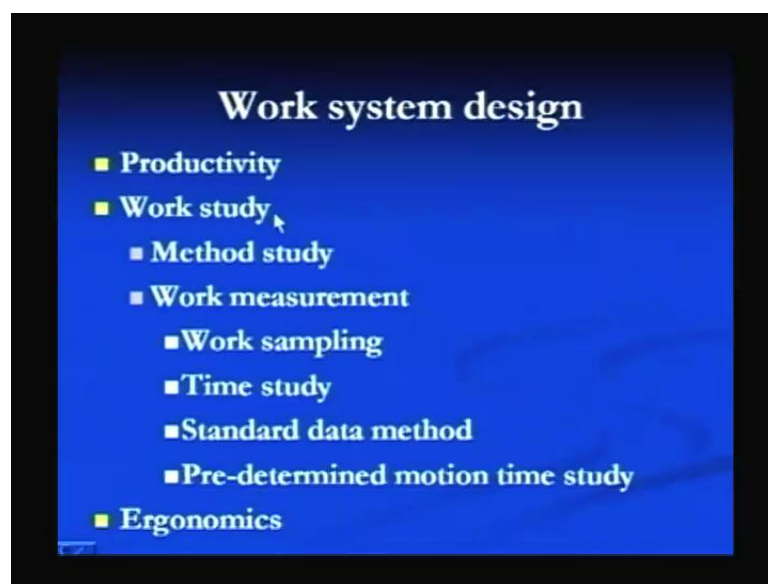


Industrial Engineering
Prof. D. K. Dwivedi
Department of Mechanical & Industrial Engineering
Indian Institute of Technology, Roorkee

Module - 03
Lecture - 01
Productivity

Welcome students, this is the first lecture on the Industrial Engineering, this is 16 lecture series on the industrial engineering. And this lecture is based on the Productivity, under this productivity part is basically related to the subject, which is work system design of the industrial engineering. So, the productivity is a part of complete subject on the work system design, in these 16 lectures I shall be covering the different topics related to work system design.

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And these are the productivity the first one and then, work study, work study is a way of studying and the method of doing a job and then with the intention of improving it, so that the job can be done effectively, easily without consuming much time and the resources, without causing much fatigue to the operator. And this work study uses a two techniques, one is method study, which is basically the way about the study of the way by which job is carried out.

And if any new method is to be developed to carry out job, a new job then how effectively that job can be done and that is developed for carrying out a new method. So,

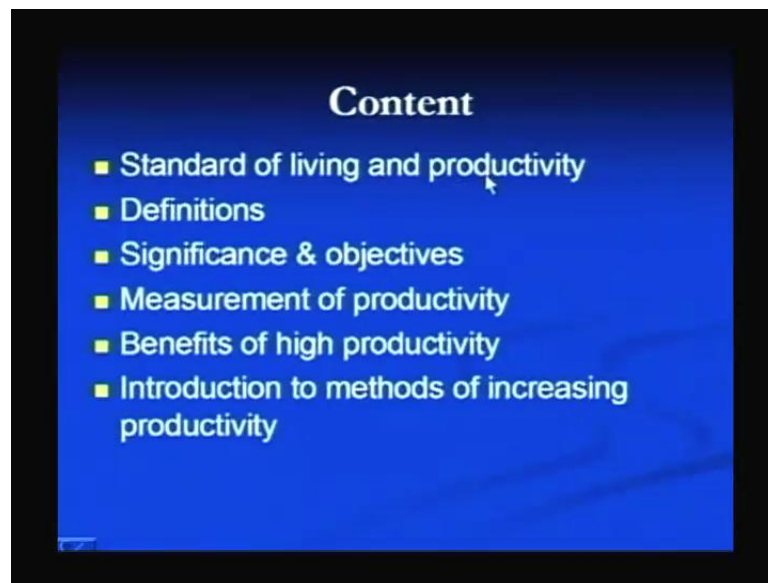
methodic study covers both types of the jobs from the improvement point of view of the existing job or for developing a new method to carry out method a new job. Another technique related to the work study is the work measurement which is about the quantification or the time required to carry out given job.

And identify the time which is being effectively used and the time which is ineffective or which is not being effectively used, so we normally term it in this subject as ineffective time. So, identification of effective and un effective time, ineffective time in doing a given job is determine using the work measurement. And work measurement uses the number of techniques like work sampling, time study, standard data method and predetermined motion time study.

And when the time for carrying out a given job using a standard set procedure is established that helps in number of ways, particularly in carrying out the plans or the plans to establish the capacity or to hire the work force to purchase the required amount of the material, so that a given order or the given quantity of the products can be produced. Ergonomic is the ergonomics is the third portion related to this chapter, in which basically the basic principles related to the design of the work place or are studied and...

According to the work place should be design in such a way that, an individual can perform given job with a minimum effort and the minimum fatigue, so that a he is able to perform for long without a need of much rest. It includes the different sciences like the medical science aspects or the physical science aspects or the engineering sciences, so it is a combination of the various sciences related to the development of work place. For carrying out given job with the minimum use of the effort under the resources, here as far as productivity is concern in this lecture, we will able talking mainly about the productivity aspects.

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And it covers these and the topics like the standard of the living and productivity, that if the productivity is high or low for a given organization, for a given state or for a given nation. Then, how the standard of life or a standard of living will be effected because of the productivity and why we should work for the better productivity or higher productivity. Few definitions related to the productivity like total productivity and partial productivity will be covered here.

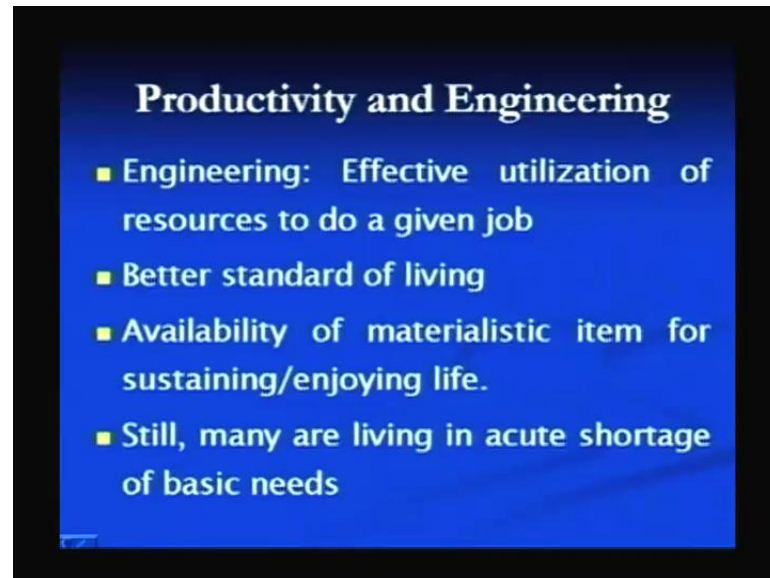
And the significance and objective what is the significance of partial or the total productivity is, and how the decision should be made in allocating the resources or redirecting the resources for carrying out a given job. Then, those are decided largely on the basis of the productivity aspects related to that particular area are of a particular organization. Objectives means what, if we go for the measurement of the productivity, then how it can help us in doing the job in better way.

So, that more quantity of the goods from the same input can be produce, for the betterment of the society or for increased standard of the life of the people.

