Conservation Economics
Dr. Ankur Awadhiya, IFS
Indian Forest Service
Indian Institute of Technology, Kanpur

Module 5
How can Economics help?
Lecture 2
Thinking as an Economist

Namaste!

In the last lecture we saw that conservation and economics are both related to each other, both are being done for the common aim of providing more and more benefits to more and more number of people, but still in certain cases, there are difficulties, because there are some people who might consider that economics and conservation are at loggerheads. They are not serving the same process.

The solution lies in having more and more economics. The people who are there in a position of decision making, they need to be made aware that if we are doing good conservation this is also going to be bringing benefits to a large number of people. And a good example is the provisioning of mitigation structures such as underpasses for the movement of wild animals.

Now, underpasses not only provide a way for wild animals to move across a road, but they also provide protection to people, because they will not find a wild animal out there in the road, to collide with their vehicles, to destroy the vehicle and probably also lead to the death of a some human beings in these accidents.

If we do not have underpasses the other option for people to move safely is to lower their speeds. So, in a number of areas we find that there is a speed limit regulation of say around 20 kilometers per hour, but then if we go with a speed of 20 kilometers per hour that also leads to certain detriments to a large number of people. Because goods will move slowly, people will move slowly and so in such a situation doing development of the area will be more difficult.

The issue here is to bring the economists and the ecologist on the same field and come up with certain solutions through which we can find a means to satisfy both the circumstances. It is important to know the language of both these people, it is important to know the language of economists and the language of the ecologists. And in this lecture, we will have a look at the language of the economist; we will have a look at how an economist thinks and how he or she takes a decision.

In particular to use economics we must know economics and in this lecture we will look at certain terms; terms of economics or let us say the lingo of the speed. We also have a look at the methods that are employed. Now, different disciplines might be using different methods. Now there are some methods that are specific to a field; however, there are certain methods that are

common across all fields such as the scientific method. We will have a look at what kinds of methods are used in economics.

We will also try to discern what kinds of analysis are done in this field. And then we will also look at the field realities.

Let us begin with the terms. There are a number of terms in economics and to understand any field it is important that we know the language of the field. For instance when an economist says that the market is going up or the market is going down or the market is essential for such and such society or the market says. What does this market refer to? Is it referring to your local market, is it referring to the stock market, is it referring to something else.

To understand the language of an economist it is important to know the terms that an economist uses. So, for instance a market is defined as a group of buyers and sellers of a particular good of or service. It is a group of buyers and sellers which means that you cannot have a market with say just a few buyers or just a few sellers or say just one buyer and one seller that will not make a market. You require a large number of buyers and a large number of sellers.

And these are buyers and sellers of a particular good or service. Which means that we can have different kinds of markets, we can have a market for goods, we can have a market for services. In the case of a market for goods we can have a market for say a good, we can have a market for land we can have a market for construction activities. In the case of services we can have a market of education.

Now, in any of these markets there are certain people who want to procure these goods and services and these people are known as the buyers and there are certain other people who provide these goods and services to the buyers and these people who provide these goods and services are known as the sellers. Now, in any market you will have a group of buyers and a group of sellers for that particular good or service.

Then we have quantity demanded; quantity demanded of any good or service is the amount of goods that the buyers are willing and able to purchase. Quantity demanded is the amount of goods that buyers are willing to buy. So, they must be willing and they must be able to purchase, which means that when we look at quantity demanded if there is a section of buyers that says ok I am going to procure this item for say 2 lakhs of rupees, I am willing to do that, but then those buyers do not have the funds with them.

They are not able to provide this much amount of money. So, in that case we will not include that section into the computation of the quantity demanded or there might be certain people who have money with them, but they do not want to spend it on that particular good or service, and in that case as well we will not include it in the definition of quantity demanded.

The quantity demanded is the amount of goods that buyers are willing and able to purchase. Now it is very important in the case of conservation, because there is a market for a lot of goods that are to the detriment of nature and ecology. So, for instance there is a market for tiger skin. Now why is there a market for tiger skin? Because there are certain buyers who want to procure tiger skin, there are certain sellers who want to sell tiger skin.

Now, where will these sellers get the tiger skin from; of course, they will go into a forest and they will poach a tiger. Now, if there is this market and you want to curtail this market, you want

to stop this market, so it is important to know how these people are providing these goods and services, where this market is and what is the quantity that is being demanded by this market. Because to stop this market you will have to act at different levels, you will have to act at the level of the buyers.

