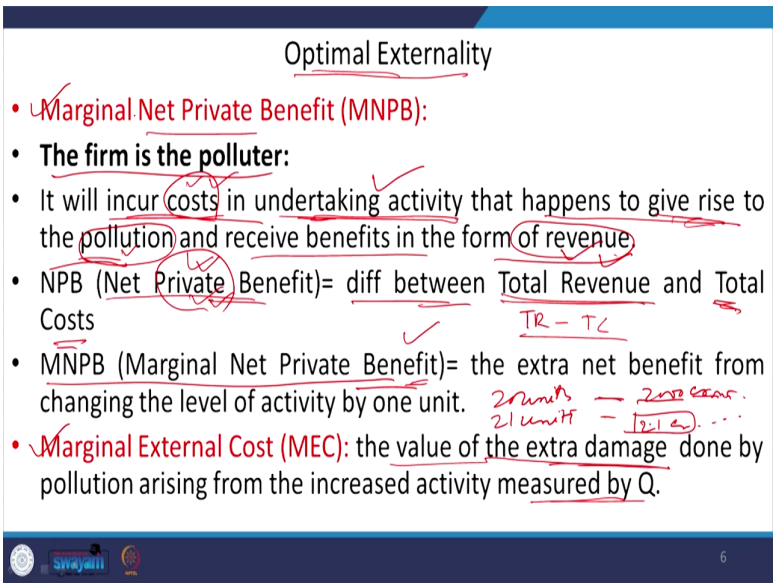

So, what is this optimal externalities? This optimal externality can be understood by the help of this marginal net private benefit concept and marginal external cost concept.

So, what is this marginal net private benefit? So, now, let say; obviously, when the firm is producing so, this pollution it is treated as an externality and this pollution or externality is a byproduct of the output that the firm is producing. So, now, the firm is the polluted itself.

So, when the firm is a polluter here, then in this case the firm will be incurring costs, when it undertakes or produces the output and as a result it will also be producing the pollution or

externalities, right. So, what is the cost here that the firm is bearing? That is the cost that the firm is incurring towards the productions, right.

So, after production; obviously, the firm is selling its output and getting the revenue, ok. So, now, the firm is getting the costs in terms of cost of production, out of his production itself and the second thing the firm is receiving benefits in terms of revenue after selling the products, right. And, we a we also know that when the firm is producing its products it is also giving rise to a kind of externality which is known as the pollution. But this pollution cost the firm is not including in its cost of production.

So, now for this firm what is the net private benefit? So, we can find this net private benefit by drawing a difference between total revenue and total cost. So, what is the total revenue the firm is getting? It is the revenue after selling its products and what is the total costs the firm is getting? So, that is only the cost of productions not it is not including the pollution cost. So, that is why it is known as the private net private benefit.

But, when this pollution cost or externality cost is added it is known as the social cost itself, right. But here we are only concerned about the private benefits and private costs that is why, we have not taken into account this pollution because pollution is an external cost or social cost right.

So, the net private benefit is nothing, but your total revenue that the firm is getting and what is the total costs the firm is incurring in its production process, right. So, now, we can say that this marginal net private benefit right. So, that can be defined as the extra net benefit the firm is getting by changing one unit of its production. So; that means, if the firm is earlier producing 20 units of output and he is getting and it is getting the benefit let say of 2000 crores of rupees, right.

Now, when one more unit is produced, right. So, what is what will be the change in the benefit from 2000 crores of rupees to 2002.1 crores of rupees or likewise, right. So, here marginal net private benefit is the extra benefit that the firm is getting from its production by changing only

one unit of output, right. So, this is how the first concept that is marginal net private benefit we are finding.

So, the second concept that we need to discuss for optimal externality is the marginal external cost. So, what is the marginal external cost? And you understand that marginal is always associated with just one extra unit of productions, right. So, in this case of marginal external cost we can define that this is the value of extra damages or extra cost that is done by the firm itself in terms of pollutions, right. By increasing its production by unit by one unit.

