**Introduction to Environmental Economics**
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**Lecture – 49**
**Property Rights & Coase Theorem – II**

Hello everyone. So, today we will be continuing from our last lecture that is Property Rights and Coase Theorem. So, in last lecture we discussed, what is a property right and what is optimal level of externalities? So, today we will be continuing from this and in addition we will be discussing the Coase Theorem.

So, before discussing what is the necessity of Coase theorem, I just want to put forth the very question that we are posing, that how to internalize the externalities? Because, we are saying in almost all cases, we are facing the presence of externalities. So, in that case, the greatest challenge is how to internalize the externalities or how to reach the social optimum, right?

So, in this case even though there is no market mechanisms or even if the markets may not secure, the optimum amount of externalities. This optimum amount of externalities can slowly be notched, in this very directions without the involvement of the Government.

Generally we are saying that when there is some externalities, Government must interfere through different mechanisms or instruments like taxes or subsidies. But, even the Government is not interfering and we can also move towards the social optimum and we can internalize the externalities. So, that is the very gist of the Coase Theorem. Now, let us discuss this Coase Theorem in nuts in detail.

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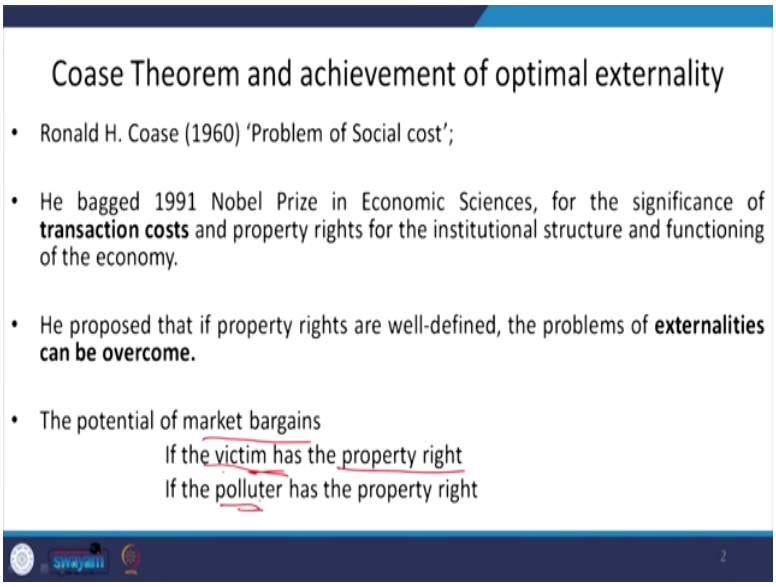


So, as you understand that what is the how to define this optimal level of externality? And, that is what the social desirable externality level. And, that is why the challenge is to achieve the optimal level of externalities. And, Coase tried to show that how this optimal externality can be achieved without the intervention of the Government itself. So, he delineated his thoughts in the problem of social costs, which was published in 1960.

And, because of which he got his Nobel Prize in Economic Sciences. And, when the Nobel Committee cited that the two articles, two most important articles by Coase Ronald Coase, it was on the nature of the farm, which was published in 1937; along with the 'Problem of Social cost', which has published in 1960.

So, basically the second one the problem of social costs, it talks about that if there is no transaction costs, then the private parties, they can bargain and negotiate to internalize, the

externalities, without even the intervention of the government itself. And, because of this thought that how this transactions? If, there is no transaction costs and there is a the bargaining and negotiations among or between the private parties, that can lead to the social optimal externalities, because of this idea. He bagged this Nobel Prize in Economic Sciences in 1991 right.

And, there the very assumptions he has taken is property rights must be well defined. And, because of this well-defined property rights, the institutional structure must be well fitted.

So, he proposed this idea that, when the property rights are well defined and the problems of externalities can be prevented. But, here the condition is that the property rights. So, he proposed this very idea that, in case of the property rights are well defined, then the problem of externalities can be prevented easily.

And, based on this idea, he thought about a market bargains, that how private parties? Those who are creating the externalities and those who are suffering from these externalities, they can come together, because it is assumed there is no transaction costs they can negotiate. And, bargain and thereby both of them they can actually get this social optimal externalities.

So, now let us think about this potential market bargains right. So, there we can we can actually argue about, if the victim is having the property right, then how this achievement of optimal externality can be possible. And, the second bargain scenario is if the polluter has the property right then in that case, how this optimal externality can be achieved.

