Foundation Course in Managerial Economics
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Lecture - 16
Costs

Welcome back to our discussion on production and cost which we started with the previous lecture and we have already discussed about explicit cost, implicit cost, economic profit etc.

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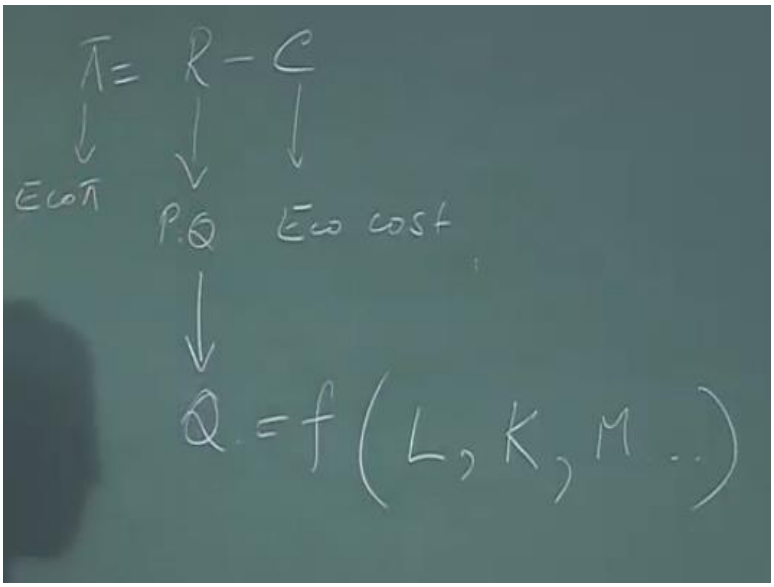

And we said that profit is equal to revenue minus cost and this is obviously economic profit and this is equal to P multiplied by Q and this is economic cost. So this is economic cost. So in this module we will try to understand where does this Q come from. How do we determine Q? How much output will be produced how is that determined and basically production of any output like in the previous example we used the example of mangoes, mangoes getting produced.

So how much quantity of mango will be produced will be dependent on or will be a function of lot of inputs. It is a function of amount of say raw material used, number of seeds used, amount of pesticide used, fertilizer used etc. which is which will be probably the raw material, people working in the land people working on the land so labour then the land itself the amount of land that is there available to grow the mangoes. So we can call that the capital and if any machine is used to whatever machine equipments used in the that will be included in capital and raw materials etc.

So these are the kinds of inputs which are going to produce the output. So output is basically a function of lot of inputs. Now from here the producer has to decide how much output he would like to produce and before that he needs to know he should know that a certain amount of labour a certain amount of capital a certain amount of materials together is going to give me a certain amount of output. So this knowledge is essential for a person to start production in the first place. So this is called the production function. So this is not the how I explained it is not a definition of production function but this is how production how what we understand by production function.

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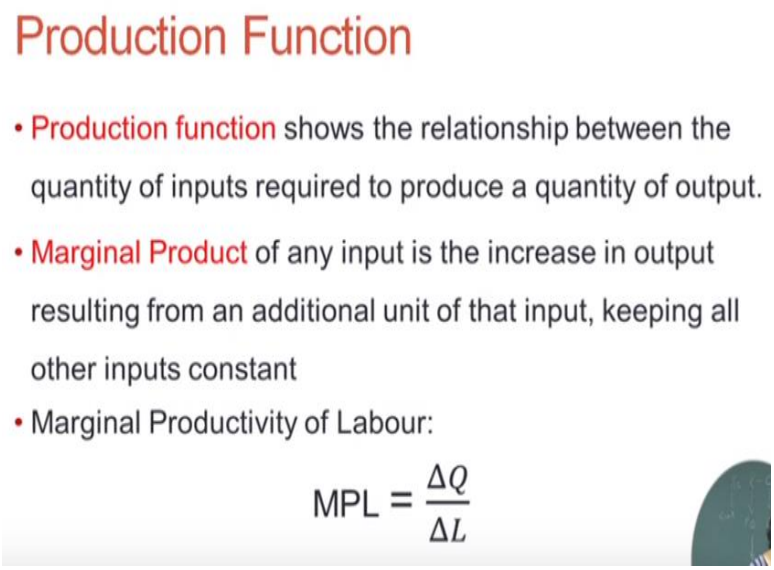

So production function shows the relationship between the quantities of inputs required to produce a quantity of output and so this is our production function from here and before I go on to another technical term called the marginal product, marginal product is basically marginal products is about any input; say marginal product of labour.