So, when the firm is increasing its production by one unit. So, what is the value of this extra damage? That is because of the pollution itself. So, now, you understand what is marginal net private benefit and what is marginal external cost itself.

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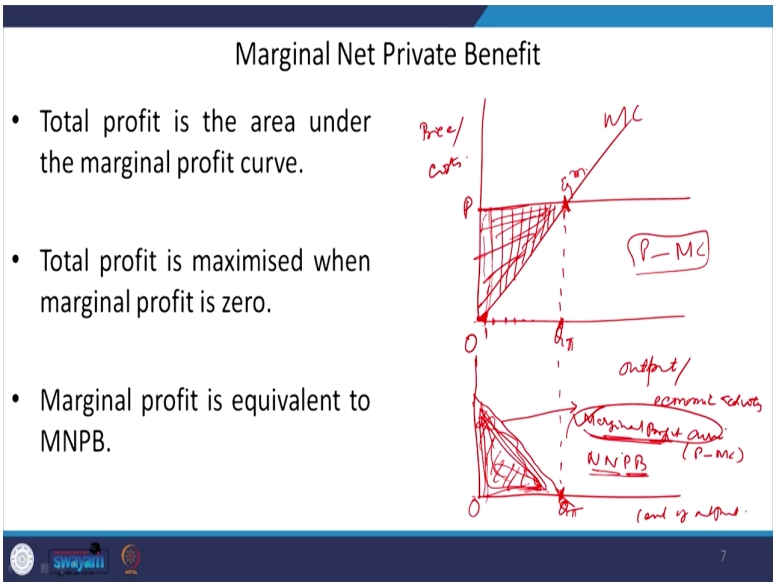

So, after all understanding this these two concept now, we can have this graphical representation of this marginal net private benefit and marginal external cost. So, how to find this marginal net private benefit?

So, in our externality discussions we knew that; the particular firm is a price taker not a price maker. So, therefore, whatever the prices price is established for a particular product in a industry the same price it will be taken by the firm itself. So, the same price will be chart by this firm itself. So, here in the x axis we are define; we are representing this output level or economic activity by the firm itself, right. And, in the right hand side sorry, in the vertical axis we are representing this price and costs.

So, as you know that the firm is a price taker. So, price is already decided and this is P. So, now, how the firm is going to decide, what much of output to produce it depends upon the marginal cost itself. And when marginal cost curve is intersecting the price line so, there it is deciding the equilibrium level and equilibrium output would be Q phi right. So; that means, in a perfectly competitive market a particular firm will be producing this Q phi level of output. And, now your task is to find out what is the marginal net private benefit. We can derive this marginal net private benefit from this curve itself.

So, what is this? This is your price line and this is your marginal costs right. So, what is the benefit that the firm will be getting when it will be producing one unit of output, two unit of output and likewise up to Q phi level of output? So, the firm will be getting benefit. Why it will be getting benefit? Because if he produces the firm produces one unit of output at this point, then at this price level O p you will be getting this much of revenue and only this much of costs right. So, in a similar logic when the form is containing with a increasing its production level, then these lines would be the profit lines or the benefit areas.

So, these area are the benefit or the profit areas. So, the same from these we can actually find out, what is the marginal profit curve for this particular firm. How to find? So, at this 0 output when output is 0 profit is; obviously, 0. When it is producing the first unit then this is the one.

So, we can just define the level of output here, right. And we know that this profit is nothing, but price minus marginal costs.

So, at the point Q phi level of this point the firm is getting the maximum profits at this point it is 0 profit, right. So, we are taking this 0 and the maximum profit and we are; we are drawing a line right. Then this curve is right now, known as the marginal profit curve; which is defined by price minus marginal cost, right.

And this is also known as the marginal net private benefit. Because benefit is knows to profit here we are assuming right. So, how to define this marginal profit curve? Marginal profit curve is the extra profit that is made by the firm itself by expanding its output by one unit only. So, that is how we are defining the marginal profit curve.