And the measurement of the productivity, under this we will be talking about that how the productivity of an organization or of a state or at national level productivity can be measured and what are the problems related with the productivity measurement at different levels. High benefit of the high productivity that if an organization works for the better productivity or higher productivity, how it can be useful for a given

organization and to the society as a whole. And it in the lastly we will also try to give the introduction to the methods which are normally used for increasing the productivity.

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So, productivity and engineering are very closely related, if we see from the objective point of view and if we see that engineering studies help us to carry out a given job with a minimum use of the resources that to safely. So, to carry out a given job with a minimum use of resources is made possible by the different branches of the engineering. And if we see that, if given job can be carried out with a minimum use of resources, then that will help us to save the useful resources.

And that will help to produce the more goods from the same amount of resources which can be made, these goods can be made available to the people of the society for their consumption, which can help them to improve their standard of the life. So, if we see the better standard of life and the engineering are the closely related, if engineering helps to produce more than that helps to increase the standard of the life of the people of a particular state are of the nation.

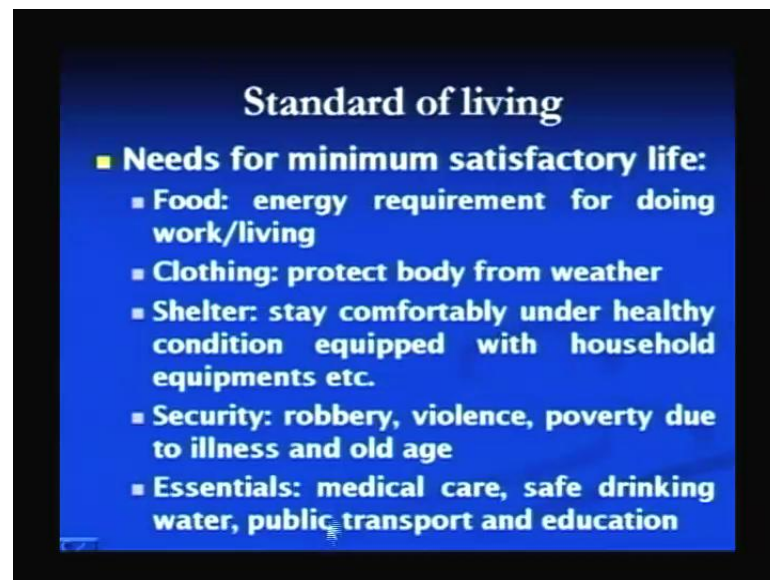
So, for increasing the standard of life we have to make the goods available in large quantity that to at a cheaper rates. So, if the goods are available in the large quantity and that to at cheaper rate, then the people will be able to avail them for sustaining their life and enjoying the life. So, if more goods are available at cheaper rate on an average the standard of life of people in an state would improve.

And that is why availability of the materialistic, if the availability of the materialistic items increases due to the increased utilization of the resources to produce more goods with a minimum use of resources, then that helps to increase the standard of life. If we see that even in a country, you will find that the different states are having the different level of the standard of living, because the goods are not equally available to all those who are living in the different states.

Instead of the states or some of the areas we will find that lot of goods are available to them for use, while for others the goods are not available at all to sustain the life. And therefore, many are forced to live in very acute shortage of the basic needs, and they are forced to live in very bad condition due to the lack of availability of the materialistic items or the goods which are required to fulfill their basic needs.

So, if we see that, if the life of the people in a state is to be improve, then we have look into what are the different things which are required for improving the standard of life of the people in that particular state. And certain needs are to be satisfied if we have to improve the standard of living.

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And these needs are has been tabulated like the food, food should be made available in the large quantity that to at a cheaper rate, so that the people are able to fulfill their energy requirements which is required for living, and then to carry out a given job. Whenever a physical activity is carried out energy is consumed and to replace the

consumed energy to refill that a consumed energy, the food is to be taken by the individuals.

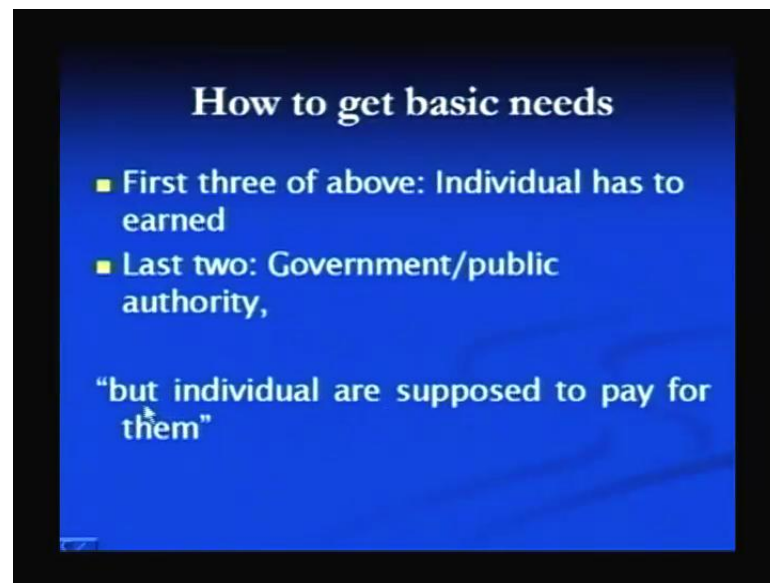
And that food must be made available to the people, so that their basic need requirement can be fulfilled, another basic need is the clothing, clothing is required to protect the human body from the atmospheric conditions. If one is not able to protect his body, then how can he perform better in the field, that is why it comes under the basic needs on which the things must be made available or related to which things must be made available for the better life are for better standard of the living.

Shelter is the another requirement where one can stay comfortably during the period when he is not at work, under that house he is equipped with the equipments which are required for sustaining the life. And like the furniture or utensils etcetera, whatever is required to sustain the life that house must be equipped with the household equipments. So, means shelter along with the necessary items to sustain and the life comfortably under the healthy conditions is a third requirement the little be standard of living.

If we see security another comes under the basic needs for the minimum satisfactory life, even one may be enjoying the life by doing the job he has got, but if he is not secured security from the robbery, violence or from the poverty due to the illness or old age is required. And another important item essential service are to be provided to the individuals of a state, like the medical facilities are required for sustaining the life safe drinking water, the public transport system and the education.

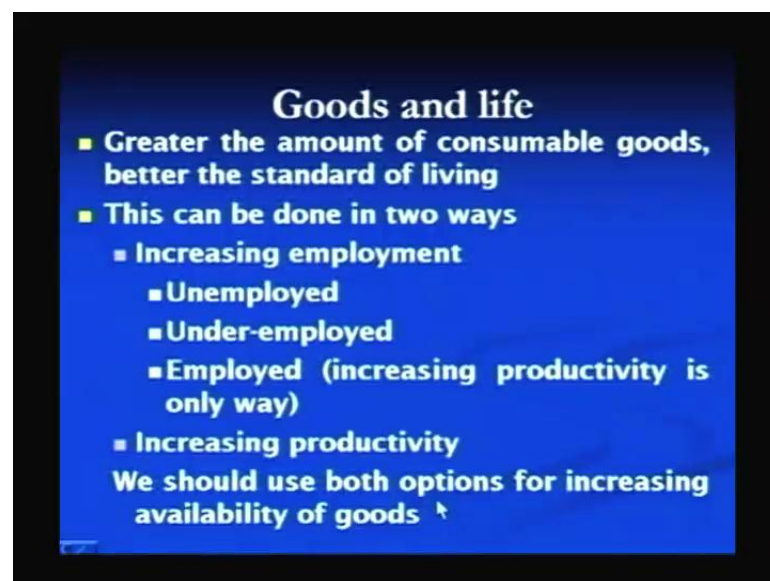
If we see out of these five basic needs the food clothing and shelter these are suppose to be gained by the individuals from their earning, while last two the security and essential services are related to the government or the public authorities related to that particular area. So, if we see how to satisfy these needs, from where we should get these needs the satisfied, so if we see the first three of the above like food, clothing and shelter are to be earned by the individuals for himself.