If somebody is trying to buy these tiger skins you would have to stop them. You have to act at the level of the sellers and then you also have to act at the level of the market. Now, remember that a market is a group of buyers and sellers of a particular good or service and these days the online marketplace has also come up as a very important market.

Now, when we look at the online marketplace, at times you will find that even on the most reputed online marketplaces there might be certain people who are selling products such as a claw of a tiger or say the skin of the snake and so if you want to perform conservation you will have to act at the level of these markets as well.

So, it is important to know what is the market, who is the buyer, who is the seller, what is the quantity demanded, what is the quantity supplied and then you can even act at this level. How do you reduce the willingness of the buyer? How do you reduce the ability of the buyer to purchase a thing such as a tiger skin?

Willingness of the buyer can be reduced by say coming up with certain means of education or awareness or by say putting up a social cost, a of putting up certain excessive taxation or excessive punishment if if anybody comes to know that that such and such person has bought a tiger skin or you could even act at the level of ability.

If you know who are the buyers who preferentially try to buy a tiger skin you might try to reduce their ability to purchase a tiger skin. Now, this reduction of the ability can be through say more taxation of those people or say by freezing up of their accounts.

Now, if you freeze the account of a potential buyer. In that case this buyer is no longer able to procure the goods and so the amount of quantity demanded in the market will go down. And as the quantity demanded goes down the price will go down and it will no longer be profitable for the seller to go and poach a tiger and bring it to the market.

It is important to know what the quantity demanded is. Similarly, you need to know the quantity that is supplied, the amount of a good that sellers are willing and able to sell. So, the sellers must be willing and they must be able. Here again there could be certain sellers that are willing to sell a good such as tiger skin, but they are unable to sell it, because they do not have access to the resources, or there could be certain sellers who have the ability to hunt a tiger, but they are not willing.

And in a number of cases we find that there are people who live around a tiger reserve. So, these people have access to the tiger, but tiger conservation has been successful only because these people are unwilling to go into the forest and poach a tiger. So, we also have to work at the level of the willingness and ability of the sellers or the potential sellers. So, these are some important terms in economics.

Another term is elasticity; elasticity is a measure of the responsiveness of quantity demanded or supplied to a change in one of its determinants. Essentially if you look at say a thing such as a price elasticity of demand, it is percentage change in the quantity demanded divided by

percentage change in the price. Essentially if there is a change in one or more of the determinants of a good then is the quantity demanded or quantity supplied does it change or not?

Now, if there is a good for which when there is a change in its determinants and the amount of quality or the or the or the quantity of goods that are supplied or the the goods that are bought, if it changes then we will say that the demand or the supply curve is elastic.

Whereas, in certain other cases if the demand or this if the quantity demanded or the quantity supplied if it remains the same then we will say that the demand or supply for such and such good or service is inelastic.

Now, it has been seen that in the case of certain goods; such as food grains, the demand and supply are very inelastic and why are they inelastic? Because even if a person has access to more funds or if the person shifts to some other place, there is a limit to how much food grains he or she can eat. And so the quantity that has been demanded is more or less fixed.

Similarly in the case of a number of industrial products, it is difficult to change the quantity that is applied on a short term basis, and so the supply of such goods and services will be called inelastic. There are also other terms such as comparative advantage externality and so on and will explore all these different terms as we move through the course.

Next let us have a look at the methods of economics. And the most important method that we make use of is the scientific method. Now, the scientific method works like this: there is an observation and any observation can lead to a question. So, for instance there is an observation that there is a market for tiger body parts. The question is, ok what are the determinants of this market?

Does this market depend on who is the buyer or who is the seller? Or does this market depend on what the currency exchange rate is? Or does this market depend on what is the level of insurgency in areas where you have the tigers?So, that it is easy to post the tigers.

There could be a number of questions that can be asked based on any observation. Now, based on any of these questions we can come up with certain hypotheses. Now, a hypothesis is a possible explanation for what is going on. Now this possible explanation could be correct or it could be incorrect, but so it be the hypothesis has to be formed.

For instance we can say we can formulate a hypothesis that there is this market for say food grains and the market for food and the amount of food grains that is supplied to this market depends on say the cost of fertilizers.