So, now, let us talk these two scenarios. So, before talking about the two scenarios we need to assume the conditions. So, what are the very assumptions that we must take into account for this Coase Theorem?

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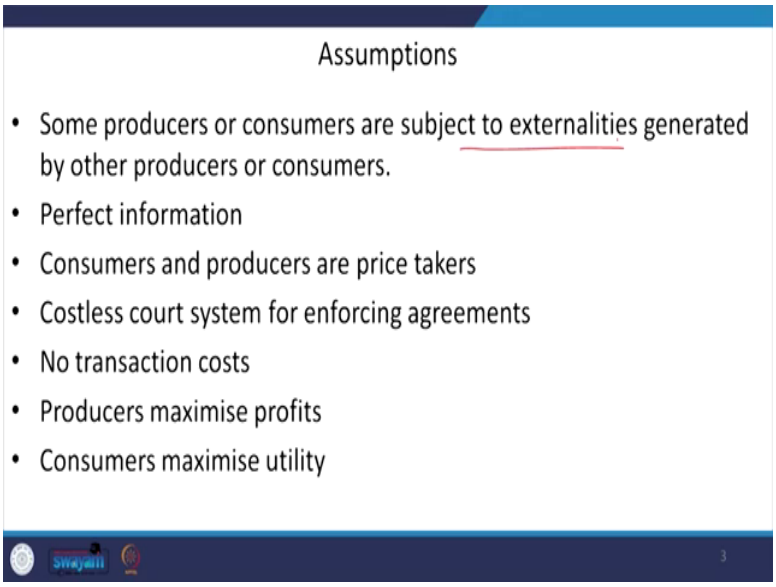


The first one is that, the producers or consumers, they are subject to externalities right. So; that means, the externalities is a must when you are producing or consuming and that is why, they because of your activity. The second consumer or second producer they are suffering. And, the second assumption it has been taken the case of perfect informations; that means, it is a kind of perfect competitive market situation prevailing. And, everyone is having a the equal informations or perfect informations.

So, the consumers and producers are here the price takers, because we have already assumed the case of the perfectly competitive market scenarios. And, moreover it is also assumed that, the legal processor like your Coase, it is a costless process for enforcing the agreements.

And, it also argues that there is no transaction costs for this negotiation and bargaining. And, moreover it also takes into account the basic microeconomics principles that producers they

always max try to maximize the profits and the consumers, they will be trying to maximize their level of satisfaction in terms of utility. So, these are the broad assumptions the theory has taken into account.

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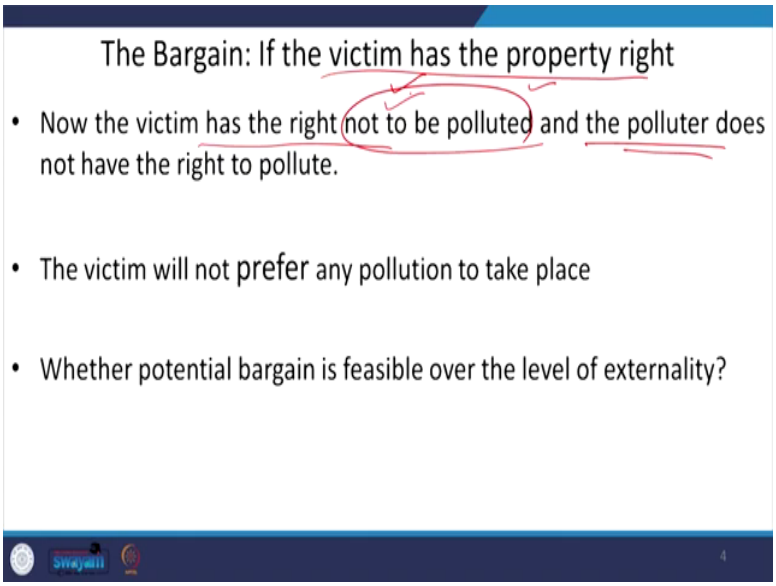


Based on these assumptions, now, let us have these two scenarios. So, what is the bargaining scenario? The first bargaining scenario is that, if the victim has the property right. So, what is the scenario now? We are saying that, there are two parties; one is the producer right, that is the polluter and the second one is the victim. Because of producer's activity, that is in terms of pollution, the second person is victimized or suffering from the externality or pollutions.