So, now based on this understanding now we will be saying what is the total profit? So, total profit area; total profit is the area under this marginal profit curve. So, now, what will be the total profit? So, this will be the total profit, ok. It is area under this marginal profit curve. And, this total profit it will be maximized right; when the marginal profit because this is marginal profit and this is total profit right and summation of all marginals are the totals right, that is why we are saying it is the total profit area. So, area under the marginal profit curve is your total profit.

So, total profit is maximized when your marginal profit is 0. So, at this point your marginal profit becomes 0. And, again this marginal profit curve is equivalent to your net marginal net private benefit.

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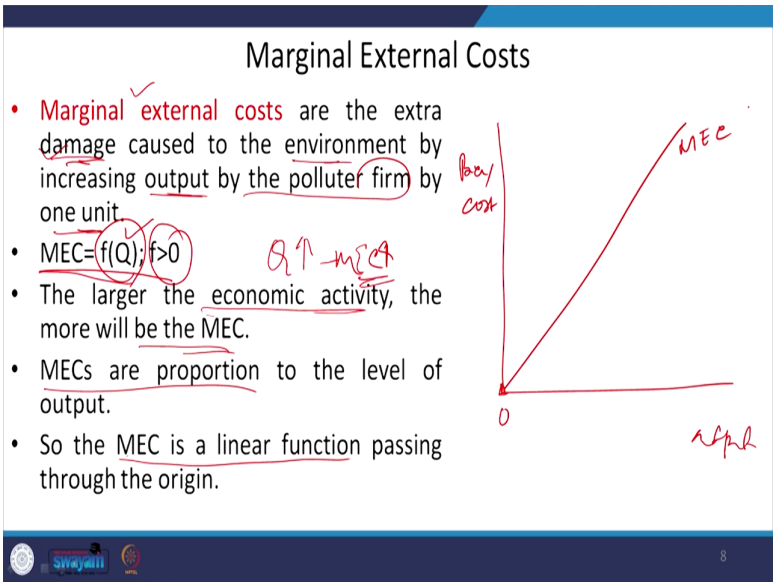

So, similarly; now let us discuss about the marginal external cost. So, what is marginal external cost? The additional cost or extra damaged right. That is caused to the environment by increasing the output by this firm by one unit. If the firm is increasing its output by one more unit right and because of which the environment is facing some damages right and this damage cost is known as the marginal external cost.

So, now we can say that this marginal external cost is related to the unit of output produced. That means; marginal external cost is; obviously, a function of output that the firm is producing. So, that means; when your output level is increase the external marginal external cost is also increasing, right. So, that is why this f is an increasing functions. And, moreover when the output or economic activity is very large, right the marginal external cost will be

large also. So that means; the marginal external cost are proportion rises in proportion to the level of activity or level of output, right.

So, based on this understanding now, we will be saying that marginal external cost it will be linear functions. What will be its starting point? Obviously, it will be starting from the origin itself. Because when there is no economic activity the externality would be 0. So, based on this understanding we can draw the marginal external cost. This is your output or economic activity price or cost. So, your marginal external cost is it is having its origin is 0 right. This is marginal external cost.

So, that is how we are defining this marginal external cost and marginal net private benefit. So, now, let us understand; what is optimal externality or optimal level of externality. And, we have already discuss that we can decide this optimal level of externalities by take into account marginal external cost concept and marginal net private benefit concept.