So marginal product of any input is the increase in output resulting from an additional unit of that input keeping all the inputs constant. So that is the marginal product of labour. But before I go on to marginal product let me explain the concepts of production function, marginal product of labour etc. through a very simple example.

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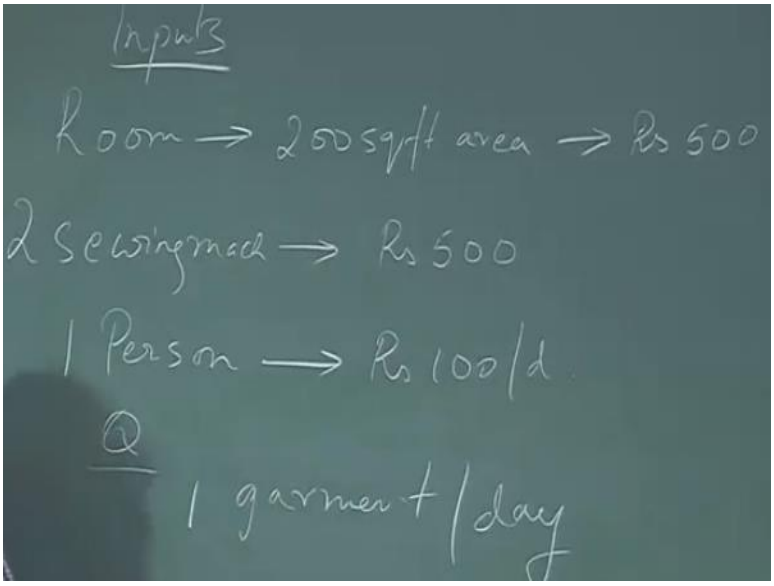

Let us take the example of a tailoring shop. Let us take the example, a very simple example of a tailoring shop where basically there is a land say there is a land of rather than land say there is a room. There is a tailoring shop which is basically a room of 200 square feet area and there are 2 sewing machines. There are 2 sewing machines in that shop.

So the shop the what is the so what is the the what so the room itself and the sewing machines they would be inputs in the production of garments in the tailoring shop. So there is a room of say 200 square feet area and say the so this is one input. So these are the inputs.

So there is a room and this input has a so every input has a cost. So when we wrote the production function in the first place Q is the function of all these inputs every input has a cost and that is the that cost is what is of concern right? So room is 200 square feet area and it has a rent of say Rs 500 okay so whatever like this is a flat amount of 500 that per week or month or whatever he is paying.

Secondly there are 2 sewing machines. So there are 2 sewing machines and sewing machines either they have been bought say for example someone has borrowed the money to buy the sewing machine or so basically you can imagine that the for the sewing machine he has to pay say Rs 500 say it is 250 per sewing machine that he has pay to whoever he has bought the machine from or borrowed the money to buy the machines from. So this these are the cost.

Now even before he buys purchases any cloth to produce garments a tailor or a person who decides to start the tailoring shop he is incurring these costs. He is incurring these costs. Now

imagine he has engaged one person now he hires a tailor or he hires a person okay. He hires one person he hires one person and say he pays him Rs 100 per day.

So he pays him Rs 100 per day and he hires this person who is going to stitch clothes for him. He is going to stitch garments for him and so these are his inputs and when this person comes he starts so let us ignore about the let us not talk about the cloth etc. So imagine everything is included here or so this person is getting a amount of Rs 100 per day and he is able to stitch. So now we are talking about Q.

Next is we are talking about Q. So this person is able to stitch one garment per day. So when the person starts of with a shop he has to incur the cost of this entire 200 square feet area of room for Rs 500. He has to pay for the 2 sewing machines and then he hires a person and he gets to gets the output of one garment per day. So since there is only one person there is no way that he can increase the number of garments. So the only way he can increase his output is by hiring more people. So he can do this by hiring more people.