So, now we are saying that, if the property right is hold by the victim itself, then the how then how the bargaining process or negotiation process will be carried forward and how these optimal externalities can be achieved? So, when you are assuming this case, that the victim had

the property right. So; that means, it means that the victim has the right not to be polluted. The victim cannot allow any kind of pollutions, because he has or she has the property right.

And, the polluter or the producer he does not have any property right to pollute. So, this is how the very meaning of these the scenario. So, when the victim has the property right and, he has the right not to be polluted then; obviously, the victim will not prefer any pollution to take place. He will not be allowing any pollution to take place by the polluter itself right.

So, if this is the case, now the question is that, whether any kind of potential bargain is feasible or not right?

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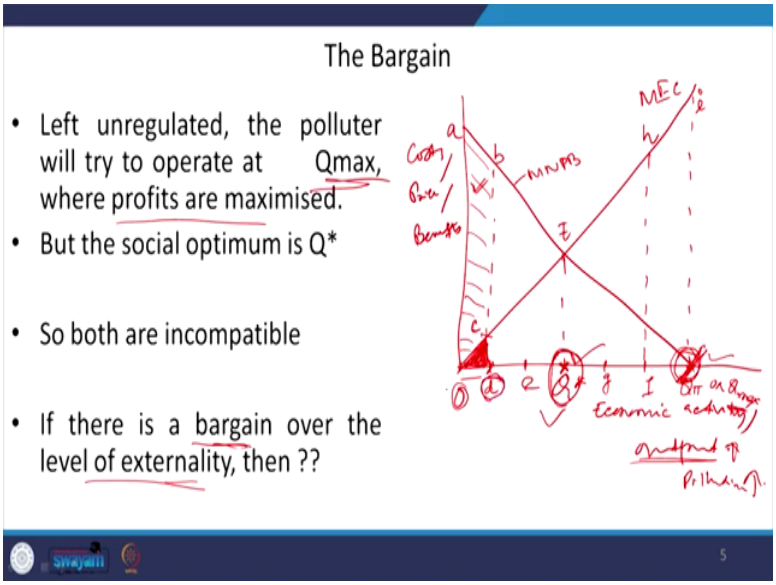


So, for this reason let us understand the bargain. So, what is the bargain? We can actually display this by using, a graph. So, as you understand we are now we are just taking the similar

graph from the externality itself. So, in the horizontal axis we are we are measuring the output or economic activity or output right.

And, in the vertical axis we are measuring the cost, price, and benefits ok. And, we have already discussed that, this is your marginal, net, private, benefit curve and this is the marginal, external cost curve. So, let me just draw this diagram, then we will be explaining and interpreting it, this is Q star right.

So, this is the point at which at point E the marginal external cost curve and the marginal net private benefit curve, they intersect each other right. And, as a result this Q star social optimum level of output and pollution is produced ok. So, now, we will be taking another two points, let us say the point d and point e ok. And, here after the, this level of social level of production we can have another 2 point, let us say this is point g and this is point f right this is i point ok.

So, now we can interpret this diagram. So, if the producer or polluter is left unregulated; that means there is no regulation in the production activities of the producer or see it is also the polluter itself. Then; obviously, the polluter will be trying to operate at the maximum level of production point, that is Q pi or Q max point right. Where for the private benefit or for the polluter itself, it is private benefit or profits will be maximized right. And, why we are saying the there will be at this point? The profit for the polluter will be maximized, you can see this diagram, this is the marginal net private benefit right.

So, this is nothing, but the revenue the farm is getting. So, the area under this marginal net private benefit it is the benefits to the polluter itself right. So, when the polluter is expanding it is production from 0 level of output to Q pi level of output, the profits will be getting increased more and more right? So, that is why a if there is no regulation on the production level and the generation of pollution level, then the farm or the polluter will be interested to produce at Q pi or Q max, level of output right.

So, here we are assuming that, when the when the producer is producing it is output, then it is also producing or generating the pollutions. So, more output means more pollutions ok. And,

so, far this social optimum level of production and social optimum level of pollution is concerned, it is at this Q star level that we have already discussed in optimal externality discussions right. So, if the socially desirable or socially optimum level of pollution and production is Q star level, but the harm is interested to produce at this Q pi level, then both these scenarios are incompatible right.

