Lecture – 90
Diminishing Marginal Product Vs. DMRTS

So, we studied about diminishing marginal rate of technical substitution and we also studied diminishing marginal product.

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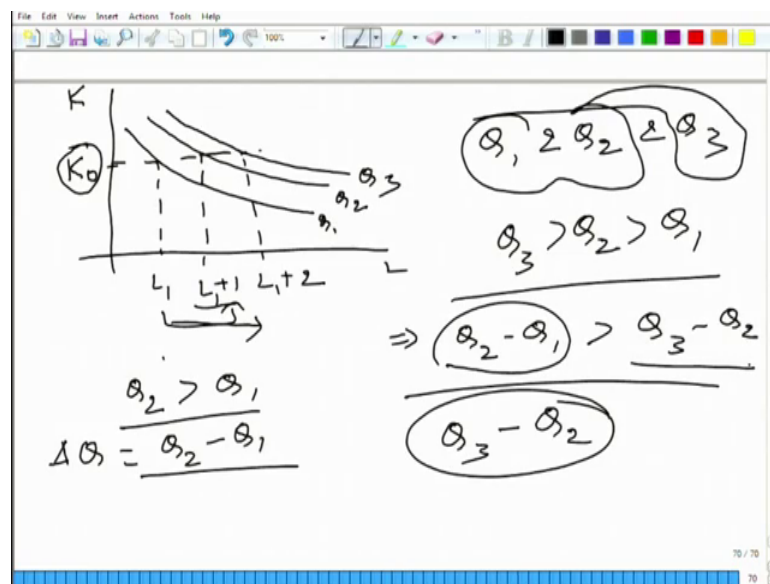
So, let us see do not get confused between these 2 terms, because it is very easy to get confused. So, let us look at graph and try to understand how these 2 things are different. So, first let me say let us take these are isoquant fine and what we have let us, let us say on y axis we have capital, and x axis we have labour let us say.

So, these are three isoquants Q 1, Q 2, Q 3 fine here we have L 1 here let us say its L 1 plus 1, here it is we have L 1 plus 2, can we say anything about Q 1, Q 2 and Q 3? If let us say when we talked about diminishing marginal product, what did we say? That eventually may not be in the beginning, but eventually the marginal product of an input starts diminishing that is what we talked earlier.

Let us say that that diminishing marginal marginal productivity has already set in at this point ok. So, this is not the case that the marginal productivity is increasing when we

increase labour beyond L 1. So, what I am saying? We are moving from L 1 to L 1 plus 1, L 1 plus 1 to L 1 plus 2 and capital is fixed at K naught and these are the three isoquant Q 1, Q 2, Q 3.

Can we say anything about Q 1, Q 2, Q any functional relation we can talk here? That we know that this is given the way we have talked about isoquant, we have talked about monotonicity. So, that is given that Q 3 is greater than Q 2, is greater than Q 1 that we have already talked about. But if we bring the concept of diminishing marginal productivity can we say anything more, that is the first of all diminishing diminishing marginal productivity has nothing to do with the slope.

Student: Sir; Q 3 minus.

That is what we are talking about now, but you what you have said is not correct, Q 2 minus Q 1 is greater than Q 3 minus Q 2 because it is diminishing what we have done here? We have fixed the K naught and what we are doing? We are adding labour by one unit. So, of course, as labour is being added Q 2, Q 2 will increase output will increase ok, but by how much? We can quantify the increase by Q 2 minus Q 1 now again at L 1 plus 1, we are adding one more unit of labour what we are getting is now Q 3, but this addition because capital is fixed, I have already fixed capital at K naught. So, only we are increasing the amount of labour. So, what does the marginal product diminishing marginal product says.

Student: That.

That each addition is;

Student: Less than the;

Less than the previous edition is subsequent addition is less than the previous addition that is what you know the diminishing marginal product means. So, the subsequent addition is Q 3 minus Q 2. So, what we get? Q 2 minus Q 1 is greater than Q 3 minus Q 2 it has nothing to do about nothing to do with the slope is it clear fine ok. Now let us look at it, again, what do we mean by diminishing marginal rate of substitution?

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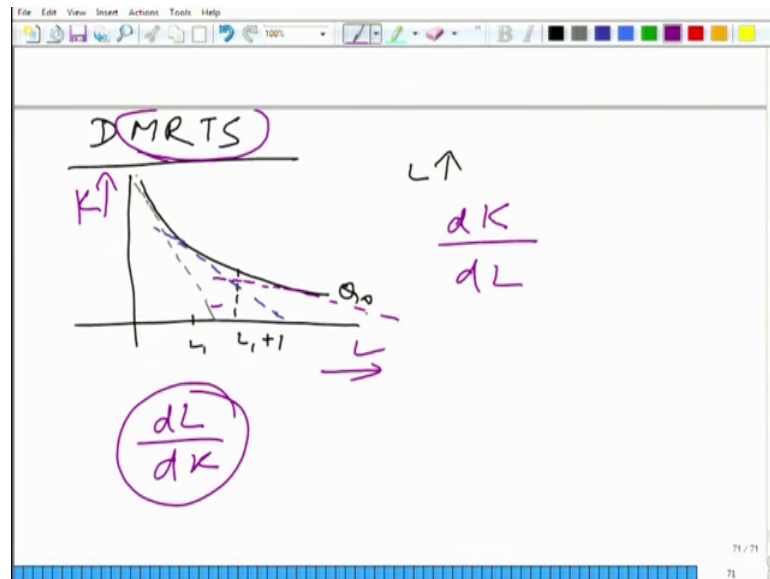
DMRTS Diminishing Marginal Rate of Substitution what we are saying? Here we take we are taking one isoquant and we are not fixing the capital or labour what we are saying? Of course, when we increase the amount of labour let us say from L to L 1 to L 1 plus 1, we need to decrease the amount of capital to produce the same amount of output. So, what is important here, that we remain on the same isoquant that is let us say Q naught. So, what we are talking about here is that the marginal rate of technical substitution keeps on decreasing as we keep on increasing L. So, here the slope is this is the slope.

Now, the slope as l increases slope decreases and what does the slope represent? Slope represents the marginal rate of.

Student: (Refer Time: 06:02).

Technical substitution. So, as we increase labour the slope keeps on decreasing this is this slope is steeper than this, this slope is steeper than this. So, DMRTS MRTS is diminishing simply means that this slope is decreasing the shape of isoquant is like this ok. So, do not get confused when we talk about diminishing marginal product, we jump from one isoquant to another isoquant, keeping the one of the;

Student: Input fixed.

All other inputs fixed in our case we have only 2 inputs. So, we keep the capital fixed and we are talking about changing the label. So, marginal product of labour we are

talking about ok. So, we move from one isoquant to another isoquant , but here when we talk about diminishing marginal rate of technical substitution, we are at the same isoquant; we do not keep inputs fixed what we keep fixed here we keep the output fixed.

Student: Output.

That output is equal to Q naught and as we are as of course, we are increasing labour, it is decreasing. Another way to look at it is because here we are defining MRTS a s d K by d L. One can change the terminology and one can define it as d L by d K in that case we will keep on increasing k.

Student: K.

And d L by d K will keep on decreasing.

Student: Decreasing.

Because we say marginal rate of technical substitution diminishes fine is it clear. So, do not get confused between these 2, and its very (Refer Time: 07:50) it is very very easy to get confused between these two, fine. So, theoretically clear graphically clear.