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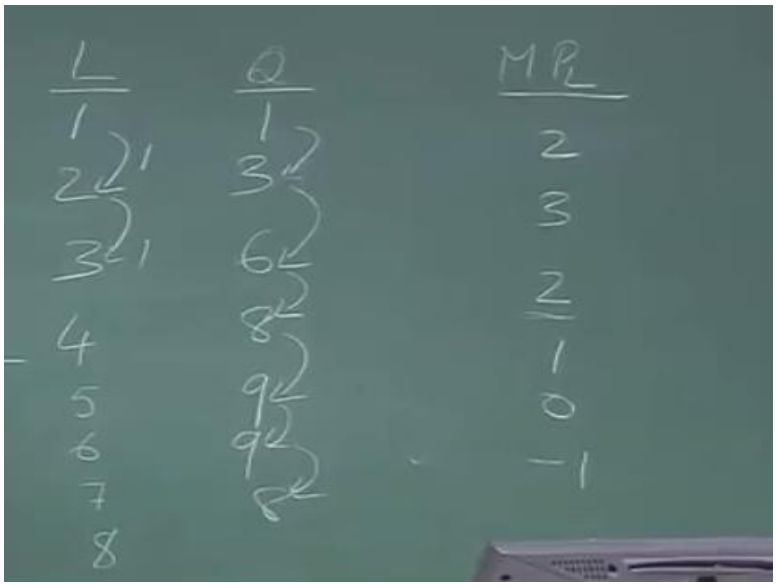

So now in the same room with the same amount of sewing machines let us say, so now he has a fixed input of land plus sewing machine are his inputs which are fixed, he cannot change that. Even if he does not produce any garments he is having to pay for this these. So say for example he is paying 1000 Rs for these. So let us not talk about this part right now.

So number of people he is hiring is say first person he is able to stitch 1 garment. Then he hires one more person and as soon as there are 2 people there say due to whatever reason say the

output increases to 3. Say for example this person really you know like sharing of knowledge two people are there, they are talking. So they he feels more motivated and they produce more clothes. It is not that 2 people are there 2 garments are getting stitched. So there is may be sharing of knowledge or whatever so little more number of garments are getting stitched here.

Now say for example he hires 3 people. So then we see that the number of garments that are getting stitched is 6. So although there are 2 sewing machines now maybe there is some division of labour so 2 people are stitching on the sewing machines and the third person is helping with the say buttons, some amount of thread work, this, that. So basically the productivity increases and there is more amount of output getting produced here.

Then he increases the number of people that he hires here to 4 and number of garments getting stitched is 8. Then say for example so similarly he increases 5, 6, 7, 8 and the for the fifth person that he hires his number of garments increases by only one unit. So there is only additional unit that is getting stitched. When he hires the 6th person he sees that the number of garments that is getting produced is not increasing it is still the same.

He is able to produce still 9 units of garments and if he hires the 7th person he actually produces 8 garments. So why am I giving the example in such a way that what is the reason behind output getting stagnated after certain amount of input addition and later actually decreasing. What is the reason behind that or what is the intuition behind that.

The intuition is usually what happens is remember that the area of the room is still constant it is still 200 square feet and the number of sewing machines to work on that is also same that is only there are only 2 sewing machines. So now if you keep on increasing the amount of clothes or number of people who can work there they will be working with only 2 machines and in that land in that amount of space only.

So they will probably not be able to increase the output any further and on the contrary it may quite happen that since the room is getting very crowded that there are too many people and as they say that too many cooks spoil the broth so similarly too many tailors are probably creating a mess over here and why the output is actually falling.

So this is very highly possible. So this is a very possible outcome which the producers are quite aware of and they know that the production just by increasing the amount of input there is only a limit to which you can increase the output and beyond that you have to increase the other inputs as well if you want to keep on increasing the output.

So in this situation now if at this stage if the person decides the producer decides that I am going to increase the space of the of my shop or better still I am going to add one more sewing machine then again probably his output is again going to grow much more than this. So but since he is not doing this so what we see is the additional output that the labour the input called labour is able to add or the that is able to contribute keeps on after a point of time it keeps on decreasing.

So initially it keeps on increasing as there is lot of fixed capital or fixed machineries to work with and gradually it gets saturated and later after a point of time the amount of output additional output that is produced it keeps on declining. So this is what happens.