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And the last two needs like security and essential services are suppose to be provided by the government or by the public authorities. The government may make them available, but individuals are suppose to pay for them, like if we have to avail these essentially services being provided by the government, individual should earn enough, so that he can pay for using those essential services. So, that is what easier, but individuals are suppose to pay for utilizing the essential services.

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And if we see how goods, availability of the good and the life can be can be related, if the greater amount of the goods are available, then better will be the standard of living.

Like if the food clothing and the shelter are available at very cheaper rate in the large quantity and as a whole, it will help to improve the standard of living of the individuals of particular state. And for achieving the status where the large quantity of the goods are available at cheaper rate it is required to carry out the work in very strategic manner. And as there are two way which are normally used in for increasing the quantity of the goods and services, which are being produced by that particular state.

One is by involving as many people as possible for producing the goods and services required by the society and another option is that increasing the productivity, that is by making the more goods available by utilizing the same amount or same volume of the resources.

So, here both these approaches are actually different, here first is about giving the employment to those a who are either unemployed or underemployed. So, as far as employment is concerned, there can be three different situations where the people of the state either not completely employed. So, by providing them employment they can be involved in the process of producing the large quantity of the goods, so that the goods can be made available to the people of a that particular state.

And another is the underemployment where the people are unable to get the job as per their capability, so if we are not utilizing the capabilities or not tapping the potential available with the individuals, then that is termed as underemployment. And that will not be helping much to the state to produce the desired quantity of the goods from the available employment or from the available human resource.

And the third possibility is that all people available in the state for are employed, means they are doing one or another kind of job and in this case, this employment option for increasing the quantity of the goods available to the consumers will not work by giving the employments, because people are already employed. The one option is under this situation when everybody is employed to carry out the expected job, the increasing the productivity is the only option left for making the large quantity of the goods available.

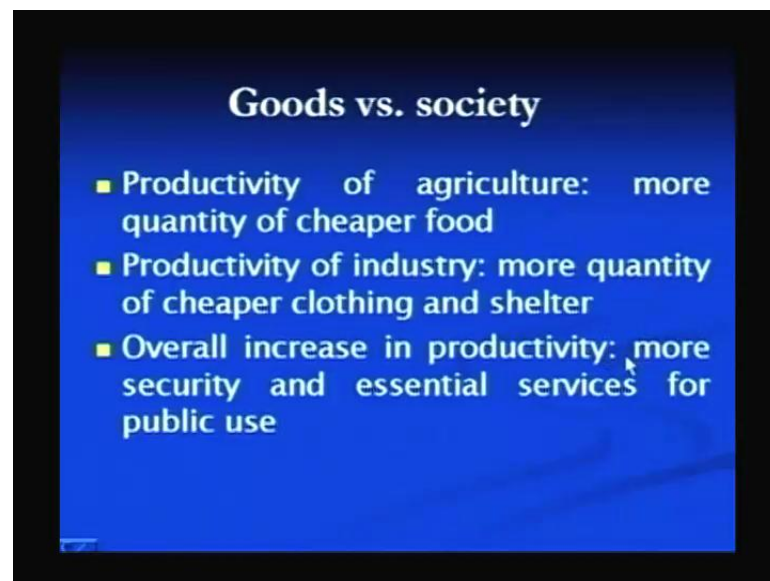
And that means, increasing the productivity of an organization or of an state, means by from the use of same resources which are available to the state producing the greater quantity of the output or the consumer goods or the goods, which are required for consumption of the society. So, here the alternative option is that targeting directly

increased the productivity, but increased productivity will not be a very good solution, because unemployment if is there, then how people will be able to earn their livings.

And that is why it will better option to use both ways for increasing the quantity of the goods available, that is using the increased employment and increasing productivity, both option should be used for producing the large quantity of the goods. So, that they can made available to the consumers and that this is what is there, we should use both options for increasing the availability of the goods, so that the standard of living of a the people of a particular state can be increased.

If we see here, if we are working for the better productivity in a particular state, then area wise productivity can be seen in the number of ways like the productivity of a agriculture sector. Productivity of the industrial sector or productivity of the services sector, because all these things will be consumed by the people of that particular state.

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And if the productivity of the particular area say agricultural productivity is good, then more quantity of the cheaper goods will be available for the consumers for their consumption. And if the productivity of the industry is good, then that will help to make the available large quantity of the cheaper clothing and shelter, so here agriculture productivity helps to fulfill the first need that is the food.

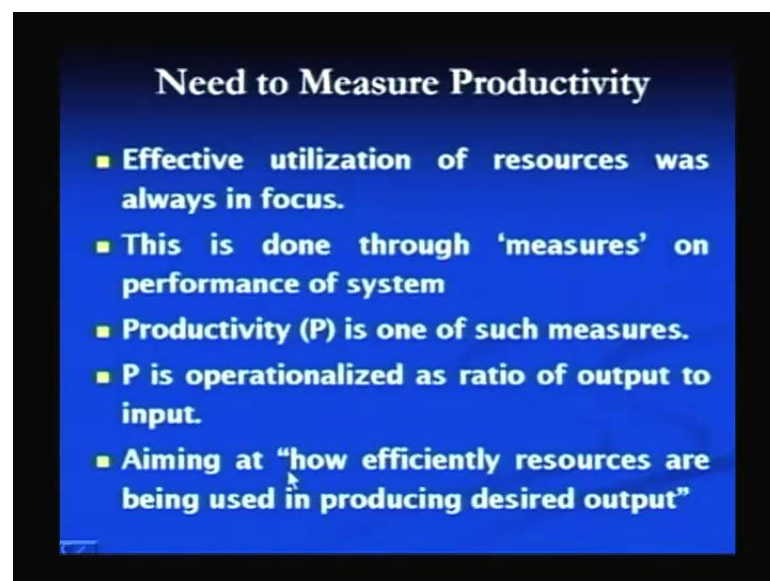
And the productivity of the industry, increased productivity of the industry helps to satisfy the second and third requirement that is clothing and the shelter, because if the productivity of the industry is high, then it will able to make the large quantity of goods

available by using the same input resources. So, overall increase in productivity means whatever sector is there being used for producing the goods and services, if there is increase in productivity in all spheres of the activities, then that will help to generate to more resources to the government or to public authority.

So, that will in turn will help to increase the security and essential services needs by the public authority and the government. So, overall increase in productivity helps to fulfill the last two needs, that is increased security requirement and the essential services for public use. And why should we measure the productivity at all, means a different the organization, different industries, different sectors will be involved in the various kind of activities for producing the goods and services.

And how the different sectors are performing and where is the scope to improve the methodologies of carrying out the job, and increase the quantity of the products without consuming much resources to look into those aspects is where improvement can be done for increasing the quantity of the goods and services being produced. We need to see that, what is the productivity of a particular organization or of the state. Right from the beginning, means beginning of the civilization efforts have always been made to look into that, how effectively things are being used and how effectively we are doing in the particular section sector.