Now, it is possible to say that in this area fertilizers are very expensive as compared to the other raw materials that are needed to manufacture food grains. And so if the price of fertilizers goes up then people will be unable to procure more and more fertilizers and so the amount of fertilizers that are applied to the crops will go down and so the quantity that is supplied will go down.

But there could also be a situation that the fertilizers are very cheap as compared to say the cost of irrigation. And so there is hardly any impact of the cost of or of the price of fertilizers on the quantity of food grains that is supplied in this market. Now, whether a hypothesis is true or not it will have to be discerned, but before we get to the task of discerning why a thing is happening in a certain manner, we will first have to formulate a hypothesis.

We can formulate n number of hypotheses. We can say that the quantity of food gains that is supplied to this market depends on the price of fertilizers or it depends on say the price of irrigation, or it depends on the price of transportation, there could be n number of hypotheses.

And then we will try to look at each and every one of these hypotheses in more detail. Now how do we look at or how do we discern a hypothesis? It is done either through experiments or through observations. Now what can be an experiment? So, suppose we wanted to see if the price of fertilizers is the most important factor that determines how much is the amount of food grains that is supplied by a seller.

In that case we can artificially pick certain farmers and we can provide them with fertilizers at a reduced rate. So, we can provide them with certain subsidies. We can tell them that ok if you purchase 1 kg of fertilizers, we are going to pay you 20 percent of the money, you will only have to pay 80 percent of the sum.

In place of a higher price now the farmer is paying a lower price and then we can formulate certain groups we can say that there is this cohort that is paying a 100 percent price, there is the second cohort that is paying 90 percent price, there is the third cohort that is paying 80 percent price and so on.

And then we can try to look at what is the amount of food grains that is supplied by these different cohorts into the market, so this can be an experiment. Or in certain cases when it is difficult to perform an experiment, we can even look at more observations.

For instance we can say that ok if everything else remains same, but then also the price of fertilizers would be varying to some extent, or probably there are different places in our area of study and in one place the price of fertilizers is more in another place the price of fertilizers is less and everything else is more or less the same.

In that case the scientist or the economist might try to figure out if these natural variations in the prices have got something to do with the quantity of food grains that these different sellers provide to the market. So, we can explore a hypothesis either through experiments or through observations.

And when we do these experiments and observations it is possible that the hypothesis gets rejected. So, it is possible that we formulated all these different cohorts, we gave them different amounts of subsidies, but still every cohort provides the same amount of food grains or supplies the same amount of food grains to the market.

In that case we will reject the hypothesis that the price of fertilizers has the majority share in determining the amount of food grains that are supplied by the seller to the market.

This is a hypothesis that gets rejected through either the experiments or through the observations. And when this happens then we will go ahead with the next hypothesis or we will even formulate a new hypothesis. So, in this case we might say that the price of fertilizers has nothing to do with the quantity of food grains that these people are supplying, so probably it is the price of transportation. So, that is the new hypothesis that the price of transportation governs the quantity of food grains that are supplied by the sellers to the market. This is the next hypothesis.

And what do we do with this hypothesis? We repeat the process, we go ahead with more experiments and observations. And we perform these two operations of formulating hypotheses

and checking them out through experiments or observations till we have reached a point where the hypothesis gets confirmed.

Suppose our hypothesis that the cost of transportation determines the quantity of food grain that is supplied to the market. Suppose we are able to prove this hypothesis in our study area, so in that case we will formulate a theory.

Now, this theory would say that the cost of or the price of it of transportation determines the amount of food grains that is supplied to the market, but then it is also possible that this theory is only applicable to the current area of study. It is not applicable everywhere else. In that case it will remain at the level of a theory, but then if a theory stands the test of time.

So, we test it in different locations, we test it in different periods of time, we test it under different circumstances and every time we find that it is actually the price of transportation that determines the quantity of food grains that are supplied by the sellers to the market. If that happens then we will upgrade the theory to the level of a law and then we will call it the law of say governance of the quantity of food grains supplied to the market.

Another example from a very different field is that suppose you have a torch and this process is not working, how do you apply the scientific method?

Now, remember that the scientific method's aim is to help you get to the correct conclusion. So, your torch is not working and there could be n number of things that are wrong with the torch. Probably the batteries have died out, probably the bulb has got fused, probably the switch is not working, probably the wires are broken, there could be a number of things. Now, we can apply scientific methods to any observation and to any question.