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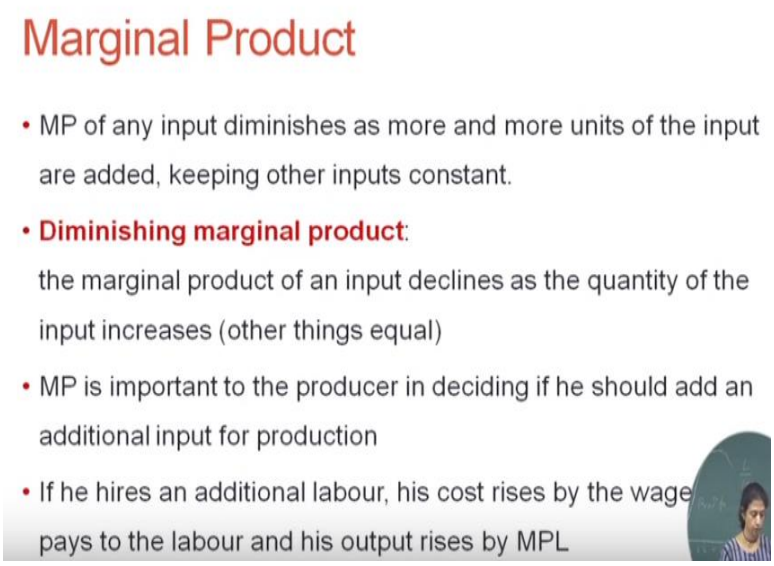

So then we are going to so then what is marginal product that we are talking about. So marginal product is MP of any, marginal product of any input diminishes as more and more units of the input are added keeping other inputs constant. So here coming back to this example then, what is the marginal product of any input. So what is the marginal product of the first input? So the first input that is added here 1 unit of labour is been added and what is the increase in output 2.

Now here again 1 unit of labour added, increased out is 3. So basically marginal product of labour is here marginal product of labour is 2. Here it is marginal product of sorry let me write it neatly. So from here to here marginal product of labour is 2. From here to here it is 3. From here to here it again falls to 2. From here to here it is 1. Here to here it is 0 and here to here it is actually - 1.

So this is how marginal product keeps on, initially it increases but then it keeps on diminishing. So this is called the diminishing marginal product. So this is called the diminishing marginal product and so diminishing marginal product is the marginal product of an input declines as the quantity of the input increases other things equal. So MP is very important to the producer in deciding if he should add an additional input for production.

So you can very well figure out from here that a person who is deciding how many units of labour to hire, to produce the amount of output, he is going to look at the marginal product. He is going to basically think at the margin.

He is a rational person and he is going to think at the margin and he is going to see that here if I produce initially if I hire 1 person here if I hire this person here I am getting 2 additional number of garments. If I hire 1 more person I get 3. If I hire yet 1 more person I get a little less but still it is positive, still there is increase in the amount of output. So this is what he is going to consider. So before I move on to talking about costs or talking about his decision making process let me also draw the diagram, what it looks like.

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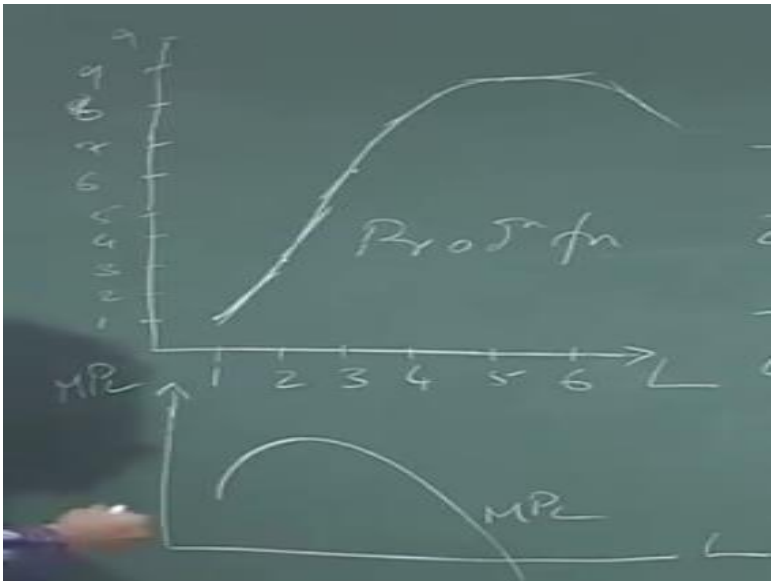

So what does the production function basically look like? So the production function basically looks like here is the number of units of labour he is basically deciding the producer is deciding whether to hire one more person or not. So say 1, 2. So here is the output that he is getting out of every additional hiring.