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And that is why effective utilization of the resources was always in focus and efforts were have always been made to utilize the resources as effective manner as possible.

And but to see it in very systematic way, how effectively we are utilizing the resources it is necessary to measure the performance of a system or of particular department or of the state. And due to for measuring the performance of system once such measure of the performance is the productivity.

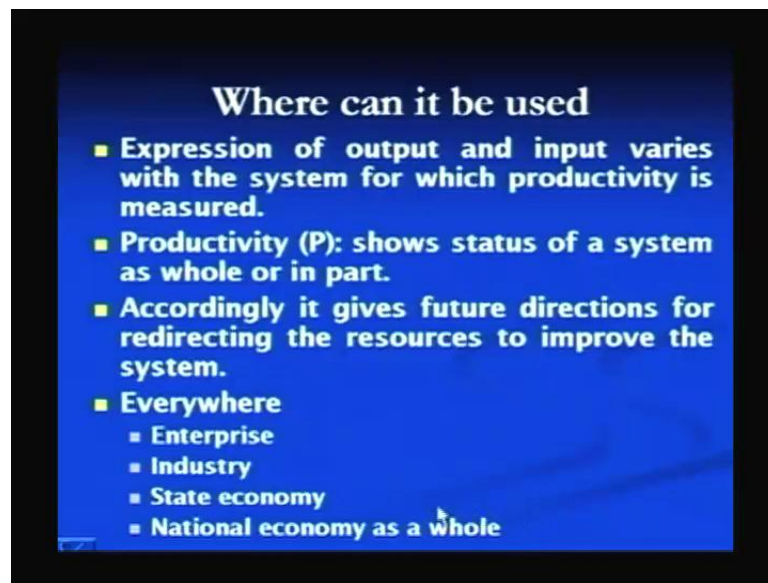
Productivity helps to indicate that how well a particular sector is utilizing the resources for producing the output, or how an organization or an industry is utilizing the resources for producing the goods required. And here productivity plays a significant role, because it is used as if one of such measures, which indicates the performance of a particular system. So, if we have to measure the productivity of an organization, which can be used as a measure of performance of an organization.

Then, this is operationalized or this is measured using the ratio of the output of the goods, which are being produced or the services which are being produced by a particular organization and the inputs which are being given. Inputs, it may be in terms of the human resources, may in terms of material land machine or any other item which is required for a producing the desired goods or services.

So, here this is a very simple and very general definition of the productivity and it is defined as the ratio of the output to the input. And basically the aim of the measuring productivity is to see that how efficiently resources are being used for producing the desired output. If it indicates that the productivity is high, means the resource utilization is good, it depends on that how it is being calculated.

And what are the different components being included in the productivity measurement, and where it can be used, means where this measure of the performance can be applied, so that it can be used effectively for comparing the performance of the system or redirecting the resources, so that the performances of a system can be improved.

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Expression of the output and input varies with the system for which productivity is being measured, if at all we have to measure the performance of a system. We have to see that what are the different outputs being given by given system, and what are the different inputs being used to produce the given output. And these input and output variables depends upon the kind of system, for which productivity is being measured.

Like if an industry is producing the biscuits, we have to see what quantity of the wheat or the sugar or other items being used to produce, the given quantity of the biscuits like that, productivity shows the status of a system as a whole or in part. So, depending upon the way by which productivity is measured for a given output, it indicates that how system is performing and what is it is present status.

If we include the aggregate output and divide it by the aggregate input, it indicates the performance of a system as a whole or if we see that what output is being given, because of one particular kind of input, then that indicates the productivity in part. So, accordingly that helps to see that where and how organization is performing and where it is required to look into or to take the corrective actions for the better performance.

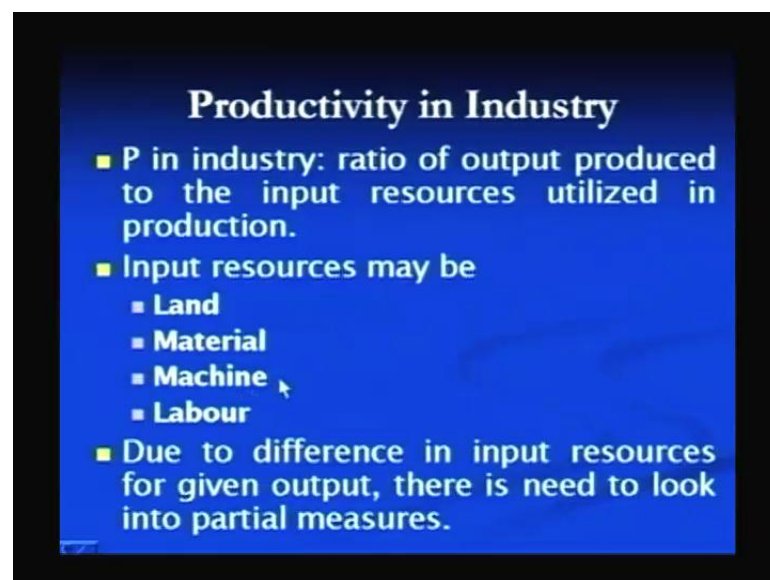
So here, because it indicates the status of a system as a whole or in part depending upon the way which it has been calculated, both these are being used see that, what improvements are possible to generate more output from the given utilization of the resources. Or how the resource utilization can be improved, so that the future directions

for redirecting the resources to improve the system is obtained on the basis of the partial or the total productivity of the system.

And this productivity of a system can be measured at any level like, it can be at the organization level means enterprise level as at industry level or at the state level or district level or as national economy as a whole. So, this productivity measurement can be used as indicator of performance of the system at any level as it is clear from these four areas. And if we have to say that a productivity in the industry particularly, industry will be involved in production of the goods like whatever you produced, or like a fan is to be produced.

So, industry will be using some of the materials, some of the equipments are the capital or the labor which is involved in processing all these things. So, here if we have to see that what output we are getting in form of desired product and what input is being given in different forms, like material, man, machine or the labor. So, if the productivity of the industry is to be measured, we have to see what output is being produced from the given input resources for the production purpose.

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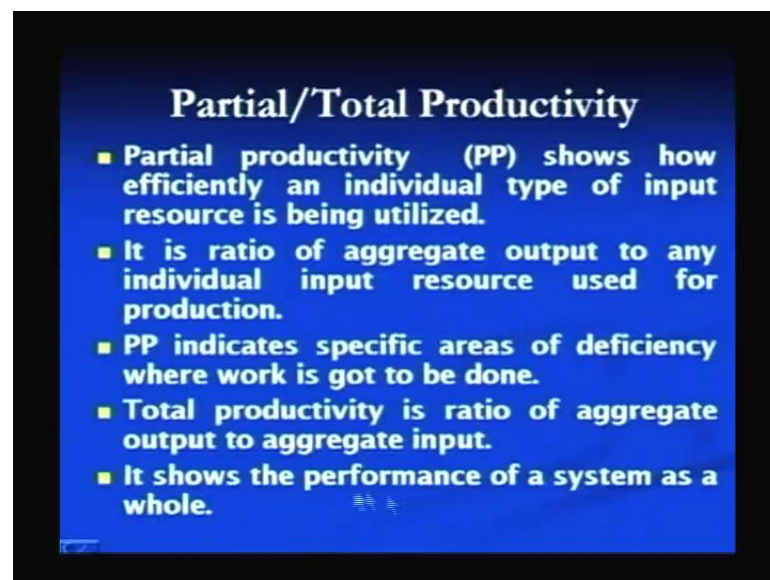
And these are resources may be in form of the land, the material, machine or the labor, these are very common forms of the inputs which are given to produce the output in an industry. And because the nature of the input resources is entirely different, like the land being used were machine have been installed. And the production is being made, the

material which is being consumed in production of the certain good, machines which are being used to process the material for producing the goods.