In this case the observation is that the part was not working, the question is why is the torch not working? So, we will formulate certain hypotheses, the first hypothesis is perhaps the battery is dead. Now, how do you check whether this is the correct hypothesis?

Will you change the battery or you charge the battery and check if the torch works. Now if the torch still does not work then our hypothesis that the battery is dead is wrong, because if this hypothesis was correct the torch should have worked when you change the battery or when you charge the battery.

So we reject this hypothesis that the torch is not working, because the battery is dead. Then we come up with another hypothesis that the torch is not working, because the bulb has been fused. So, we change the bulb. So, this is the experiment, you change the bulb and check if the torch works.

And you find through this experiment that the torch still does not work which means that the bulb was not fused, because you have changed the bulb in that case. So, one by one we are formulating a hypothesis, we are testing the hypothesis and we are accepting or rejecting the hypothesis.

If the bulb is not fused then perhaps the switch is not working. So, in that case the experiment is you change the switch and then check if the torch is working. And now through this experiment you come to know that the torch is working. In that case you can through this method of testing out different assumptions, different hypotheses, one by one you can reach a conclusion about why while you were observing the observation that you were observing.

That is through looking at all of these hypotheses one by one you can come to the conclusion that your torch was not working because its switch was malfunctioning, which you could not have done if you looked at all of these different aspects at the same time.

So if you have a torch that is not working and you wanted to check the bulb, you wanted to check the battery, you wanted to check the switch, you wanted to check the wires, everything at the same point of time then it would have been very difficult to come to the conclusion or especially the right conclusion about why your torch is not working. Now, similarly in the field of economics there are a number of questions, there are a number of observations and the economist uses the scientific method to understand or to explain why a certain thing is behaving in the way it is doing.

We have observations about things such as inflation. Why does inflation occur? Why do we have unemployment in our society? And all of these questions are understood through the scientific method.

And if any of these theories stands the test of time then we say that we have come up with a law. So, if you want to understand how an economist thinks, it is important to know the scientific principle and to deploy scientific principles in different circumstances.

Now in the case of economics the experiments are in a number of cases a natural experiment. Now, natural experiment means that, especially because economics has got a lot to do with different people. So, you cannot, say, subjugate a person to malnutrition or you cannot subjugate a person to poverty, just to test if a certain observation is because of a certain hypothesis, because there are human costs involved.

If you wanted to check if the price of crude oil has got something to do with, say an observation x, you cannot just go ahead and increase the price of crude oil. Because one; in a number of cases, you will not have access to the power to increase the price of crude oil and two because of the human costs that are involved. So, the economist in a number of cases makes use of natural experiments.

What is a natural experiment? Out there in nature even without us doing anything there are variations. So, suppose somebody wants to understand the role of poverty he or she can look at two different areas; one in which more and more people are poor and the other area where people are less poor. Or if somebody wanted to understand the impact of an increase in the price of crude oil then they only have to look at those periods of time such as wars, where the price of crude oil goes up.

So, these natural experiments can be made use of in understanding and checking any hypothesis. And in the scientific method we also make use of assumptions and models why? Because if you look at the scientific method you will find that there are a number of hypotheses that need to be tested and if we do not make certain assumptions then there will be so many hypotheses that it will be very difficult to check any of those.

So, for instance if you wanted to check if poverty has got something to do with the amount of education that people receive. So, and when you are doing any experiment or when you are looking at a natural experiment then it is possible that not only are these people poor, but probably they are also living in say a nation with a very different political principle. So, we are

looking at one one society that is living in a capitalist country and another society that is living in a communist country.

Now, if a number of things are different between both of these societies then we cannot pinpoint whether the amount of education that people are receiving is because of poverty or not. So, we will have to make the assumption that everything else being constant poverty has so and so impact on education, and so this is an assumption that we need to make use of.

Similarly, we also make use of a number of models. Now, what is a model? A model is a simplified depiction of reality. So, for instance if you look at say the climate of India, then a model would say that ok in the months of May or June you have the summer season, in the months of December and January you have the winter season, but the reality could be different, the reality would be that in case of December and January being winter months you could be having a winter from say 15th of November or a winter that extends till the end of February in certain years.

But then if we want to discern the rule of something we will have to simplify things. If it is very much complicated then and then looking at or making pinpointed conclusions would become more difficult. And so we make use of models which are simplified versions of reality.