So; that means, this is the point at which the individual or private polluter he is interested to produce. And this is the level, that the society wants this much of pollution and production is desirable right.

So, and in this case because they are they are actually two different things. So, they are incompatible. So, the question is that if there is any bargain possible here? So, if there is bargain over this level of externalities right.

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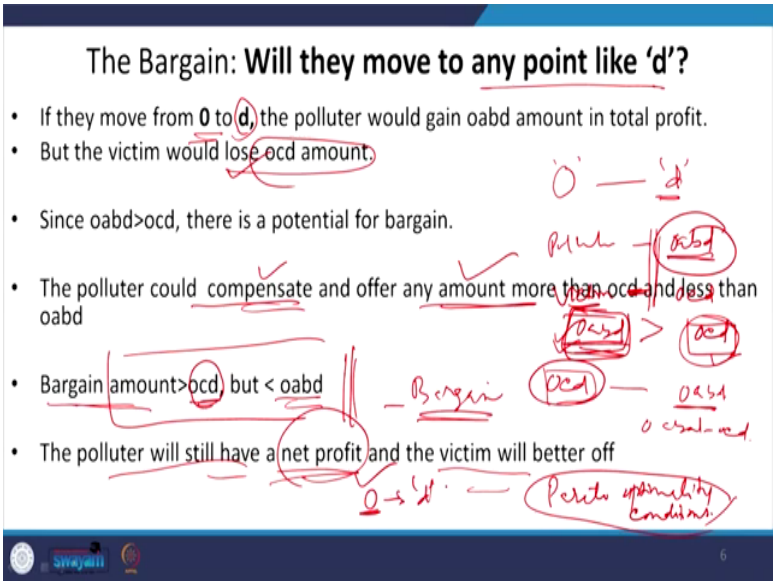

So, the question we are saying that, if there is any bargain and that is the possible bargain is there, then we will be saying that will they both the polluter and bulk victim they will move to any point like ‘d’. So, in this case, what is our assumptions, what is the scenario? The scenario is that here the victim has the property right and the polluter does not have any right to pollute right. So, now, if the victim is allowing, the polluter to produce then only the polluter can produce.

So, in this case, if the polluter is moving from 0 production; that means, 0 pollution to the production level at point d, then what is the gain for the polluter? So, the polluter so, if the polluter is moving from 0 point to d point, then the polluter will be gaining what amount? This is the amount. This is defined as the area under this marginal net private benefit up to this d point right.

So; that means, this is the benefit or profit to the polluter. And, what about the externality or pollution that the victim needs to victim is going to take? So, this is defined as this triangle that is o c d area is the lost to the victim who is going to suffer from this pollution, in case the polluter is producing at d level of output right.

So, that is how why you can say, the victim will be losing this ocd amount of output or benefit. So, he will be losing ocd. So, now, you will be saying that what is the bargain? If, the polluter or the producer is moving from 0 production to the production at ‘d’ point, then the polluter will be gaining by this oabd amount of area right, and the and the victim he will be suffering from a loss that is ocd area.

So, now, the question is that, is there any bargain or can there be a bargain? So, you can just see the cost benefit. So, what is the benefit to the polluter? oabd area and loss is ocd; obviously, oabd area is greater than this ocd area.

So, in this case the polluter can compensate, because this area this his profit is more than the loss victim is suffering. So, that is why, what the polluter can do in order to in order to continue his production at d level of output, he can compensate the victim right. Now, the

question is that if the polluter is going to compensate the victim, what would be the amount of compensation right?

So, this amount must be more than the loss that is so, now, the compensation amount should be greater than this oacd area, and it must be less than this benefit that is oabd benefit that the polluter is getting. Now, you are saying the bargain is feasible, because this bargaining amount must be greater than this oacd amount, but it must be less than the oabd amount.

So, if the situation the conditions are satisfied; then this bargain is possible or negotiation will be possible for both the parties. Again why, because in this case even though the polluter is compensating the victim right, by taking this conditions then till the producer or polluter he is also going to have a net benefit. Because, he is just paying oacd and he is gained from this activity at this d point is oabd.