And the labor which is involved in processing of the material using the machines to produce the desired goods. So, the nature of all these resources is different and there, so that how all these resources being effectively used for getting the desired output, that also can be calculated individually. Like for a given land how much, what output is being obtained and what output can be obtained by consuming a given quantity of the material what is the output and how much it can be done.

And the same base with the machine using 2 or 10 or 100's of the machines, what is the present output and where it can be is what maximum can be done in, so since the nature of these input resources is different. So, it will be possible to calculate the contribution of the given input on the output, that will help us to see that how one input parameter is going to effect the overall output, for that purpose we need to take the partial measures. And that is why due to difference in the input resources for a given output it is required to look into the partial measures, so it is necessary to look into the partial productivity aspects related to the different areas and in an industry.

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So, if we see that the partial productivity and the total productivity both these things are slightly different, and the partial productivity shows that how efficiently a particular type of the input resource is being utilized. And if we have to see the total productivity, then we have to see how all types of the resources is being use to produce a given amount of

the output being used means, how all types of resources are being used to produce given quantity of the output, that indicates a total productivity.

So, the difference is here in partial productivity we consider only one type of the input resource, while in total productivity we consider all types of resources, which are being used for production of given output. So, that is why it is defined accordingly that the partial productivity is the ratio of aggregate output to the individual to the amount of any individual input resource being used for production of the goods.

Like the 100 pens are being used and how much plastic is being used for the production of 100 pens in half kg or the 2 kg, so if we had to see the material productivity, then the 100 pens divided by the 2 kg material, it will give like this. For unit quantity of the resources how much output is being produced, so what which type of the partial productivity we should measure, it depends again on the type of the organization.

And the which type of the resource is more important for that particular organization, so if we here we can see that the partial productivity is the ratio of the aggregate output to the any individual input resource being used for that particular production. And it indicates that whether are a specific input resource is being utilized effectively or it is being used very poorly.

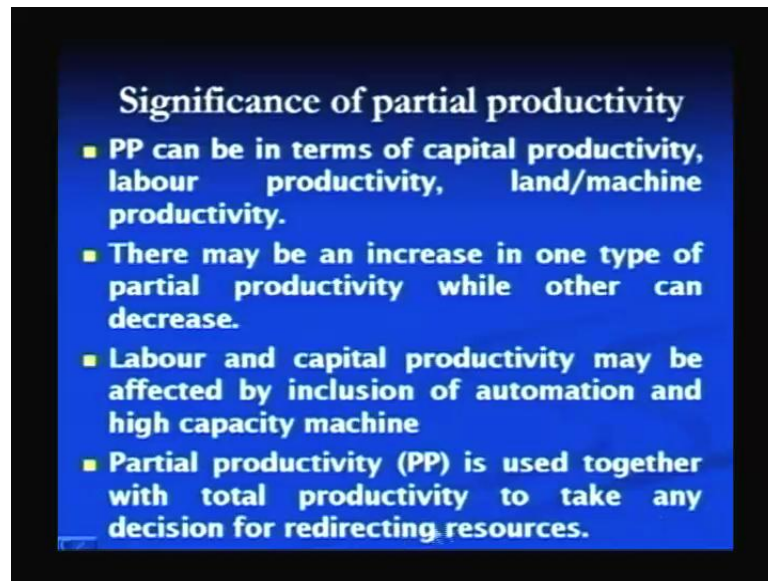
So, if there are deficiency those are highlighted by the partial productivity and if the deficiencies have been identified in utilization of a specific type of the resource, then that can be corrected as per needs, or the steps can be taken to rectify the problem in a specific areas, so that the overall productivity of the organization can be increased. While the total productivity is the ratio of aggregate output to aggregate input, where all types of the products being produced.

Or the services is being produced by the industry, or an organization or an a state, those are taken into a account to calculate the aggregate output. And the aggregate input is calculated from all types of the resources in form of land material machine or anything else, which is being used for the production of the goods by the particular organization are taken as aggregate input. And if we see the total productivity, then it indicates the performance of a particular organization as a whole for a certain period of time.

So, here there is some difference in the partial and the total productivity, partial productivity indicates a effective utilization or the extent of effective utilization of

particular kind of input, resource being used for producing the output. And that the total productivity indicates the performance of an organization as a whole, so overall performance of organization can be seen from total productivity. Here partial productivity can be calculated in terms of the capital investment, labor productivity or the land or the machine productivity.

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And it depends that which type of partial productivity will be calculated by an organization for the further directions, that will depend upon that which resources is more important for given organization. If an organization has invested a significantly on the equipments, then the organizations of the high capital investments will be more interested in the capital productivity. If the skilled labor is being used for the production purpose, which is very costly in advanced nations, then labor productivity will be more important for them.

And according the machine or the land productivity, depending upon the importance of a particular kind of input resource for a given organization, it is required to calculate the land, machine or labor or capital productivity. So, because are used as indicator were is the scope for the improvement for improving performance of a system as a whole. And if we see the partial productivity, partial productivity for the different types of the inputs can vary in different way.

Like increase in the one type of the partial, increase in the partial productivity for one resources will lead to the reduction in the partial productivity of the other resource. For

example, for increasing the volume of the output if new machines are installed, then by using the huge capital investment we can install big machines of the high capacity, we can go automation which can help to increase the output from the given input in form of the labor.

So, but we may not get the output which is proportionally greater for a given capital investment, so for a given capital investment if you are not getting the increased output, while there is significant increase output for given labor input, then labor productivity will improve significant. While the capital productivity may indicate some sort of reduction also, so it is not necessary that the partial productivity for the different input resources it give the same kind of trend, in some cases increase in one type of the productivity may be noticed well in others, it can decrease.

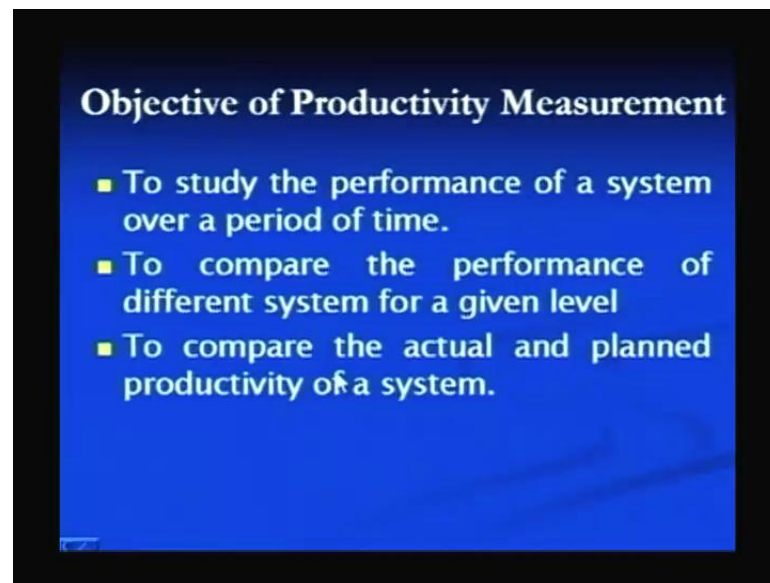
The labor and capital productivity may be affected by the automation and the high capacity machines, that is what I have just explained that if the new systems are included, that can increase the labor productivity. But, the capital productivity may come down, if the increase in output is not a proportional to the increase in capital investment being made in form of the equipments, installed in a given organization.