So for the first person he gets 1 unit. For the second person he gets 3 units. For the third person he gets sorry let me extend it. So third person he gets 6 units and then 8, 9, 9. So person for person 8 then 9 then again 9 and then declining. So basically his production function basically looks like this. So production function looks like this and what does the marginal product look like.

Now so this is the production function and what is the marginal product. Firstly, the marginal product is the slope of this curve at every point. So this is the slope of the curve at different points and we are going to see that the slope actually initially increases and then becomes constant and then decreases. So this is the slope of the curve and if we plot the slope of the curve we are going to see that it basically looks like this. So this is marginal product of labour where you have labour on the x axis and marginal product of labour which is basically units of output in units of output. So marginal product of labour curve looks like this.

So coming back to the slides, coming back to the slides what we were discussing we said why is marginal product important. Why are we so concerned about trying to understand what marginal product of labour is and the reason that we are interested in this is because the producer while hiring the people what, he has to make a tradeoff here. So what is he doing here?

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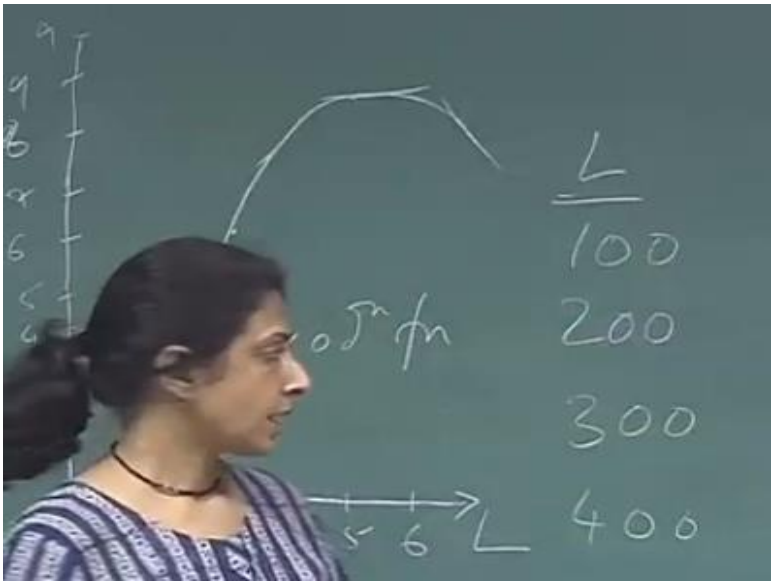

So basically, now every person that he hires and say it is a fixed amount of he is paying an amount of 100 Rs per person. So every person that he hires he is having to incur a cost of first

one 100, second one 200, third person he has hired 300, 400. So he is having to incur these costs and for every person that he hires he is getting a margin additional output of these units.

So obviously while hiring he is going to say see if I hire the next person this is the amount of cost additional cost that I have to incur which is Rs 100 in this case and the additional revenue that I can hope to get by hiring this person is basically this additional amount that is getting produced multiplied by the price. So this is the tradeoff that he looks at.

He knows that if I hire one more person I am going to get some additional output out of him which is the marginal product of labour at that point but I have to incur an additional cost of hiring this person which is the wage that I am paying to this person. So if the amount of output gives me a revenue which is higher than the cost I am having to incur by hiring this person, I am going to hire this person.

But if my production or if my revenue falls below that I may not like to hire this person. The reason I said I may not like to hire because there are other costs involved, other decisions involved. We are going to look at the output choice of a producer later when we actually do the market structures but right now it suffices to know that marginal product is definitely important to understand because the producer makes his choices at the margin and he is going to look at his benefit and cost at the margin that is additional benefit he gets by producing an additional unit of output from hiring another person and the cost that he has to incur.

So this is why MP is important to the producer in deciding if he should add an additional input for production. Now if he hires an additional labour, his cost rises by the wage he pays to the labour and his output rises by marginal productivity of labour and this is why it is important to understand.

In the next module of this lecture we are going to look at cost curves and we are going to see, it will be basically a continuation of this discussion, and we will be able to see what the cost curves look like and we are also going to talk about the fixed cost which we have not spoken about in this module. We are going to talk about those also. Thank you.