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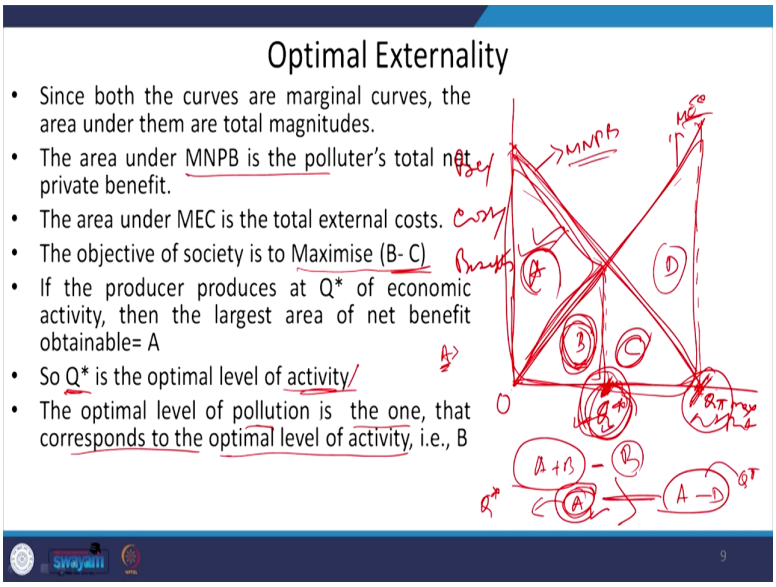

So, how to find this optimal externality? So, now, we can say we know what will be graphically we can represent this right. So, this is your output already we know and this is your price or costs and also the benefits.

And, you have already known; how to find out the marginal net private benefit, this is your marginal net private benefit and how to draw the marginal external cost? This is your marginal external cost right. So, this is 0, this is marginal net private benefit, this is marginal external cost curve.

So, now, let suppose say this area is denoted as A this area is B, this area is this. When the marginal external cost is intersecting, the marginal net private benefit this intersection point, it

is dividing this total triangle into two parts. This area is B and this area is let say C. This level is known as the Q max or Q pi, ok. And this area is known as Q star.

And based on this drawing now we can say; both this curves marginal net private curve and marginal externality curve they are the marginal curves, right. And, the area under this marginal net private benefit is the polluter's total net private benefit. This is how the we are saying the polluter firm or the polluting firm it will be getting this level O this one and this one area of benefit by expanding its output. And, moreover the area under this marginal external cost this from point this to this, to this it is the total external cost that the society is receiving, because of the firms production.

So, in this case what is the objective of the society? Obviously, to maximize the benefits and costs, right. So, what is the private benefit? This area is the private benefit right and this area is the social cost. So, if the producer is producing at this level of output, right that is the intersection point of marginal external cost and marginal net private benefit. Then the this the benefit would be this much only A; A area and the cost would be this area, ok.

So, that means; benefit is definitely larger than the cost incurred right. And, when benefits is larger than cost it is the highest one then; obviously, this corresponding to this Q star that is the output this is the optimal level of output that the firm most produce, right. So, how to define this optimal level of pollutions? Because so, here we are talking about the output as well as pollution, because the optimal level of pollution is the one that correspondents to the optimal level of activity, right. So, what is the optimal level of activity? So, if it is continuing till this Q star of output. So, that is the activity level would be till this point B point, ok.

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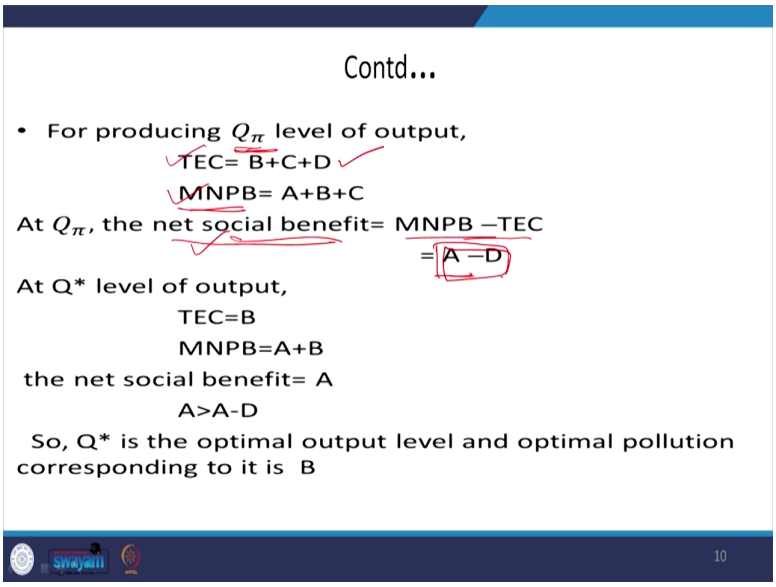