Partial productivity is used together with the total productivity if we have to take any decision for redirecting the resources or for the improvement, it will depend that which type of the resource should be used more effectively. And where improvement is required that decision is made in light of the total productivity for an organization, significant increase in material productivity may not be important for organization, well the capital productivity may be more important for a given organization.

So, whether really one should go for increase the material productivity or not, that will depend upon how the total productivity of the organization will be affected, because as a whole it will affect to the performance of an organization. Or in capability to produce the given quantity of the output or the larger quantity of the output, so the steps to take the corrective actions to improve the partial productivity for particular input resources will be determined, the way by which total productivity is been effected, because of change in the given partial productivity.

And for a specific type of the input resource, and why do we go for the partial productivity measurement at all, they are some specific objectives behind that.

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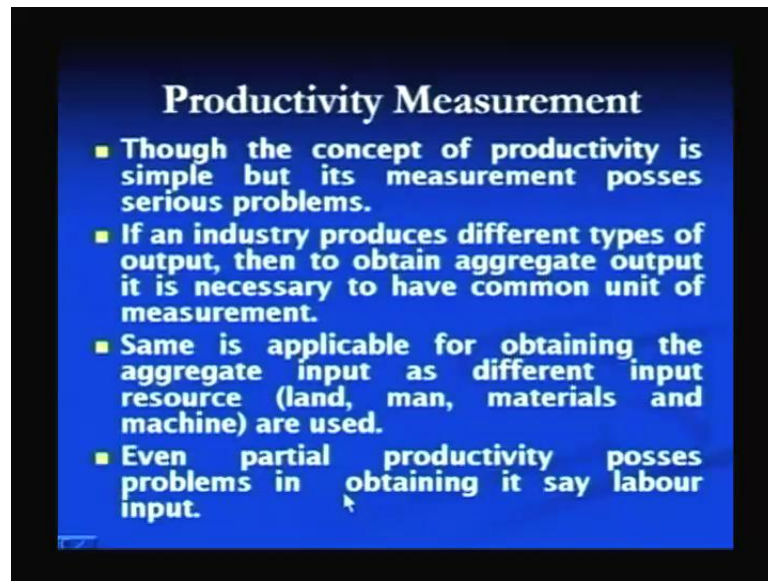


One is to see, first one is to see that how an organization is performing during a certain period, so to see the performance of the system or an organization or an state a over a period of time productivity is calculated. Another is to see that how one section of an organization is performing compare to others at the same level, so to compare the performance of the different systems, such a given level or the productivity is also now measured.

And to compare that how actually we are performing right now and how we are different from the planned the productivity of the system, so basically it is also used to compare the actual performs of the given organization with the planned performance or the planned productivity of the system. Productivity can be measured by using the ratio of the output and the input, but if we see the concept wise this productivity appears to be very simple, but its measurement is difficult.

And a particular due to the compilation of the data problem related to the output and the input of the resources which are being used, the compilation is very difficult task in calculation of the productivity measurement particularly. Because many times either data is not available or data is in very raw form or the variety of the data is there or variety of the output items are there, variety of input items are there. And there aggregation becomes very difficult job to calculate the productivity for a section for an organization occur in the industry.

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So, if an industry produces the different types of the job, then to obtain a aggregate output it is necessary to have the common unit. Means this is the primary requirement that whatever products are being produced by an organization all should be quantified in common term or in common unit like an organization may be producing pen or biscuits or wheat or the some of the services. So, the quantification or the aggregation of all types of the outputs they becomes difficult, because they may be different in terms of the prices, in terms of the quantities.

And if the data is available, then things can be calculated easily, many times the availability of the data also creates the problem in calculation of the productivity. And the major requirement for productivity calculation is to have common unit for the measurement of all types of the outputs and the same is applicable for the inputs also. That for aggregating the inputs of all resources, we have to use a common unit of the measurement, and it is common to use the monitory terms for aggregating all types of the outputs and the inputs.

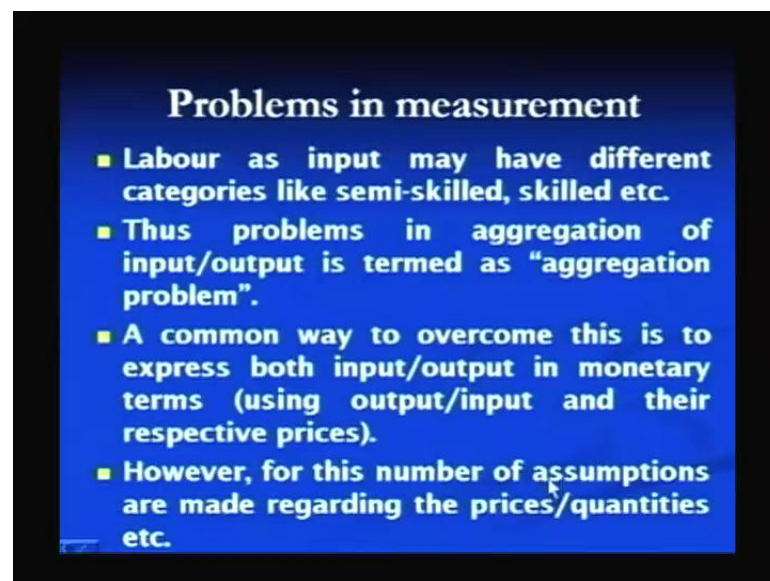
Under here this is what I have just said that the same common unit concept should be used for obtaining the aggregate input, were different inputs can be used for production purpose in form of say land, material, man and machine. And even if we see not only the total productivity of an organization becomes difficult, but many times the calculation of the partial productivity also poses the same problem. Because, aggregate output

calculation is the same as the earlier one, which creates problem in calculation of the total productivity.

And if we see the input, here input resource will be used in one form, but input resource of one type may also be having different categories, like if the labor productivity is calculated in an organization there may be different types of the labor, which is being used for the production purpose. Like the helper or the technician, supervisor, manager, or a semiskilled worker and each price related to the each type of the labor will be different.

And that calculation of that also becomes difficult to obtain and the input resource in form a labor or in form of material, materials are of variety of materials are used for producing a given output. So, not only the total productivity, but also partial productivity calculation, calculations becomes difficult, because of the calculations related to the a obtaining the aggregate output or aggregate input or a specific type of input for calculation of the partial productivity.