So, what is the net gain oabd minus ocd? So, still the polluter will be having this net benefit or net profit and victim is also equally better off right. Now, remember the Pareto optimality conditions. So, as per the optimal Pareto optimality conditions, this is a better situation, or Pareto improvement is there, if the production is moved from no production 0 point to point ‘d’.

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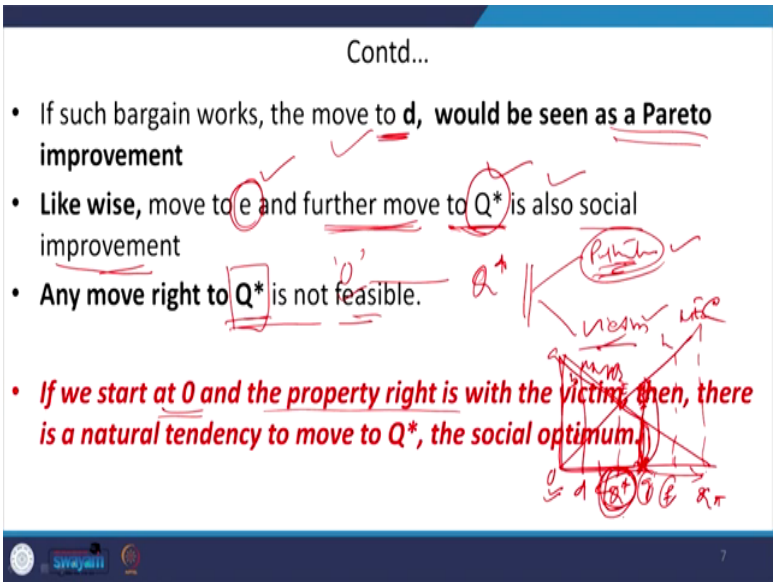


So, similarly we can also take another point next to this point right. So, if d is potentially feasible; that means it is a Pareto improvement conditions right. So, both the parties they will be benefited and no one is going to be affected adversely. So, by taking the same by making the same logic we can say, the polluter he can also move to point e by following the same logic. And, also he can this they this move to Q star point is also feasible if the bargaining between these two parties happens.

So, as a result what will happen? This Q star level that is what is defined as the social improvement right, that is the desirable socially desirable level of output this is possible right. So, in this way by compensating to the victim the polluter can expand it is it is production from 0 level of output to Q star level of output and the both the parties the polluter as well as the victim they can be better off ok.

But, however, if the polluter is targeting to move beyond this socially desirable level of output that is Q star, it is not feasible. Why it is not feasible? You can just remember, that in our discussion we talked about that this is the marginal external cost curve, I am just draw redrawing right this is marginal net private benefit.

This is the same graph we are taking this is the intersection point and as a result Q star socially desirable level of output, this is g and this is f Q pi or Q max this is h ok. So, now, the question is that the producer can move from point 0 output to Q star output. And, in this case both the polluter and the victim they will be benefited, although the property right is hold by the victim itself.

So, it is possible through bargaining a negotiation and the polluter is compensating the victim itself. Now, the question is that, whether by the same logic the can the producer also move beyond the Q star. Let us say g, whether this is feasible or not. This is not feasible, why it is not feasible? Because, see at this point g star g level of output if the producer is thinking to produce, what is the benefit that the producer is going to make? This is this level of benefit, right?

And, what is the cost? Cost is more than that, because it is the extra one, marginal external cost, which is which the victim is suffering.

So; that means, at this point if the benefit is this much and the cost is this much, then; obviously, the polluter cannot compensate the victim. And, that is why the bargain is not feasible at the point like g or f or likewise after the Q star point right. So, what you can deduce?

So, we can now conclude, if you start at point 0 that is no production and the property right is hold with the victim itself. Then, there is a natural tendency to move to the Q star level of output that is the social optimum level of output and social optimum level of externalities as well right.