A model can be defined as a simplified description, especially a mathematical one of a system or a process, to assist calculations and predictions.

Io, it is a simplified description. So, you are removing most of the complexity, especially a mathematical one. Now why do we prefer mathematical models? Because a mathematical model makes it much easier to predict things, it has a better predictive power. So, a model is a simplified description, especially a mathematical one of a system or a process. And why do we make a model? To assist calculations and predictions. It makes calculations easy and it gives us a certain amount of predictive power.

Why do we use models? Models are simple to understand by removing the specifics. So, in the case of the climatic model you are removing the specifics about which date or say on which date what was the temperature. We are just looking at a very simplified depiction when we say that so and so months are summer months, so and so months are winter months and then spring and autumn and so on.

So they make things simple to understand by removing the specifics. They help us concentrate on the most relevant variables. So, for instance if we wanted to check whether a particular activity is more in the summer season and less in the winter season. So, if we made use of this model, we do not have to concern ourselves with what was the exact temperature on that day, what was the exact humidity on that day.

Now, remember that all these different factors could also have a bearing on our observation. But then by removing all of these variables, we are making it simple to understand and we are concentrating on the most relevant variables. It promotes reflection and clarification of ideas, it gives a certain amount of explanatory power.

Through a model we can explain things and we can even predict what is going to happen in the future. If we have a simplified model it is easy to to understand things, it is easy to explain things to others and it is also easy to predict what is going to happen in the near future.

But then when we are simplifying things, we are also removing a lot of details. So, this is a limitation of models. Most of the models are approximations; they are not exactly how the real-world functions. And remember that this is ok because we made a model, knowing that we are unable to comprehend the complete reality and model will help us understand the reality, and so there will be certain limitations. Then there is a tradeoff between accuracy and predictive power and simplicity.

Now, if you have a model and you want to be extremely accurate then you will have to consider all the smaller variables that were also playing a part, but then if you include all the smaller variables then your model becomes so complicated that it becomes difficult to comprehend and difficult to explain and probably even difficult to deploy. So, there is always a tradeoff, between accuracy and predictive power on one hand and simplicity. With more predictive power complexity goes up which might defeat the purpose of the model.

Let us now have a look at certain models that we commonly use in economics. The first one is the circular flow diagram. It is a visual model of the economy that shows how money flows through markets among households and firms. So, a circular flow diagram is a visual model. It is a model and it helps you to visualize things. It is a model of the economy and it shows how money flows through markets among households and firms.

What does this model say? This model says that there are two big entities; there are firms and there are households. Firms are those entities that produce and sell goods and services. So, they are the producers and they are the sellers of goods and services. Now, to produce these goods and services they hire and make use of factors of production. So, you can understand a firm easily by visualizing say an industry.

Now, an industry is manufacturing certain goods or it is providing certain services, and to manufacture these goods and services it requires labour. So, how will it get labour, it will hire labour, it will employ people. A firm is the set of entities that produce goods, that produce and sell goods and services and for production, they hire and use the factors of production. Factors of production means they are using land, labour and capital.

The other big entity is the households. Households are those entities that buy and consume goods and services. So, these are the buyers of goods and services. They own and sell the factors of production. So, the households own their own labour and they sell their labour to the firms to help them produce things and in return they will be getting a salary or the households are those entities that own the land and they will make this land available to the firms in exchange for say a rent.

Households buy and consume goods and services, they own and sell the factors of production. So, there are these two entities. Now these two entities interact in the market, and remember that a market is the place where buyers and sellers are coming together, but markets are places where buyers and sellers of a particular good or service come together. So, in this case we can clarify that there are two different markets; there are markets for the goods and services.

Now, goods and services are those things that the firms are producing and the firms are selling. On the other hand the households buy these goods and services. So, in the market for goods and services, the goods and services are sold by the firm in this market and they are bought by the

households. Now, when the households are buying the goods and services from this market, they will have to make a spending, they will have to pay something.

So, let us say that they are paying in rupees. So, one rupee is moving from this household to the market, because a certain portion of goods and services are being bought by the households in this market. And this market is then channelizing this rupee to the firm and the firm is getting this money in the form of revenue. So, this is the revenue of the firm. And why is the firm getting this revenue? Because it is selling goods and services. So, this is one market in which the firms and the households interact with each other.