So, if the firm is not sticking at this Q star level of output rather it needs to expand its production till this Q phi level of output, then what will be the total external cost? So, the total external cost; obviously, would be B area plus C area plus D area. B plus C plus D will be the total external cost and likewise; what will be the marginal net private benefit? So, marginal net private benefit would be this area, A area plus B area plus C area. Area under this marginal net private benefit.

So, now what is the net social benefit? That is the marginal net private benefit minus total external cost. So, this area is the A minus D area, right. So, we are getting this net social benefit A minus D area, right this area minus this area when the firm is producing at Q phi level of output. But if the firm is producing at Q star level of output, then the total benefit is

A, right. Because C this is the at this level of output, the marginal net private benefit is A plus B right. Marginal external cost is B only.

So, A plus B is the total benefit. What is the total cost B? So, A plus B minus B is A so; that means, the social benefit we are getting is A. But in this case when the output or the firm is expanding its production up to Q phi, then the net social benefit is A minus B. So, among these two so, here we are getting this net social benefit, if the firm is producing at Q star and you are getting this net social private net social benefit if the firm is producing at Q phi.

So; obviously, you will be saying that this A area is greater than this A minus D area. That means; this the net the net social benefit is the highest one if the if the firm is going to produce at this point and not at this point.

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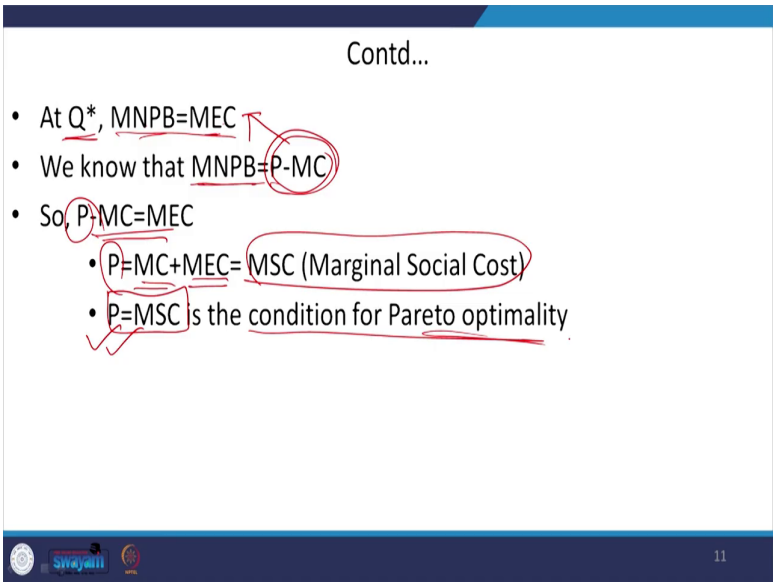

And, we know that at this point; marginal net private benefit is intersecting the marginal external cost so, equating and this net marginal net private benefit is defined by price minus marginal cost that we have already discussed.

So, now we can say because they are, their equivalent is there. So, that is why you can say this price minus marginal cost is equal to marginal external cost, right. So, what will be the price? Price is now marginal cost plus marginal external cost which is known as the marginal social cost. And, when this condition is established; that means, price is equivalent to your marginal social cost, then you are saying the conditions for the Pareto optimality has been established.

So, by this way you can internalize your externality; if the if you are producing the optimal level of externality, right. So, in the next class we will be discussing the next portion, the continuing portion of this particular lecture. We will be discussing what is the Coase theorem in this context and how this property rights are taken into account in explaining this bargaining.

Thank you very much.