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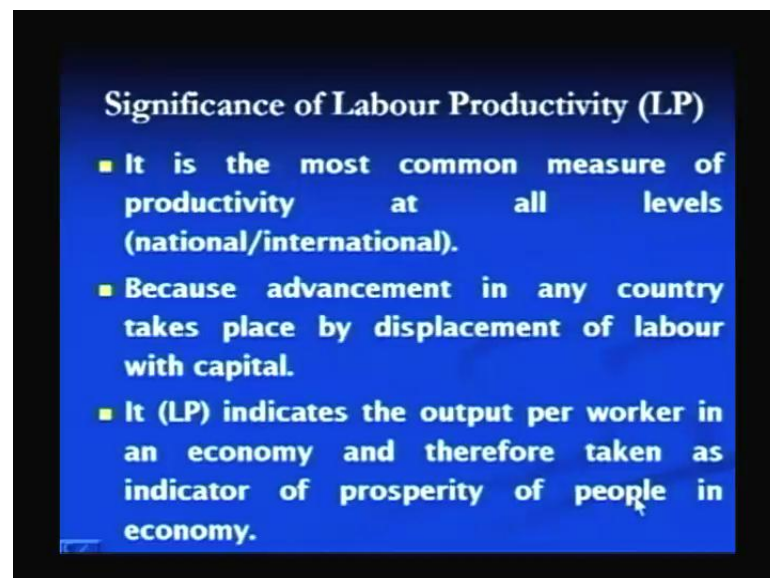
This what I have just explained that there is one problem is that labor, labor is used in of the different types may be skilled, semiskilled or at are up to the different level for which an organization as to pay the different salaries and their numbers may also be different. So, the calculation of the input as a labor resource becomes difficult, and the problems related to the aggregation of the input and output of the goods and input of the resources is commonly termed as the aggregation problem.

And this is handled by making or by using the common unit of the input and the output of the resources which are being used as an input, and the common unit for aggregating the output. And the common unit for both input and output is used as, in terms of the money or the cost or the prices which are involved related to the output or the input. And for this calculation we use the quantity of the output and their price, in the same way quantity of input of the resources which are being used, and respective prices for aggregating the input and the output.

And for this purpose, many times it becomes difficult to see that which price is to be fixed, what quantity is to be used for the calculation purpose of a material, land, machine, because things will also keep on changing. Over a period of time you may come across the variety of rates, different rates, different times, if the productivity of a system is being looked for a period of time and there might have been different rates and the different qualities also.

So, to deal with this kind of situation number of assumptions are also made are normally inflated rates or the prices are being normally used for the calculation purpose. Here, so that is what has been mentioned a number of assumptions are made, while calculating or aggregating the input and output.

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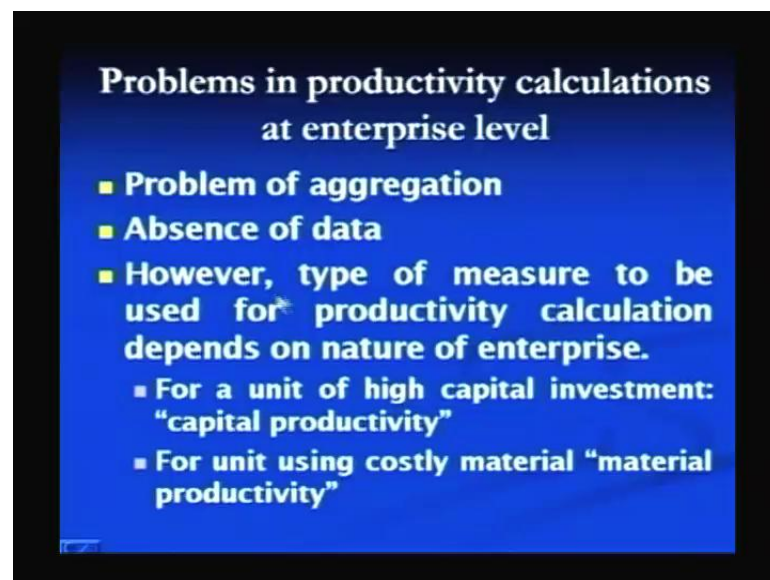


And if we see what the labor productivity if you calculate the partial productivity in form of labor productivity what does it indicate, that it is a common measure for the productivity at all the levels, whether it is the industry or national or international level.

So, the productivity of the labor indicates that how effectively labor is being used, and it can be used as a common measure at all the levels, whether it is national international or the state level or the industry level.

And productivity of the labor indicates that how much, and that particular state or the nation is advanced, because in most of the cases, the labor productivity is improved by giving more capital investment, or by installing the new and advanced machines and going for automations. So, these things help to increase the labor productivity, if labor productivity of nation is high that indicates, that particular nation is prosperous or in which direction it is going. It indicates that output per worker in an economy and therefore, it is taken as a indicator of the prosperity of the people in particular economy.

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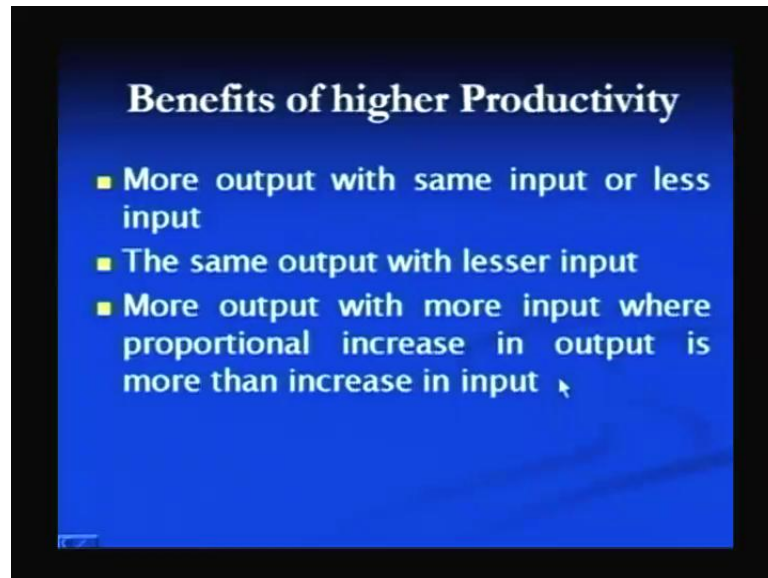


And the problems related to the productivity calculations at enterprise level are different from the national level, because at national level most of the time data is not available. While at the product, at the enterprise level or at industry level data is available, but it is aggregation becomes difficult, so the aggregation is one major problem. Many times if the data is not being kept and maintained properly and absence of the data can also create problem in calculation of the productivity in a industry level also.

So, the type of the measure to be used for productivity calculations, it depends on the nature of the enterprise or the particular organization. Like one will go for the capital productivity in case if it is of high investment unit or if it is processing very costly material, then productivity will be more important for that organization. And these

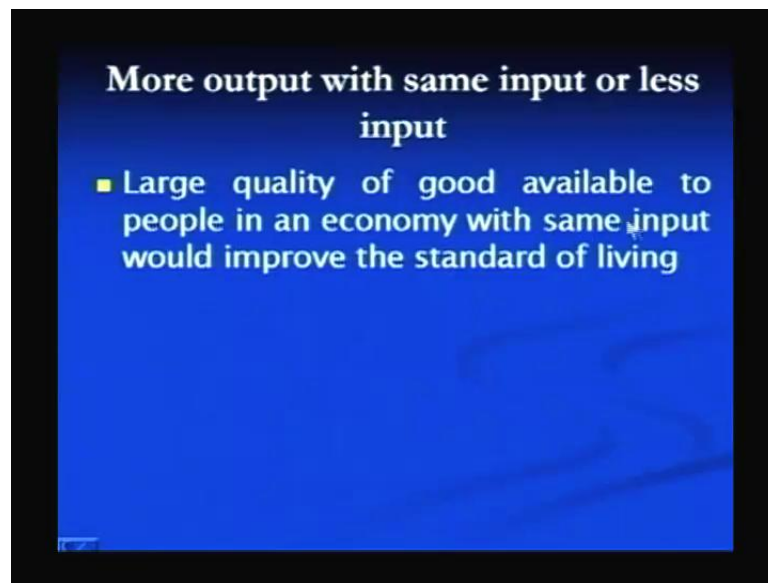
productivities will help the organization to redirect the resources, and take the corrective actions for the better productivity as a whole of the organization.