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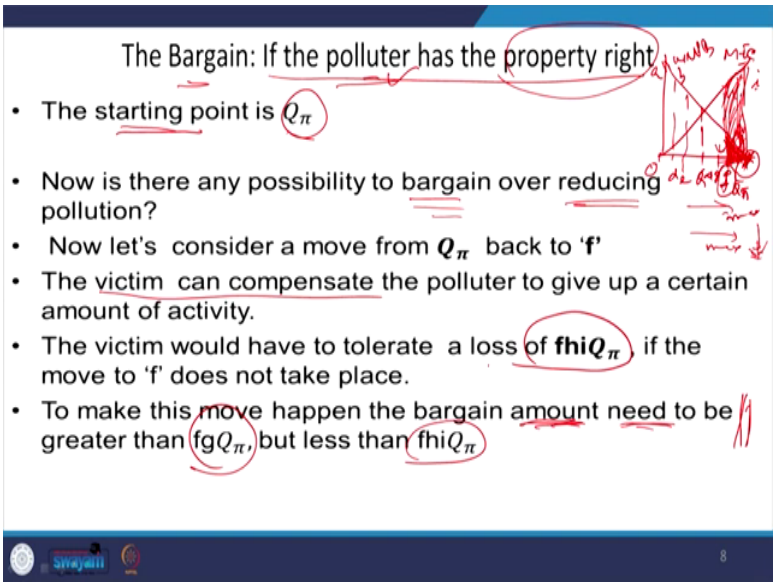


So, now let us take a talk about the second scenario. So, what is the second scenario? That if the polluter had the property right.

So, in the earlier case in the first case we talked about if the victim is having the pollute this property right, then whether the bargain is feasible or not. Bargain is bargain is feasible, but up to a point which went the point of social optimality right.

So, similarly now we will be taking talking about, whether the bargain is feasible if the property right is hold by the polluter itself and to what extent, right? We are continuing with the same graph. So, now, we will be starting from not 0 point, but this is your marginal external cost and this is your marginal net private benefit right, this is Q star this is Q pi or Q max this is a, this is f ok.

So, now what we were saying that if the property right is hold by the polluter itself then; obviously, the polluter has the right to pollute. If, the polluter has the right to pollute, then we will be thinking of production at that point, where he is getting the where the benefit is maximum. So, this is the point at which he is getting the maximum benefits that is Q star Q pi or Q max level of output.

So, that is why, now the producer will be or the polluter will be starting from this Q pi point right. So, now, the question is that in these conditions, whether there is any possibility to bargain over reducing the pollutions. Because, this is the maximum level of economic activity or output that is the maximum level of pollution as well right. When there is maximum level of pollutions, then the victim is; obviously, tolerating the maximum level of burden from pollution itself right.

So, that is why now we will be thinking about, whether because of this bargain, through this bargain can we reduce the pollution level or not? Now, let us talk about the reducing the level of pollution from Q pi to any point like f. So, now, the situation will be just the opposite. So, now, the polluter is having the property right and that is why the victim needs to compensate the polluter right.

So, what will happen? Now, the victim can compensate the polluter to reduce the level of output and pollution from Q pi level to f level right. And, the situation is that, at this point in comparison to f point the victim has to tolerate a loss of this area fhi Q pi. If, the polluter is not going to reduce it is pollution and production, then the victim is going to take this much of more pollution damages right or you can say loss right. And, if the polluter can be can be interested to reduce the pollution, in the condition that the victim is going to compensate the pollution polluter right.

So, then only the move can happen or the polluter can reduce the pollution level from Q pi to f. So, now, the same question will be asked, what is the amount of the bargain or what is the bargain amount that needs to be paid to the polluter? So, that the polluter would be reducing it is pollution from Q pi to f.

So, this is the area c the polluter is getting this much of benefit this is the triangle ok. And, the victim is suffering the fall of this area f h i Q pi right this is the loss ok. So; that means, the bargain can happen if this amount compensation amount to the polluter is greater than, the benefit the polluter is getting in terms of this triangle and it must be less than the loss amount that is f h i Q pi.

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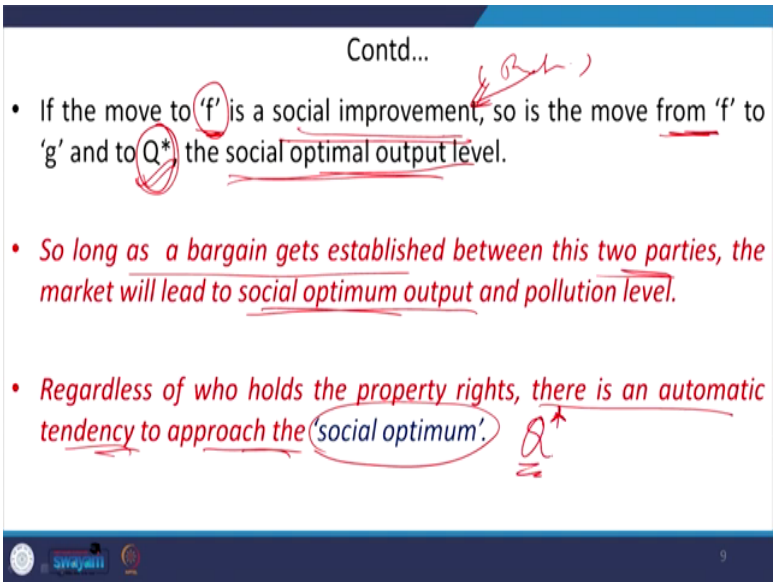