Now, if you do not have any other market, if we have only one market, then there will be a situation where the households will very soon end up all the money that they have, all the money will get accumulated here and the households will only have certain goods and services that they have bought from the firms. So, after a while this economy will stop. Now the reason why the economies do not stop is that we have another market which is known as the market for the factors of production.

Now, in the market for the factors of production the firms buy and the households sell. Now what do the firms buy? The factors of production. So, the firms are buying the labour of people who reside in the households, or the firms are buying the land or they are renting the land that is owned by different people. So, the firms are buying here and when the firms are buying, they will be spending the money that they have.

In this case the rupee is moving from the firms through this market of production into the households the. So, the firms are paying the wages, rent and profit. So, if there is labour that is being purchased. So, in exchange for labour the firms will be paying wages. If there is land that has been purchased or rented then the firms will be paying the rent. If there is capital that has been purchased then the firms will be paying for through their profits.

So, in this market for factors of production the firms are buying the factors of production and they are selling or they are paying for it through various rent or profit. On the other hand these factors of production are being made available through the households. So, the households are selling land, labor and capital and in exchange for it they are getting the income.

So, this is a circular flow diagram, because if you look at say the flow of money it moves from households through the market to the firms then through the second market back to the household. So, it completes a complete circle.

On the other hand, if you look at the flow of inputs and outputs, we will find that the inputs and outputs are going through this circle. In both the cases the circle is complete, and so this is the circular flow diagram of an economy.

Packet of milk: identify this transaction on the circular flow diagram. What is Hari in this case? Hari is a part of the household and Hari is paying a dairy for the packet of milk. Dairy is producing and selling this packet of milk. So, the entity that produces and sells goods and services is the firm and the entity that buys these goods and services is the household.

In this example the dairy is the firm and Hari is the household and Hari is paying 60 rupees for this packet of milk. The first thing to understand is whether this is the market for goods and services or whether this is the market for the factors of production. Now, the answer is, in this

market the firm is selling things to the household, and so when the firm is selling things to the household it is the market for goods and services.

In this market for goods and services Hari who belongs to the household is spending 60 rupees in this market and the firm which is the dairy is getting a revenue of 60 rupees. And if you look at the flow of inputs and outputs the firm is selling the goods and the goods in this case which is a packet of milk and the household which is Hari is buying this good which is a packet of milk.

Now, where does Hari get this money from? So, Hari earns say 15000 rupees working as a waiter in a restaurant. Now identify this transaction on the circular flow diagram. In this case Hari is earning something, working as a waiter, which means that Hari is providing his labour.

So, he is selling his labour and in return for selling his labor he is getting 15000 rupees. And who is Hari selling this labour to? He is selling this labor to a restaurant. So, in this case the firm is the restaurant or the restaurant is the firm, because firms hire and use the factors of production.

In this case the restaurant is hiding the factor of production which is Hari and using Hari as a waiter. So, the restaurant is the firm, Hari is the household, because Hari is owning and selling the factor of production which in this case is his own labour. This interaction is occurring in the market for the factors of production where the firms buy and the household sell.

Now Hari is selling his labour to the firm, so the firm is procuring the factor of production which is labour. And the 15000 rupees that Hari gets is his income that is deriving from this market of four factors of production and this income is coming through these firms. So, the firms are paying this money in the form of wages.

So, the restaurant is paying wages and these wages become the income of Hari who is the household, a part of the household. So, this is the circular flow diagram.

Now, why is this a model? Why do we call it a model? Because this is a very simplified representation of the working of the economy. The economy is not this simple, because in the circular flow diagram we do not see the government anywhere. So, it does not consider the role of the government.

The government may be providing, maybe collecting taxes, the government may be providing subsidies, the government may be putting certain controls on these markets and on farms and households, but the circular flow diagram is neglecting all of these issues.

It is possible that out of this revenue there is a certain portion that is going to the government. When the households are spending, probably the government is taking the share. When the households are getting income probably there is an income tax that is being paid, but a circular flow diagram is neglecting all of these entry cases and is simplifying things and so this is a model. It also does not consider the role of international trade, because in this model we are considering that this economy only comprises these two entities: the firms and the households.

And we are not considering those goods and services that are being brought from outside. So, it neglects imports and exports.

Another model that we routinely make use of is the production possibilities frontier. Production possibilities frontier is a graph that shows the combinations of output that the economy can prove can possibly produce given the available factors of production and the available production technology.