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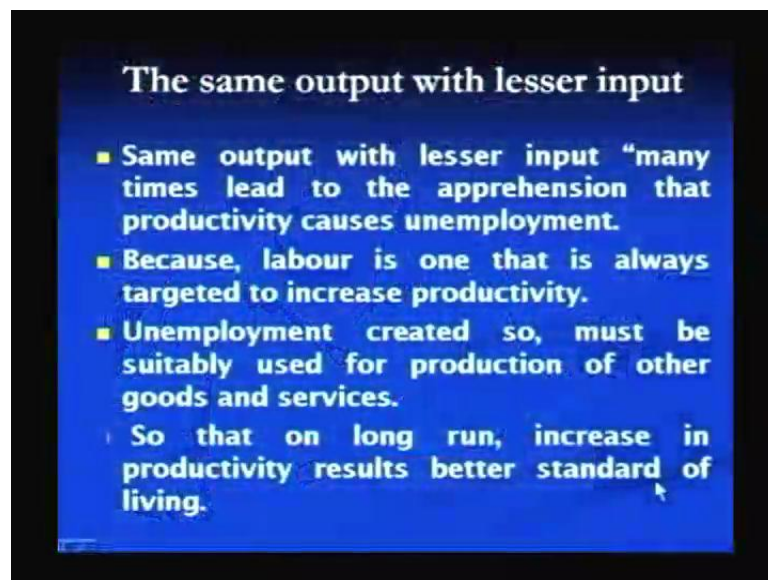
When the productivity of an organization or of a state improves the number of benefits are automatically obtained, like the more goods are produce with the same inputs or the less input also. And another possibility is that, the same output is produced with the lesser input and the third possibility is that the more output can be produce with the more inputs, where the proportional increase is output is more compare output that of increase in input. So, if the increase input, if there is significant increase in the output, and that will also help to produce a large quantity of the goods, which can be made available to the people of the society.

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So, that there life of a standard of living can be improved, but that is what we can see here more output with the same input or lesser input helps to make the large quality of the goods available, so that a the standard of life can be improved.

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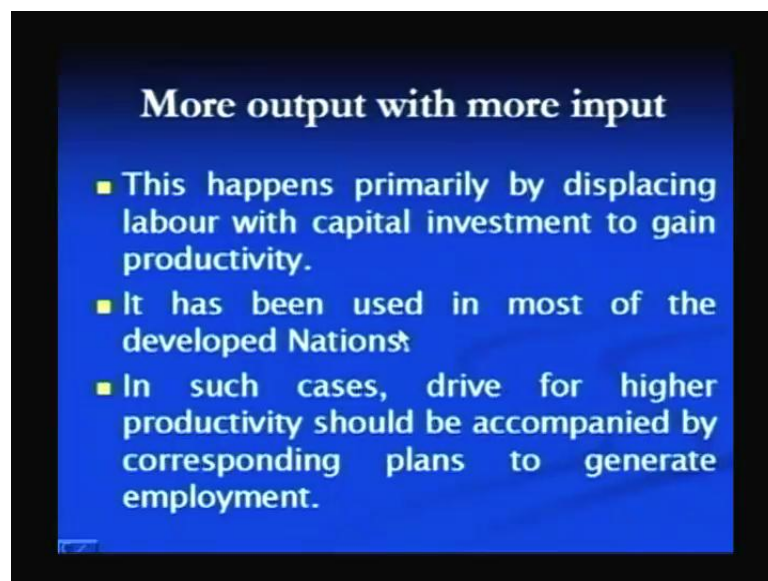
And this is the second point the same output with the lesser input, about this there is only problem like, that if the same output is being produced with the lesser material, lesser energy, lesser land or lesser machine, then there is no problem, but the labor is reduced for getting the same output. We get the different apprehension on the people have apprehension about the same output with the less input, in terms of that the productivity

causes the unemployment, because unemployment means a the labor productivity is targeted first to get the same output with the lesser inputs.

And that is why people will feel that if the productivity, if people are working on improving the productivity, then it will lead to the unemployment and the labor is one which is always targeted for increasing the productivity. And if it happens, so then unemployment is created and that the unemployment created so must be used suitably for the production of a other goods and services, so that they can be made available.

Means whatever unemployment is generated, because of increase in productivity those people should be used suitably for the production the good and services. And on the long run if this technique is used that will help to increase, the standard of the life of the people as a whole.

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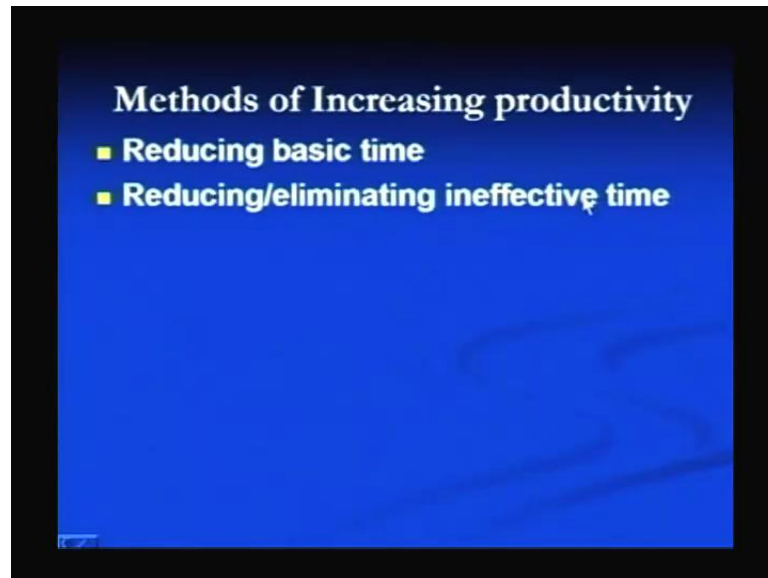


And the third case we have more output with the more input is used is obtained, here this is the case where proportional increase in output is more for given increase in input, that is achieved particularly by the capital investment by installing high capacity machines or by going to the automations. So, this helps to increase the productivity and to produce the greater quantity of the goods available.

And this is very effective way of increasing the productivity, it has been very effective way of increasing the productivity particularly in the advanced nations. In such cases to deal with the unemployment aspects, it is necessary to work on the both the issues, like the drive for the high productivity should be accompanied by the plans to generate the

employment. The same time an organization should also focus on effective utilization of the people who are being unemployed, because of increase in productivity or productivity caused by the capital investment or displacement of the labor capital investment.

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Certain methods are used for increasing the productivity and these are the reduced basic time for carrying out the job, reducing the ineffective time and these are two major areas where work is carried out for increasing the productivity. And in detail about these aspects I shall discuss in the coming lectures, so now I would like to summarize this lecture. Here, in this lecture we have seen that in the productivity of an organization or of a state or a nation is very important. And because it effects the quality of the goods and services available to the people of that particular society or of a state, if the productivity of an organization is good that helps to increase the life of a standard, the standard of life of a people of that particular state or a standard of living.

Thank you for your attention.