So, if this condition is satisfied then the polluter will be decreasing it is pollution and production from Q pi and 2 f and by doing. So, both the a parties the victim as well as the polluter will be benefited right. So, that means, we can say when you are moving from moving to 'f' point to Q pi it is a social improvement. Why it is social improvement? It is we can use this Pareto optimality criteria, in order to argue this right.

So, similarly if you are moving from 'f' to any point like g and finally, to Q star is possible right. And, as you understand this Q star is the social optimum level, by arguing the same logic, by taking the same logic that the victim needs to compensate the polluter right. The social optimum level of output can be achieved that is Q star. So, what is the conclusion we are making in the second scenario?

So, we are making the conclusion that. So, long as the bargaining gets established between these two parties and it will lead to this social optimum level of output and social optimum level of pollution as well. So, from this two scenarios, now we are deducing these that, whether the victim is having this property right or whether the polluter is having the property right. Whosoever is holding the property right, there is an automatic tendency to reach to the social optimum, that is Q star level which is socially desirable right.

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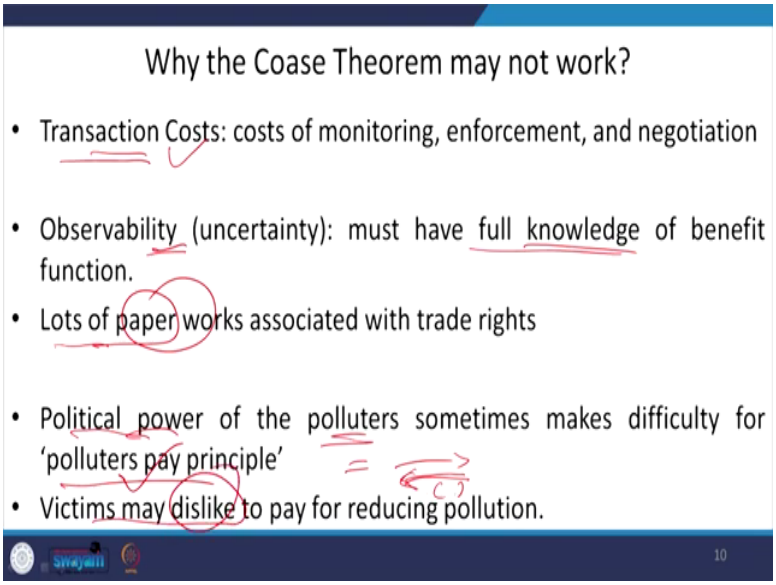

So, now we will be discussing that why this Coase Theorem may not work. Although, this piece of work is a very interesting work both in economics and law and it has it is a kind of solutions to the many of the externalities we are facing, basically environmental problems we are facing nowadays, but still in certain cities situations the Coase Theorem may not be applicable.

So, what is the, what is the points or what are the limitations or what are the cases where this theorem may or may not be applicable? We can take the very assumption itself. So, assumptions are limitations of this Coase Theorem. So, in case of the transaction cost, because we assume there is no transaction costs, but in real life if the bargaining and negotiation to happen between or among parties, then transaction cost is a must right.

So, that means, in the presence of transaction costs this Coase Theorem may not be effective or may not be applicable. And, the second case were this theorem may not work is where; there is no full knowledge or full information about the benefits or costs of the externalities.

So, in this case also will be facing the same problem right. And, another case is that in real life we are actually facing lots of papers works right. So, far the property right and trade rights are concerned. So, this is again one of this the cases where the Coase Theorem may not be applicable.