So, is it a graph or a chart and what does it show? It shows the combination of output that the economy can possibly produce. So, it shows us what the combination of different outputs that the economy can produce, the constraint of the available factors of production and the available production technology. So, given the available factors of production and given the production technology of the time and phase, what are the different combinations of output that can be produced is shown by the production possibilities frontier.

Now, let us say that there is an economy and for simplicity's sake there are only two goods that can be produced with the technology and with the factors of production. The first good is say computers and the second good is cars. Now, we are simplifying things because we are saying that in this economy, we have only these two items that have been produced. There is no third item because we are trying to understand how the factors of production are allocated.

So we make the simplification that there are only two items. Then the second simplification is that any factor of production can be used in making either of these goods. So, for instance if there is a worker, we can use that worker to produce computers or we can use that worker to produce cars. Now, this again is a big simplification, because in a number of cases the workers who are trained to make computers might not be that trained in making cars, but then this is a simplification that we are using.

Similarly, a number of items that are used in the manufacturing of cars are very different from those that are used in making computers. So, for instance we use silicon in the IC chip that is there in the computers. Now silicon is hardly used in cars. But then when we are making this model of production possibilities frontier, we are saying that any factor of production can be used in making either of these two goods.

Now, suppose the economy decides that we are only going to produce computers. In that case it produces zero cars and it produces 3000 computers. So, that is one production possibility. If you do not make any cars, if you put all your resources into making computers you will make 3000 computers. On the other hand if you put all the resources into making cars you will make say 1000 cars. So, this is the other extreme of this production possibility frontier.

Now, if you spend say 50 percent of your factors of production into making computers and 50 percent into making cars then there will be some other point. If you spend say 10 percent and 90 percent there will be some other point. So, all the points that represent what all things can be manufactured are shown by this line. So, a point such as this will tell us that the economy is currently producing 700 cars and 1200 computers.

Similarly, this point is also possible. All the points that are inside the curve to the left of the curve are also possible, but we say that these are inefficient use of resources, because the resources are not being put to complete use. So, for instance the economy might say that we will be producing say one computer and one car ; however, they could have even produced 700 cars and 1200 computers, but in place of producing 700 and 1200 items they are only producing one. So, that is possible, but that is inefficient.

So, the production possibility frontier tells us the most efficient production of two different goods that the economy can make. Any points that are to the right of this curve are an impossible combination, because the resources and technology are not available to make so many goods or

services. So, this is a simplified model that we refer to as the production possibilities frontier.

Now, such a model helps us understand the principles of economies, because here what we are emphasizing is that the society is facing a tradeoff, what is that trade off? The society wants more cars and more computers, but there is a limit and so the society can either have more computers or it can have more cars. So, it will have to make a tradeoff between computers and cars. The second thing is that tradeoffs are leading to cost and cost is what you give up to get something.

So, in this case you are giving up 3000 computers to make 1000 cars. So, the cost of 1000 cars is 3000 computers or the cost of 3000 computers is 1000 cars. So, this is the cost. So, this model is helping us understand concepts such as tradeoffs and concepts such as cost.

The cost in this case is the opportunity cost. If the society wants more computers it will get less number of cars, and when the society chooses to make only computers the best workers for car production are also used in making computers. But they may not be that good in producing computers, because they are not trained in producing computers which produce the bow shape curve. Putting these workers into car production will not only greatly impact the number of computers produced, but will also greatly increase the number of cars produced.

What we are saying here is that specialization is also being depicted on this curve, because of this shape. Now, in place of producing 3000 computers suppose you could suppose the society produced say 2900 computers. So, we will get a curve like this and the point where this line cuts this curve is this.

So, what we are seeing here is that just by reducing 100 computers we are getting say close to 200 cars why? Because when we are leaving out certain workers from computers into making cars, in a number of cases they will be those workers who are more capable and willing to produce cars, and so we are seeing an effect of specialization.

If the society decides to make only one thing then even those people who are not that specialized to make that item will be used in the manufacturing of that item which will not be the most efficient utilization of resources. So, we are seeing an inefficient utilization of resources when society chooses to make only computers or only cars. So, this is another concept that we are observing through this curve.