And, furthermore we know that this political power of the polluters. It actually sometimes makes difficulty for polluter pay principle. So, when you are saying that polluter will be compensating the victim and the victim will be compensating the polluter. So, that the polluter will be reducing the pollution so, this is a kind of polluters pay principle right, but if the polluter is having this influential power like political power he is associated with political power.

So, this Coase Theorem may not be effective. And, moreover when you are talking that the victim can also compensate the polluter in order to reduce the pollution level.

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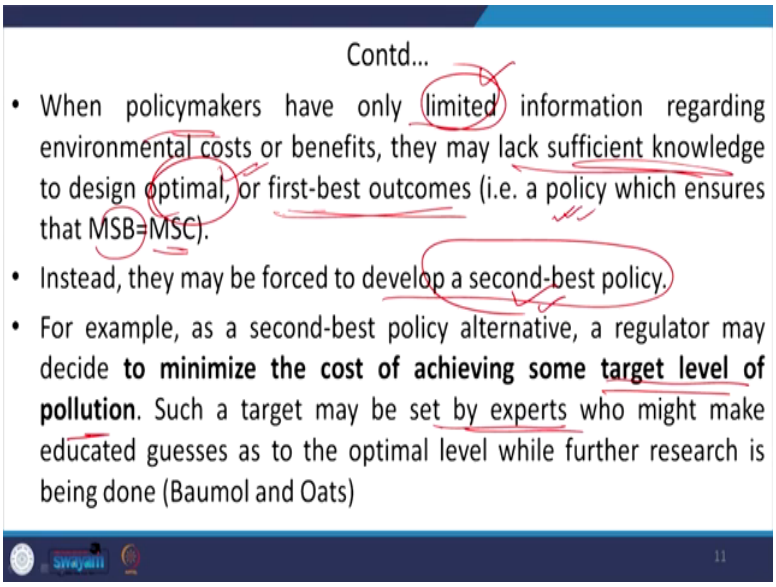


So, it may happen that victims may dislike this idea to pay for reducing the pollution level itself. And, moreover so, far the policies are concerned and policymakers are concerned. Sometimes, it also happens many a times it also happens we are observing, this policymakers they are only having very limited information, regarding this environmental cost or externality or environmental benefits right.

And, because of their having limited information's, they may lack the sufficient knowledge to design this optimal level of externalities right. So, at this point we can say that, first-best outcomes, that is marginal social cost with the marginal social benefit may not be possible.

So, instead what they are doing, they will be forced to develop a second-best policy. What is the second best policy? They can they can take the opinions from the experts right. And, the experts can set what will be the target or what will be the ah standard of pollutions right. And,

accordingly the policymakers are assuming that as if the second best policy is this is going to first best policy, but it is not the case.

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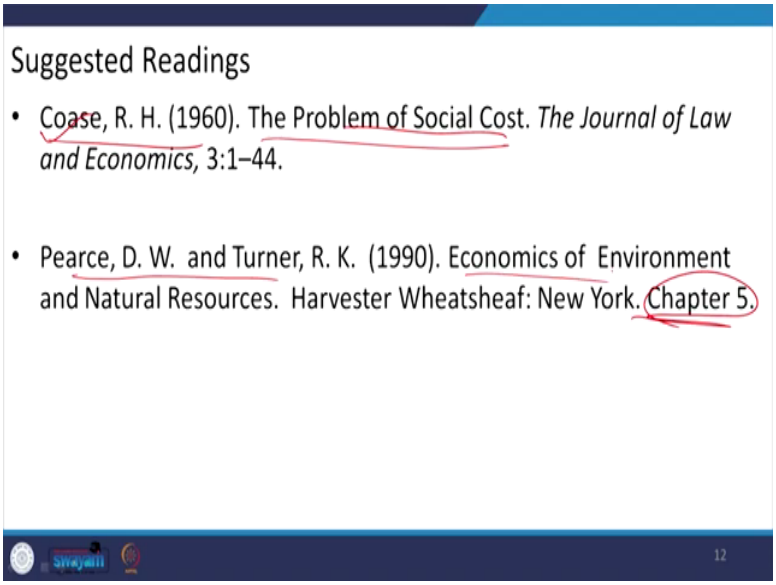


And, for detail you can go through this original work by Coase. This is the Problem of Social Costs, where he talks about the economics of pollutions right. And, the second one you can follow this chapter 5 from this textbook Economics of Environment and Natural Resources by Pearce and Turner.