Now why is this a model? Because this is a simplified representation of the working of the economy. Almost no economy is there that only produces two goods. Most of the economics produce hundreds of thousands or millions of goods, but then to understand the role of allocation of resources or to understand the opportunity cost or to understand specialization, we have looked at an economic economy that makes only two items.

Similarly, not all factors of production can be equally deployed in making of these two items, but then this is another simplification that we have made, but these simplifications permit an easy grasp of economic ideas of scarcity, efficiency, trade off, opportunity cost and economic growth.

How economic growth? Suppose there is the availability of better technology, and so the economy in place of making 3000 computers can now make 4000 computers.

Now, remember that when we started with the production possibility frontier, we said that given the available factors of production and the available production technology. So, this is an

assumption in this model. What happens when we break these assumptions? If we say that we make more people available or we say that we make available better technology. So, in that case the total amount of computers that can be produced now will increase from 3000 to 4000.

Now, when this happens, the curve the production possibility frontier shifts from here to this red line. When that happens now if you look at these two points, earlier the society could have 700 cars and 1200 computers, but now this point is also possible that the society can have 750 750 cars that is more number of cars and 1400 computers that is more number of computers.

Now the economy: this society can have more computers and more cars even though the technology has only increased the number of computers that can be made. Now, this is an example of economic growth. Now in the economic growth more and more people can have access to more and more items. So, in place of this point 700 and 1200 now we have 750 and 1400. This is an example of economic growth.

We can understand economic growth by looking at this production possibility frontier. Next, let us have a look at the economic analysis. Now economics does analysis at two different levels; the first is the level of microeconomics. Microeconomics is the study of how households and firms make decisions and how they interact in the markets. So, in the case of microeconomic analysis we will concentrate on a single firm or we will concentrate on say a single household and we will concentrate on a market in which these are interacting.

In macroeconomics we look at the impacts of all of these different combinations by all the households and all the firms in all the markets. So, macroeconomic phenomena, including inflation, unemployment and economic growth. So, in microeconomics we are looking at things at a micro level at a small level. So, we are asking the question: how do you decide, or how do I decide whether to buy item one or item two? Or how does a firm decide whether to produce item one or produce item two and how much amount to produce? So, questions such as these are asked in the field of microeconomics.

So, it concentrates on either one household or say a firm or on a market. Macroeconomics looks at things from a wider level and it looks at the impact of the interactions and the activities of all the households, all the firms and all the markets in the economy. And so in that case we can understand concepts such as inflation, unemployment, economic growth and so on. Another aspect of analysis is that economics can make use of positive analysis or it can make use of normative analysis.

Now positive analysis is an analysis that claims that the attempt to describe the world is as it is as a scientist; such as minimum wage legislations increase unemployment. So, in this case we are not saying whether this should be done or that should be done. We are just giving things as a matter of fact that in this case minimum wage legislation increases unemployment. This is the fact that we are putting up, so this is a positive analysis. A normative analysis claims to attempt to prescribe how the world should be as a policy advisor.

If I say the same sentence and if I put it as minimum wage legislations should be removed when I am talking about a normative analysis. Because I am talking about the way things should be, it should be removed. Now, all that being said there are certain field realities also that we need to be aware of. Economic advice is not always followed, sometimes other considerations such as

votes or private profits or lethargy may hold sway.

If there is an economic analysis that says that minimum wage legislations should be removed, it does not mean that the minimum wage legislations will be removed, because you also have to look at other factors; such as politics or the level of society of that area and so on. The second thing is that the economists themselves disagree a lot why? Because of differences in which scientific theory to follow, differences in their value judgments. Example whether to choose efficiency or equality because in a number of cases the economists themselves are doing a normative analysis.

For instance a person who puts much faith in increasing efficiency might say that minimum wage legislation should be removed. On the other hand another economist who emphasizes on the level of or or on the quality of life of these labourers might say no; minimum wage legislations are extremely important otherwise these people might get exploited.

Now, both of these economists are correct in their own opinions. They are correct in their own places, but they have a difference in the value judgments, whether they are trying to emphasize the efficiency of the economy or whether they are trying to emphasize the level of equality that is there in the society.

So, these are certain reasons because of which the economist might themselves disagree. So, you have to take everything with a pinch of salt. So, in this lecture we had a look at how an economist thinks, what are the different kinds of models, what are the different kinds of analysis that we make use of, certain terms that belong to the screen and so on.

That is all for today. Thank you for your attention. Jai Hind!